

PROJECT MANUAL

INCLUDING SPECIFICATIONS FOR THE CONSTRUCTION OF

MATERIALS RECOVERY FACILITY RETROFIT

MECKLENBURG COUNTY

CHARLOTTE, NORTH CAROLINA



Prepared by

FMK ARCHITECTS

Date of Issue:
October 09, 2024

These plans and specifications are to be provided only as a full and complete set of documents and can be obtained **digitally** at **no cost** from the County as indicated in the Notice-to-Bidders.

If a contractor obtains a set of Contract Documents (plans and specifications) from any source other than the County, it will be that contractor's responsibility to obtain any addenda. If a contractor bids any portion of these plans without receiving the full and complete set of plans and specifications, they will do so at their own risk. If such bid is accepted by the County, the Contractor is liable for all work as described in the Plans, Specifications, and Addenda.

Sealed proposals will be received until **2:00PM, on November 7, 2024 at the first floor reception desk in the lobby of the office of the Mecklenburg County Land Use and Environmental Services Agency (LUESA) Department, 2145 Suttle Avenue, Charlotte, NC 28208**, for the construction of the **Materials Recovery Facility Retrofit**, at which time and place Bids will be opened and read aloud. Single-prime, lump sum bids will be taken for construction as indicated in the bidding documents. Proposals must be made on standard forms furnished by the County. The project is located at **1007 Amble Drive, Charlotte, North Carolina 28206**.

The Contractor can obtain the Bid Documents digitally at no cost by emailing the Architect, FMK Architects, at **ndixon@fmkarchitects.com**.

Plans and Specifications may be reviewed through the Mecklenburg County Business Diversity & Inclusion (BDI) Program.

Bid, Performance, and Payment & Material bonds shall be required for this project.

The laws of North Carolina and applicable regulations of various Licensing Boards and MWBE provisions will be observed in receiving bids and awarding contracts.

A pre-bid meeting shall be held at **10:30AM on October 16, 2024, at 1007 Amble Drive, Charlotte, NC 28206**. All interested contractors and sub-contractors are strongly encouraged to attend. This will provide an opportunity to review the existing conditions of the work area.

All questions regarding the documents and bidding shall be submitted in writing via email to the Architect, Neil Dixon, AIA at **ndixon@fmkarchitects** and Mecklenburg County LUESA at **SolidWasteProjects@MeckNC.gov** no later than **5:00PM on October 24, 2024**. Answers shall be provided by **5:00PM on October 30, 2024**.

Additional site visits can be made by appointment only prior to the question cutoff date above. Submit such requests via email at **SolidWasteProjects@MeckNC.gov**.

Mecklenburg County reserves the right to reject any or all proposals and to waive informalities or technicalities, as it may deem to be in its best interest.

Upon request, this information will be made available in an alternative format for persons with disabilities. Please email **SolidWasteProjects@MeckNC.gov** for assistance.

*A true copy of this notice was published on the **North Carolina Interactive Purchasing System (IPS)** website:
<https://www.ips.state.nc.us/IPS/Default.aspx>*

- 1. FAMILIARITY WITH WORK AND CONDITIONS:** Before preparing Bids, Bidders are urged to visit the site to inform and familiarize themselves with all conditions involved and under which the project is to be constructed or apparatus erected or installed. The Owner will not be responsible to the Contractor for payments other than as set out in the Construction Contract should construction conditions be different from those assumed or contemplated by the Contractor. The Contractor is required to satisfy himself, before bidding, as to the correctness of the site as indicated by the Contract Documents.
- 2. FAMILIARITY WITH LAWS, ETC.:** The Bidder shall be familiar with all Federal, State and Local Laws, ordinance and regulations, which may in any manner affect those engaged or employed in Work, or the materials or equipment in or upon the Work, or in any way affect the conduct of the Work, and no pleas of misunderstanding will be considered on account of the ignorance thereof. If the Bidder or Contractor shall discover any provisions in the plans, specifications or Construction Contract (hereinafter sometimes referred to as "Contract") which are contrary to or inconsistent with any such law, ordinance, or regulation, he shall immediately report it to the Consultant in writing before the bid opening.

- 3. INTERPRETATIONS OF PLANS AND SPECIFICATIONS:** If any prospective Bidder is in doubt as to the true meaning of any part of the Contract Documents, he shall submit to the Consultant no later than seven (7) calendar days prior to the bid opening, a written request for an interpretation thereof.

Any interpretation of the proposed documents will be made only by Addenda to the Contract Documents, which will be sent to all persons to whom Contract Documents have been issued. Interpretations, corrections and changes in Contract Documents made in any other manner will not be binding.

All such addenda shall become part of the Contract Documents. The Consultant and the Owner will not be responsible for any other explanations or interpretations.

The Bid Proposal shall be based upon the materials and equipment described in the Contract Documents or on substitutions that have been approved for use on this project. The proposal shall include any fees associated with the Mecklenburg County permits & plan review and City of Charlotte plan review & permits.

- 4. INSURANCE, PERFORMANCE & PAYMENT AND MATERIAL BONDS:** See the General Conditions for Insurance, Performance & Payment and Material Bond requirements.
- 5. PROPOSAL FORM:** All forms included in the bidding documents shall be completed in ink or be typewritten. Both words and figures shall be indicated on the bid proposal form. If there is a discrepancy between the wording and the figures, the wording shall govern. With each bid, the Contractor shall include:

- Certification of Non-Discrimination in Employment,
- Contractor E-Verify Declaration
- Certification of Compliance with Americans with Disabilities Act,
- Bidder's Qualification And Affidavit,
- Bid Bond,

- BDI Form A – Listing of Good Faith Efforts (GFE),
- BDI Form B – Identification of Subcontractor Participation

If there are any omissions, lines left blank on the bid form, alterations, or qualifiers of the bid form; the bid proposal shall be deemed as non-responsive unless such omission, alteration or qualifier is waived by the Owner as an informality or technicality in the Owner's sole discretion. If an Alternate does not change the "Base Bid" then the Contractor shall enter "No Change" in the blank. A person that is legally authorized to bind the Contractor to a contract with the Owner shall sign the proposal. The signer of the bid proposal shall initial any corrections.

The Contractor shall bid the number of calendar days, unless indicated otherwise within the Contract Documents, required to complete the Work.

- 6. QUALIFICATIONS:** The Contractor shall include the Bidder's Qualifications And Affidavit Form with their bid. The Owner reserves the right to disqualify a bid if the bidder does not possess the minimum stipulated qualifications for the Work or has not provided the requested information
- 7. BID BOND OR BID DEPOSIT:** Each proposal must be accompanied by a Bid Bond executed by a corporate surety licensed under the laws of North Carolina to execute such bonds, conditioned that the surety will, upon demand forthwith make payment to the Owner if the bidder fails to execute the Contract. The Bid Bond shall be in the amount of five (5%) percent of the total bid plus all of the alternates. The Bid Bond shall be valid for a minimum of one hundred and twenty (120) calendar days. In lieu of a Bid Bond, a deposit equal to five (5%) percent of the total bid plus all of the alternates in the form of a Cashier's Check or Certified Check on some bank or trust company insured by the Federal Deposit Insurance Corporation and payable to Mecklenburg County. The purpose of the Bid Deposit or Bid Bond is to ensure that the bidder will enter into a Contract with the Owner with the terms stipulated in the Bid Proposal and the bidder guarantees that a Performance, Labor & Material Bond will be executed. If the Contractor fails to execute a Contract, the Bid Bond or Bid Deposit shall be seized. Bid security shall be submitted separately for each project and bid.
- 8. DIRECTING PROPOSALS:** Each proposal must be complete and independent including bid proposal forms, bid security, etc. No verbal or electronic bids will be accepted. Each proposal must be submitted in (2) opaque adhesively sealed envelopes, to conceal its contents as follows:
 - a. Inner Envelope shall contain all bidding documents indicated in Item-5 of Instructions to Bidders with the exception of the Bid Bond. The name of the Bidder, their address and license number shall be marked on the outside of the Inner Envelope.
 - b. Outer Envelope shall contain the sealed Inner Envelope and the Bid Bond. The Project Name and Bid Date shall be marked on the outside of the sealed Outer Envelope as well as the address for submission as indicated in the "Notice to Bidders".
- 9. OPENING OF PROPOSALS:** Properly submitted bids will be opened publicly and read promptly at the time, date, and place set forth in the "Notice to Bidders". Bidders or their authorized agents and other interested parties are invited to be present.
- 10. BID ERROR:** After the bid opening, if the low bidder finds he has made an error that is clerical in nature and he can support his claim with evidence as defined by law he may request to withdraw the bid. This written request shall be submitted within a period of 72 business hours after the opening of bids. Following such event, if the Owner approves the bid withdrawal request in accordance with North Carolina law, action on the remaining bids shall be as if the withdrawn bid had not been received. The

Contract shall be awarded to the next responsible, responsive low bidder.

11. BID VALIDITY: The Bid Proposal shall be deemed valid for a period of one hundred and twenty (120) calendar days after the opening thereof, for purposes of execution of the Contract.

12. AWARDING OF CONTRACT: The Owner will award a Contract conditioned on the availability of funds. The Owner shall have the right to accept Alternates in any order or combination. The Owner shall award the Contract to the lowest responsible, responsive bidder taking into considerations quality, performance, and the time specified in the Bid Proposal for the performance of the Contract. The Owner reserves the right to negotiate with the apparent lowest responsible, responsive bidder to reduce the scope of the Work to be within budget. The Owner also reserves the right to reject any or all proposals and to waive informalities or technicalities. After the project has been awarded to the Contractor by the Owner, the Owner shall prepare a Contract for the Contractor to execute. Notice to Proceed shall be issued after all parties have executed the Contract.

13. EXECUTION OF CONTRACT: The successful bidder shall execute the Contract within ten (10) calendar days of receipt of the Contract. Failure to execute the Contract can result in the forfeit of the Bid Bond or Bid Deposit.

14. NON-DISCRIMINATION: The County is committed to promoting equal opportunities for all and to eliminating prohibited discrimination in all forms. For purposes of this section, prohibited discrimination means discrimination against Contractor's employees providing services on County premises or in the solicitation, selection, and / or treatment of any subcontractor, vendor, or supplier providing services in connection with this Agreement which actions are illegal under either state or federal law. As a condition of entering into the Agreement, the Contractor represents, warrants and agrees that it does not and will not engage in or condone prohibited discrimination with respect to any Contractor employees assigned to work on behalf of County and that prior to being deployed to a County assignment or premises, employees and subcontractors will review and agree to abide by the County's Harassment Policy as to the assigned employees.

Bidders must submit with their initial bid a signed statement certifying compliance with requirements of this proposal regarding non-discriminatory employment practices.

15. MINORITY/WOMEN/SMALL BUSINESS ENTERPRISE OPPORTUNITY:

It is the policy of the Owner to provide minorities, women, and small business enterprises equal opportunity for participating in all aspects of the County's contracting and procurement programs, including but not limited to employment, construction development projects, materials/services contracts and/or lease agreements, consistent with the laws of the State of North Carolina. It is further the policy of The Owner to prohibit discrimination against any person or business in pursuit of these opportunities on the basis of race, color, national origin, religion, sex, age, handicap or veteran's status. It is further the policy of the Owner to conduct its contracting and procurement programs so as to prevent such discrimination and to resolve any and all claims of such discrimination.

16. AMERICANS WITH DISABILITIES ACT REQUIREMENTS: The Owner will comply with the Americans with Disabilities Act (ADA), which prohibits discrimination on the basis of a disability. The Owner will make reasonable accommodations in all programs to enable participation by an individual with a disability who meets essential eligibility requirements. The Owner's programs will be available in the most integrated setting for each individual. If any accommodations are necessary for participation in any program or services, participants are encouraged to notify County Staff. Bidders must also submit a signed statement as provided herein, certifying compliance with the requirements of the Americans with Disabilities Act regarding non-discriminatory employment practices.

- 17. SUBSTITUTIONS:** All Requests for approval of substitutions for specified products will be considered only upon submission of samples and manufacturers' data, in triplicate, of the product intended for substitution. The Consultant, no later than ten (10) calendar days prior to the bid opening, must receive all written requests for proposed substitutions for consideration. If the Consultant accepts any proposed substitutions, such acceptance will be set forth in an addendum.

END OF INSTRUCTIONS TO BIDDERS

ARTICLE 1 – GENERAL PROVISIONS

- 1.1 CAPITALIZATION:** Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs, and Clauses in the Documents or (3) the titles of Documents published by the American Institute of Architects.
- 1.2 INTENT OF THE CONTRACT DOCUMENTS:** The Contractor shall use all the Contract Documents in this project, because they are complimentary. The requirements of one of the Documents shall be as binding as if required by all. Performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as an instrument to produce the indicated results.
- 1.3 INTERPRETATION:** In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an”, but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.
- 1.4 GOVERNING LAW:** The Contract and Contractor shall be governed by the laws of North Carolina and the Federal Government.
- 1.5 USE OF SITE, CONSTRUCTION PROCEDURES AND SAFETY:** The Contractor shall confine construction operations to the limits of construction as indicated in the Contract Documents. The Contractor shall provide the Owner, Consultant, independent testing laboratories, and governmental agencies with jurisdictional interests access to the site and the Work at reasonable times for their observation, inspections and testing. The Contractor shall provide them proper and safe conditions for such access and advise them of the Contractor’s site safety procedures and programs so that they may comply.
- 1.6 SUCCESSORS AND ASSIGNS:** The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Construction Contract Documents. Neither party to the Contract shall assign the Construction Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

Any Monies paid to the Contractor by the County cannot be assigned to any project other than this project.

- 1.7 CONTRACT DOCUMENTS:** The specifications shall govern in the case of discrepancy between the specifications and the drawings. In all cases, the figured dimensions shall govern in the case of discrepancy. Detailed drawings shall govern in the case of discrepancy between the general drawings and detailed drawings.

The organization of the Construction Documents has no intent to define or limit the scope of the Work performed by any trade, subcontractor, or supplier. Unless otherwise defined in the Contract Documents, words used will have the well-known technical or construction industry meanings.

In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

- A. The form of Construction Contract.
- B. Addenda, with those of later date having precedence over those of earlier date.
- C. The Supplementary Conditions.
- D. The General Conditions.
- E. Drawings and Specifications. Full-size or large-scale details or drawings shall govern small-scale drawings which they are intended to amplify. Details or conditions indicated for a portion of the Work but not repeated fully for other portions shall apply throughout to all similar portions except as otherwise specifically noted. In the case of an inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Consultant's interpretation.

- 1.8 RIGHTS AND REMEDIES:** Duties and obligations imposed by the Construction Contract and Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

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

- 1.9 TESTS AND INSPECTIONS:** Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. The Owner shall hire a Testing Firm for tests, inspections and approvals. The Contractor shall give the Testing Firm and Consultant timely notice of when and where tests and inspections are to be made so that they may be present for such procedures. The Consultant shall define

the nature of all testing criteria for testing contract proposes.

If such procedures for testing, inspection or approval reveals failure of the portions of the Work to comply with requirements established by the Contract Documents, laws, ordinances, rules or regulations. All necessary cost for re-testing, additional Consultant's fee, repair of the Work shall be paid by the contractor.

The Testing Firm shall distribute the certification of tests, inspections, or approvals to the Owner, Contractor, and Consultant.

1.10 SUBSTANTIAL COMPLETION: When the Contractor considers that the Work, or a portion thereof which the Owner and the Consultant agrees to accept separately, is substantially complete, the Contractor shall consult with the Owner, through the Consultant, to obtain preliminary verification that the Work is ready for its intended use. Once the Owner has stated its agreement the Contractor shall schedule a Substantial Completion walkthrough and notify the Owner, through the Consultant, a minimum of ten (10) days prior to the Substantial Completion meeting. After the Substantial Completion, the Contractor shall prepare and submit to the Consultant a comprehensive list of items to be completed or corrected prior to Final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Upon receipt of the Contractor's list, the Consultant will make an inspection to determine if the Work, or designed portion thereof, is substantially complete. If the Consultant's inspection disclose any items, whether or not included on the Contractor's list, which are not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Consultant. In such case, the Contractor shall then submit a request for another inspection by the Consultant to determine Substantial Completion.

When the Work or designated portion thereof is substantially completed, the Consultant will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designed portion thereof unless otherwise provided in the Certificate of Substantial Completion.

The Certificate of Substantial Completion shall be submitted to the Owner and the

Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

The Owner shall allow the Contractor reasonable access to complete or correct the list of items to be completed or corrected prior to Final payment.

1.11 PARTIAL OCCUPANCY OR USE: The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Consultant as described above. The Consultant shall determine the stage of the progress of the Work.

Immediately prior to such partial occupancy or use, the Owner, Contractor and Consultant 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.

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

1.12 PROGRESS PAYMENTS:

- A. After the Consultant has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents.
- B. The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to its Sub-contractors in similar manner.
- C. The Consultant will, on request, furnish to a Subcontractor, if practicable, information regarding percentage of completion or amounts applied for by the Contractor.

- D. Neither the Owner nor the Consultant shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.
- E. Payment to material suppliers shall be treated in a manner similar to that provided in Article 3 and 4 in this section.
- F. The Contractor shall not be paid anticipated profit(s), or revenue, or other economic loss arising out of a result of the Contract being terminated for any cause or the reduction of the Work.
- G. The Owner shall pay a payment request within forty-five days (45) of receipt of an acceptable and correct payment request from the Consultant. The Contractor shall submit partial payment requests once a month. See Payment Procedures, in section 01 29 00.
- H. Provide a separate line item in the Schedule of Values for close out documentation as set forth in the Supplementary Conditions.
- I. Upon completion of the Work, the Consultant shall proceed with due diligence to measure up the Work and material and present his Final estimate to the County, whereupon the County shall pay or cause to be paid within forty five (45) days thereafter such amount, less payments previously made, in legal tender of the United States, and such payments of such Final Amount shall release the County from all claims for Work done or materials furnished under this Contract.

1.13 FINAL COMPLETION AND FINAL PAYMENT: Upon receipt of written notice that the Work is ready for Final inspection and acceptance and upon receipt of a Final Certificate for Payment, the Consultant will make an inspection and, when the Consultant finds the Work acceptable under the Contract Documents, has received all close out Documentation, and determines the Contract is fully performed, the Consultant will certify the Final Certificate for Payment. The Consultant's Final Certificate for Payment will constitute a further representation that the comprehensive list of items to be completed or corrected prior to Final payment has been reviewed and all items have been satisfactorily resolved as precedent to the Contractor's being entitled to Final payment have been fulfilled. See Payment Procedures, in section 01 29 00.

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

- A. Claims, security interests or encumbrances arising out of the Contract and unsettled;
- B. Failure of the Work to comply with the requirements of the Contract Documents; or
- C. Terms of special warranties required by the Contract Documents.

Acceptance of Final payment by the Contractor, or a Subcontractor or material supplier

shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of Final Certificate for Payment.

1.14 TERMINATION BY THE OWNER FOR CAUSE

- A. The Owner may terminate the Contract if the Contractor:
1. Persistently or repeatedly refuses or fails to supply appropriate properly skilled workers, or appropriate equipment and materials:
 2. Fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors:
 3. Persistently disregards laws, ordinances, or rules, or regulations or orders of a public authority having jurisdiction:
 4. Otherwise is guilty of substantial breach of provision of the Contract Documents.
 5. Abandons the Work for 20 days without consent from the Consultant.
- B. When any of the above reasons exist, the Owner, upon certifications by the Consultant that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety seven (7) days written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:
1. Take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor:
 2. Accept assignment of subcontracts after termination of the Contract and only for those Subcontract agreements, which the Owner accepts by notifying the Subcontractor and Contractor in writing. Assignment is subject to the prior rights of the surety obligated under bond relating to the Contract.
 3. Finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

When the Owner terminates the Contract for one of the reasons stated above, the Contractor shall not be entitled to receive further payment until the Work is completed.

If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Consultant's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid

to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract.

The Contractor shall not be paid anticipated profit(s), or revenue, or other economic loss arising out of a result of the contract being terminated for any cause or the reduction of the Work.

1.15 SUSPENSION BY THE OWNER FOR CONVENIENCE

The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine. The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption and the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination. Adjustment of the Contract Sum shall not include anticipated profit. No adjustment shall be made to the extent:

- A. That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- B. That an equitable adjustment is made or denied under another provision of the Contract.

1.16 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

- A. Cease operations as directed by the Owner in the notice;
- B. Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- C. Except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

- 1.17 HARASSMENT:** Mecklenburg County is strongly committed to maintaining a workplace and service environment free of harassment and discrimination towards its employees, customers, contractors, and other service providers.

Harassment on the job site by the Contractors or Subcontractors toward another individual (this also includes the general public) because of sex, race, religion, age, national origin, or physical/mental challenge shall not be tolerated. Such behavior is illegal under Title VII of the Civil Rights Act and will be treated as an offense.

Definition – Harassment is verbal or physical conduct that denigrates or shows hostility or aversion toward an individual because of race, color, religion, gender, national origin, age, disability, or political affiliation, which has the purpose or effect of creating an intimidating, hostile, or offensive environment or interferes with an individual's work performance or otherwise adversely affects an individual. Sexual harassment also includes unwelcome behavior such as gestures, comments, suggestions, jokes or derogatory pictures, cartoons or drawings, unwanted sexual advances (ie. including but not limited to whistling, yelling, "cat-calling", etc.), and pressure for sexual favors.

Any person who is aware of any instance of harassment as defined above shall report the alleged act immediately to his or her supervisor or the County's project manager. The County's project manager will contact the Contractor's project manager.

- A. The person(s) that have allegedly harassed someone shall be removed from the construction project site for the number of days required to investigate the alleged harassment.
- B. If the person(s) having allegedly harassed someone enters the project site or has any contact with those person(s) reporting the alleged harassment during the investigation, that person shall be removed from the site immediately, and a restraining order shall be served. Violation of the restraining order is subject to the legal terms of the order.
- C. The County's project manager shall notify Mecklenburg County's legal department and they will conduct the investigation. The Contractors and Subcontractors shall cooperate fully and completely with the legal department.
- D. All complaints will be investigated promptly, impartially, and discreetly and, upon completion of the investigation, the appropriate parties will be notified immediately of the findings. Any employee(s) of the Contractor or Subcontractor or Mecklenburg County who have been found to harass anyone will be subject to appropriate corrective action as deemed by the law.

- 1.18 EQUAL:** For any equipment or product to be considered an equal, it shall perform equal to or better than the performance specifications of the product that is listed. This may

also include the weight of the equipment or product. If there are any modifications required to use the "Equal", the cost of such modifications shall be borne by the Contractor. The "Allowance or Contingency" shall not be used for the purpose of modifying the "Work" to be able to use the proposed equipment or product".

- 1.19 BASIS OF DESIGN:** If a model and manufacturer is listed as the basis for a design, it does not preclude any other manufacturer from being able to furnish said equipment or product. Also, it does not exclude manufactures from designing/manufacturing the equipment or product to meet the requirements. For the equipment or product submitted to be considered an "Equal or Substitution", it shall meet the requirements of being an "Equal". The design/manufacturing of said equipment or product will not increase the Owner's cost for the "Work".

ARTICLE 2 – OWNER’S RIGHTS AND RESPONSIBILITIES

- 2.1 COMMUNICATION TO THE CONTRACTOR:** All notices to the Contractor shall be in writing and shall be signed by an authorized representative of the Owner. Such notices can be delivered in person to the official representative of the Contractor or mailed to the Contractor's official address. Such delivery in person or by mail shall constitute service of the notice.
- 2.2 APPLICATION FOR PAYMENT:** The Owner shall make payment to the Contractor as indicated in Division I - General Requirements of the Technical Specifications entitled Payment Procedures. If any Application for Payment is not correct, it will be returned to the Contractor for correction and resubmission.
- 2.3 STAFF AUTHORIZATION:** The Owner through the Consultant shall have the right of approval of the Contractor’s superintendent and project manager. If at any time, the Owner or the Consultant deems either the Contractor’s superintendent or project manager is performing unsatisfactory, the Owner may request that he or they be replaced to the satisfaction of the Owner.

Within ten (10) calendar days after the Contract is awarded, the Contractor shall furnish in writing, to the Consultant, a list of all Subcontractors. The Consultant will promptly reply to the Contractor in writing stating whether or not the Owner or the Consultant, after due investigation, has reasonable objection to any such proposed Subcontractor(s).

- 2.4 CONSTRUCTION BY THE OWNER OR BY SEPARATE CONTRACTOR(S):** The Owner reserves the right to perform Construction with his own forces or to award separate Contract(s) for the following conditions:
- A. When the Contract Documents indicates a portion of the work shall be performed by the Owner’s own forces or be performed by another separate contractor.
 - B. The Contractor does not correct work as indicated in “Stop Work Order”.
 - C. Failure of the Contractor to adequately correct the Work or complete the Work on approved schedule as determined to be adequate by the Consultant.
 - D. Termination of the Contractor.

The Owner shall provide for coordination/supervision of the activities of the Owner’s own forces and of each separate Contractor(s) with the Work of the Contractor. All contractors and the Owner’s forces shall cooperate with each other, the Consultant, and the Owner. The Contractor shall participate with other separate Contractor(s) and the Owner in reviewing their construction schedule when directed to do so by the Consultant. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement of the Contractor, separate Contractor(s), the

Consultant, and the Owner. The new construction schedule shall then constitute the schedule to be used by the Contractor, separate Contractor(s), and the Owner until a subsequent revision is made.

- 2.5 MUTUAL RESPONSIBILITY:** The Contractor shall afford the Owner and separate Contractor(s) reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and coordinate the Contractor's construction and operations with the Separate contractor'(s) operations as required by the Contract Documents.

If part of the Contractor's Work depends on the proper execution or results by construction or operations by the Owner or a separate Contractor(s), the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Consultant any apparent discrepancies or defects in the Work that would render it unsuitable for proper execution and results. Failure of the Contractor to report shall constitute an acknowledgment that the Owner's forces or Separate contractor'(s) completed or partially completed work is fit and proper to receive the Contractor's Work, except as to defects not reasonably discoverable.

Damages to the Contractor, or separate Contractor(s), or Owner caused by delays or improperly timed activities or defective construction shall be borne by the party responsible for the damages.

- 2.6 OWNER'S RIGHT TO CLEAN UP:** If a dispute arises among the Contractor, separate Contractor(s) and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in the Contract Documents, the Owner may clean up and allocate the cost among the responsible parties as determined by the Consultant to be just.

- 2.7 OWNER'S RIGHT TO CONTRACT MODIFICATIONS:** Contractors should note that Owner retains the exclusive right to modify the Contract and Scope of Work for budgetary or other reasons.

- 2.8 STOP WORK:** The Consultant, after concurrence with and on behalf of the Owner, may issue a "Stop Work Order" for the project or portions thereof when the Contractor fails to correct any Work that is deemed not to be in accordance with the Contract Documents. If the Contractor fails to correct said deficiencies within seven (7) days, upon the direction from the Consultant, the Owner shall issue to the Contractor a construction change order or change directive to correct the deficiencies and deduct all costs (including the Owner's expenses, Consultant's fees, legal costs, and any other associated costs) from any future payments to the Contractor. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

The Owner may occupy or use any completed portion of the Work as designated by the Contract Documents. Occupying any portion of the Work shall occur after the Consultant has issued a Certificate of Substantial Completion and the Code Enforcement Agency has issued a Temporary Certificate of Occupancy (TCO).

The Owner shall have the right to terminate the Contractor's Contract in accordance with the Construction Contract.

ARTICLE 3 – ADMINISTRATION OF THE CONTRACT

- 3.1 REPRESENTATION:** The Consultant shall be the Owner's representative during construction, and during the warranty period after Substantial Completion. The Consultant will have authority to act on behalf of the Owner to the extent provided in the Contract Documents unless otherwise modified by written instrument.
- 3.2 COMMUNICATIONS:** The Owner shall communicate to the Contractor through the Consultant about matters arising out of or relating to the execution of the Work and Contract. The Consultant shall not communicate with the Contractor's Subcontractors and suppliers unless the Contractor grants consent. The Consultant shall be responsible for scheduling, managing, facilitating, and conducting the construction meetings.
- 3.3 EVALUATION OF WORK:** The Consultant shall evaluate the executed Work, the schedules, the amounts of Work completed, and substantial and final completion of the Work. The Consultant will review the Contractor's Applications for Payment, certify the amount due the Contractor, and forward to the Owner for execution.
- 3.4 INTERPRETATION OF CONTRACT DOCUMENTS:** The Consultant shall render an interpretation of the requirements of the Contract Documents. Interpretations and decisions made by the Consultant shall be consistent with the Contract Documents or reasonably inferable from them as an instrument to produce the indicated results. The Owner or the Contractor may make written request to the Consultant concerning such interpretations. The Consultant's decisions concerning the interpretations and aesthetic effects of the Contract Documents will be final and consistent with the intent expressed in the Contract Documents.
- 3.5 SITE VISITS:** The Consultant will visit the project site at intervals appropriate to the stage of construction. The purpose of the visits will be:
- A. to observe and become familiar with the progress and quality of the Work, and render interpretations necessary for its execution;
 - B. to endeavor to guard the Owner against defects, insufficiencies, shortages omissions, and deficiencies in the Work;
 - C. to determine if the Work is in accordance with the Contract Documents and approved Contractor's submittals; and
 - D. to report to the Owner and Contractor concerning the mentioned purposes.
- 3.6 WORK ACCEPTANCE AND TESTS:** The Consultant shall have the authority to reject Work which does not conform to the Contract Documents and approved Contractor's submittals. When the Consultant considers it necessary or advisable for the

implementation of the intent of the Contract Documents, the Consultant will have authority to require additional inspections or testing of the Work whether or not such Work has been fabricated, installed or completed. However, neither the Consultant's authority to act nor any decision made by the Consultant in good faith either to exercise or not to exercise such authority, shall not release any duties or responsibilities of the Contractor and any Subcontractor(s) from performing any of the Work.

- 3.7 PROJECT MODIFICATIONS:** Refer to Section 01 25 00, of the Technical Specifications entitled Contract Modification Procedures for information and procedures related to change orders, construction change directives and minor changes to the work.

The Contractor, Owner, or Consultant may identify a need for modifications to the Contract Documents. Such modification may be accomplished by Change Orders, Construction Directives, or Minor Changes in the Work after the execution of the Contract. All modifications are subjected to the conditions of the Contract Documents.

Any modifications performed to the Work or Contract Documents without prior authorization by the Consultant shall not be considered for a Change Order.

The Contractor shall proceed with the modifications promptly, unless otherwise indicated in the Change Order, Construction Change Directive, or order for a minor change in the Work.

- 3.8 REVIEW OF SUBMITTALS:** The Consultant will review and approve or take appropriate action upon the Contractor's Submittals of samples, product data, shop drawings, and as requested in the Contract Documents. The approval of submittals by the Consultant is for the limited purpose of verifying conformance with the Contract Documents. Such action will be done in accordance with Section 01 33 00, Submittal Procedures, Paragraph 1.4. The Contractor shall review and approve submittals prior to presenting them to the Consultant for his review and approval. This review by the Contractor will be regarding dimensional accuracy, completeness, quantities, performance, and all characteristics that shall remain the sole responsibility of the Contractor. Review of Submittals by the Consultant shall not indicate approval of an assembly of which the item is a component. The Consultant shall be responsible for reviewing the Contractor's submittal log.

- 3.9 CERTIFICATES FOR PAYMENT:** The Consultant will, within seven (7) days after receipt of the Contractor's Application for payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Consultant determines is properly due, or notify the Contractor and Owner in writing of the Consultants reasons for withholding certification.

The issuance of a Certificate for Payment will constitute a representation by the Consultant to the Owner, based on the Consultant's observations at the site and the data

comprising the Application and Certification for Payment, that the work has progressed to the point indicated and that, to the best of the Consultant's knowledge, information, and belief, quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by the Consultant. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified.

The Consultant may decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Consultant's opinion the representations to the Owner cannot be made. If the Consultant is unable to certify payment in the amount of the Application, the Consultant will notify the Contractor and Owner. If the Contractor and Consultant cannot agree on a revised payment amount, the Consultant will promptly issue a Certificate for Payment for the amount for which the Consultant is able to make such representations to the Owner. The Consultant may also decide not to certify payment or, because of subsequent observations may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Consultant's opinion to protect the Owner from loss because of:

- A. Defective Work not remedied;
- B. Third party claims filed or reasonable evidence indicating probable filing of such claims;
- C. Failure of the Contractor to make payments properly to Subcontractors or for labor, materials, or equipment;
- D. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- E. Damage to the Owner or another contractor;
- F. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- G. Persistent failure to carry out the Work in accordance with the Contract Documents.
- H. Completed Work has been damaged, requiring correction or replacement;
- I. The Contract Price has been reduced by Written Change Order;

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

3.10 CLAIMS AND CONTRACT MEDIATION PROVISIONS:

CHANGES IN WORK; CLAIMS: No claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph.

Notice: Written notice stating the general nature of each claim shall be delivered by the claimant to the other party to the Contract promptly, but in no event later than thirty (30) calendar days after the start of the event giving rise to the claim.

The responsibility to substantiate a claim shall rest with the party making the claim. The amount or extent of the claim, with supporting data, shall be delivered to the other party to the Contract within fifteen (15) calendar days after the initial Notice of the Claim. Each claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to the claimant within thirty (30) calendar days after receipt of the claimant's last submittal.

The parties agree to make a good faith effort to resolve the claim or dispute prior to the time it must be submitted to the Consultant or to mediation as set forth in Section: DISPUTE RESOLUTION below.

DISPUTE RESOLUTION: Claims and Disputes arising under this Contract shall be subject to one of the following dispute resolution processes:

A. Claims and Disputes Not Subject to Mediation

The following claims and disputes, if validly submitted as provided in Section: CHANGES IN WORK; CLAIMS, are not subject to mediation, and are to be decided by the Consultant without mediation:

- 1) A claim or dispute seeking a non-monetary recovery; and
- 2) A claim or dispute seeking a monetary recovery of \$15,000 or less; and
- 3) A claim or dispute seeking the extension of any time limit shall be subject to mediation pursuant to the Contract Mediation Provisions only if the damages which would be suffered by the Party seeking the extension would exceed \$15,000. To the extent that liquidated damages are set forth in the Contract Documents and is the measurement of damages for failure by such Party(s) to meet the time limit, the liquidated damages shall be the exclusive standard for determining the amount of damages associated with such dispute.

CLAIMS NOT SUBJECT TO MEDIATION MUST BE SUBMITTED TO THE CONSULTANT FOR DECISION WITHIN SIXTY (60) DAYS AFTER THE START OF THE EVENT GIVING RISE TO THE CLAIM OR DISPUTE.

B. Claims and Disputes Subject to Mediation

Any other claim or dispute arising between or among the Parties listed herein that arises from the Project, including without limitation a breach of such Contract, shall be subject to non-binding mediation administered by the American Arbitration Association under its Construction Industry Mediation Rules, or to such other mediation process to which the parties may agree, except as otherwise expressly set forth in these Contract Mediation Provisions. To the extent any provision of the Construction Industry Mediation Rules is inconsistent with the provisions of these Contract Mediation Provisions, the provisions of the Contract Mediation Provisions shall control.

The Owner and any Party contracting with the Owner or with any first-tier or lower-tier subcontractor for the Project hereby agree to participate in good faith in any mediation of a claim or dispute subject to these Contract Mediation Provisions, including without limitation the following Parties: Consultant(s), architect(s), engineer(s), surveyor(s), prime contractor(s), surety(ies), subcontractor(s), and supplier(s).

The Contractor, and all other Parties, shall include these Contract Mediation Provisions in every agreement to which they are a Party for the Project, without variation or exception. Failure to do so will constitute a breach of the Construction Contract, and the Contractor or other Party failing to include these Contract Mediation Provisions in any agreement shall indemnify and hold harmless the remaining Parties from and against any and all claims, including without limitation reasonable attorney fees and other costs of litigation arising in any manner from such breach.

For purposes of these Contract Mediation Provisions, a claim or dispute is limited to the recovery of monetary damages from the same transaction or occurrence against a single Party or two or more Parties alleged to be jointly liable. Two or more claims or disputes may not be consolidated without the consent of all Parties to such disputes.

A request for mediation shall include the amount of the monetary relief requested.

A request for mediation must be made within ninety (90) days after giving notice of the claim or dispute as required by Section: CHANGES IN WORK; CLAIMS above.

Prior to requesting mediation, a Party must believe that it is entitled under applicable law to recover the monetary amount to be included in the request from one or more of the remaining Parties. Such belief must be based on a reasonable and prudent investigation

into the claim or dispute. The request for mediation must be based on such investigation and may not include any amount or the name of any remaining Party(s), unless supported by such investigation by the Party requesting the mediation.

If a Party does not perform a reasonable and prudent investigation, it shall indemnify and hold harmless all other Parties from any costs, including reasonable attorney fees and other costs of mediation, litigation, and damages incurred by such other Parties.

All expenses incurred by a Party in preparing and presenting any claim or defense, shall be paid by the Party preparing for mediation. Such expenses shall include, without limitation, any associated cost for witnesses, exhibits, and attorney fees. All other expenses, including filing fees and required traveling expenses by the mediator, and other expenses of the mediator, shall be borne as follows: (1) One half by the Party requesting the mediation, with the remaining parties paying equal shares of the remaining expenses and costs. (2) If the Owner is named as a party to the mediation, the Owner shall pay at least one-third of the mediation expenses and 2/3 of the expenses shall be divided among the remaining Parties. (3) If more than one Party to dispute requests mediation, the mediation expenses and costs to be divided among the Parties shall be borne equally by the Parties to the dispute; however, if the Owner is named as one of the parties to the mediation, the Owner shall pay at least one-third of the mediation expenses.

The mediation shall be held at a location agreeable to the mediator and all of the Parties. If no agreement can be reached, the mediation will be held at a location in Mecklenburg County as the mediator shall determine.

The provision of these Contract Mediation Provisions is subject to any other provisions of the Construction Contract concerning the submission, documentation and/or proof of any claim(s) or dispute(s).

C. Claims and Disputes Submitted to the Consultant

For purposes of this Contract, the "Consultant" shall be FMK Architects, P.A. Claims should be submitted to the Consultant at the following address:

**123 New Bern Street
Charlotte, NC 28203**

FINAL RESOLUTION OF DISPUTES: ANY VALIDLY SUBMITTED CLAIM OR DISPUTE UNRESOLVED AFTER SUCH MEDIATION, OR THAT DOES NOT REQUIRE MEDIATION, SHALL BE SUBMITTED TO THE CONSULTANT FOR FINAL RESOLUTION IN ACCORDANCE WITH THE FOLLOWING PROVISIONS:

CLAIMS NOT SUBJECT TO MEDIATION MUST BE SUBMITTED TO THE CONSULTANT FOR DECISION WITHIN SIXTY (60) DAYS AFTER THE START OF THE EVENT GIVING RISE TO THE CLAIM OR DISPUTE.

CLAIMS SUBJECT TO MEDIATION MUST BE SUBMITTED TO THE CONSULTANT WITHIN THIRTY (30) DAYS AFTER THE MEDIATION ENDS.

THE CONSULTANT WILL BE THE INTERPRETER OF THE REQUIREMENTS OF THIS CONTRACT AND THE JUDGE OF THE PERFORMANCE THEREUNDER BY THE OWNER AND CONTRACTOR.

IT IS AGREED BY AND BETWEEN THE PARTIES TO THIS CONTRACT THAT THE CONSULTANT SHALL RESOLVE ALL DISPUTES, INCLUDING, WITHOUT LIMITATION, DISPUTES INVOLVING (i) THE QUANTITY AND QUALITY OF THE SEVERAL KINDS OF WORK AND MATERIALS WHICH ARE TO BE PAID FOR UNDER THIS CONTRACT; (ii) THE APPORTIONMENT OF LIQUIDATED DAMAGES AMONG CONTRACTORS, INCLUDING THE CONTRACTOR; (iii) ALL QUESTIONS IN RELATION TO LINES, ELEVATIONS, AND DIMENSIONS OF THE WORK; AND (iv) THE PROPER INTERPRETATION OF THE PLANS AND SPECIFICATIONS.

IN MAKING ITS DECISION IN THESE MATTERS, THE CONSULTANT SHALL REQUIRE SUCH INFORMATION AND EVIDENCE, AS THE CONSULTANT, IN ITS SOLE DISCRETION, SHALL DEEM NECESSARY TO FULLY AND FAIRLY CONSIDER THE MATTER AND TO ALLOW IT TO RENDER A FULL, FAIR, AND IMPARTIAL DETERMINATION OF THE CLAIM OR DISPUTE SUBMITTED TO IT.

Consultant's Action: Consultant will review each claim or dispute and, within thirty (30) days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. Deny the claim in whole or in part; or
2. Approve the claim in whole or in part.

THE CONSULTANT'S DECISIONS UPON THESE CLAIMS AND DISPUTES SHALL BE FINAL AND BINDING UPON THE OWNER AND THE CONTRACTOR.

ARTICLE 4 – CONTRACTOR’S RESPONSIBILITIES

- 4.1 OBSERVANCE OF LAWS:** The Contractor shall observe and comply with all Federal, State, and Local laws, ordinances, regulations, and all such decrees as exist at present or may be enacted during construction, by bodies or tribunals having any jurisdiction or authority over the Work, in any manner affecting the conduct of the Work. No plea of misunderstanding will be considered on account of the Contractor’s ignorance thereof.
- 4.2 PERMITS AND LICENSES:** The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notice necessary and incident to the due and lawful prosecution of the Work.
- 4.3 WORK CONFORMANCE:** The Contractor shall perform the Work in accordance with the Contract Documents and approved submittals, shop drawings, product data, and samples. The Contractor shall furnish the Owner and Consultant every reasonable facility to ascertain that the Work is performed consistent with the requirements of the Contract Documents.

The Contractor shall carefully study the Contract Documents and field conditions and shall promptly report to the Consultant, in writing, any errors, inconsistencies, or omissions. If the Contractor performs any construction activity knowing it involves an identified error, inconsistency, or omission in the Contract Documents, the Contractor shall be responsible for such performance and shall bear all costs for any corrections with no Contract modifications. The Contractor shall obtain approval from the Consultant for such corrections.

- 4.4 SUPERVISION AND CONSTRUCTION PROCEDURES:** During the performance of the Contract, it shall be the responsibility of the Contractor to pursue the orderly progress of all Work stages throughout the project and to assure that all Work is completed within the time period bid by the Contractor, or stipulated herein as the Contract Time. The Contractor shall have sole responsibility and control of the work, including all means, methods, techniques, sequences, procedures, and coordination of the Work.

If the Contract Documents give specific instructions concerning site conditions, construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences, or procedures may not be safe, the Contractor shall give timely written notice, including recommendations for safer methods to accomplish the task to the Owner and Consultant and shall not proceed with that portion of the Work without further written instructions from the Consultant. If the Contractor is then instructed to proceed with the

required means, methods, techniques, sequences, or procedures without acceptance of recommendations proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage.

The Contractor shall employ a competent and qualified superintendent and necessary assistants, who shall be in attendance at the project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communication shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case. The Contractor shall keep a minimum of one (1) Superintendent on the job at all times, authorized to act for the Contractor and direct the work of all Subcontractors for the different phases of the work.

The General Contractor shall be the "Project Expeditor" and shall have the responsibility to coordinate, cooperate with, and obtain from the several Subcontractors on the job their respective schedules and to integrate them into a Construction Schedule.

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Consultant and the administration of the Contract; or by tests, inspections made by testing firms, or approvals required or performed by persons other than the Contractor.

The Contractor shall be responsible for inspection of portions of the Work performed under this Contract to determine that such portions are in proper condition to receive subsequent Work, and are in accordance with the Contract Documents.

- 4.5 CONTRACT TIME:** On projects less than \$500,000, the contract will not be required to be approved by the Board of County Commissioners. Therefore, it should take no more than 60 days after the bid opening to issue the Notice to Proceed. On projects over the \$500,000 threshold, the contract will be required to go to the BOCC; therefore, the Notice to Proceed would be expected 120 days after bid opening.

The Contract Time indicated within the Contract Documents shall begin on the date set forth in a Notice to Proceed from the Consultant to the Contractor and includes all weather and delivery delays.

The time limits stated in the Contract Documents are the essence of the Contract. By executing the Construction Contract, the Contractor confirms that the Contract Time is a reasonable amount of time for performing the Work. The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

If the Contractor is delayed at any time during the progress of the Work by an act of negligence by the Owner or Consultant, or a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes beyond the Contractor's control, which the Consultant determines may justify a delay, then the Contract Time shall be extended by a Change Order for such reasonable time as the Consultant may determine. Refer to Supplementary Conditions for additional information of Contract Time.

4.6 CONSTRUCTION SCHEDULES: The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner and Consultant's information, a construction schedule. The construction schedule shall be a detailed bar chart or Critical Path Method, for the Work to be performed. The schedule shall not exceed time limits current under the Contract Documents and shall include weather delays and delays due to delivery of the equipment. The schedule shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of Work.

The Contractor shall maintain the construction schedule, making monthly adjustments, updates, and corrections. The construction schedule shall be reviewed at each construction meeting.

The Contractor shall also prepare a schedule of submittals which shall be coordinated with the Contractor's construction schedule. The submittal schedule shall also be reviewed at each construction meeting and adjusted as necessary.

The following chart is the anticipated adverse weather delays for this project.

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
10	10	11	6	6	6	6	5	6	6	7	9

The construction schedule shall reflect the anticipated adverse weather delays.

National Oceanic and Atmospheric Administration (NOAA) data shall be used to claim addition construction days beyond the above chart for critical path activities.

Weather days occurring on holidays or Sundays will not be considered as delays significant to the Contract completion date. The request for a weather delay must be submitted to the Consultant in writing with supporting data within (20) days following the occurrence.

The Contractor shall allocate sufficient resources to meet the current construction schedule.

4.7 SAFETY PRECAUTIONS AND PROGRAMS: The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

4.8 SAFETY OF PERSONS AND PROPERTY: The Contractor shall take reasonable precautions for safety of and shall provide reasonable protection to prevent damage, injury or loss to:

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

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

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

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

The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in "Work Acceptance and Tests" caused in whole or in part by the Contractor, a Subcontractor, a Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible except damage or loss attributable to acts or omissions of the Owner or Consultant or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor.

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

the Owner and Consultant.

- 4.9 HAZARDOUS MATERIALS:** If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Consultant in writing.

The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Consultant, the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance.

The Contractor and the Consultant will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Consultant has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Consultant have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional cost of shut-down, delay, and start-up, which adjustments shall be accomplished as provided in Article 3.7 of the General Conditions.

The Owner, to the fullest extent permitted by law, shall indemnify and hold harmless the Contractor, Subcontractors, Consultants, Consultants Sub-consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area, if in fact the material or substance presents the risk of bodily injury or death, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself) and provided that such damage, loss, or expense is not due to the sole negligence of a party seeking indemnity. The Owner shall not be responsible for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents. The Contractor shall act at his own discretion to prevent damages, injury, or losses as part of the original Work.

If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred. These additional costs shall follow the procedures established for addition compensation and additional time extension to the Contract.

4.10 EMERGENCIES: In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss.

4.11 WARRANTY: The Contractor warrants to the Owner and Consultant that materials and equipment furnished under the Contract will be of good quality and new, unless otherwise required or permitted by other sections of the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Consultant, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. A one-year general warranty for the complete project shall start when the Contractor achieves Substantial Completion.

4.12 REPAIR OBLIGATION: If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of Work.

During the 12 (twelve) months after the project is totally completed (unless otherwise specified), if the Owner finds a situation that is creating a health hazard:

1. The Owner shall immediately notify the Contractor of the hazard.
2. The Owner shall relocate employees and the general public from the area of concern.
3. Within the first eight (8) hours of being notified, the Contractor shall investigate the condition and contract with any agency qualified to identify and assess the

work required to remediate the hazard.

4. The Contractor shall contain the hazard within twenty four (24) hours from being notified of the hazard.
5. Within three (3) calendar days or as quickly as a permit can be issued, the Contractor shall start abating the hazard.
6. Once the area is "Clean" the Contractor shall start reinstalling all of the components that were required to be removed for the abatement.
7. The Owner shall move employees back into the area once everything has been completed and a final permit has been issued.

If the Contractor fails to complete any of the tasks listed above in the time frame given, the Owner shall remediate the hazard. The Contractor has the option to reinstall the components required to be removed for the abatement.

The cost of the remediation and reinstalling the components shall be born One Hundred percent (100%) by the Contractor. It shall be the responsibility of the Contractor to collect from the insurance company and/or any Sub Contractors for any cost associated with the remediation.

4.13 LIMITATION OF WARRANTY: Nothing contained in the above sections shall be construed to establish a period of limitation with respect to other obligations, which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in Section 4.11 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

4.14 PROJECT CONTINGENCY AND ALLOWANCES: The Contractor shall include in the Contract Sum the Project Contingency and all Allowances stated in the Contract Documents. Items covered by the Project Contingency and/or Allowances shall be supplied for such amounts as the Owner may direct.

A. Project Contingency: The Contingency or portion thereof is to be used only when directed to do so in writing by the Owner, through the Consultant. The unused portion of the Contingency shall be credited to the owner at the end of the project. The Consultant will prepare change orders at the appropriate time to be signed by the contractor for contingency credits where applicable.

B. Material Allowances: Unless otherwise provided in the Contract Documents:

1. Materials and equipment under an allowance shall be selected by performance specification promptly by the Owner, through the Consultant

to avoid delay in the Work;

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

4.15 TAXES: The Contractor shall pay sales, consumer, use, and similar taxes for the Work or portions thereof provided by the Contractor which is legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

4.16 SALES AND USE TAX: Upon submission of each Application and Certification for payment, the Contractor must furnish for itself as well as for all Subcontractors, certified statements stating the cost of the tangible property purchased from each vendor and the amount of sales and/or use taxes paid thereon. In the event the Contractor makes several purchases from the same vendor, such certified statements must indicate the invoice numbers, date of invoice, and the inclusive taxes paid thereon. Such statements must also include the cost of any tangible personal property withdrawn from the Contractor's warehouse stock and the amount of sales or use tax paid thereon by the Contractor. Similar certified statements by his Subcontractors must be obtained by the Contractor and furnished to the Consultant. The subtotal amounts of the prices of the items, state sales tax, and County sales tax, and use tax shall be totaled at the bottom of each page and a grand total of each at the bottom of the last page. Different tax rates (e.g. 7% versus 7-1/2%) shall be listed on separate, notarized tax statements.

Non-Tangible items such as silt fencing, tree-protection fencing, erosion control devices, small tools, owned or rental equipment, etc. shall not be claimed on the tax statement. Only material items, which have become a part of the building, structure, or Work shall be included. The Contractor shall attach copies of all listed invoices on the certified statement, only upon request by the Owner.

Use the State and County Sales /Use Tax Statement & Certification form provided.

4.17 CONTRACTOR'S WARRANTY OF TITLE: The Contractor warrants and guarantees that title

to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner free and clear of all Liens no later than the time of payment.

4.18 UNCOVERING AND CORRECTION OF WORK

A. UNCOVERING OF WORK

If a portion of the Work is covered contrary to the Consultant's request, or to the Owner's or governing authority's request or requirements, or to requirements specifically expressed in the Contract Documents, the Contractor must, if required in writing by the Consultant, be uncovered for the Consultant's or governing Authority's examination and be replaced at the Contractor's expense without a change in the Contract Time.

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

B. CORRECTION OF WORK BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

If, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Paragraph 4.11 or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it within seven (7) days after receipt of written notice from the Consultant to do, or within a mutually agreed upon schedule between the Contractor and the Consultant and Owner. This obligation shall survive acceptance of the Work under Contract and termination of the Contract. If the Contractor fails to correct nonconforming Work within a reasonable time during that

period after receipt of notice from the Owner or Consultant, the Owner may correct the deficiencies at the Contractor's expense.

- 4.19 LIQUIDATED DAMAGES:** If the Contractor fails to achieve Substantial Completion within the Contract Time, the Contractor shall be assessed liquidated damages. The rate of liquidated damages shall be as established in the Supplementary Conditions.

If the Contractor fails to correct defective Work as outlined on a list accompanying the Certificate of Substantial Completion within thirty (30) days from the date of Substantial Completion, liquidated damages shall start to accrue until all defective Work has been corrected.

- 4.20 CUTTING AND PATCHING:** The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

The Contractor shall not damage or endanger any portion of the Work that was fully or partially constructed by the Owner or separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or separate Contractor except with written consent of the Owner and of such separate Contractor. Such consent shall not to be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate Contractor the Contractor's consent to cutting or otherwise altering the Work.

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

If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost shall be charged to the Contractor.

- 4.22 INDEMNIFICATION:** To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Consultant, Consultant's Sub-Consultants and agents, and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performances of the Work, provided that such claim, damages, loss, or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property including loss of use resulting there from, but only to the extent caused in whole or in part by Contractor or anyone employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part

by a party indemnified hereunder. Such obligations shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this paragraph.

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

The obligation of the Contractor under this paragraph shall not extend to the liability of the Consultant, the Consultant's Consultant(s), and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications, or (2) the giving of or the failure to give directions or instructions by the Consultant, the Consultant's Consultant(s), and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

4.23 COMPLIANCE PROVISION: The Contractor agrees to make itself aware of and comply with, and cause its subcontractors to comply with, all federal, state, and local laws, regulations and ordinances relating to the performance of this Contract, or to the products and services delivered hereunder, including without limitation, **E-Verify (Article 2 of Chapter 64 of the North Carolina General Statutes)**, Workers' Compensation, the Fair Labor Standards Act (FLSA), the Americans with Disabilities Act (ADA), the Family and Medical Leave Act (FMLA), and Occupational Safety And Health Administration (OSHA). The Contractor further agrees to obtain all verifications, permits, and licenses applicable to the performance of this Contract. If any violation of this section has occurred or does occur, the Contractor will indemnify and save harmless the County from all losses, damages, costs, expenses (including reasonable attorneys' fees), obligations, duties, fines, penalties, interest charges, and other liabilities (including settlement amounts) incurred on account of such violation.

4.24 IRAN DIVESTMENT ACT CERTIFICATION: Contractor certifies that as of the date of this agreement, contractor is not currently listed on the Final Divestment List created and maintained by the North Carolina State Treasurer pursuant to G.S.143-6A-4. Further, pursuant to G.S. 143C-6A-5(b), Contractor agrees not to sub-contract with any person or entity to perform any part of the contract terms herein, if, at the time, the sub-contractor's name appears on the then-current version of the Divestment Act List. Contractor further agrees to notify the County Procurement Department if at any time during the term of this agreement, it is added to the "List." The Divestment List may be found on the State Treasurer's website at www.nctreasurer.com/Iran.

ARTICLE 5 – BONDS AND INSURANCE

5.1 PERFORMANCE AND PAYMENT BONDS: The successful Bidder shall provide a Performance Bond and Payment Bond. The bond amounts shall be written in the amount of One-Hundred percent (100%) of the Contract Price, and conforming to the Owner's requirements. The bonds shall be delivered to the Owner with the executed Contract.

A. If the provided bonds or insurance do not meet the Owner's requirements, the Contractor shall have ten (10) calendar days after receipt of notice of rejection to provide satisfactory bonds. If the Contractor does not deliver proper bonds, the Contract may be awarded to the next lowest responsible, responsive bidder; or all bids may be rejected and the project re-bid.

5.2 INDEMNITY & INSURANCE: The Contractor shall indemnify and save harmless the Owner, its agents and employees and assigns from and against all loss, cost, damages, expense, and liability caused by an accident or other occurrence resulting in bodily injury, including death, sickness, and disease to any person; or damage or destruction to property, real or personal; arising directly or indirectly from operations, products, or services rendered under this Contract. The Contractor further agrees to purchase and maintain during the life of this Contract with an insurance company acceptable to the Owner authorized to do business in the State of North Carolina the following insurance:

Automobile: Bodily injury and property damage liability covering all owned, non-owned, and hired automobiles for limits of not less than \$2,000,000 each person, \$2,000,000 each occurrence bodily injury liability, and \$2,000,000 each occurrence property damage liability.

Comprehensive General Liability: Bodily injury and property damage liability insurance as shall protect the Contractor and any Subcontractor performing Work under this Contract from claims of bodily injury or property damage which arise from operations of this Contract whether such operations be performed by the Contractor, any Subcontractor, or anyone directly or indirectly employed by either. The amounts of such insurance shall not be less than \$1,000,000 bodily injury and property damage liability each occurrence/aggregate. This insurance shall include coverage for products/completed operations, and contractual liability assumed under the indemnity provision of this Contract. To be included in Comprehensive General Liability is the Broad Form Property Damage. On the policy, list "Mecklenburg County" as an "Additional Insured".

Workman's Compensation & Occupational Disease Insurance:

Meeting the statutory requirements of the State of North Carolina including employer's liability insurance for an amount of not less than \$100,000 for each accident, \$100,000

for disease each employee, and \$500,000 for policy limit.

Professional Errors & Omissions

Insurance with a limit of not less than \$1,000,000 per claim occurrence as shall protect the contractor and the contractor's employees for negligent acts, errors or omissions in performing the professional services under this contract.

Builder's Risk Insurance: The Owner shall purchase and maintain "all risk" Builder's Risk Insurance, including, without duplication of coverage, theft, vandalism, and malicious mischief. This insurance shall cover the entire Work at the site to which the Contract applies, to the full insurable value thereof and shall be for the benefit of the Owner and Contractor as their interest may appear, except that any loss not covered because of deductible clauses or policy exclusions shall be the sole responsibility of the Contractor.

The Owner's Builder's Risk Insurance shall not cover the Contractor's:

1. Tools
2. Equipment
3. Storage shed or office
4. Vehicles

Other Insurance Requirements:

- a) The Owner shall be exempt from and in no way liable for any sums of money which may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the Contractor and/or subcontractor providing such insurance.
- b) Mecklenburg County shall be named as an additional insured under the general and automobile liability insurance policies
- c) The contractor shall be responsible for notifying Mecklenburg County of any material changes (including renewals) to or cancellation of the insurance coverages required above. Notice to Mecklenburg County must be completed in writing within 48 hours of the changes.
- d) Should any of the required insurance coverages be self-insured by the contractor, a copy of the Certificate of Self-Insurance or other documentation from the North Carolina Department of Insurance shall be furnished to the owner.
- e) If any part of the work under the Agreement is sublet, the **subcontractor shall be required to meet all insurance requirements** set forth in the Agreement. Nothing contained herein shall relieve the Contractor from meeting all insurance requirements or otherwise being responsible for the subcontractor.

Certificates of such insurance shall be furnished to the Owner and shall contain the provision that should any of the above described policies be cancelled before the expiration date thereof, the issuing insurance company will endeavor to mail thirty (30) days written notice to "Mecklenburg County". The Contractor agrees to notify the Owner by telephone and by providing written notice within two (2) days after receipt of information that the insurance company either intends to amend or terminate a policy or has amended or terminated any insurance policy providing the coverage referred to above.

ARTICLE 6 - DEFINITIONS

Whenever in these specifications and Contract Documents the following terms or pronouns in places of them are used, the intent and meaning shall be interpreted as follows:

AS-BUILT DRAWINGS: A set of Construction Documents used by the Contractor to indicate all changes, clarifications, and actual execution of the Work.

BIDDER: Any individual, firm, corporation, or partnership submitting a proposal of the work contemplated.

BID PROPOSAL: The approved prepared form on which the bidder is to, or has submitted his proposal for the contemplated work.

CHANGE ORDER: A written instrument prepared by the Consultant and signed by the Owner, Contractor, and Consultant, stating their agreement upon all to modification of the following:

- A. The Work;
- B. The Contract Sum;
- C. The Contract Time.

CHANGE PROPOSAL REQUEST: Outlines proposed changes in the Work and possible changes to the Contract Sum and/or Contract Time.

CONSTRUCTION CHANGE DIRECTIVE: A written order prepared by the Consultant and signed by the Owner and Consultant, directing a change in the Work prior to agreement on an adjustment, if any, in the Contract Sum or Contract Time, or both.

CONSULTANT: The person lawfully licensed to practice Architecture or Engineering or Landscape Architecture, or an entity lawfully practicing Architecture or Engineering or Landscape Architecture which is referred to throughout the Contract Documents as if singular in number. The "Consultant" is the duly authorized representative of the Owner.

CONSTRUCTION CONTRACT: Represents the entire and integrated agreement between the Owner and Contractor and supersedes prior negotiations,

representations, or agreements, either written or oral, and consists of the Form of Construction Contract and the Contract Documents. The Construction Contract shall not be construed to create a contractual relationship of any kind (1) between the Consultant and Contractor, (2) between the Owner and a Subcontractor or Sub-Subcontractor, (3) between the Owner and Consultant or (4) between any persons or entities other than the Owner and Contractor. The Construction Contract may also be referred to as the "Contract".

**CONSTRUCTION
DOCUMENTS:**

The Bid Package, including without limitation, any Addendum to the Bid Package, the Notice to Bidders, Instructions to Bidders, the General Conditions, the M/W/SBE Provisions, all information in the Project Manual including the Technical Specifications, the Contractor's Itemized Proposal, and all other specifications and drawings referenced therein.

CONTRACT:

The "Construction Contract".

**CONTRACT
DOCUMENTS:**

Consist of all documents shown as incorporated by reference into the "Sample Construction Contract" between the Owner and the Contractor as provided therein. Contract Documents are also sometimes referred to as "Construction Documents".

**CONTRACT
MODIFICATION:**

Defined as (1) a Change Order, (2) a Construction Change Directive or (3) a clarification, interpretation, or a written order for a Minor Change in the Work issued by the Consultant.

CONTRACT TIME:

The consecutive calendar days, including authorized adjustments, allotted in the Contract for Substantial Completion of the Work. The commencement date of the Work is the date established in the Notice to Proceed.

CONTRACTOR:

Any individual, firm, corporation, or partnership, or his/her/their/its employees, agents, or assigns with whom a contract is made with the Owner for the construction of the total project (including, but not limited to Plumbing, Mechanical, Electrical, Landscape, Structural Construction, and Fire Protection work).

CONTRACT SUM:	As stated in the Construction Contract and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.
DRAWINGS:	The graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.
DAY(S):	The term "day" as used in the Contract Documents shall mean calendar day.
EVALUATION:	The word "evaluation" and any derivative thereof, as used in reference to Consultant means, to become familiar with the progress and quality of the portion of Work.
FURNISH:	Unless specifically noted otherwise, the word "furnish", and any derivatives thereof, means furnishing to the Project site items specified such as materials, equipment apparatus, appurtenances, and all other necessary items.
INSPECT:	The word "inspect" and any derivative thereof, as used in reference to the Consultant shall mean; type of evaluation that a reasonably prudent Consultant, in the exercise of ordinary care, would make to determine if the Work is in general accordance with the Contract Documents at Substantial and Final inspections.
INDICATED:	The words "indicated" or "shown" and any derivative thereof shall mean; as detailed, scheduled, schematically depicted, or stated in the Contract Documents.
INSTALL:	The word "install", and any derivative thereof, means to incorporate into the Work all necessary labor, materials, and connections required to perform and properly complete in-place, testing, inspection and approval by Governing Agencies, and make the resulting product ready for operation or use.
LIQUIDATED DAMAGES:	An amount estimated in advance, to cover the losses incurred by the Owner by reason of failure of the Contractor to complete the Work within the time specified in the Contract Documents.

MINOR CHANGES

IN THE WORK:

A written order prepared by the Consultant for modifications in the Work not involving adjustment in the Contract Sum or Contract Time and not inconsistent with the intent of the Contract Documents.

OWNER:

As referred to in these documents is Mecklenburg County.

PROJECT:

The total construction, of which the Work performed under the Contract may be the whole or a part, and which may include construction by the Owner or by separate Contractors.

PROJECT MANUAL:

The compilation of all of the written material that is part of the Contract Documents. It contains, but is not limited to, bidding requirements, sample forms, conditions of the Contract, schedule of drawings, technical specifications, and all addenda.

PROVIDE:

The word “provide”, and any derivatives thereof means, to furnish and install as defined.

RECORD DRAWINGS

A set of drawings produced and certified by the Consultant based on information shown on the “As-Built Drawings” provided by the Contractor.

RIGHT-OF-WAY:

The area that has been acquired for the location, installation, and maintenance of a public or private utility, roadway drainage facility, sewer lines and water lines, etc.

SEE:

In interest of conciseness, references to specification sections and drawing details are preceded by the word “see” to mean to refer to that work item, section, or part thereof.

**SINGLE PRIME
CONTRACTOR:**

Any individual, firm, corporation, or partnership, with whom a contract is made by Mecklenburg County for the total project. The word “Contractor” is referred to throughout the Contract Documents as if singular in number and means a Contractor or an authorized representative of the Contractor.

SPECIFICATIONS:

That portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards, and

workmanship for the Work, and performance of related services.

STOP WORK ORDER: A written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

SUB-CONTRACTOR: Any individual, firm, corporation, or partnership whom has a direct contract with the Single-Prime Contractor to perform a portion of the Work. The word "Sub-Contractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-Contractor or an authorized representative of the Sub-Contractor.

SUB-SUBCONTRACTOR: Any individual, firm, corporation, or partnership whom has a direct contract with a Sub-Contractor to perform a portion of the Work. The word "Sub-Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-Subcontractor or an authorized representative of the Sub-Subcontractor.

SUBSTITUTION: Any product, not specified, to be considered to be used in the place of a product in the construction of the Work that was not in the Construction Documents.

SURETY: The corporate body, which is bound with and for the Contractor, who is primarily liable and which engages to be responsible for the Contractor and his acceptable performance of the work for which he has contracted.

SUBSTANTIAL COMPLETION: The stage in the progress of the Work when the Work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

THE CONTRACTOR SHALL: In interest of conciseness; sentences, statements, and clauses may be verb phrases with expressive verbs such as "furnish", "install", "provide", "perform", "construct", "erect", "comply", "apply", "submit", etc. Any such sentences, statements, and clauses are to be interpreted to include the applicable form of the phrase "the Contractor shall" preceding the expressive verb, with the requirements described interpreted as mandatory elements of the Contract.

WORK:

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. The Work also includes providing supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure, complete, and functional installation.

WRITTEN NOTICE:

A written communication delivered to the Contractor, or to a partner of the firm in the case of a partnership, or to a member of the contracting organization, or an officer or an employee of the organization in the case of a corporation, or sent to the last known business address of the contracting organization.

END OF GENERAL CONDITIONS OF THE CONTRACT

ARTICLE 4 – CONTRACTOR’S RESPONSIBILITIES

4.2 PERMITS AND LICENSES:

Add the following paragraphs:

The Contractor shall include in his contract all fees related to connection of all utilities to the building such as potable water, fire line, storm drainage, sewer, power, natural gas, etc.

The General Contractor shall be responsible for coordinating the connection and division of responsibilities between site contractors and mechanical, plumbing, electrical, plumbing and fire protection contractors for all utilities entering and leaving the building.

4.5 CONTRACT TIME:

Delete the last sentence and replace with the following paragraph:

The Contractor shall commence work to be performed under this agreement on a date to be specified in a written order from the Consultant, and shall fully complete all work hereunder within **365** consecutive calendar days from the date of the written order. For each day in excess of **365** consecutive calendar days, the Contractor shall pay the Owner **\$500.00** per day as liquidated damages which have been reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of said Contractor to complete the work within the time specified, such time being in the essence of this Contract and a material consideration thereof.

END OF SUPPLEMENTARY CONDITIONS

BUSINESS DIVERSITY & INCLUSION PROGRAM PROVISIONS GUIDE

The following pages contain necessary information on Mecklenburg County's Business Diversity and Inclusion Program. General Contractor shall utilize this guide for adherence to the BDI program's requirements.



**MECKLENBURG COUNTY
BUSINESS DIVERSITY & INCLUSION (BDI)
PROGRAM PROVISIONS GUIDE**

BUSINESS DIVERSITY & INCLUSION (BDI) PROGRAM OVERVIEW

Mecklenburg County has made great strides to ensure business is conducted fairly and with diverse populations in our community. Mecklenburg County's Office of Economic Development engaged Griffin & Strong, P.C. (GSPC) to conduct a disparity study on the availability and utilization of minority and women-owned business enterprises by the County and to examine the relevant evidence of race – or gender – based discrimination in the County's contracting process.

The [2020 Mecklenburg County Disparity Study](#) revealed areas for improvement, for which GSPC made recommendations to assist the County in remediating the disparities to ensure that all qualified firms within the relevant market are given equal opportunity to succeed in doing business with the County. The full report and recommendation list can be found on the Mecklenburg County website.

Because the implementation of the Disparity Study recommendations will impact internal and external stakeholders, the County has decided on a phased transitional approach to implement the objectives.

Mecklenburg County Government will provide Minority-owned, Women-owned, and Small Business Enterprises (collectively "MWSBE") as well as other responsible vendors with fair and reasonable opportunity to participate in conducting business with Mecklenburg County.

The BDI Program Provisions Guide requires Contractors and Subcontractors to take all reasonably necessary steps to ensure maximum inclusion opportunity for the participation of Minority Business Enterprises and Women Business Enterprises certified through NC Historically Underutilized Businesses (NCHUB), herein referred to as MBE, WBE or MWBE firms in its contracting activities with Mecklenburg County. Businesses that are not certified MBE or WBE as previously mentioned, will be herein referred to as non-certified. It is further the intent of the Program to broaden opportunities for the participation, increase competition, and to ensure the proper and diligent use of public funds. The BDI Program Provisions Guide includes Contract-by-Contract and Achievement goals for MWBE utilization in proportion to the availability of qualified vendors in particular areas of procurement.

1. Program Statement.

It is the practice of the Mecklenburg County's Business Diversity and Inclusion Program (the "BDI Program"), in conjunction with the County Procurement Division, to foster greater competition, increase opportunities for participation by all segments of the business community, and maximize value for the taxpayers' dollars through efficient use of public funds. The BDI Program accordingly is intended to promote full and equal business opportunities for all businesses contracting with Mecklenburg County by increasing the opportunity for purchase of goods and services from minority-owned and women-owned enterprises.

Consistent with the Mecklenburg County Solicitation Terms & Conditions, which encourage Bidders and Contractors to take all reasonably necessary and responsible steps to ensure that minority, women, and small business enterprises have the maximum opportunity to participate in County contracts, it is the practice of the BDI Program to encourage Contractors to actively seek MWBE participation to the greatest

extent possible, and to monitor compliance.

2. Promotion of Equal Opportunity.

The BDI Program seeks to ensure that firms desiring to participate in contracting and procurement activities with the County are not prevented from doing so based on the race, color, national origin, or gender of their owners. It is the intent of the BDI program that no firm, business enterprise, or person shall be denied the benefit of, or otherwise be discriminated against, on the grounds of race, color, national origin, or gender in connection with the award or performance of any contract paid for, in whole or in part, with funding from Mecklenburg County.

3. Program Objectives.

The objectives of the Mecklenburg County BDI Program are to promote and encourage full and open competition in all County contracting and purchasing; to encourage all County personnel involved in procurement and contracting activities to utilize appropriate procedures to identify and remedy any participation by the County in unintended unlawful discrimination (active or passive).

Mecklenburg County engaged a consultant, Griffin & Strong P.C. (“GSPC” or the “consultant”), to conduct a Disparity Study assessing County purchasing, contracting and the MWSBE Program. The consultant produced its Study Report to the County in 2020, and the BDI Program has the objective of implementing recommendations included in the Study. For example, the consultant found that there is a factual predicate for the continuation of the MWSBE (now BDI) Program. Moreover, the results of the study confirmed that the race and gender-neutral policies and program elements thus far employed by the County have proven insufficient to remedy the present effects of past discrimination in purchasing/contracting in the relevant market. The consultant therefore recommended implementation of certain race conscious and gender conscious elements as part of the Program.

4. Commitment to Program Objectives.

In the 2020 Disparity Study, GSPC recommended that Mecklenburg County increase staffing to facilitate recommendations relating to supportive services, monitoring and compliance, forecasting, and goal-setting. The County is committed to achieving the BDI Program objectives and, accordingly, to providing the necessary budgetary, staffing, and support resources necessary for the success of the BDI Program.

For assistance, contact the Office of Economic Development’s BDI Team.

Mecklenburg County - Office of Economic Development
Business Diversity & Inclusion (BDI) Program
Charlotte-Mecklenburg Government Center
600 East 4th Street Charlotte, North Carolina 28202

Phone: 980.314.2945
Email: BDI@mecknc.gov
Website: oed.mecknc.gov/BDI

BDI SOLICITATION COVERSHEET

The County maintains a strong commitment to the inclusion of MWBEs in the County's contracting and procurement process. Accordingly, BDI provides information and forms that Bidders will supply to be considered for the Program.

Bidders are expected to review the entire BDI Program Provisions Guide and this BDI Solicitation Coversheet as they are planning to submit the BDI form(s) with their Bid/Proposal. The Bid/Proposal should outline any supplies and/or services to be provided by Subcontractors, including each certified Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) for the Contract. Submittals (forms) and time frames can be referenced in Section-4.

PROJECT NAME: MRF Retrofit Infrastructure

INDUSTRY CATEGORY

☐ Architect & Engineering ☒ Construction ☐ Professional Services ☐ Other Services ☐ Goods

Review the established participation goal type selected with the ☒ below for this specific solicitation.

PARTICIPATION GOAL TYPES

☒ **A. CONTRACT-BY-CONTRACT GOALS**

THE ESTABLISHED **SUBCONTRACTOR** PARTICIPATION GOALS FOR THIS PROJECT ARE:

11% **MBE** 4% **WBE**
**Note: the goals must be achieved independently and not in combination*

Required Bid forms associated with this participation goal type are:

- [Form A] Listing of Good Faith Efforts (GFE)
- [Form B] Identification of Subcontractor Participation
- ☐ Joint Ventures Documentation (include when ☒ is selected)

ALL PRIME CONTRACTORS MUST DEMONSTRATE GOOD FAITH EFFORTS IN SOLICITING CERTIFIED NCHUB MBE & WBE SUBCONTRACTORS TO ACHIEVE THE SUBCONTRACTING GOALS NOTED ABOVE.

Reference: A. Contract-by-contract goals stated above cannot be fulfilled by Prime.

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SECTION-1 | FORMAL AND INFORMAL PURCHASING

The BDI Program Team applies the [general purchasing procurement policies and procedures](#) as required by law and enacted by Mecklenburg County, including all applicable purchasing thresholds and approval requirements, as if fully set forth herein.¹ Mecklenburg County's Procurement Policies are incorporated in this document by reference, and can be found on the Mecklenburg County website noted in Section-10(2).

SECTION-2 | PARTICIPATION GOALS

1. Achievement Goals

Achievement Goals may be included only in those County solicitations that **do not contain contract-by-contract goal-setting** for specific MWBE goals, and when included, shall be advisory, and must also be accompanied by the full definition of the term in such solicitations as stated in this Program Provisions Guide.

Achievement Goals for MWBE participation in County contracts in the categories of Construction (including Construction-related Professional Services), Architecture and Engineering, non-construction Professional Services, Other Services, and Goods are established as follows and are based upon the MBE and WBE Availability by industry / commodity in accordance with the findings of the 2020 Disparity Study.

Industry Category	MBE Goal	WBE Goal
Construction	8%	8%
Architecture & Engineering	14%	4%
Professional Services	10%	4%
Other Services	11%	4%
Goods	5%	4%

**Note: the goals must be achieved independently and not in combination*

2. MWBE Inclusion Plan

(submitted with Bid/Proposal, when selected in the BDI Solicitation Coversheet)

Purpose:

Create defined metrics of success, by creating a MWBE Inclusion Plan

MWBE Inclusion Plan:

Create a detailed description of the strategies and actions the Bidder/Participant will take to outreach fairly and equitably, to support, and to contract with MWBEs.

The following are elements to incorporate into the MWBE Inclusion Plan to help collaborate with MWBEs by addressing any of the following, but not limited to:

- the firms you contacted, when, and how you made contact, and their contact information;
- the outreach strategy used to meet this Contract's MWBE achievement goals;
- the specific resources and resource contacts utilized to locate MWBE firms for this Contract, when, and how you made contact, and their contact information;

¹ See Mecklenburg County, North Carolina Procurement Policy, ¶¶ 7-8, 10-11.

- the plan for building a connection with MWBEs and developing a project team;
- the plan to strengthen business relationships;
- the methods that will be used to improve lines of communication;
- the approach(es) that will be taken to resolve disputes;
- detailed description of the supportive services and activities that will be established for business development and how the plan will be executed;
- the mentorship opportunities that will be made available and how those opportunities will be executed; and
- the efforts that will be made available for capacity building and how those efforts will be executed.

Resources:

To assist in locating MWBEs, the Bidder/Participant may utilize an MWBE Diversity consultant and/or contact Certification Agencies, Advocacy Groups, Business Resource Agencies, Regional and Diversity Chamber of Commerce Organizations, Industry/Trade Associations, Mecklenburg County's Procurement Department, and the BDI Program Office, etc.

Some Resources: Metrolina Minority Contractors Association, Hispanic Contractors Association of the Carolinas, The Institute, and the HUB Office or hire a diversity consultant.

3. Goal-Setting Committee

The Goal-Setting Committee (GSC) is to be chaired by the BDI Director (or designee) with consultation from the County Attorney's Office when applicable. The GSC shall also include, at a minimum, the BDI Compliance Officer assigned to the solicitation (or designee), the Procurement Director (or designee), the Director of the Originating Department(s) (or designee) including the respective BDI liaison, a member from the Mecklenburg County business community, and, if the goal is for a Construction or Architecture & Engineering contract, the project manager or engineer assigned to the solicitation, all without duplication of designees. Any of these committee members may, on an as-needed basis, also designate a subject matter expert to participate in the goal-setting for the particular contract(s) at issue.

The GSC establishes BDI Program goals (e.g., contract-by-contract subcontracting goals) based upon Industry Categories (or commodity codes), vendor availability, and contract-specific characteristics.

At the BDI Director's discretion, additional personnel from the Originating Department(s) and/or industry experts in relevant fields can be appointed, and one or more GSCs may be appointed to serve in this capacity simultaneously if it serves the County's best interests in efficiently processing Bid solicitations and applying Program elements to them. At a minimum, the GSC shall:

- a) Meet as often as it deems necessary to accomplish its duties as outlined in this Program Provisions Guide, but not less than once monthly;
- b) Review in advance proposed contract bid specifications to ensure that they are not unnecessarily restrictive and do not adversely affect the ability of MWBE firms to competitively bid without adequate business justification;

- c) Formulate and recommend to the County Manager (or designee), and implement additional rules and procedures for BDI Program goal-setting and other aspects of its duties in selecting and applying specific Program elements to County contracts in an efficient and effective manner; and
- d) Support the implementation and efforts of the BDI Program.

4. Contract-by-Contract Goals

The Goal-Setting Committee (GSC) will set specific percentage-based MWBE Subcontracting goals on a contract-by-contract basis for Contracts valued in excess of \$300,000 and shall have the authority to establish such goals based upon the type of Contract, the type of subcontracting work that will be required, and the availability of MWBEs to perform the work for that specific Contract.

The GSC shall not establish Subcontracting Goals on contracts where (a) there are no subcontracting opportunities identified for the contract; or (b) there are not at least three MBE and/or WBE firms that are available and capable to perform a Commercially Useful Function for the overall subcontracting opportunities on the contract. This process is determined by the BDI Program Office.

All subcontracting goals authorized under the BDI Program are intended to be established by the GSC and implemented only on a contract-by-contract basis. It is intended that such goal-setting will be based upon careful analysis of the availability of Commercially Useful subcontracting opportunities within a given contract and the relative availability of MWBE firms to perform required tasks on such subcontracting opportunities. Contract-by-contract goal-setting shall be based upon reasonably reliable MWBE Subcontractor availability data. Compliance with contract-specific subcontracting goals shall also require compliance with Good Faith Efforts as established in this Program Provisions Guide.

The GSC shall not establish a Subcontracting goal for a contract where there are no subcontracting opportunities identified for the contract or there is insufficient availability of MBEs or WBEs (as applicable) to perform scopes of work or provide products or services that the GSC regards as realistic opportunities for subcontracting. Accordingly, in establishing Contract Goals, the GSC shall:

- a) Review in advance proposed contract bid specifications to ensure that they are not unnecessarily restrictive and do not adversely affect the ability of MWBE firms to competitively bid;
- b) Formulate, recommend to the BDI Director (or designee), then implement additional rules and procedures for MWBE goal-setting and other aspects of its duties in selecting and applying specific Program elements to contracts with Mecklenburg County in an efficient and effective manner; and
- c) Monitor and support the implementation of the contract-by-contract goals aspect of the BDI Program.

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5. Special Projects

For qualifications-based selections for Construction Manager at Risk (CM@R), Public Private Partnerships (P3), Master Developers, Design Build, and other Alternative Build Methods, the County's overall goals for the project are based upon the Availability of firms in the Industry Categories of Construction and Architecture & Engineering. The overall goals will be included in the solicitation that the Participant(s) will agree to make Good Faith Efforts to meet the goals. At the time of qualification submittals, Participant(s) should submit an 'MWBE Inclusion Plan' that represents how the Participant(s) intends to meet or exceed the goal. As construction bid requests or packages are issued by the selected Contractor(s) and Developer(s), they shall include the BDI Provisions Guide, Good Faith Efforts, and the MWBE Participation Goals for each contract and the requirement for its tiered subcontractors.

Industry Category	MBE Goal	WBE Goal
Construction	15%	8%
Architecture & Engineering	15%	8%

6. Program Waiver

Should the BDI Program Office determine after consideration of all relevant documents and other information that there are no subcontracting opportunities identified for a particular contract or there is insufficient availability of MBEs or WBEs (as applicable) to perform scopes of work or provide products or services that identifies realistic opportunities for subcontracting, no subcontracting goal shall be assigned to such contract and a Program Waiver notification shall be issued. As defined herein, a Program Waiver applies to "[a] particular solicitation for which goals are not required and is therefore waived."² This is not the same as a "Waiver based on Good Faith Efforts."

7. Joint Ventures

Based upon the scope of work and market availability, the County Manager (or designee) shall determine if a joint venture for a construction project is required with input from the BDI Program Team and the Originating Department. Utilization efforts to form a joint venture shall be required for such project. Only Construction projects valued over \$5,000,000 are eligible for consideration under this section.

On such projects in which utilization efforts to form a joint venture relationship is required, no Bid shall be accepted unless submitted by a joint venture, unless the BDI Program Team determines that in its discretion and judgement sufficient utilization efforts to enter into a joint venture have been demonstrated based on a careful review of relevant facts, documents, and circumstances.

Also, on such eligible projects, the joint venture member businesses/partners must have different race ownership, different gender ownership, or both. MWBE members of the joint venture must be certified as such (as required by the BDI Program Office), and the joint venture team shall include in its Bid submittal the proof of MWBE Certification of each MWBE joint venture member. A Bid submitted by a joint venture comprised of Bidders with both the same race and gender ownership shall be deemed non-responsive and rejected.

² See Definitions, *infra*.

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As to each joint venture under this section, a written joint venture agreement must be completed by all parties to the joint venture and executed before a notary public, which clearly delineates the rights and responsibilities of each member or partner, complies with any requirements of the BDI Program Office as set forth in Bid documents or otherwise, and provides that the joint venture shall continue for, at a minimum, the duration of the Contract.

The BDI Program Team shall review and approve all contractual agreements (with consultation from the County Attorney's Office when applicable) regarding the terms and provisions of each joint venture relationship prior to the award of a contract on eligible projects. The joint venture agreements should at a minimum include the following information:

- the initial capital investment of each venture partner;
- the proportional allocation of profits and losses to each venture partner;
- the sharing of the right to control the ownership and management of the joint venture;
- actual participation of the venture partners on the project;
- the method of and responsibility for accounting;
- the method by which disputes are resolved; and
- any additional or further information required by the office of contract compliance as set forth in Bid documents or otherwise.

The joint venture, and each member of the joint venture, shall provide the BDI Program Team access to review all records pertaining to joint venture agreements before and after the award of a contract in order to reasonably assess compliance with this subdivision.

A Bid submitted by a joint venture that does not include a satisfactory written joint venture agreement in accordance with the requirements of this section shall be deemed non-responsive and rejected.

SECTION-3 | THE BIDDING PROCESS AND RESPONSIBILITIES

The formal and informal bidding process is governed by state law and the relevant provisions of the Mecklenburg County, North Carolina Procurement Policy.³ The following outlines or underscores relevant steps and processes that most often arise in the context of the BDI Program.

The RFP/RFQ process is set out in the County's policies and the BDI Provisions adopt the County's policies and clarify unique BDI requirements.

All parties listed below (1-5) must adhere to the BDI Program Provisions Guide.

³ See N.C.G.S. §§ 143.128, 143.129; Mecklenburg County, North Carolina Procurement Policy, ¶ 11.

a) Bidder/Participant Responsibilities**a) Time of Bid**

In adherence to the Bid due date, along with the Bid documents, the Bidder is required to fully complete and submit the appropriate BDI Program Form(s) relating to potential MWBE utilization on the project. The specific forms to be utilized are noted on the Bid Solicitation Information Coversheet per the Participation Goal Type.

- Form A – Listing of Good Faith Efforts (GFE)
- Form B – Identification of Subcontractor Participation
- Form C - Statement of Intent to Perform Contract with Own Workforce
- [Form D] MWBE Inclusion Plan
- Joint Venture Documentation (if applicable)

Descriptions of the aforementioned forms are included in Section-4.

Bid responses will be reviewed and validated for compliance by the County.

b) Time of Intent to Award

The Bidder that is determined to be the lowest responsible and responsive Bidder (construction) or the best value responsible and responsive Bidder (procurement) is required to submit the appropriate BDI Program Form(s) relating to confirmed MWBE utilization and Good Faith Efforts accomplished (if applicable).

- Form B1 - Identification of Subcontractor Participation – Alternates (Construction Only)
- Form E - Subcontractor Utilization Commitment
- Form E1 – Tier 2 Subcontractor Utilization Commitment (Special Projects Only)
- Form F – Certificate of MWBE Unavailability
- Good Faith Efforts (GFE) Documentation (if applicable)

Descriptions of the aforementioned forms are included in Section-4.

c) During Contract Period

The apparent lowest responsible and responsive Bidder/Participant (construction) or the apparent best value responsible and responsive Bidder/Participant (procurement) is required to complete and submit the appropriate BDI Program Form(s), any additional documentation requested, and attend and participate in communication efforts and meetings relating to MWBE utilization on the project, compliance efforts, and dispute resolution(s). The Bidder/Participant should also engage in ongoing communication with the project team (inclusive of Subcontractors/suppliers). After award of fully executed Contract, the contractor is required to utilize the contract compliance solution system when applicable/directed.

- Form E - Subcontractor Utilization Commitment

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- Form E1 – Tier 2 Subcontractor Utilization Commitment (Special Projects Only)
- Form G – Prime Contractor/Project Identification
- Form H – Statement of Payments to Subcontractors/Suppliers

Descriptions of the aforementioned forms are included in Section-4.

b) BDI Program Office Responsibilities

- a) At the time of advertisement for Bids, the BDI Program Team will notify certified Minority and Women Business Enterprise firms of the opportunities available to them and will provide them with a list of potential prime Bidders upon request or within 72-hours. The BDI Program Team will provide the Bidders/Participants with an updated list of certified MWBE firms that may be able to provide sub-bids and/or quotes for scopes of service and/or goods upon request or within 72-hours.
- b) The Originating Department and the BDI Program Team shall review and validate the Bid information and forms.
- c) The BDI Program Team will also collect and review all required BDI program forms and documentation submitted by Bidders/Participants, and any additional documents required, in its discretion, to evaluate the compliance and sufficiency of the GFEs claimed.
- d) The BDI Team will conduct meetings and engage in communication efforts with Contractors (prime/sub) prior to and throughout the contract period. The BDI Program Team will utilize the Contract Compliance Solution System when applicable.
- e) BDI Program Team encourages utilization of MWBEs for Contracts and business opportunities under \$30,000 and for any dollar amount when formal advertisement and Bidding requirements are not applicable.
- f) The [Office of Economic Development](#) provides supportive services to all businesses.

c) County Department Responsibilities

As set forth in the Mecklenburg County, North Carolina Procurement Policy, Department Directors are required to adhere to certain procedures regarding Bids and awards.⁴

It shall further be the responsibility of each Department to ensure that solicitations emanating from the Department adhere to the procedures and provisions set forth in this BDI Program Provisions Guide:

- (a) The Department Director (or designee) shall assume primary responsibility for achieving the objectives of this BDI Program Provisions Guide within the Department and shall review, on a continuing basis, all aspects of the Program's operations to assure that the purpose is being achieved.

⁴ Mecklenburg County North Carolina Procurement Policy, ¶ 17.

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- (b) Departments shall provide copies of the pre-bid attendance list within two (2) business days of the session ending.
 - (c) Departments shall provide copies of the interested bidders list upon request and/or within two (2) business days following the pre-bid meeting.
 - (d) Departments shall provide copies of the BDI forms submitted with the Bid from all the Bidders within 24 hours of the Bid opening/Bid due date to the BDI Office.
 - (e) Departments and the BDI Program Team shall review and validate the Bid information and forms.
 - (f) Departments shall communicate the selected apparent lowest responsible and responsive Bidder/Participant (construction) or the apparent best value responsible and responsive Bidder/Participant (procurement).
 - (g) Departments shall maintain accurate records for each contract awarded, including unsuccessful Bidders, dollar value, the nature of the goods or services to be provided, the name of the contractor awarded the contract, the efforts it employed to solicit responses from MWBEs, and all subcontracts awarded by the Prime Contractor identifying for each its dollar value, the nature of the goods or services provided and the name of the Subcontractor(s).⁵ Departments will utilize the Contract Compliance Solution System when applicable/directed.
- d) BDI Program Team encourages utilization of MWBEs for Contracts and business opportunities under \$30,000 and for any dollar amount when formal advertisement and bidding requirements are not applicable.

d) MWBE Responsibilities

It is the responsibility of the MWBE firm to contact the BDI Program Team for Contract opportunities, to provide quotes, and/or sub-bids when requested. The MWBE will also be responsible for completing Form E, the Subcontractor Commitment Form, in a timely manner and return it to the Prime Contractor.

This paragraph only applies to Achievement Goals. This does not apply to Contract-by-Contract Goals. The MWBE firm must be certified by the NC Office of Historically Underutilized Businesses (MWBE) for their Contract dollar amounts to be counted as MWBE participation. If the MWBE firm is not certified at the time, the firm commits to provide services, the MWBE should apply for the approved Certification designation with the County's approved Certification agency within thirty (30) business days. If the MWBE firm fails to submit an application for Certification within the specified time frame or if the MWBE firm is not certified, the non-certified firm's Contract dollar amount will not be counted as MWBE participation. The Prime Contractor must complete efforts to fulfill the committed MWBE participation goal(s).

MWBE firms who are contacted by Owners or Bidders/Participants must respond promptly whether or not they wish to submit a Bid (or sub-bid).

⁵ See N.C.G.S. § 143-128.2(i); N.C.G.S. § 132-1.

Lastly, the MWBE firm is required to complete and submit the appropriate BDI Program Form(s), any additional documentation requested, and may be asked to attend and participate in communication efforts and meetings relating to MWBE utilization on the project, compliance efforts, and dispute resolution(s). The MWBE firm may also be asked to submit additional documentation when requested.

e) Contract Compliance Solution System

When applicable, the BDI Office, the Prime Contractor(s), and Mecklenburg County designees will utilize the web-based Contract Compliance Solution System to document, monitor, and track the project/contract information (including payments), and compliance efforts. Training and supportive services will be provided by the Procurement Department, with the BDI Office serving as their backup, to assist with use of the system.

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Mecklenburg County Government

Formal Documents

SECTION-4 | SUBMITTALS AND TIME FRAME

The specific forms to be utilized are noted on the Bid Solicitation Coversheet per the Participation Goal Type.

"Failure to file a required affidavit or documentation that demonstrates that the contractor made the required good faith effort is grounds for rejection of the Bid." NCGS 143-128.2(c)

Form Name/Description	Submission Requirements	Required Form #
Listing of Good Faith Efforts (GFE) Completed by Bidder(s). Identifies the statutory Good Faith Efforts undertaken to recruit and solicit MWBEs to meet or exceed the participation goal for this Contract SEE BDI SOLICITATION COVERSHEET FOR ESTABLISHED SUBCONTRACTING GOALS	Due with Bid/Proposal when noted on Bid Solicitation Information (if subcontracting)	Form A
Identification of Subcontractor Participation Completed by Bidder(s). Identifies MWBEs and non-certified firms (their scope of work and dollar value) that are anticipated to receive a subcontract for this Contract.	Due with Bid/Proposal (if subcontracting)	Form B
Identification of Subcontractor Participation - Alternates Completed by Bidder(s)/Participant(s). Identifies certified NCHUB MWBEs and non-NCHUB MWBEs that are anticipated to receive a subcontract for this Contract in the event Construction Alternates are selected by the County.	Due within three (3) business days after receiving a request from the County (if subcontracting)	Form B1
Statement of Intent to Perform Contract with Own Workforce ~~Completed by Bidder(s). Indicates that the Bidder does not customarily subcontract elements of this type of project, normally performs, has the capability to perform, and will perform ALL elements of the work on this Contract with its own current workforce AND will not purchase any material or supplies for the project in the performance of this Contract.~~	~~Due with Bid/Proposal (if self-performing)~~	~~Form C~~
~~MWBE Inclusion Plan Completed by Bidder(s)/Submitter(s). A detailed description of the strategies and actions the Bidder/submitter will take to outreach fairly and equitably, support, and contract with MWBEs.~~	~~Due with Bid/Proposal when noted on Bid Solicitation Information Coversheet (if subcontracting)~~	~~Form D~~
Subcontractor Commitment Completed by Prime Contractor(s) and ALL of the Subcontractors (Suppliers/Subconsultants). This document shall not serve in a manner as an actual subcontract between the two parties. A separate binding agreement will describe in detail the contractual obligation of the Prime Contractor and the Subcontractor conditioned upon the execution of a contract with Mecklenburg County.	Due within three (3) business days after receiving a request from the County (if subcontracting)	Form E
Tier 2 Subcontractor Commitment (Special Projects Only) Completed by Tier 1 Subcontractor and ALL of the Tier 2 Subcontractors (Suppliers/Subconsultants). This document shall not serve in a manner as an actual subcontract between the two parties. A separate binding agreement will describe in detail the contractual obligation of the Tier 1 Firm conditioned upon the execution of a contract with the Prime and Mecklenburg County and Tier 1 Firm and the Prime.	Due within three (3) business days after receiving a request from the County (if subcontracting-Tier 2)	Form E1
Certificate of MWBE Unavailability Completed by Bidder(s)/Participant(s). This document identifies the MWBE firms that were originally committed to Subcontract in good faith but became unavailable prior to signing a formal Agreement/Contract.	Due with the Subcontractor Commitment Form (Forms E/E1)	Form F
Prime Contractor / Project Identification Completed by Prime Contractor. Identifies the Prime Contractor and Project information.	Due within three (3) business days after receipt of fully executed County Contract	Form G
Statement of Payments to Subcontractors/Suppliers Completed by Prime Contractor(s) (and Tier 1 Subcontractors when applicable). Prime Contractors must submit this form with each request for payment showing work that has been approved and completed for all Subcontractors (suppliers, manufacturers, brokers, and/or members of a joint venture) in connection with the Contract.	Due with Pay Applications	Form H
Good Faith Efforts (GFE) Documentation Completed by Bidder(s). If the established MBE and WBE goals are not achieved at the time of Bid, the Bidder shall provide the backup documentation using the GFE Points System as a guide for documentation submission to support the Good Faith Efforts selected on Form A.	Due upon the time specified by the County, if not specified then within three (3) business days after the bid due date	Backup Documentation using the GFE Points System
Joint Venture Documentation Completed by Prime Contractor(s). Documentation that acknowledges a joint venture, the terms, and percentage breakdown.	Due with Bid/Proposal when noted on Bid Solicitation Information Coversheet (if subcontracting)	Backup Documentation

SECTION-5 | GOOD FAITH EFFORTS (GFE) POINTS SYSTEM

North Carolina law (N.C.G.S. § 143.128.2(f)) permits local governments some level of discretion in setting and applying the Good Faith Efforts (GFE) point system for MWBE inclusion, but a local government cannot require a Bidder to earn more than fifty (50) points. “Failure to file a required affidavit or documentation that demonstrates that the contractor made the required good faith effort is grounds for rejection of the Bid” as being non-responsive. N.C.G.S. § 143-128.2(c) Id. Accordingly, the County has established the following GFE point system:

- The County will evaluate all efforts made by the Bidder/Participant to determine compliance with good faith efforts categories. The BDI Program Team will assess whether the efforts employed by the Bidder are those a Prime Contractor would reasonably be expected to take if they were actively and aggressively trying to meet each Goal established for the Contract. The assessment will be made on a case-by-case basis taking all available facts into account, including documentation provided by the Bidder/Participant.
- The BDI Program Team (or designee) may take into account the performance of other Bidders/Participants in meeting the established Goals. Mere *pro forma* efforts will not be sufficient. The focus will be on the likely effectiveness of steps taken.
- To avoid any impression of unfair Bid practices, all actions necessary to earn the GFE points must be undertaken prior to the Bid opening/Bid due date. For each subcontracting Goal that is unmet, the Bidder/Participant must earn at least fifty (50) GFE points (the “Minimum GFE Points”) from the GFE categories described below to be considered responsive and responsible.
 - a) **Subcontractor Solicitation - (15 pts)** Bidder/Participant solicited Bids from MWBEs that would meet the Goals stated for the respective Contract, that reasonably could have been expected to submit a quote, and that were known to the Bidder/Participant or available on State or local government-maintained lists, at least **ten (10) Business Days** before the Bid Opening/Bid due date and notified them of the nature and scope of the work to be performed.

Factors considered for these points may include, but are not limited to:

- Providing a contact log (telephone and/or email) of initial communication to, responses from, and follow-up communication to and from each firm solicited.
 - the Bidder's/Participant's solicitation of Bids from MWBE Subcontractors, while also considering total number of available MWBE firms that would meet the Goals stated in the respective Contract;
 - whether the Bidder/Participant solicited Bids from MWBEs listed as performing scopes of work sufficient to meet each Goal;
 - whether the solicitations were made at least **ten (10) Business Days** before Bid opening/Bid due date;
 - how the solicitations occurred and whether they were documented in a verifiable way (and in compliance with any forms provided by the County);

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- whether the substance of the Bidder's/Participant's solicitation was reasonably sufficient to generate a response from MWBEs;
- whether the Bidder/Participant promptly and adequately responded to inquiries received from MWBEs; and
- whether the Bidder/Participant initiated follow-up communications to MWBEs that did not respond to the Bidder's/Participant's initial solicitation.

- b) **Plan Availability – (10 pts)** The Bidder/Participant made the Project Documents (e.g., project descriptions, scopes of work, construction plans, specifications, and/or requirements) available for review by prospective MWBE Subcontractors or provided these documents to them at least **ten (10) Business Days** before the Bids are due. **A Bidder/Participant may receive credit for this GFE only if the Bidder/Participant receives credit for the above Subcontractor Solicitation GFE (subsection (a)) and it responds promptly to any request(s) made for access to the project documents.**

The ways a Bidder/Participant made Project Documents available for these points include:

- providing a telephone number or email address for MWBE firms to request copies of the Project Documents via email, fax, regular mail, or other means of document transfer, at no cost; and/or
- providing an address within the Charlotte-Concord-Gastonia MSA where MWBEs can physically access/review the Project Documents at no cost; and/or
- posting the Project Documents on a website that MWBEs can access at no cost.

- c) **Breaking Down Work – (10 pts)** The Bidder/Participant separated or combined elements of work into economically feasible units to facilitate MWBE participation. **A Bidder/Participant may receive credit for this GFE only if the Bidder/Participant receives credit for the above Subcontractor Solicitation GFE (subsection (a)).**

In deciding whether to award points for this GFE, the BDI Program Team will consider:

- the number and dollar value of the scopes of work the Bidder/Participant listed in its written invitation to Bid for MWBE participation,
- whether those scopes would be sufficient to meet the contract subcontracting Goals and how the Bidder/Participant notified MWBEs of its willingness to break down the work into such units.

Simply restating the County's subcontracting scopes as listed in the solicitation documents may not be sufficient to earn this GFE; the Bidder/Participant should provide written documentation to demonstrate negotiations with MWBEs after having proposed broken-down or combined elements of work.

- d) **Working with an MWBE Assistance Organization – (10 pts)** The Bidder/Participant must document it worked with MWBE trade, community, or

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contractor organizations identified by the BDI Program Team, the NC Office of Historically Underutilized Businesses, and/or included in the Bid documents that provide assistance in recruitment of MWBE businesses, at least **fifteen (15) Business Days** before Bids are due. **A Bidder/Participant may receive credit for this GFE only if the Bidder/Participant receives credit for the above Subcontractor Solicitation GFE (subsection (a)).**

The Bidder/Participant must document that it worked with an MWBE assistance organization to provide assistance in recruiting MWBEs for the Contract for which Bids are sought. In deciding whether to award points for this GFE, the BDI Program Team will consider:

- the timing and nature of how the Bidder/Participant worked with the MWBE organization, and;
- whether such efforts were reasonably likely to result in significant MWBE participation for the Contract for which Bids are sought.

- e) **Attending Pre-Bid – (10 pts)** The Bidder/Participant attended any pre-Bid meetings scheduled by the public owner.
- f) **Bonding or Insurance Assistance – (10 pts) After the Bidder/Participant received a Bid from an MWBE Subcontractor**, the Bidder/Participant committed to providing assistance to the MWBE in obtaining required bonding or insurance or provided alternatives to bonding or insurance. **Mere willingness to offer such assistance in the absence of some MWBE Subcontractor participation will not result in credit for these points.**

To document satisfaction of this GFE, the Bidder/Participant must submit:

- the name and contact information of the MWBE;
- a description of the assistance the Bidder/Participant will provide;
- the date the Bidder/Participant will provide the assistance;
- the name of a contact person with the MWBE who can verify that the Bidder/Participant committed to providing the assistance; and
- any additional information requested by the County.

No credit will be given for assistance provided to an Affiliate of the Bidder/Participant or assistance provided that is required by law.

In deciding whether to award points for this GFE, the BDI Program Team will consider how significant and meaningful the assistance was, how many MWBEs the assistance was offered to, and what impact it likely had on the Bidder's/Participant's efforts to recruit MWBEs for the project.

- g) **Negotiating in Good Faith with MWBEs- (20 pts)** The Bidder/Participant must demonstrate that the Bidder/Participant negotiated in good faith with interested MWBE businesses (which, at a minimum, means showing some back-and-forth negotiations between the Bidder/Participant and prospective MWBEs), and did not reject any MWBEs as unqualified without sound reasons based on their capabilities

and shall document in writing the reasons for rejecting any MWBEs for lack of qualifications.

The County will determine if the rejection is valid based on the following information to be provided by the Bidder/Participant:

- copies of all Subcontractor proposals/responses received from each MWBE firm responding to the Bidder's/Participant's solicitation;
- letter from Bidder/Participant detailing reasons for rejecting MWBEs due to lack of qualifications;
- for subcontracts where a MWBE firm is not considered the lowest responsible Subcontractor, copies of proposals/responses received from all firms submitting proposals for that particular scope of work;
- if the rejection is due to self-performance of a specified work area, Bidder/Participant must submit Bidder's/Participant's own estimate for the scope of work.

The Bidder/Participant must not alter any dollar amounts and/or scopes of work. If a revision is required a revised proposal must be submitted. All telephone proposals must be followed up with a written proposal. All proposals must be received prior to Bid opening/Bid due date.

h) Financial Assistance – (15 pts) After the Bidder/Participant received a Bid from an MWBE Subcontractor, the Bidder/Participant committed to providing one of the following types of assistance to an MWBE in connection with the Contract, once awarded:

- assistance in obtaining equipment, a loan, capital, lines of credit, joint pay agreements or guaranties to secure loans, the purchase of supplies, or letters of credit, including waiving credit that is ordinarily required, or
- assistance in obtaining the same unit pricing with the Bidder's/Participant's suppliers as the Bidder/Participant.

To receive credit for this GFE, Bidders/Participants must provide:

- language in the Bidder's/Participant's solicitation letter and publication advertisement stating the Prime Contractor's Financial Assistance Policy;
- the name and contact information of the MWBE;
- the description of the assistance to be provided by the Bidder/Participant;
- the date the Bidder/Participant will provide the assistance; and
- the name of a contact person with the MWBE firm who can verify that the Bidder/Participant committed to providing the assistance.

In deciding whether to award points for this GFE, the BDI Program Team will consider how significant and meaningful the assistance was, how many MWBEs assistance was offered to, and what impact the assistance likely had on the Bidder's/Participant's efforts to recruit MWBEs for the project. **Mere willingness**

to offer such assistance in the absence of some MWBE Subcontractor participation will not result in credit for these points. No credit will be given for assistance provided to an Affiliate of the Bidder/Participants.

- i) **Joint Venture Arrangement – (20 pts)** The Bidder/Participant must demonstrate that the Bidder/Participant negotiated joint venture/partnership/association arrangements with MWBE in order to increase opportunities for MWBE participation on this project.
 - To receive credit for this GFE, Bidders/Participants must provide:
 - the name and contact information of the MWBE;
 - a copy of the Joint Venture agreement or other formal business arrangement;
 - evidence of the date the MWBE entered into the agreement; and
 - the name of a contact person with the MWBE firm who can verify the existence of the agreement.

No credit will be given for a Joint Venture with an Affiliate of the Bidder/Participant. **Mere willingness to offer such arrangement in the absence of some MWBE Subcontractor participation will not result in credit for these points.**

- j) **Quick Payment Commitment – (10 pts)** After the Bidder/Participant received a Bid/Proposal from an MWBE Subcontractor, the Bidder/Participant committed to providing quick pay agreements and policies to enable such MWBE Subcontractor(s) and/or supplier(s) to meet cash-flow demands. **Mere willingness to offer such agreement in the absence of some MWBE Subcontractor participation will not result in credit for these points.**
 - Quick Pay Agreements are defined herein at Section-10(1) (Definitions).
 - To receive credit for this GFE, Bidders must provide the BDI Program Team with:
 - language in the Bidder's/Participant's solicitation letter and publication advertisement stating the Prime Contractor's Quick Pay Policy;
 - a copy of the Bidder's Quick Pay Commitment related to the specific Contract;
 - documentation indicating that all MWBEs notified under the above Subcontractor Solicitation GFE (subsection (a)) have received a written copy of the Bidder's Quick Pay Commitment prior to the Bid opening/Bid due date.

GFE Documentation

To demonstrate GFE compliance, a Bidder/Participant must submit the GFE Supporting Documentation within the time specified by the BDI Program Office. If the BDI Program does not specify a time, the Bidder/Participant must submit GFE Supporting Documentation within **three (3) Business Days** after the Bid due date. The BDI Program Office may request GFE Supporting Documentation from other Bidders in order to evaluate the MWBE participation achievement and the GFEs of the apparent low/best value Bidder relative to others.

Regardless of when the GFE Supporting Documentation is due, **all actions necessary to earn the GFE points must be undertaken and dated prior to Bid opening/Bid due date.**

Consistent with the NC general statute, “Failure to file a required affidavit or documentation that demonstrates that the contractor made the required good faith effort is grounds for rejection of the Bid.” N.C.G.S. § 143-128.2(c).

MWBE Good Faith Efforts Appeal Process

If a Bid/Proposal is rejected because the BDI Program Office determined after reviewing all relevant information that the submitted documentation was inadequate to establish sufficient Good Faith Efforts, the Bidder/Participant may request a review of this determination in accordance with the following process: The Bidder/Participant who wishes to dispute the Good Faith Efforts decision of the BDI Program Office may have that decision reviewed by the Hearing Committee provided the Bidder/Participant submits a request for review in writing to the Originating Department within five (5) business days of the date of the decision to reject the proposal. The request shall contain specific reasons and any supporting documentation for why the Bidder/Participant believes that the Good Faith Efforts decision was in error.

The Originating Department shall refer the matter to the Hearing Committee (send a copy to the BDI Program Office). A hearing shall be scheduled within fifteen (15) business days of the receipt of the review request. The Hearing Committee will be provided all relevant documents in possession of the BDI Program Team. The Hearing Committee, upon its discretion, may seek review of the Good Faith Efforts decision with the Bidder and/or its representative and the BDI Director (or designee). The Hearing Committee shall make a decision and notify the Bidder in writing within five (5) business days following the hearing. The Hearing Committee may affirm, reverse, or modify the Good Faith Efforts decision of the BDI Program Office. The decision of the Hearing Committee shall be final.

SECTION-6 | REQUIRED FORMS

Listed below.

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Form A – Listing of Good Faith Efforts (GFE)

[Submit with Bid]

Name of Bidder:

(Company Name)

Project Name:

Solicitation #:

Prior to submission, review your documents for accuracy and ensure all items are complete

I have reviewed and made a good faith effort to comply with [Section-5 Good Faith Efforts \(GFE\) Points System](#) and have marked the following by selecting the checkbox(es) ☒ below and totaling the final points attained.

Bidders must earn at least fifty (50) points from the good faith efforts listed for their Bid to be considered responsive. (1 NC Administrative Code 30 I.0101). **The Bidder agrees to provide any additional information and/or documentation per [Section-5 Good Faith Efforts \(GFE\) Points System](#) requested by the Owner in support of the Bidder's good faith efforts.**

NOTE: All actions necessary to earn GFE Points must be undertaken prior to Bid opening/Bid due date.

- ☐ (a) – 15 pts **Subcontractor Solicitation:** Bidder/Participant solicited Bids from MWBEs that would meet the Goals stated for the respective project, that reasonably could have been expected to submit a quote, and that were known to the Bidder/Participant or available on State or local government-maintained lists, at least **ten (10) Business Days** before the Bid date and notified them of the nature and scope of the work to be performed.
- ☐ (b) – 10 pts **Plan Availability:** The Bidder/Participant made the Project Documents (e.g., project descriptions, construction plans, specifications, and/or requirements) available for review by prospective MWBE Subcontractors or provided these documents to them at least **ten (10) Business Days** before the Bids are due. **A Bidder/Participant may receive credit for this GFE only if the Bidder/Participant receives credit for the above Subcontractor Solicitation GFE (subsection (a)) and it responds promptly to any request(s) made for access to the project documents.**
- ☐ (c) – 10 pts **Breaking Down Work:** The Bidder/Participant separated or combined elements of work into economically feasible units to facilitate MWBE participation. **A Bidder/Participant may receive credit for this GFE only if the Bidder/Participant receives credit for the above Subcontractor Solicitation GFE (subsection (a)).**
- ☐ (d) – (10 pts) **Working with an MWBE Assistance Organization:** The Bidder/Participant must document it worked with MWBE trade, community, or contractor organizations identified by the BDI Program Team, the state Office of Historically Underutilized Businesses, and/or included in the Bid documents that provide assistance in recruitment of MWBE businesses, at least **fifteen (15) Business Days** before Bids are due. **A Bidder/Participant may receive credit for this GFE only if the Bidder/Participant receives credit for the above Subcontractor Solicitation GFE (subsection (a)).**
- ☐ (e) – (10 pts) **Attending Pre-Bid:** The Bidder/Participant attended any pre-Bid meetings scheduled by the Owner.
- ☐ (f) – (10 pts) **Bonding or Insurance Assistance:** **After the Bidder/Participant received a Bid/Proposal from an MWBE Subcontractor**, the Bidder/Participant committed to providing assistance to the MWBE in obtaining required bonding or insurance or provided alternatives to bonding or insurance. **Mere willingness to offer**

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such assistance in the absence of some MWBE Subcontractor participation will not result in credit for these points.

☐ (g) – (20 pts)

Negotiating in Good Faith with MWBEs: The Bidder/Participant must demonstrate that the Bidder/Participant negotiated in good faith with interested MWBE businesses (which, at a minimum, means showing some back-and-forth negotiations between the Bidder/Participant and prospective MWBEs), and did not reject any MWBEs as unqualified without sound reasons based on their capabilities and shall document in writing the reasons for rejecting any MWBEs for lack of qualifications.

☐ (h) – (15 pts)

Financial Assistance: After the Bidder/Participant received a Bid/Proposal from an MWBE Subcontractor, the Bidder/Participant committed to providing one of the following types of assistance to an MWBE in connection with the Contract, once awarded:

- assistance in obtaining equipment, a loan, capital, lines of credit, joint pay agreements or guaranties to secure loans, the purchase of supplies, or letters of credit, including waiving credit that is ordinarily required, or
- assistance in obtaining the same unit pricing with the Bidder's/Participant's suppliers as the Bidder/Participant.

☐ (i) – (20 pts)

Joint Venture Arrangement: The Bidder/Participant must demonstrate that the Bidder/Participant negotiated joint venture/partnership/association arrangements with MWBE in order to increase opportunities for MWBE participation on this project.

☐ (j) - (10 pts)

Quick Payment Commitment: After the Bidder/Participant received a Bid / proposal from an MWBE Subcontractor, the Bidder/Participant committed to providing quick pay agreements and policies to enable such MWBE Subcontractor(s) and/or Supplier(s) to meet cash-flow demands. **Mere willingness to offer such agreement in the absence of some MWBE Subcontractor participation will not result in credit for these points.**

The undersigned will enter into a formal agreement with the firms listed on the Identification of Subcontractor Participation Form (Form B), conditional upon the scope of contract to be executed with the Owner. Substitution of Contractors must be in accordance with GS143-128.2(d). Failure to abide by this statutory provision will constitute a breach of the contract, giving rise to all contract and/or statutory remedies, including but not limited to cancellation of the contract.

The undersigned hereby certifies that he or she has read the terms of the BDI Program Provisions Guide and the formal agreement with the firms listed on Form B and is authorized to bind the Bidder/Participant to the commitment herein set forth.

Total GFE Points _____ (Calculate the total GFE points selected with ☒ above)

For each Participation Goal (MBE and WBE) that is unmet, the Bidder must earn at least fifty (50) GFE points (the "Minimum GFE Points") to be considered responsive. Be prepared to submit the documentation following the Bid opening/Bid Due date.

Date: _____

Name of Authorized Person: _____

Signature: _____

Title: _____



State of _____, County of _____
Subscribed and sworn to before me this _____ day of _____ 20____
Notary Public Name/Signature _____
My commission expires _____

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Form B – Identification of Subcontractor Participation

[Submit with Bid]

SEE BDI SOLICITATION COVERSHEET FOR ESTABLISHED SUBCONTRACTING GOALS

The County maintains a strong commitment to the inclusion of MWBEs in the County's contracting and procurement process when there are viable subcontracting opportunities. Bidders must submit this form with their Bid/Proposal outlining any supplies and/or services to be provided by all Subcontractors, including each MBE, WBE, and non-certified firms for the Contract.

Prior to submission, review your documents for accuracy and ensure all items are complete

Name of Bidder:
(Company Name)

Certification Status
(check all that apply):

☐ MBE ☐ WBE ☐ NCSBE
☐ CBI-SBE ☐ NCDOT-DBE

Project Name:

Solicitation #:

Total Bid Amount:

Authorized Person:

Telephone:

Email:

I, the Authorized Person, do hereby certify that on this Contract, we intend to use the following certified **MWBEs** and non-certified firms as Subcontractors (subconsultants, vendors, suppliers, and/or providers of professional and/or other services). We intend to expend the amounts/percentages below of the total dollar amount of the contract with the businesses listed

****MBE and WBE Certification with the NCHUB Office is required to be counted toward participation goals.**

Total Utilization Amount	Total Utilization Percentage	Total MBE Amount	Total MBE Percentage	Total WBE Amount	Total WBE Percentage	Total Non-Certified Amount	Total Non-Certified Percentage

#	Firm Name / Contact Person	Telephone / Email	County / State	Scope of Work	MBE Amount	WBE Amount	Non-Certified Amount
1							
2							
3							
4							
5							
6							

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8							
9							
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11							
12							
13							
14							
15							

(add additional sheets if needed)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with the firms listed on this form, conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract, giving rise to all contract and/or statutory remedies, including but not limited to cancellation of the contract.

The undersigned hereby certifies that he or she has read the BDI Program Provisions Guide and the terms of this commitment and is authorized to bind the Bidder to the commitment herein set forth.

Signature of Authorized Person

Title

Date

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Form B1 – Identification of Subcontractor Participation - ALTERNATES

[Do not submit with Bid – Due within three (3) business days after receiving a request from the County]

In the event Construction Alternates are selected by the County, the established Subcontracting goal(s) for this Contract will apply to the total contract amount, including contingency and the selected Alternates ("Total Contract Amount"). In such an instance, Bidders/Participants must identify additional MWBE commitments and submit Form B1 showing all commitments made after Bid Opening.

The County maintains a strong commitment to the inclusion of MWBEs in the County's contracting and procurement process when there are viable subcontracting opportunities. Bidders must submit this form outlining any supplies and/or services to be provided by all Subcontractors, including each MBE, WBE, and non-certified firms for the Contract.

Prior to submission, review your documents for accuracy and ensure all items are complete

Name of Bidder

(Company Name): _____

Total Contract Amount: _____

Project Name: _____

Solicitation #: _____

Authorized Officer Title: _____

Telephone: _____

Email: _____

I, the Authorized Person, do hereby certify that on this Contract, we intend to use the following certified **MWBEs** and non-certified firms as Subcontractors (subconsultants, vendors, suppliers, and/or providers of professional and/or other services). We intend to expend the amounts/percentages below of the total dollar amount of the contract with the businesses listed

****MBE and WBE Certification with the NCHUB Office is required to be counted toward participation goals.**

Total Utilization Amount	Total Utilization Percentage	Total MBE Amount	Total MBE Percentage	Total WBE Amount	Total WBE Percentage	Total Non-Certified Amount	Total Non-Certified Percentage

#	Firm Name / Contact Person	Telephone / Email	County / State	Scope of Work	MBE Amount	WBE Amount	Non-Certified Amount
1							
2							
3							
4							

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14							
15							

(add additional sheets if needed)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with the firms listed on this form, conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract, giving rise to all contract and/or statutory remedies, including but not limited to cancellation of the contract.

The undersigned hereby certifies that he or she has read the BDI Program Provisions Guide and the terms of this commitment and is authorized to bind the Bidder to the commitment herein set forth.

Signature of Authorized Person

Title

Date

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Form C – Statement of Intent to Perform Contract with OWN Workforce

[Submit with Bid]

Prior to submission, review your documents for accuracy and ensure all items are complete

Name of Bidder:

(Company Name)

Telephone:

Certification

Status:

Emails:

☐ MBE

☐ WBE

☐ NCSBE

☐ CBI-SBE

☐ NCDOT-DBE

Project Name:

Solicitation #:

Total Bid Amount:

I hereby certify that it is our intent to perform 100% of the contract required for this Contract.

1. In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type of project, normally performs, has the capability to perform, and will perform **all elements of the work** (labor) on this project with his/her own current workforces – including any aggregation of material, equipment or supplies required for the project provided by the Bidder's company for utilization on a County Project, with the total value of which is ten percent (10%) or more of the value of the contract or \$2,000, whichever is less; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

2. If it should become necessary to subcontract some portion of the work at a later date, the Bidder will comply with all "Good Faith Efforts" requirements in providing equal opportunity to MWBE firms to subcontract the Work. The BDI Program Office should be notified immediately and approved, and respective BDI Program Provisions and Forms should be adhered to.

The undersigned hereby certifies that he or she has read the BDI Program Provisions Guide and this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____

Name of Authorized Person: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public Name/Signature _____

My commission expires _____

Form D – MWBE Inclusion Plan

[Submit with Bid/Submission, when selected in the BDI Solicitation Coversheet]

Create a detailed description of the strategies and actions the Bidder will take to outreach fairly and equitably, support, and contract with MWBEs.

Prior to submission, review your documents for accuracy and ensure all items are complete

The following are elements to incorporate into the MWBE Inclusion Plan to help collaborate with MWBEs by addressing the following, but not be limited to:

- the firms you contacted, when, and how you made contact, and their contact information
- the outreach strategy used to meet this Contract's MWBE achievement goals;
- the specific resources and resource contacts utilized to locate MWBE firms for this Contract;
- the plan for building a connection with MWBEs and developing a project team;
- the plan to strengthen business relationships;
- the methods that will be used to improve lines of communication;
- the approach(es) that will be taken to resolve disputes;
- detailed description of the supportive services and activities that will be established for business development and how the plan will be executed;
- the mentorship opportunities that will be made available and how those opportunities will be executed; and
- the efforts that will be made available for capacity building and how those efforts will be executed.

(add additional sheets if needed)

DO NOT SUBMIT WITH BID

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Form E – Subcontractor Commitment

[Do not submit with Bid – Due within three (3) business days after receiving a request from the County]

This document standing alone shall not be considered an actual subcontract between the two parties. A separate binding agreement will describe in detail the contractual obligation of the Prime Contractor and the Subcontractor. The undersigned will enter into a formal agreement for the scope of work mentioned, conditioned upon the execution of a contract with Mecklenburg County. Breach of this commitment constitutes breach of Bidder's/Participant's contract if awarded. **If subcontracting with MBE/WBE Firms, any changes in this commitment must be approved in advance by the BDI Office.**

To be completed by the Prime Contractor			
Project Name:		Solicitation Number:	
Company Name:			
Authorized Person:		Title:	
Email:		Telephone:	
Reason for Out-of-State Sub Selection (if applicable):			

If the Prime Contractor has entered into a Quick Pay Agreement, in association with this Commitment, attach a copy of the executed Agreement with the undersigned business.

Upon execution of a Prime Contract with the County for the above referenced project, the Bidder/Participant certifies that it intends to utilize the business listed below, and that the description, cost of work to be performed by the business as described below is accurate. Both parties have or will enter into a formal agreement conditioned upon the execution of a Contract with Mecklenburg County.

Signature of Authorized Person (Prime Contractor)

Date

To be completed by the Subcontractor (Supplier/Subconsultant)			
Company Name:			
Authorized Person:		Title:	
Telephone:		Email:	
Address, City, St, Zip:			
County:		Ownership is Minority Female:	☐ Yes ☐ No
Source of Ownership Category:	** Please Select **	Ownership Category:	** Please Select **
Contract Date:		Attended the Pre-Bid:	☐ Yes ☐ No

Identify in complete detail the scope of work to be performed and/or item(s) to be supplied with projected start and end timeframe. The undersigned intends to and is prepared to perform the work and/or provide the supplies (described below) in connection with the above project at the following Price (\$): _____

NIGP Code	Scope of Work	Projected Start Date	Projected End Date

The subcontracting firm certifies that it has read the BDI DBE Program Guide and agreed to provide such work/supplies for the amount stated above. Both parties have or will enter into a formal agreement conditioned upon the execution of a Contract with Mecklenburg County.

Signature of Authorized Person (Subcontractor/Supplier)

Date

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Form E1 – Tier 2 Subcontractor Commitment (Special Projects Only)

[Do not submit with Bid – Due within three (3) business days after receiving a request from the County]

This document standing alone shall not be considered an actual subcontract between the two parties. A separate binding agreement will describe in detail the contractual obligation of the Tier 1 Subcontractor and the Tier 2 Subcontractor. The undersigned will enter into a formal agreement for the scope of work mentioned, conditioned upon the execution of a contract between the Prime Contractor with Mecklenburg County and with the Prime Contractor and the Tier 1 Subcontractor. **If subcontracting with MBE/WBE Firms, any changes in this commitment must be approved in advance by the BDI Office.**

To be completed by the Tier 1 Subcontractor			
Project Name:			
Company Name:			
Authorized Person:		Title:	
Email:		Telephone:	
Reason for Out-of-State Sub Selection (if applicable):			

If the Subcontractor has entered into a Quick Pay Agreement, in association with this Commitment, attach a copy of the executed Agreement with the undersigned business.

Upon execution of the above-mentioned executed Contracts, the Tier 1 Subcontractor certifies that it intends to utilize the business listed below, and that the description, cost of work to be performed by the business as described below is accurate. Both parties have or will enter into a formal agreement conditioned upon the above-mentioned executed Contracts.

Signature of Authorized Person (Tier 1 Subcontractor)

Date

To be completed by the Subcontractor (Supplier/Subconsultant)			
Company Name:			
Authorized Person:		Title:	
Telephone:		Email:	
Address, City, St, Zip:			
County:		Ownership is Minority Female:	☐ Yes ☐ No
Source of Ownership Category:	** Please Select **	Ownership Category:	** Please Select **
Contract Date:		Attended the Pre-Bid:	☐ Yes ☐ No

Identify in complete detail the scope of work to be performed and/or item(s) to be supplied with projected start and end timeframe. The undersigned intends to and is prepared to perform the work and/or provide the supplies (described below) in connection with the above project at the following Price (\$): _____

NIGP Code	Scope of Work	Projected Start Date	Projected End Date

The subcontracting firm certifies that it has read the BDI DBE Program Guide and agreed to provide such work/supplies for the amount stated above. Both parties have or will enter into a formal agreement conditioned upon the above-mentioned executed Contracts.

Signature of Authorized Person (Tier 2 Subcontractor/Supplier)

Date

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Form F – Certificate of MWBE Unavailability

[Do not submit with Bid – Due within three (3) business days after receiving a request from the County]

This document identifies the MWBE firm that was originally committed to Subcontract in good faith but became unavailable prior to providing the work/supplies, originally agreed upon for this project.

To be completed by the Prime Contractor			
Project Name:		Solicitation Number:	
Company Name:			
Authorized Person:		Title:	
Email:		Telephone:	
Reason for Out-of-State Sub Selection (if applicable):			

The undersigned certifies that the below MWBE was contacted in “**Good Faith**” and agreed to participate on the Project mentioned above with the stated price and scope of work but is now unavailable per the reason they have stated below.

Signature of Authorized Person (Prime Contractor)

Date

To be completed by the Subcontractor (Supplier/Subconsultant)			
Company Name:			
Authorized Person:		Title:	
Telephone:		Email:	
Address, City, St, Zip:			
County:		Ownership is Minority Female:	☐ Yes ☐ No
Source of Ownership Category:	** Please Select **	Ownership Category:	** Please Select **
Contract Date:		Attended the Pre-Bid:	☐ Yes ☐ No

Price (\$)	Scope of Work	Reason for Unavailability

The firm certifies that it is no longer available to provide such work/supplies for the amount stated above, per the reason stated.

Signature of Authorized Person (Subcontractor/Supplier)

Date

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Form G – Prime Contractor / Project Identification Form

[Do not submit with Bid – Due within three (3) business days after receipt of fully executed County contract]

To be completed by the Prime Contractor			
Project Name:		Solicitation #:	
Company Name:			
Owner Name:		Owner Email/Telephone:	
Authorized Person:		Title:	
Email		Telephone:	
Address, City, County, State, Zip:			
Bid Opening Date:		Self-Performing:	☐ Yes ☐ No
Contract Date:		Contract #:	
Original Contract Value:		Current Certification(s):	
Primary Type of Work for this Contract (Construction)	**Please Select**	Primary Discipline for this Contract (Construction)	**Please Select**
Construction Method (Construction)	**Please Select**	Type of Service (Construction)	**Please Select**
Scope of Work (Services/Goods)			
Ownership Category	** Please Select **	Ownership is Minority Female	☐ Yes ☐ No
Source of Ownership Category	** Please Select **		

Signature of Authorized Person_____
Date

BUSINESS DIVERSITY & INCLUSION (BDI) PROGRAM PROVISIONS GUIDE

Mecklenburg County Government

Formal Documents

Form H – Statement of Payments to Subcontractors (Suppliers/Subconsultants)

[Do not submit with Bid – Due with pay applications]

Prime Contractors (Tier 1 Subcontractors when applicable) must submit this form or when applicable, input this information into the Contract Compliance Solution System with each request for payment showing work that has been approved and completed for all Subcontractors (suppliers, manufacturers, brokers, and/or members of a joint venture) in connection with the Contract.

Copy this form as needed.

Project Name:		Contract Number:	
Company Name:			
Authorized Person:		Title:	
Email:		Telephone:	
Address, City, County, State, Zip:			
Payment Period (dates – from/to):		Payment/Invoice #:	
Invoice Amount:		County Project Manager Name:	
Notes:			

FINAL PAYMENT: ☐ Check this box only when submitting with the Final Pay Request **Final Contract Total Value:** _____

☐ No Payments: Certify that no Subcontractors (suppliers/subconsultants) were used in performing the Contract for the payment period indicated above.

PAYMENTS TO ALL SUBCONTRACTORS

Complete the fields below for all Subcontractors (suppliers/subconsultants) on the contract for the above-mentioned period regardless of dollar amount.

Firm's Name	Cert.	Scope of Work	NIGP	Amount to be Paid from this pay request	Total Payments to Date	Total Amount Committed
	Select					
	Select					
	Select					
	Select					
	Select					
	Select					
	Select					
	Select					
	Select					
	Select					

Formal Documents

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	Select				
	Select				
	Select				
	Select				
	Select				
Total Amount Paid on this Statement					
Total Amount paid to MBE firms on this Statement					
Total Amount paid to WBE firms on this Statement					
Total Amount paid to Non-Certified firms on this Statement					

The undersigned certifies the preceding chart is a true and accurate statement of all payments that have been made to Subcontractors (suppliers/subconsultants) on the above referenced Contract, and that all Suppliers providing goods under this contract include sales tax. If no Subcontractors or Suppliers are listed on the preceding chart, the undersigned certifies that no Subcontractors or Suppliers were used in performing the Contract for the payment period indicated. Failure to provide accurate and truthful information is a violation of Mecklenburg County's BDI Provisions Guide (Section-9) and may result in the sanctions prescribed therein.

Signature and title of the authorized person of the company and the date must be properly executed or this document will be deemed nonresponsive.

Date _____

SECTION-7 | PROMPT PAYMENT

Prompt payment of Prime Contractors and Subcontractors.⁶

The County shall pay the Prime Contractor in compliance with N.C.G.S. § 143 - 134.1(a), which mandates payment within forty-five (45) days of a complete and satisfactory invoice/demand.

Upon payment to the Prime Contractor by the County, the Prime Contractors shall thereafter ensure the prompt and full payment of any Subcontractors working on the contract. **Prime Contractors shall pay Subcontractors within seven (7) days of the Prime Contractor's receipt of payment, in compliance with N.C.G.S. § 143 - 134.1(b).**

Every contract with the County for the performance of work shall contain a provision requiring the Prime Contractor to certify in writing that all Subcontractors and suppliers have been paid promptly for work and materials from previous progress payments received (less any retainage) by the Prime Contractor prior to receipt of any further progress payments. A Prime Contractor is required to pay Subcontractors or suppliers funds due from progress payments within seven (7) days of receipt of payment from the County (see § 143 - 134.1(b) above).

During the contract and upon completion of the contract, the County may request documentation to certify payment to Subcontractors or suppliers. This subsection in no way creates any contractual relationship between any Subcontractor and the County or any liability on the County for a Prime Contractor's failure to make timely payment to the Subcontractor.

A Prime Contractor who fails to ensure the prompt and full payment of Subcontractors for goods or services delivered and accepted shall be subject to the penalties set forth in (N.C.G.S. § 143 - 134.1(b)).

SECTION-8 | ADDITIONAL RACE AND GENDER-NEUTRAL PROGRAM ELEMENTS

1. Vendor Rotation

For certain contracts in Construction, Architectural & Engineering, Professional Services, and Other Services that have the respective contract values listed below and are of a fairly routine nature, the BDI Program Office in conjunction with the Originating Department may reserve such contracts for award to an on-call list or pre-qualified panel of firms on a rotating basis. In determining whether the Vendor Rotation Program should be considered for a particular contract, the BDI Program Team and Department shall consider: a) whether there are at least three (3) firms that are available and capable to perform as Prime on such contracts; and b) whether the anticipated frequency of such contract opportunities will warrant multiple awards on a rotating basis.

- Professional Services and Other Services: contracts valued at \$30,000 or over, may be required to have additional review by the BDI Director (or designee) with consultation from the County Manager (or designee) when applicable;

⁶ Subcontractor payments are monitored and tracked by the BDI Program Office, as appropriate.

- Construction: contracts valued at \$30,000 or over, may be required to have additional review by the BDI Director (or designee) with consultation from the County Manager (or designee) when applicable;
- Architectural & Engineering: contracts valued at \$50,000 or over, may be required to have additional review by the BDI Director (or designee) with consultation from the County Manager (or designee) when applicable;

SECTION-9 | PROGRAM COMPLIANCE & GRIEVANCE PROCEDURES

1. Prime Contractor and Subcontractor Non-Compliance

The BDI Director, along with contracting staff of each County user Department, shall monitor compliance with these BDI Program requirements by Prime Contractors and Subcontractors during the term of the contract. If it is determined there is cause to believe a Prime Contractor or Subcontractor has failed to comply with any of the requirements of this Program, or with the contract provisions pertaining to MWBE utilization, the BDI Director (or designee) shall so notify the Director of the Originating Department, Procurement and the Contractor or Subcontractor in writing.

The BDI Director (or designee) may require such reports, information, and documentation from Prime Contractors, Subcontractors, and/or the Director of any County Department, division or office as are reasonably necessary to determine compliance with the Program requirements, within fifteen (15) business days after the notice of non-compliance.

If the requested materials are not received within fifteen (15) business days, then a finding of non-compliance is determined and appropriate penalties and sanctions will apply as stated in Section-9(3) of this Provisions Guide, set forth below.

It is the joint responsibility of the BDI Director (or designee) and the Director of the Originating Department (or designee) to attempt to resolve the non-compliance with the requirements of this Program, or the contract provisions pertaining to MWBE utilization, within thirty (30) business days.

If non-compliance cannot be resolved within the thirty (30) business days, the BDI Director (or designee) and the Director of the Originating Department (or designee) shall submit written recommendations to the County Manager (or designee) and/or the County Attorney (or designee) and if the County Manager and/or County Attorney (or respective designee) concurs with the finding, such sanctions as stated in Section-9(3) of this Provisions Guide shall be imposed.

2. Other Prime Contractor or Subcontractor Program Violations

It shall be a material violation of the BDI Program to:

- fraudulently obtain, retain, or attempt to obtain/retain (or aid another in fraudulently obtaining, retaining, or attempting to obtain/retain) Certification status as an MBE, WBE, or SBE for purposes of this Program;
- willfully falsify, conceal, or cover up by a trick, scheme, or device, a material fact pertaining to the provisions of this Program;

- knowingly make any false, fictitious, or fraudulent statements or representations, or make use of any false writing or document, knowing the same to contain any false, fictitious, or fraudulent statement or representation pertaining to the provisions of this Program;
- willfully obstruct, impede, or attempt to obstruct/impede any authorized official or employee who is investigating the qualifications of a business entity which has requested Certification as an MBE, WBE, or SBE;
- fraudulently obtain, attempt to obtain (or aid another person fraudulently obtaining or attempting to obtain) public monies to which the person is not entitled under the provisions of this Program; or
- make a false statement to any business entity or government representative that another entity is or is not certified as an MBE, WBE, or SBE for purposes of this Program;
- any person who violates the provisions of this section shall be subject to the penalties and sanctions set forth in Section-9(3) of this Provisions Guide, as well as any other remedies available under law up to the maximum penalty provided by law.

3. Penalties and Sanctions for Non-Compliance

Upon determination and recommendation of sanctions by the County Manager and/or County Attorney (or their respective designee) regarding the failure of a contractor, vendor, or other business representative to comply with any portion of the BDI Program, the non-complying party shall be subject to any or all of the following penalties:

- withholding of up to ten percent (10%) of all future invoiced payments for the eligible project until the BDI Program Office determines that the contractor is in compliance with the Program;
- withholding of all future payments under the eligible project until the BDI Program Office determines that the contractor is in compliance with the Program;
- rescission of the contract based upon a material breach of contract pertaining to BDI Program compliance;
- refusal to accept a Bid, proposal or response; and
- disqualification of the contractor, vendor, or other business from eligibility for Bidding Construction projects, providing goods or services (Professional or otherwise) to the County for a period not to exceed two (2) years.

4. Mediation of Disputes between Prime Contractors and Subcontractors; Joint Venture Partners

If, after the award of a contract, pursuant to the BDI Program, a dispute arises between the Prime Contractor and a Subcontractor regarding performance of work or provision of

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services or supplies on the eligible project, then such Prime Contractor or Subcontractor may seek review and mediation of the issue before the BDI Director (or designee). The request for review must be made in writing.

Within twenty (20) business days of receipt of a request for review, if the dispute has not already been resolved informally among the parties, the BDI Director (or designee) shall set a mediation date and shall provide written notice of the mediation date to each of the interested parties.

The BDI Director (or designee) shall have authority to make recommendations in an attempt to resolve the dispute.

In the event that the mediation with the BDI Director (or designee) does not resolve all disputes, the BDI Director (or designee) shall have the option of referring mediation proceedings to a qualified outside mediator, contingent upon the consent and at the expense of the interested parties.

However, any actions taken by the BDI Program Office to resolve contractor disputes or to ensure the fair and equitable treatment of Subcontractors (or joint venture partners) working on County contracts are done pursuant to the BDI Program Provisions Guide or general non-discrimination policy and shall not be construed as the County taking a position as to the merits of the dispute nor creating any privity of contract between the County and any contractor or Subcontractor. Further, no contractor working on a County contract shall have any claim against Mecklenburg County for any actions taken to ensure the fair and equitable treatment of Subcontractors (or joint venture partners) working on County contracts.

SECTION-10 | APPENDIX

1. Definitions

Affiliate(s): Two entities are affiliates of one another when: (a) one controls or has the power to control the other; (b) a third-party controls, or has the power to control, both; or (c) there is a significant relationship between the two entities based on common ownership, management or employees, shared equipment, assets, or facilities, physical proximity, percentage of revenue derived from the other entity, or loans, leases, contributions, and contracts.

Achievement Goal(s): An aspirational participation percentage applied on each contract for MBE and WBE Subcontractor participation for Construction, Professional Services, Goods and Other Services. The Achievement Goals are based upon the availability in the Relevant Market as determined by the disparity study which is conducted every five (5) years by the County.

Availability: In accordance with the most recent Disparity Study Means being qualified, ready, willing, and able to perform work for the County on a Contract. This means that the Bidder/Participant does business within an industry group from which the County or its Contractors make certain purchases; the firm's owner has taken steps to do business with the County and qualified itself to do such business by registering with the County as a vendor and/or being certified, as appropriate; and the firm is located within a relevant geographical area such that it can do business with the County.

Authorized Person: The authority of a person or business owner to legally sign responses to solicitations and contracts, make price negotiation decisions, sell or liquidate the business, and have the primary authority to direct the day-to-day management and operation of a business enterprise without interference from others.

Award: The final selection or approval of a Respondent for a specified (Prime) Contract.

Best Value Contracting: A purchasing solicitation process which may evaluate factors other than price. Evaluation criteria for selection may include a Respondent's previous experience and quality of product or services procured, and other factors identified in the applicable solicitation.

BDI: Business Diversity and Inclusion

BDI Director: The staff member that is primarily responsible for the management of the BDI Program with the County and ultimately responsible for oversight, tracking, monitoring, compliance, administration, implementation, and reporting of the MWSBE elements within the BDI Program. The BDI Director is also responsible for enforcement of contractor and vendor compliance with contract participation requirements and ensuring that overall Program goals and objectives are met.

BDI Program: The combination of race- and gender-neutral and race- and gender-conscious remedies, policies, procurement reforms, and Program Elements that are provided herein for the purpose of enhancing the ability of MWSBE firms to fairly compete for County contract opportunities, and for the purpose of establishing a broader marketplace environment that is less susceptible to the ongoing effects of discrimination.

BDI Program Team or Office: A group of staff members or designated representatives who work collectively and individually under the direction of the BDI Director. The team is responsible for executing the work of the BDI Program.

Bid: A quote, proposal, or offer to perform work or provide labor, materials, supplies, or services for Mecklenburg County for a price.

Bid Due: The date and time specified that Bids, Proposals, or other submittals are due.

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Bid Opening: The process of opening Bids conducted at the time and place specified in the Invitation to Bid and/or the advertisement. For Contracts that are subject to formal Bidding requirements under the North Carolina Bid statutes (N.C.G.S. § 143-128 and § 143-129), the Bid Opening shall be the date and time that Bids are opened by the County.

Bidder/Participant: Any person, firm, company, partnership, corporation, association, or joint venture seeking to be awarded a contract by the County on a project by submitting a Bid.

Business Days: Days on which the administrative offices of Mecklenburg County are open to the public for business.

Charlotte – Concord – Gastonia MSA: The Charlotte-Concord-Gastonia Metropolitan Statistical Area in effect as of 2013, consisting of: (a) the North Carolina counties of Mecklenburg, Union, Gaston, Cabarrus, Iredell, Rowan, and Lincoln Counties; and (b) the South Carolina counties of York, Chester and Lancaster.

Commercially Useful Function: An MWSBE firm performs a Commercially Useful Function when it is responsible for executing the contracted work and is carrying out its responsibilities by actually performing, staffing, managing and supervising the work involved. To perform a Commercially Useful Function, the MWSBE firm must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quantity and quality, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether an MWSBE firm is performing a Commercially Useful Function, an evaluation must be performed of the amount of work subcontracted, normal industry practices, whether the amount the MWSBE firm is to be paid under the contract is commensurate with the work it is actually performing and the MWSBE credit claimed for its performance of the work, and other relevant factors. An MWSBE firm does not perform a Commercially Useful Function if its role is limited to that of an extra participant in a transaction, contract or project through which funds are passed in order to obtain the appearance of meaningful and useful MWSBE participation, when in similar transactions in which MWSBE firms do not participate, there is no such role performed.

Contract: A legally binding agreement through which Mecklenburg County agrees to procure goods or services and a vendor or contractor agrees to provide goods or services for agreed upon consideration.

Contract Documents: All documents that constitute the agreement between the County, the Owner and/or the Contractor or Vendor, including documents incorporated by reference into the agreement.

County: Mecklenburg County, North Carolina.

Days: Any reference to “days” in this Program shall mean calendar days unless it is specifically indicated to be Business Days.

Disadvantaged Business Enterprise (DBE): For-profit small business concerns where socially and economically disadvantaged individuals own at least a fifty-one percent (51%) interest and also control management and daily business operations.

African Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent Asian Americans, and women are presumed to be socially and economically disadvantaged. Other individuals may also qualify as socially and economically disadvantaged on a case-by-case basis.

Formal Solicitations: An invitation to Bid (ITB), request for proposal (RFP), request for qualifications (RFQ), or other solicitation document issued by a County Department for a Contract that requires formal advertisement in accordance with the procurement rules adopted by the County Manager (or designee) and/or pursuant to statutory requirements (i.e., N.C.G.S. § 143.129). [Mecklenburg County's Procurement Policies](#)

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Goal: A numerical objective.

Goal-Setting Committee (GSC): Means a committee tasked with setting contract-by-contract goals for the MWBE elements within the BDI Program.

Good Faith Efforts (GFE): The activities of Bidders/Participants for County projects designed specifically to obtain participation of MWBE Subcontractors on their projects. Such activities shall be documented and verified when MWBE goals for a County project are not achieved. Actions and efforts taken by the Bidder/Participant in furtherance of meeting any MWBE goals, as further defined and outlined in N.C.G.S. § 143.128.2 and in Section-4 herein.

Good Faith Efforts Documentation: All forms and documentation as may be required by the County, including pursuant to N.C.G.S. § 143.128.2, described/listed in Form A, or otherwise requested or required by the County at its discretion, relating to the Good Faith Efforts taken by a Bidder/Participant to meet a Goal.

Good Faith Negotiations: The actions and efforts taken by the Bidders/Participants to show that they held discussions with MWBEs aimed at reaching an agreement with honesty or sincerity of intention to comply with Bid requirements.

Independently Owned and Operated: Ownership of an MWSBE firm may be by individuals and/or by other businesses provided the ownership interests in the MWSBE firm can satisfy the MWSBE eligibility requirements for ownership and Control as specified herein. The MWSBE firm must also be Independently Owned and Operated in the sense that it cannot be the subsidiary or captive Affiliate of another firm that does not itself (and in combination with the certified MWSBE firm) satisfy the eligibility requirements for MWSBE Certification.

Industry Categories: Procurement groupings for the County inclusive of Architect & Engineering, Construction, Professional Services, Goods and Other Services (e.g., manufacturing, wholesale, and retail distribution of commodities, and non-professional services). This term may sometimes be referred to as “business categories.”

Informal Solicitations: Solicitations for contracts that do not require Formal Bid Solicitations requirements. (See, N.C.G.S. § 143.129 and § 143.131).). It is the policy of the County to obtain at least three (3) quotes. [Mecklenburg County's Procurement Policies](#)

Hearing Committee: A committee composed of three or more individuals, which shall review and make decisions on MWBE Good Faith Effort appeals.

Joint Venture: An association of two or more businesses to carry out a single business enterprise for profit, for which they combine their property, capital, efforts, skills, and knowledge.

Minority Business Enterprise (MBE): A legal entity, except a joint venture, that is organized to engage in for-profit transactions, which is Certified as being at least fifty-one percent (51%) owned, managed and controlled by one or more Minority Group Members, and that is ready, willing and able to sell goods or provide services that are purchased by Mecklenburg County. An MBE is a bona fide MBE only if the minority group ownership interests are real and continuing and not created solely to meet an MBE participation requirement. The MBE must also perform a Commercially Useful Function to be a bona fide MBE for Program purposes. Unless otherwise stated, the term “MBE” as used in this Program are not inclusive of non-minority women-owned business enterprises (WBEs).

Minority Group Members: African Americans, Hispanic Americans, Asian Americans and Native Americans legally residing in, or that are citizens of, the United States or its territories, as defined below:

- African American/Black: Persons having origins in any of the black racial groups of Africa.

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- Hispanic American: Person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands regardless of race.
- Asian American: Person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.
- American Indian/Native American: Person having no less than 1/16th percentage origin in any of the American Indian/Native American Tribes of North America as recognized by the U.S. Department of the Interior, Bureau of Indian Affairs and as demonstrated by possession of personal tribal role documents.
- Woman: female of any of the above listed minority groups
- See N.C.G.S. § 143.128.2(g) for additional definitional guidance.

MWSBE Certification: The process by which a firm is determined to be a bona fide minority-owned, women-owned, or small business enterprise.

MWSBE Directory: A listing of minority-owned, women-owned, and small businesses that have been certified as eligible to participate in, and benefit from, the application of the County's MWSBE elements within the BDI Program

NIGP: National Institute of Governmental Purchasing (NIGP) codes used to describe commodities purchased by governmental agencies.

Originating Department: The County Department or authorized representative of the County which issues a solicitation, or for which a solicitation is issued on behalf of, for the purchase of goods or services.

Owner: Mecklenburg County.

Payment Affidavit: A document detailing the total dollars paid by the Contractor to all Subcontractors and suppliers receiving payment in connection with a Contract. Payment Affidavits shall be in the format specified by the County.

Points: The numeric assignment of value for specific evaluation criteria in the vendor selection process used in some Construction, Professional Services, and Other Services contracts to meet Bid requirements (e.g., up to 10 points out of a total of 100 points assigned for the degree of MWBE participation of a Respondent/Bidder team).

Prime Contractor: The vendor or contractor to whom a purchase order or contract is issued by Mecklenburg County for purposes of providing goods or services to, or on behalf of, the County.

Program Elements: Refers to various race- and gender-neutral and race- and gender-conscious BDI Program tools that are used to encourage greater Prime and Subcontractor participation by MWBE firms, including, but not limited to, evaluation preferences, goals, and supportive services.

Program Waiver: A particular procurement solicitation for which goals are not required and is therefore waived. This is not the same as a "Waiver based on Good Faith Efforts."

Quick Pay Commitment: An agreement or commitment that a Prime Contractor makes to pay all Subcontractors participating in a Contract within twenty (20) days after the Prime Contractor confirms that the subcontracted work has been properly performed and properly completed. Such agreement or commitment exists outside of the State's Prompt Pay Act requirements, meaning that payment to the Subcontractors pursuant to such agreement is not contingent on the Prime Contractor receiving payment from the County.

Race-Conscious / Gender-Conscious Program Element(s): Any business classification or Program element which is defined by the race or gender of the business owner.

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Race-Neutral / Gender-Neutral: Any business classification or Program element wherein the race or gender of the business owner(s) is not taken into consideration.

Relevant Market: The Relevant Market encompasses the geographical area where Mecklenburg County awards at least seventy-five percent (75%) of its dollars.

Respondent: A vendor or Bidder/Participant submitting a Bid, statement of qualifications, or proposal in response to a solicitation issued by the County.

Responsible: A firm that is capable in all respects to fully perform the contract requirements and has the integrity, means, reputation and reliability which will assure performance of contract specifications within the required time.

Responsive: A firm's submittal (Bid, response, or proposal) that conforms in all material aspects to the solicitation (Invitation for Bid, Request for Qualifications, or Request for Proposal) and shall include compliance with BDI Program requirements.

Services Contract: A Contract for a business enterprise to provide an act or a variety of work for an agreed upon payment, and not otherwise defined by statute. Examples include, but not limited to, contracts for architectural, engineering, surveying, or construction management services, accounting or auditing services, computer (IT) consulting, janitorial services, etc.

Significant Business Presence: A business enterprise must have its headquarters or an established place of business in the Charlotte-Concord-Gastonia MSA, and from which at least twenty-five percent (25%) of its total full-time, part-time, and contract employees are regularly based. A location utilized solely as a post office box, mail drop, or telephone message center, or any combination thereof, with no other substantial work function, shall not be construed to constitute a significant business presence.

Small Business Enterprise (SBE): A business enterprise shall be eligible for Certification as a "Small Business Enterprise" (SBE) only if it meets the eligibility requirements for the NC Historically Underutilized Business Small Business Certification (NCSBE) or the City of Charlotte-Charlotte Business Inclusion Small Business Certification (CBI-SBE).

Special Projects: Construction Manager at Risk (CM@R), Public Private Partnerships (P3), Design Build, and other Alternative Build Methods.

State HUB Office: The Office of Historically Underutilized Businesses in the Department of Administration for the State of North Carolina.

Subcontracting Goal: The MBE goal and WBE goal established by the County.

Subcontractor: Any vendor or contractor that is providing goods or services to a Prime Contractor in furtherance of the Prime Contractor's performance under a contract or purchase order with the County. A Subcontractor may be either a first, second, or third-tier Subcontractor. A first-tier Subcontractor provides good or services directly to the Prime Contractor. A second-tier contractor is hired by a first-tier Subcontractor within the same contract or purchase order to provide a portion of the good and/or services the first-tier Subcontractor is obligated to provide under its subcontract to the Prime Contractor. A third-tier Subcontractor is hired by the second-tier Subcontractor within the same contract or purchase order to provide a portion of the goods and/or services it is obligated to provide under the second-tier Subcontractor's subcontract with the first-tier Subcontractor.

Utilization Documentation: A provision within the contract which includes the name of all Subcontractors to be utilized in the contract, specifying the MWBE Certification category for each, as approved by the BDI Program Office. This information is provided by the Bidder/Participant in Form B/Form B1.

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Waiver based on Good Faith Efforts: An exception provided to the lowest responsive and responsible Bidder or best value Bidder who did not meet or exceed the MWBE goals on a specific project/contract but who satisfactorily provided Good Faith Efforts documentation.

Women Business Enterprises (WBEs): A legal entity, except a joint venture, that is organized to engage in for-profit transactions, which is Certified as being at least fifty-one percent (51%) owned, managed, and controlled by one or more non-Minority females, and that is ready, willing and able to sell goods or services that are purchased by the County. A WBE is a bona-fide WBE only if the non-Minority female ownership interest(s) is real and continuing and not created solely to meet a WBE participation requirement. The WBE must also perform a Commercially Useful Function to be a bona-fide WBE for Program purposes. Unless otherwise stated, the term “WBE” as used in this Program is not inclusive of MBEs.

Work: (sometimes referred as Scope of Work): The construction and/or services required by the Contract Documents, including all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill its obligations under the Contract.

2. Websites

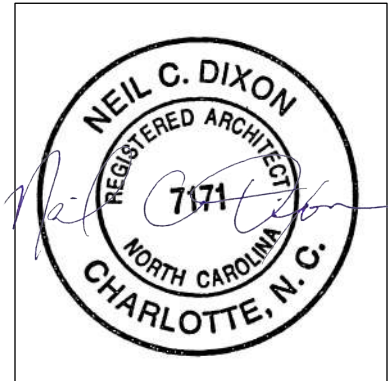
(last updated per the revised date of this Document)

- **Mecklenburg County:** www.mecknc.gov
 - **Office of Economic Development:** oed.mecknc.gov
 - Business Diversity & Inclusion (BDI): oed.mecknc.gov/BDI
 - 2020 Disparity Study Full Report: oed.mecknc.gov/BDI
 - **Procurement Department:** www.mecknc.gov/finance/procurement/Pages/default.aspx
 - Procurement Policies: www.mecknc.gov/Finance/Procurement/Pages/policies.aspx
 - MeckProcure (Vendor Registration/Solicitation Search): meckprocure.com
- **State of North Carolina**
 - **NC Department of Administration:** ncadmin.nc.gov
 - NC Interactive Purchasing System (Vendor Registration/Solicitation Search): www.ips.state.nc.us/vendor/VendorPubMain.aspx
 - **NC Historically Underutilized Businesses (NCHUB):** ncadmin.nc.gov/businesses/historically-underutilized-businesses-hub
 - NCHUB/NCSBE Certifications: ncadmin.nc.gov/businesses/hub/hub-certification
 - Vendor Directory: www.ips.state.nc.us/vendor/searchvendor.aspx?t=h
 - **NC General Statutes:** ncleg.gov/Laws/GeneralStatutesTOC
- **City of Charlotte**
 - **Charlotte Business Inclusion (CBI):** CharlotteBusinessInclusion.com
 - Small Business Enterprise (SBE) Certification: charlottenc.gov/GS/procurement/cbi/Pages/getting-started.aspx
 - Vendor Directory: charlottenc.gov/GS/procurement/cbi/Pages/vendors.aspx

DESIGN PROFESSIONALS OF RECORD

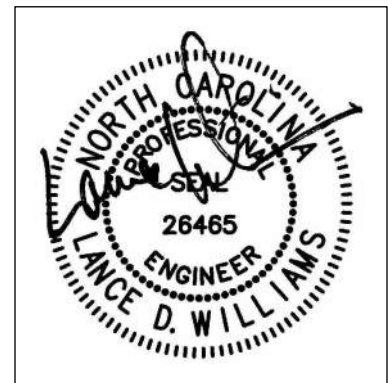
A. Architect:

1. Neil C. Dixon, AIA
2. LICENSE NO: 7171
1. Responsible for Divisions 01 - 10 except where indicated as prepared by other design professionals of record.



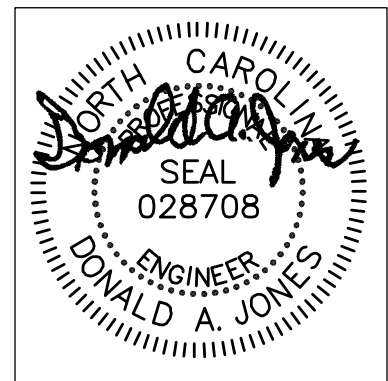
B. Structural Engineer:

1. Lance Williams, PE
2. LICENSE NO: 26465
3. Responsible for Division 03, 04, 05 except where indicated as prepared by other design professionals of record.



C. Technology/Low Voltage Engineer:

1. Donald Jones, PE
2. LICENSE NO: 28708
3. Responsible for Divisions 27 & 28 except where indicated as prepared by other design professionals of record.



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Specification Sections or Divisions provided by the following firms as indicated in the Table of Contents:

<u>Division 01 Specifications:</u>	FMK Architects – " fmk "
<u>Architectural Specifications:</u>	FMK Architects – " fmk "
<u>Structural Engineering Specifications:</u>	Stewart, Inc. – " si "
<u>Technology/Low Voltage Specifications:</u>	Quality Consulting Engineering – " qec "

PROJECT MANUAL – CONSTRUCTION DOCUMENTS (fmk)

I	Notice to Bidders
II	Instructions to Bidders
III	General Conditions
IV	Supplementary Conditions
V	Business Diversity and Inclusion Program
VI	Technical Specifications

SERIES 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (fmk)

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00 52 00	Form of Agreement
00 65 02	Affidavit and Partial Release of Liens
00 69 10	Asbestos-Free Warranty

DIVISION 01 – GENERAL REQUIREMENTS (fmk)

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01 21 00	Contingency and Allowances
01 25 00	Contract Modification Procedures
01 27 00	Unit Prices
01 29 00	Payment Procedures
01 31 00	Project Management and Coordination
01 32 00	Construction Progress Documentation
01 33 00	Submittal Procedures
01 40 00	Quality Requirements
01 42 00	References
01 50 00	Temporary Facilities and Controls
01 51 00	Temporary Utilities
01 60 00	Product Requirements
01 60 05	Substitution Procedures
01 60 05A	Substitution Request Form
01 73 00	Execution
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01 77 00	Closeout Procedures
01 78 23	Operation and Maintenance Data
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04 22 00 Concrete Masonry Units

DIVISION 05 – METALS (*fmk/si*)

05 12 00 Structural Steel Framing
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DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

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DIVISION 07 – THERMAL AND MOISTURE PROTECTION (*fmk*)

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07 92 00 Joint Sealants

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08 11 13 Hollow Metal Doors and Frames
08 14 16 Flush Wood Doors
08 71 00 Door Hardware

DIVISION 09 – FINISHES (*fmk*)

09 91 23 Interior Painting

DIVISION 10 – SPECIALITES (*fmk*)

10 14 00 Signage

DIVISION 11 – EQUIPMENT

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DIVISION 12 – FURNISHINGS

Not Used

DIVISION 13 – SPECIAL CONSTRUCTION

Not Used

DIVISION 14 – CONVEYING EQUIPMENT

Not Used

DIVISION 21 – FIRE SUPPRESSION

Refer to Fire Protection Drawings

DIVISION 22 – PLUMBING

Refer to Plumbing Drawings

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

Refer to Mechanical Drawings

DIVISION 26 – ELECTRICAL

Refer to Electrical Drawings

DIVISION 27 – COMMUNICATIONS (*qec*)

27 05 00 Common Work Results for Communications
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28 01 00 Basic Security Requirements
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28 13 00 Physical Access Control System
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DIVISION 31 – EARTHWORK

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DIVISION 32 – EXTERIOR IMPROVEMENTS

Not Used

DIVISION 33 – UTILITIES

Not Used

VII Forms

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**Document 00 52 00
AGREEMENT FORM**

1.1 FORM OF AGREEMENT

- A. The following form of Owner/Contractor Agreement shall be utilized for the Project:
1. Owner-Contractor Agreement "Construction Contract" as prepared by Mecklenburg County and attached hereto.

END OF DOCUMENT 00 52 00

STATE OF NORTH CAROLINA)
CONSTRUCTION CONTRACT)
COUNTY OF MECKLENBURG)

THIS CONSTRUCTION CONTRACT, hereinafter referred to as “Contract” or “Construction Contract” made this, ____ day of ____ 2024, by and between **Mecklenburg County**, a political subdivision of the State of North Carolina and hereinafter called “Owner” or “County” and _____ with offices at _____, hereinafter called “Contractor” or “Prime Contractor”

W I T N E S S E T H:

This Contract represents the entire and integrated Contract between the parties hereto and supersedes all prior negotiations, whether written or oral. That for and in consideration of the covenants set forth herein, the parties hereto mutually promise and agree as follows:

1. **STATEMENT OF WORK:** The Contractor shall furnish all supervision, labor, materials, tools, equipment, and perform and complete all construction and services required in an efficient and workmanlike manner, and in accordance with the _____, dated _____, including all addenda (hereinafter called the “Project Manual”), and per the acceptance of the bid from the Contractor dated _____. Contractor shall also provide supplementary of miscellaneous items, appurtenance, and devices incidental to or necessary for a sound, secure, complete and functional installation. (hereinafter referred to in this document only as the “Work”).

Total Base Bid	
Base Bid Contingency Allowance	
Total Contract Amount	

TOTAL CONTRACT AMOUNT: _____ Dollars (\$ _____) (“Contract Price”).

2. **CONTRACT TIME:** The Contract Time as defined shall begin on the date specified on a written “Notice to Proceed” from Mecklenburg County. This date is to be no more than approximately sixty (60) days after receipt of the Contractor’s bid by the Owner. The work is to be diligently performed to completion of Work within _____ consecutive calendar days after the date to start work as indicated in the “Notice to Proceed”. All work shall reach final completion within _____ consecutive calendar days after the date to start work as indicated in the “Notice to Proceed”. It is further agreed that the Owner shall have the right at its discretion to extend the time for completion of the Work.

Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly and at such rate of progress as will ensure full completion thereof within the Contract Time stated above. It is expressly understood and agreed, by and between Contractor and Owner that the Contract Time is reasonable for the completion of the Work, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

3. **CONTRACT MODIFICATION:** The County may require the Contractor to furnish materials and to do additional or extra work not provided in the contract or in the specifications, but which may be found necessary to the proper protection and completion of the Work included in this contract. Compensation for this additional work is to be negotiated. If a price cannot be negotiated, then the work shall be accomplished in accordance with Section 109-3 Force Account Work of the NCDOT Specifications. **No work other than that included in the Contract shall be done, and no additional labor or materials shall be furnished by the Contractor without a WRITTEN Change Order (“Written Change Order”) or Construction Change Directive (as defined in**

the specifications) from the County, in advance of the work. In the absence of a Written Change Order from the County, the Contractor shall not be entitled to payment for such additional or extra work. Bills for additional or extra work shall be filed with the County within three (3) days after such additional or extra work is completed, in order that the accuracy of the additional or extra work bills may be established.

4. **LIQUIDATED DAMAGES:** Subject to the limitations/exclusions set forth in Paragraph 17, The Contractor hereby further agrees that the Owner shall be and is hereby authorized to deduct and retain out of the monies which may be due or become due to the Contractor under this Contract, monies as damages for the non-completion of the Work within the Contract Time herein stipulated for completion in accordance with the provisions of this Contract ("Liquidated Damages"). The parties acknowledge such damages would be difficult to ascertain and that the Liquidated Damages contemplated herein are fair and reasonable. Liquidated Damages shall be fixed or allowed for such performance and completion in the amount of _____ (**\$0.00**) dollars per day for each calendar day of delay until the Work has reached final completion. Liquidated Damages is an estimate of expenses the Owner will suffer by reason of such default and is not by way of a penalty. The assessment and collection of liquidated damages shall in no way limit recovery by County in law or equity for ascertainable damages.
5. **CONTRACT PAYMENTS:** The County will make regular, periodic payments for work completed in accordance with the contract bid items based on work progress estimates prepared by the Contractor and submitted for approval by the County. Payment requests and supporting documentation must be submitted on standard forms approved by the County. Payment will be made within thirty (30) calendar days after receipt of an approved payment request. Along with monthly payment estimates, the Contractor shall submit a certification that all work performed to date complies with the plans and specifications.

For contracts less than \$50,000, partial payments may be made twice each month if in the judgment of the County the amount of work performed is sufficient to warrant such payment. No partial payment will be made when the total value of the work performed since the last partial payment, excluding mobilization, amounts to less than \$1,000.00.

Retainage on periodic payments will be an amount equal to five percent (5%) of the total amount due on payment requests, deducted and retained until fifty percent (50%) of the work has been completed, in accordance with N.C. General Statute 143-134.1.

6. **FAILURE TO TIMELY COMPLETE CLOSE-OUT DOCUMENTATION: If the County has not received 100% of the close-out documentation, as required in Article 1 of the General Conditions, within one hundred and twenty (120) calendar days after Substantial Completion, the Contractor shall forfeit any and all claims to any funds due the Contractor under this contract.**

In addition, if the County has not received 100% of the close-out documentation, as required in Article 1 of the General Conditions, within one hundred and twenty (120) calendar days after Substantial Completion, the County reserves the right to deem the Contractor to be not-a-responsible contractor for future projects. If the Contractor deemed to be not-a-responsible contractor is the lowest bidder on any future bids, the County may elect to award the Contract to another contractor, i.e., the lowest responsible bidder, taking into consideration quality, performance, and the time specified in the bids for performance, thus recognizing that the low bidding Contractor has been deemed to be not-a-responsible contractor or bidder.

Exceptions:

1. The final Change Order has not been executed by the County. The Contractor shall have one

hundred and twenty (120) calendar days after receiving the final executed change order to provide the County close out documentation before being considered to be not-a responsible contractor.

2. The County has requested the Contractor keep his contract open in anticipation of future work on the project.

3. The Contractor's failure to provide the missing close-out documentation is not caused by the Contractor but is caused by a third party's failure to provide necessary information to the Contractor.

7. **ASSURANCE:** Contractor is familiarized with the nature and extent of the Contract Documents (defined in paragraph 11), Work, locality, and with all local conditions and Federal, State and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

Contractor has made or caused to be made examinations, investigations and tests and studies of such reports and related data as Contractor deems necessary for the performance of the Work at the Contract Price within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by Contractor for such purposes.

Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

Contractor has given Owner written notice of any conflict, error or discrepancy that Contractor has discovered in the Contract Documents and the written resolution thereof by Owner is acceptable to Contractor.

Contractor agrees that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

8. **SAFETY:** The Contractor is solely and exclusively responsible for initiating, maintaining, monitoring and supervising all safety programs, safety precautions and procedures, safety equipment and required safety reporting procedures in connection with the Work and in accordance with County requirements and state and Federal statutes. The Contractor shall take all necessary or required measures to prevent damage, injury and loss to all employees present at the site, the employees of subcontractors and all other parties having access to the project site including visitors and the general public. Before beginning work, the Contractor shall provide a written copy of its safety program to the Owner for informational purposes and for verification that a safety program is available.

The Project is considered a "Hard Hat", "Protective Eyewear" and "Appropriate Clothing" construction project. All workmen, delivery truck drivers and visitors to the Project are required to procure and wear approved safety headgear and eye protection regardless of whether "overhead hazard" or "flying debris" work is being performed and regardless of whether the workman is operating a piece of equipment from an enclosed station. All workmen and visitors are required to wear appropriate clothing including trousers, long/short sleeved shirts and leather footwear. No sleeveless shirts or canvas or "athletic-style" shoes will be permitted. The Contractor shall furnish, install, maintain and remove signs at the Project entrance to the project stating that appropriate clothing, hard hats and protective eyewear must be worn at all times.

Notwithstanding anything contained within these General Conditions (as defined in the Project Manual) to the contrary and to the fullest extent permitted by law, the Contractor shall indemnify, protect and hold harmless the Owner, and Engineer, from and against all losses, claims, liens,

causes of action at law or at equity and expenses, including without limit, attorney's fees arising or allegedly arising from such operations, activities, mistakes, negligence or omission of the Contractor, its employees, agents, representatives, subcontractors, materialmen, or suppliers incidental to, or related to the Contract. It is expressly understood that the Owner and Engineer will not, in any way, be responsible for any losses or damages incurred, or allegedly incurred, by the Contractor, its employees, agents, representatives, subcontractors, materialmen or suppliers. Notwithstanding the foregoing, the Contractor's agreement to indemnify, protect, and hold harmless the Owner and Engineer shall not extend to any losses, claims, liens, or causes of action at law or equity arising from the operations, activities, mistakes, negligence or omission of any individual or entity, including other contractors or subcontractors or their agents, performing Owner Furnished Owner Installed work as defined in Paragraph 17.

9. **CHANGES IN WORK; CLAIMS:** No claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph.

Notice: Written notice stating the general nature of each claim shall be delivered by the claimant to the other party to the Contract promptly, but in no event later than thirty (30) days after the start of the event giving rise to the claim.

The responsibility to substantiate a claim shall rest with the party making the claim. The amount or extent of the claim, with supporting data, shall be delivered to the other party to the Contract within fifteen (15) days after the initial Notice of the Claim. Each claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to the claimant within thirty (30) days after receipt of the claimant's last submittal.

The parties agree to make a good faith effort to resolve the claim or dispute prior to the time it must be submitted to the Consultant (as defined in Article 6 of the General Conditions of the Project Manual) or to mediation as set forth in Paragraph 10 below.

10. **DISPUTE RESOLUTION:** Claims and disputes arising under this Contract shall be subject to one (1) of the following dispute resolution processes: **("Contract Mediation Provisions")**, however nothing contained herein will diminish Owner's rights of termination or suspension for cause, convenience or otherwise, as set forth in Article 3 of the Project Manual, which is incorporated herein by reference.

A. Claims and Disputes Not Subject to Mediation

The following claims and disputes, if validly submitted as provided in Paragraph 9 are not subject to mediation and are to be decided by the Owner without mediation. Should the Owner not be a party to the claim or dispute, then Consultant shall decide without mediation as set forth in Article 3 of the Project Manual:

- A. A claim or dispute seeking a non-monetary recovery; and
- B. A claim or dispute seeking a monetary recovery of fifteen-thousand dollars (\$15,000) or less; and
- C. A claim or dispute seeking the extension of any time limit shall be subject to mediation pursuant to the Contract Mediation Provisions only if the damages which would be suffered by the party seeking the extension would exceed fifteen-thousand dollars (\$15,000). To the extent that liquidated damages are set forth in the Contract Documents and is the measurement of damages for failure by such party(s) to meet the time limit, the liquidated damages shall be the exclusive standard for determining the amount of damages

associated with such dispute.

CLAIMS NOT SUBJECT TO MEDIATION MUST BE SUBMITTED TO THE OWNER FOR DECISION WITHIN SIXTY (60) DAYS AFTER THE START OF THE EVENT GIVING RISE TO THE CLAIM OR DISPUTE.

B. Claims and Disputes Subject to Mediation

Except as otherwise set forth in paragraph 10.A., any other claim or dispute arising between or among the Owner and/or Parties listed herein that arises from the Project (as defined in the Project Manual) including without limitation a breach of such Contract, shall be subject to non-binding mediation administered by the American Arbitration Association under its Construction Industry Mediation Rules, or to such other mediation process to which the parties may agree. To the extent any provision of the Construction Industry Mediation Rules is inconsistent with the provisions of these Contract Mediation Provisions, the provisions of the Contract Mediation Provisions shall control.

The Owner and any party contracting with the Owner or Contractor or with any first-tier or lower-tier subcontractor for the Project hereby agree to participate in good faith in any mediation of a claim or dispute subject to these Contract Mediation Provisions, including without limitation the following parties: Consultant(s), architect(s), engineer(s), surveyor(s), prime contractor(s), surety(ies), subcontractor(s), and supplier(s). For purposes of this section 10.B of the Contract only, these parties shall be referred to as "Parties" or "Party. "

The Contractor, and all other Parties, shall include these Contract Mediation Provisions in every agreement to which they are a Party for the Project, without variation or exception. Failure to do so will constitute a breach of the Construction Contract, and the Contractor or other Party failing to include these Contract Mediation Provisions in any agreement shall indemnify and hold harmless Owner and/or the remaining Parties from and against any and all claims, including without limitation reasonable attorney fees and other costs of litigation arising in any manner from such breach.

For purposes of these Contract Mediation Provisions, a claim or dispute is limited to the recovery of monetary damages from the same transaction or occurrence against a single Party or two (2) or more Parties alleged to be jointly liable. Two (2) or more claims or disputes may not be consolidated without the consent of all Parties to such disputes.

A request for mediation shall include the amount of the monetary relief requested.

A request for mediation must be made within ninety (90) days after giving notice of the claim or dispute in a manner as required by Paragraph 9 above.

Prior to requesting mediation, the Owner or Party must believe that it is entitled under applicable law to recover the monetary amount to be included in the request from one (1) or more of the remaining Parties. Such belief must be based on a reasonable and prudent investigation into the claim or dispute. The request for mediation must be based on such investigation and may not include any amount or the name of any remaining Party(s), unless supported by such investigation by the Party requesting the mediation.

If a Party does not perform a reasonable and prudent investigation, it shall indemnify and hold harmless the Owner and all other Parties from any costs, including reasonable attorney fees and other costs of mediation, litigation, and damages incurred by Owner or such other Parties.

All expenses incurred by a Party in preparing and presenting any claim or defense, shall be paid by the Party preparing for mediation. Such expenses shall include, without limitation, any associated cost for witnesses, exhibits, and attorney fees. All other expenses, including filing fees and required traveling expenses by the mediator, and other expenses of the mediator, shall be borne as follows: 1) One-half (1/2) by the Party requesting the mediation, with the remaining parties paying equal shares of the remaining expenses and costs. 2) If the Owner is named as a party to the mediation, the Owner shall pay at least one-third (1/3) of the mediation expenses and two-third (2/3) of the expenses shall be divided among the remaining Parties. 3) If more than one (1) Party to dispute requests mediation, the mediation expenses and costs to be divided among the Parties shall be borne equally by the Parties to the dispute; however, if the Owner is named as one (1) of the parties to the mediation, the Owner shall pay at least one-third (1/3) of the mediation expenses.

The mediation shall be held at a location agreeable to the mediator and all of the Parties and if applicable the Owner. If no agreement can be reached, the mediation will be held at a location in Mecklenburg County as the mediator shall determine.

The provision of these Contract Mediation Provisions is subject to any other provisions of the Construction Contract concerning the submission, documentation and/or proof of any claim(s) or dispute(s).

11. **DOCUMENTS INCORPORATED BY REFERENCE:** It is agreed and understood that the Bid Package, including without limitation, any Addendum to the Bid Package, the General Conditions, the BDI Provisions, all information in the Project Manual including the Technical Specifications, the Contractor's Itemized Proposal, and all other specifications and drawings referenced therein (herein "Contract Documents") are part of this Contract and are incorporated herein in full.
12. **MISCELLANEOUS PROVISIONS:** The Contractor hereby agrees that the Contractor has read each and every clause of this Contract, including all Contract Documents, and fully understands the meaning of the same, and that the Contractor will comply with all its terms. This Contract is to be executed with one (1) copy to be delivered to the Contractor and one (1) to be retained by the Owner. The Contract shall contain an original Performance and Payment Bond (if required) and a copy of the Certificate of Insurance.

The Performance and Payment Bond shall be addressed to:

Mecklenburg County
600 East Fourth Street
Charlotte, NC 28202
Attn: County Manager's Office
Mr. Tyrone C. Wade

The Certificate of Liability Insurance shall be addressed to:

Mecklenburg County
Land Use and Environmental Services Agency
2145 Suttle Avenue
Charlotte, NC 28208

13. **GOVERNING LAW AND JURISDICTION:** The parties acknowledge that the Contract is made and entered into in Charlotte, North Carolina, and will be performed in Charlotte and Mecklenburg County, North Carolina. The parties further acknowledge and agree that North

Carolina law shall govern all the rights, obligations, duties and liabilities of the parties under the Contract, and that North Carolina law shall govern in the interpretation and enforcement of the Contract and any other matters relating to the Contract (all without regard to North Carolina conflicts of law principles).

The parties further agree that any and all legal actions of proceedings relating to the Contract, after all applicable mediation procedures have been exhausted, shall be brought in a State or federal court sitting in Mecklenburg County, North Carolina. By execution of the Contract, the parties submit to the jurisdiction of said courts and hereby irrevocably waive any and all objections, which they may have with respect to venue in any court sitting in Mecklenburg County, North Carolina.

14. **INDEMNIFICATION:** To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless each of the “Indemnitees” (as defined below) from and against any and all “charges” (as defined below) paid or incurred by any of them as a result of any claims, demands, lawsuits, actions or proceedings either: (i) alleging violation, misappropriation, or infringement of any copyright, trademark, patent, trade secret or other proprietary rights with respect to the Work, or any products or deliverables provided to the County pursuant to this Contract (“infringement claims”); (ii) seeking payment for labor or materials purchased or supplied by the Contractor or its subcontractors in connection with this Contract; or (iii) arising from the Contractor’s failure to perform its obligations under this Contract, or from any act of negligence or willful misconduct by the Contractor or any of its agents, employees or subcontractors relating to this Contract, including but not limited to any liability caused by an accident or other occurrence resulting in bodily injury, death, sickness, or disease to any person(s) or damage or destruction to any property, real or personal, tangible or intangible; or (iv) arising from a violation of any federal, state or local law, regulation or ordinance by the Contractor or any of its subcontractors, including without limitation, E-Verify (Article 2 of Chapter 64 of the North Carolina General Statutes) or other immigration laws; (v) arising from any claim that the Contractor or an employee or subcontractor of the Contractor is an employee of, including but not limited to claims relating to Workers’ Compensation, failure to withhold taxes and the like. For purposes of this section: (a) the term “Indemnitees” means the County and each of the County’s officers, officials, employees, agents and independent contractors, excluding the Contractor; and (b) the term “charges” means any and all losses, damages, costs, expenses (including reasonable attorneys’ fees), obligations, duties, fines, penalties, royalties, interest charges and other liabilities including settlement amounts. Notwithstanding the foregoing, nothing in this indemnification provision shall be construed as requiring Contractor to indemnify Indemnitees for any losses, claims, liens, or causes of action at law or equity arising from the operations, activities, mistakes, negligence or omission of any individual or entity, including other contractors or subcontractors or their agents hired by County, performing Owner Furnished Owner Installed work as defined in Paragraph 17.
15. **COMPLIANCE PROVISION:** The Contractor agrees to make itself aware of and comply with, and cause its subcontractors to comply with, all federal, state, and local laws, regulations and ordinances relating to the performance of this Contract, or to the products and services delivered hereunder, including without limitation, **E-Verify (Article 2 of Chapter 64 of the North Carolina General Statutes)**, Workers’ Compensation, the Fair Labor Standards Act (FLSA), the Americans with Disabilities Act (ADA), the Family and Medical Leave Act (FMLA) and Occupational Safety And Health Administration (OSHA). The Contractor further agrees to obtain all verifications, permits and licenses applicable to the performance of this Contract. If any violation of this section has occurred or does occur, the Contractor will indemnify and save harmless the County from all losses, damages, costs, expenses (including reasonable attorneys’ fees), obligations, duties, fines, penalties, interest charges and other liabilities (including settlement amounts) incurred on account of such violation.

16. **IRAN DIVESTMENT ACT CERTIFICATION:** Pursuant to N.C.G.S. § 147-86.59, Contractor certifies that as of the date of this Agreement or purchase order, Contractor is not listed on the Final Divestment List as created by the State Treasurer, and is in compliance with the Iran Divestment Act as set forth in N.C.G.S. § 147-86.55-86.63. Further, the Contractor shall not utilize in the performance of the contract any subcontractor that is identified on the Final Divestment List. The Divestment List may be found on the State Treasurer's website at www.nctreasurer.com/Iran.
17. **ADDITIONAL TERMS:** Terms used in this Contract which are defined in Article 6 of the Standard General Conditions of the Construction Contract shall have the meanings assigned in the Standard General Conditions of the Construction Contract.

Neither Owner nor Contractor shall, without the prior written consent of the other, assign or sublet in whole or in part his/her interest under any of the Contract Documents; and, specifically but without limitation, Contractor shall not assign any monies due or to become due without the prior written consent of Owner. In case Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract.

Owner and Contractor each bind themselves, their partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

The Contract Documents constitute the entire agreement between Owner and Contractor and may only be altered, amended or repealed by a modification signed by both Owner and Contractor.

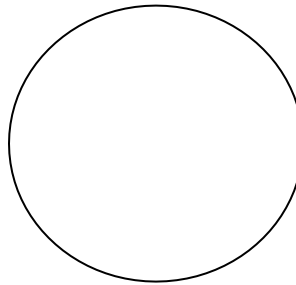
In WITNESS WHEREOF, the parties have duly executed this Contract as of the date first above written.

CONTRACTOR:

ATTEST:

Contractor Signature

(N/A for Sole Proprietor)



Corporate Seal

**MECKLENBURG COUNTY AUTHORIZED OFFICER SIGNATURES FOLLOW ON
NEXT PAGE**



Mecklenburg County

Signature Page

Contract Number: To be completed by County Finance Department
Amendment Number: To be completed by County Finance Department
Contractor Name: To be completed by County Finance Department

MECKLENBURG COUNTY:

ATTEST:

Assistant County Manager

Clerk to the Board of County Commissioners

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

APPROVED AS TO FORM:

Finance Director

County Attorney

APPROVED AS TO INSURANCE REQUIREMENTS:

Charlotte-Mecklenburg Division
of Insurance Risk Management

DOCUMENT 00 65 02
CONTRACTOR'S AFFIDAVIT AND PARTIAL RELEASE OF CLAIMS AND LIENS
FOR PROGRESS PAYMENT

STATE OF _____ COUNTY OF _____

I, _____, being duly sworn, state on personal knowledge that I am
_____ (Title) of _____ (Contractor)
and have authority to execute this Affidavit on behalf of the Contractor. I further state the following:

1. All the laborers, persons, firms and corporations having furnished services or materials for the construction of **Materials Recovery Facility Retrofit 1007 Amble Drive, Charlotte, NC** have been paid in full for labor and materials furnished to date, except retention and unfounded change orders, and that upon completion of the work of each subcontractor or supplier, the Contractor will cause each such subcontractor and supplier to execute a Release and Waiver of Claim in the form required by the Contract Documents and shall further cause each such subcontractor and supplier to cancel any liens (if any) that may have been filed against the Project.
2. The work covered by this payment has been completed in accordance with the Contract Documents.
3. In consideration of the partial payment of \$_____, the Contractor hereby releases **Materials Recovery Facility Retrofit 1007 Amble Drive, Charlotte, NC** from all lien rights, claims, or demands of any kind whatsoever which it now has against the construction of the Project arising of or in any way related to the furnishing of labor and materials on or before the date of this Affidavit, except for retainage and unfounded change orders.
4. To the best of the Contractor's knowledge and belief, no claims or claim of liens exist by or against any subcontractor or supplier who furnished materials or labor on the Project, and if any appear afterwards the Contractor shall hold **Materials Recovery Facility Retrofit 1007 Amble Drive, Charlotte, NC** harmless on the account thereof. Contractor agrees to provide a lien removal bond at no cost to the Owner or its representatives within 15 days from request by the Owner or the Owner's representatives.
5. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien, plus all lien bonds, costs, interests, both prejudgment at a legal rate.

(Contractor) By: _____

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

_____, My Commission Expires: _____

Notary Public

(Seal)

END OF DOCUMENT 00 65 02

**DOCUMENT 00 69 10
ASBESTOS-FREE WARRANTY**

Materials Recovery Facility Compressor Room 1007 Amble Drive, Charlotte, NC

The undersigned Contractor hereby warrants that no asbestos-containing materials of any kind were used in the construction of **Materials Recovery Facility Retrofit 1007 Amble Drive, Charlotte, NC.**

SCOPE OF WORK: _____

SIGNED: _____

TITLE: _____

DATE: _____

(CORPORATE SEAL)

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

____ My Commission Expires: _____
Notary Public

(Seal)

END OF DOCUMENT 00 69 10

Section 01 10 00 SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents.
 - 2. Type of the Contract for Construction.
 - 3. Work phases.
 - 4. Use of premises.
 - 5. Work restrictions.
 - 6. Owner-furnished products.
 - 7. Specification formats and conventions.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Material Recovery Facility Retrofit
 - 1. Project Location: 1007 Amble Drive, Charlotte, NC 28206
 - 2. Developer/Owner: MECKLENBURG COUNTY.
 - a. Contact: Darren Steinhilber
- B. Architect Identification: The Contract Documents dated October 9, 2024, were prepared for the Project by FMK Architects, PA, 123 New Bern Street, Charlotte, NC 28203.
- C. The work consists of various infrastructure improvements to the MRF building (approximately 94,000 sq. feet) in support of the installation of new recycling processing equipment. The Work will include, but is not limited to, a new janitor's closet with relocated water heater, a new vestibule and door from the processing area, modified equipment floor pits and modified structural bays. The existing electrical, fire alarm and fire protection systems will be modified. All new industrial equipment will be provided by the Owner's vendor, but the General Contractor will be required to coordinate construction activities with the demolition and installation of this existing equipment and the new equipment. Electrical, plumbing and mechanical connections for all the new spaces and industrial equipment are to be done under the General Contractor's contract.

1.4 WORK SCHEDULE AND SEQUENCE

- A. The Work shall be conducted in multiple phases under one mobilization, with the date of Substantial Completion to be as indicated in the Agreement. Phasing must be coordinated with the Owner's Equipment Vendor.
- B. Sequencing of the work shall be determined in conjunction with Equipment Vendor's demolition and installation Phasing Plan attached to this section.
 - 1. General contractor shall perform demolition activities in work areas ahead of the Owner's Equipment Vendor.
 - 2. New construction work shall follow behind Equipment Vendor's demolition.

3. Equipment Vendor shall perform new installation following General Contractor's new work phases. The General Contractor is required to start and complete work in a sequence that allows equipment installation to proceed without delay.
 4. Final electrical connections, sprinkler head installs under equipment, and final cleanup shall follow as Equipment Vendor's installation work completes in each phase.
- C. Sequencing of the work shall be closely coordinated with the Owner's Equipment Vendor. Key Milestone dates must be agreed to between the parties to avoid delays to the overall project schedule.

1.5 USE OF PREMISES

- A. General: Contractor shall have majority use of premises for construction operations. The facility will be non-operational for material recovery operations during the duration of construction. However, some of the Owner's management personnel may remain in the office area during the project. Owner's Equipment Vendor will be on-site simultaneously, and construction operations must be closely coordinated between the General Contractor and the equipment vendor so that each can perform their respective scopes unimpeded by the other.
1. Driveways 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 storage of materials except as directed by the Owner.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Parking: Park in designated areas only. Any parking shuttle is the responsibility of the Contractor. Obtain and display any Owner-furnished parking permits. Non-permitted vehicles and vehicles located in areas other than approved parking areas must be attended or they will be subject to towing.
- C. Deliveries: Provide representative to receive all materials and offload at the job site. The Owner will refuse all deliveries to other locations.
- D. Personnel Safety: All construction personnel in the facility must wear proper Personal Protection Equipment (hard hat, safety vest, eye protection, steel toed shoes/boots), as required by the owner, at all times. Personnel without proper PPE are subject to removal from the site by the Owner. The contractor may require more extensive PPE, but not less than that of the Owner.
- E. Safety and Security: Comply with Owner's requirements related to security and fire drills and alerts.
- F. Burning/Welding Operations: Comply with Owner's requirements related to Burning and Welding permits. Coordinate turning off fire/smoke detection systems in affected areas. Contractor shall be responsible for Fire Department response fees related to construction operations.
- G. Smoking: No smoking is allowed on the premises or as otherwise designated by Owner's representative.

1.6 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated.
1. Weekend Hours: 7:00 a.m. to 6:00 p.m.
 2. Early Morning Hours: No work to start before 7:00 a.m. on weekdays and 8:00 a.m. on weekends/holidays, unless first coordinated with the Owner.
 3. Hours for Utility Shutdowns: To be coordinated with Owner on a case-by-case situation basis.
 4. Phasing and scheduling of all work shall be developed jointly with the Owner and the Owner's industrial equipment vendor so as to coordinate and minimize all disruptions to the operations of all parties.

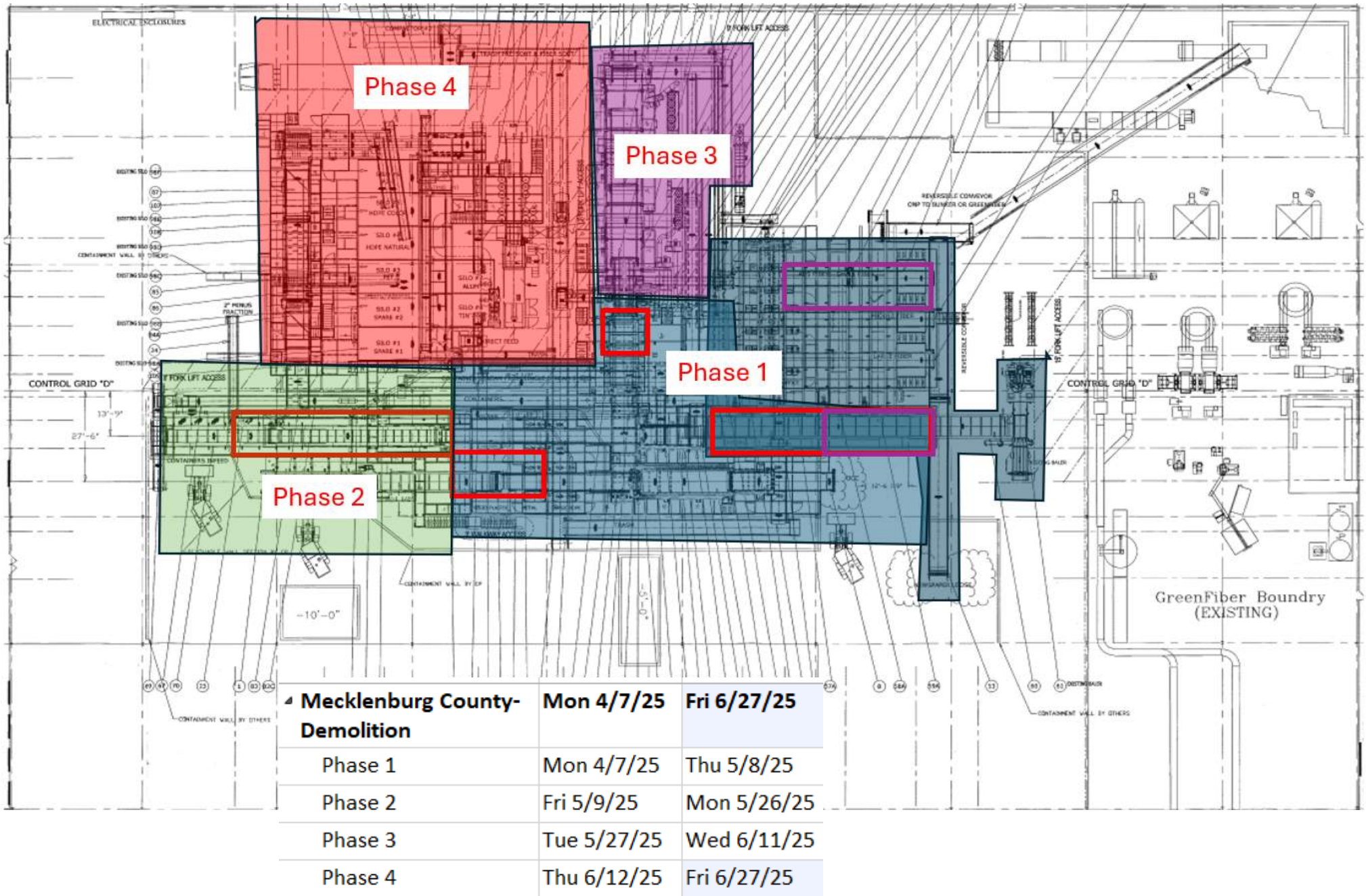
1.7 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 33 division format and CSI/CSC's "MasterFormat" numbering system.
- B. 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. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

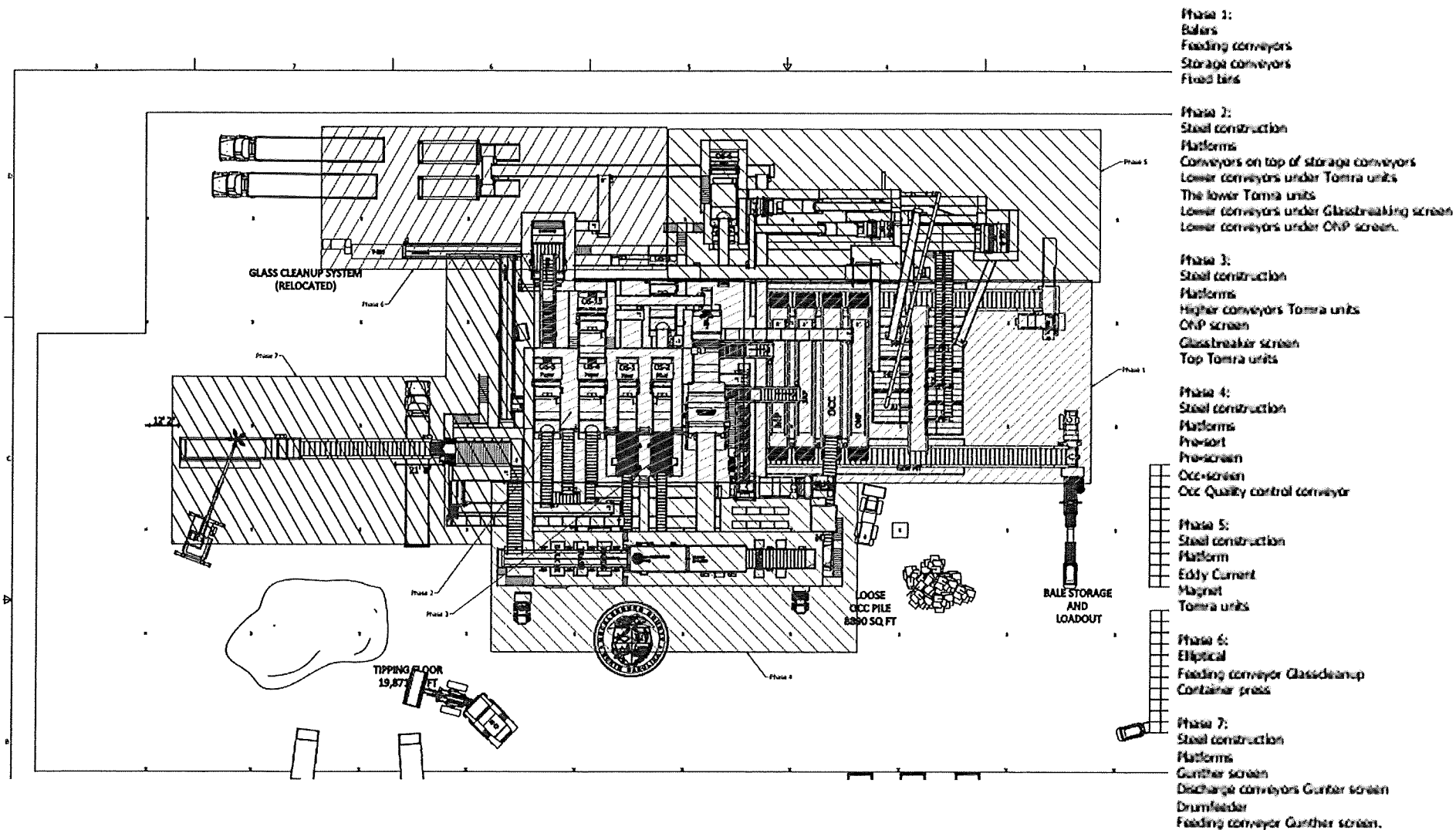


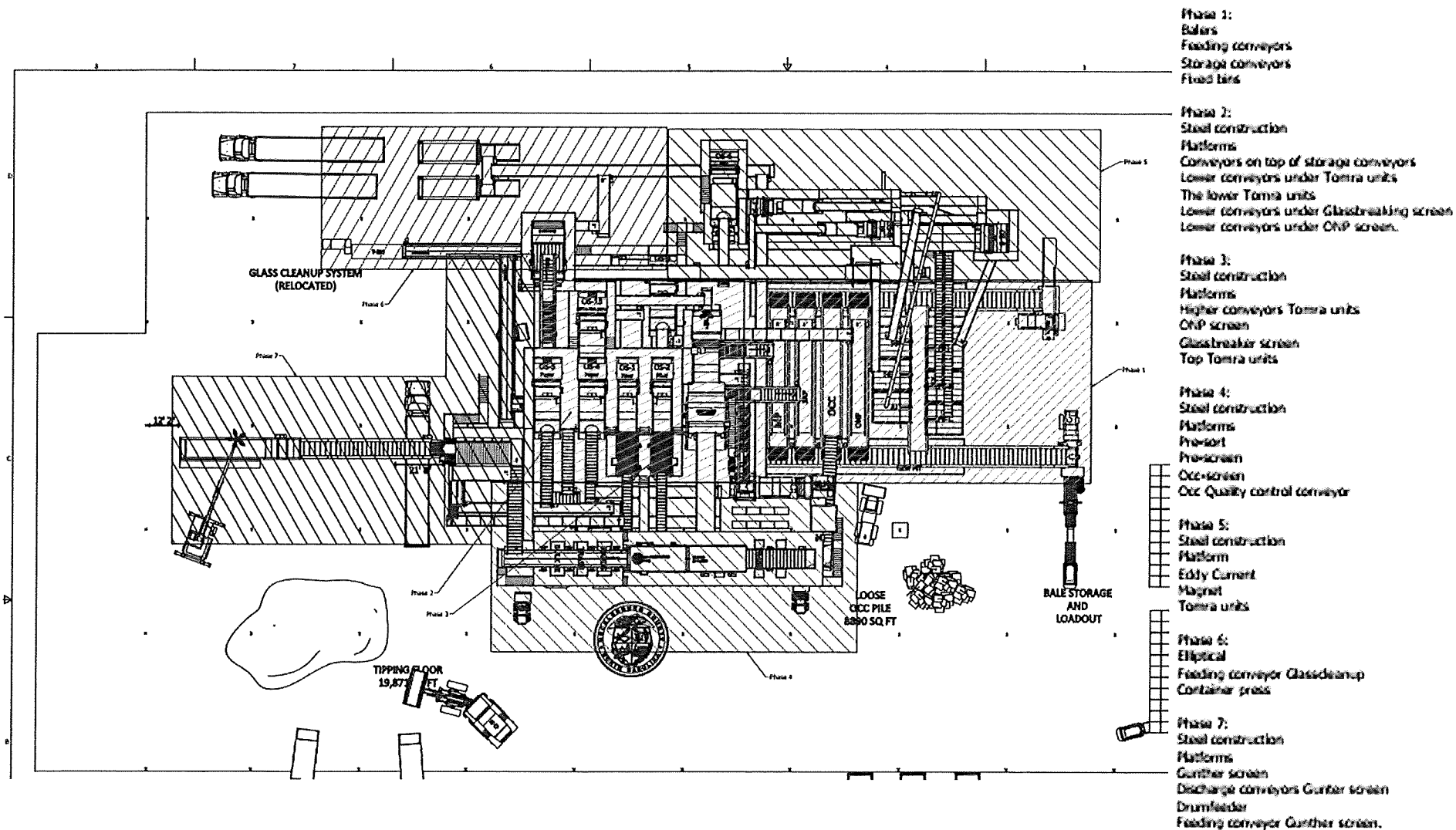
Equipment Demolition Sequencing

Install Schedule

Task Name	Start	Finish	Predecessors	Duration
Single Stream Installation & Retrofits	Wed 3/19/25	Mon 11/3/25		164 days
Phase 1	Wed 3/19/25	Wed 4/9/25		16 days
Balers	Wed 3/19/25	Tue 3/25/25	6	5 days
Feeding Conveyors	Wed 3/26/25	Mon 3/31/25	9	4 days
Storage Conveyors	Tue 4/1/25	Fri 4/4/25	10	4 days
Fixed Bins	Mon 4/7/25	Wed 4/9/25	11	3 days
Phase 2	Thu 4/10/25	Mon 5/19/25		28 days
Steel Construction	Thu 4/10/25	Wed 4/16/25	12	5 days
Platforms	Thu 4/17/25	Wed 4/23/25	14	5 days
Conveyors on top of storage conveyors	Thu 4/24/25	Tue 4/29/25	15	4 days
Lower conveyors under Tomra units	Wed 4/30/25	Fri 5/2/25	16	3 days
Lower Tomra Units	Mon 5/5/25	Thu 5/8/25	17	4 days
Lower conveyors under Glass Breaking Screen	Fri 5/9/25	Tue 5/13/25	18	3 days
Lower conveyors under ONP	Wed 5/14/25	Mon 5/19/25	19	4 days
Phase 3	Tue 5/20/25	Fri 6/27/25		29 days
Steel Constructino	Tue 5/20/25	Fri 5/23/25	20	4 days
Platforms	Mon 5/26/25	Tue 6/3/25	22	7 days
High conveyors Tomra units	Wed 6/4/25	Tue 6/10/25	23	5 days
ONP Screen	Wed 6/11/25	Fri 6/13/25	24	3 days
Glass Breaker Screen	Mon 6/16/25	Wed 6/18/25	25	3 days

Phase 4	Mon 6/30/25	Mon 8/4/25	26 days
Steel Construction	Mon 6/30/25	Fri 7/4/25	5 days
Platforms	Mon 7/7/25	Fri 7/11/25	5 days
Pre-sort	Mon 7/14/25	Thu 7/17/25	4 days
Pre-screen	Fri 7/18/25	Wed 7/23/25	4 days
OCC	Thu 7/24/25	Tue 7/29/25	4 days
OCC Quality Control Conveyor	Wed 7/30/25	Mon 8/4/25	4 days
Phase 5	Tue 8/5/25	Mon 9/1/25	20 days
Steel Construction	Tue 8/5/25	Mon 8/11/25	5 days
Platform	Tue 8/12/25	Mon 8/18/25	5 days
Eddy Current	Tue 8/19/25	Thu 8/21/25	3 days
Magnet	Fri 8/22/25	Tue 8/26/25	3 days
Tomra Units	Wed 8/27/25	Mon 9/1/25	4 days
Phase 6	Tue 9/2/25	Mon 9/15/25	10 days
Elliptical	Tue 9/2/25	Fri 9/5/25	4 days
Feeding conveyor Glass Cleanup	Mon 9/8/25	Wed 9/10/25	3 days
Container Press	Thu 9/11/25	Mon 9/15/25	3 days
Phase 7	Tue 9/16/25	Mon 11/3/25	35 days
Steel Construction	Tue 9/16/25	Wed 9/24/25	7 days
Platforms	Thu 9/25/25	Fri 10/3/25	7 days
Gunther Screen	Mon 10/6/25	Mon 10/13/25	6 days
Discharge Conveyors Gunther Screen	Tue 10/14/25	Mon 10/20/25	5 days
Drumfeeder	Tue 10/21/25	Mon 10/27/25	5 days
Feeding Conveyor	Tue 10/28/25	Mon 11/3/25	5 days





Section 01 21 00
PROJECT CONTINGENCY AND ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing project contingency and allowances.
- B. Types of allowances include the following:
 - 1. Contingency
- C. Related Sections include the following:
 - 1. Division 1, Technical Specifications Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Consultant of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Consultant's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Consultant from the designated supplier.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, on the "Proposal Request" and "Proposal Request Log" forms.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.5 CONTINGENCY ALLOWANCES

- A. Provide contingency allowance of 10% of total bid amount. List as line item on Bid Form and in Schedule of Values.

- B. Use the contingency allowance only as directed by Consultant for Owner's purposes and amount(s) to be charged to the allowance.
- C. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.6 UNIT PRICES

- A. See Section 01 27 00 for procedures and schedule.

1.7 UNUSED MATERIALS

- A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Consultant, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Consultant, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

END OF SECTION 01 21 00

Section 01 25 00
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications whereas all parties agree to the following:
 - 1. A modification in the Work or Contract Documents.
 - 2. The amount of the adjustment in the Contract Sum, if any.
 - 3. The extent of the adjustment in the Contract Time, if any.

1.3 NOTIFICATION TO SURETY

- A. The Contractor shall notify the Surety of any modifications to the Work or provisions of the Contract Documents, including, but not limited to, the Contract Price or Contract Time.

1.4 MINOR CHANGES IN THE WORK

- A. The Consultant shall have authority to order Minor Changes in the Work not involving adjustment to the Contract Sum or extension of the Contract Time, and consistent with the intent of the Contract Documents. Such changes shall be in a form of a written order and shall be binding for both the Owner and Contractor when fully executed.

1.5 CLAIMS FOR ADDITIONAL COST:

- A. No claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with the following:
 - 1. **Notice: Written notice stating the general nature of each claim shall be delivered by the claimant to the other party to the Contract promptly, but in no event later than thirty (30) days after the start of the event giving rise to the claim.**
 - 2. The responsibility to substantiate a claim shall rest with the party making the claim. The amount or extent of the claim, with supporting data, shall be delivered to the other party to the Contract within fifteen (15) days after the initial Notice of the Claim. Each claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said

event. The opposing party shall submit any response to the claimant within thirty (30) days after receipt of the claimant's last submittal. Prior notice is not required for Claims relating to an emergency endangering life or property.

- B. The Contractor shall submit a claim if he believes additional cost is involved for reasons including but not limited to the following:
1. A written interpretation from the Consultant,
 2. An order by the Owner to stop the Work where the Contractor was not at fault,
 3. A written order for a minor change in the Work issued by the Consultant,
 4. A change in the Scope of the Work by the Consultant.

1.6 PROPOSAL REQUESTS

- A. The Owner initiated Proposal Requests is generated by the Owner to modify the Work or Contract Documents. The Consultant will issue a detailed description of proposed modifications 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. The description is for information and shall be considered as a directive to automatically stop work or execute the proposed change.
1. Within ten 10-calendar days after receipt of the Proposal Request, the Contractor shall submit a Proposal Request Form with an estimate to adjust the Contract Sum and the Contract Time if necessary to execute the change. Proposal shall include support documents from Subcontractor, if applicable.
 - a. Include a list of quantities of (plus or minus) the materials and/or products required with unit prices, 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, including social security, old age and unemployment insurance, fringe benefits, and workmen's compensation insurance.
 - 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.
 2. The Contractor may initiate proposals if latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Consultant.

-
- a. 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.
 - b. Include a list of quantities of (plus or minus) the materials and/or products required with unit prices, total amount of purchases, and credits to be made. If requested, furnish survey data to substantiate quantities.
 - c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - d. Include costs of labor and supervision directly attributable to the change, including social security, old age and unemployment insurance, fringe benefits, and workmen's compensation insurance.
 - e. 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.
 - f. Comply with requirements in Division 1 Section, of the Technical Specifications "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- B. An alternative method to price the changes in the work is to utilize current "Mean's Cost Data".
- C. Profit and Overhead shall not exceed ten percent (10%) of the cost of the changes to the Work.
- D. Use Proposal Request Form provided by Owner. A Sample is included under Project Manual Heading VII - Forms. The Contractor shall prepare three copies, one for the Consultant, one for the Owner and one for himself and for all parties to sign. Each shall keep a copy.
- E. The Contractor shall be responsible for keeping and updating a "Proposal Request Log", listing all Proposal Requests and Minor Changes. The log shall also indicate the date of the Proposal Request, approval date, action taken, running balances, and a complete description of the change.
- F. After all parties have signed "The Proposal Request Form", it shall be the Contractor's authorization to proceed with the changes to the Work.
- G. If the Owner and Contractor do not agree with the requested adjustment in the Contract Sum, the Contract Time or the method of determining each, the provisions for Mediation shall be utilized.

1.8 CHANGE ORDER PROCEDURES

- A. The Consultant shall issue a Change Order for signatures once all of the Proposal Request(s) amounts exceeds the contingency amount or at the end of the project.
- B. The Contractor shall not invoice for the Change Order until it has been executed by all parties.

1.9 CONSTRUCTION CHANGE DIRECTIVE

- A. The Consultant may issue a Construction Change Directive that has been signed by the Owner to the Contractor directing a change in the Work. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Work 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. Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved. And the Contractor shall advise the Consultant of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.
- C. The Contractor shall 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PROCESSING CHANGE ORDERS

- A. The Change Order will be issued describing the change or changes to the Work and/or Contract Documents and will refer to the Proposal Requests.
- B. The Consultant shall issue one copy of the Change Order to the Contractor. The Contractor shall promptly sign the copy and return the copy to the Consultant who will sign the Change Order and forward the Change Order to the Owner to execute.
- C. Once the Change Order has been full executed, a copy shall be forwarded to the Consultant and to the Contractor for their files.

END OF SECTION 01 25 00

Section 01 27 00 UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Division 1, of the Technical Specifications Section "Contingency and Allowances" for procedures for using unit prices to adjust quantity allowances.
 - 2. Division 1, of the Technical Specifications Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 3. Division 1, of the Technical Specifications Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Technical Specifications Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent agent.
- D. List of Unit Prices: A list of unit prices is included at the end of this of the Technical Specifications Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

- A. Trench Rock \$_____ Per Cubic Yard
- B. Mass Rock \$_____ Per Cubic Yard
- C. Unsuitable Soils \$_____ Per Cubic Yard Haul Out
\$_____ Per Cubic Yard Haul In and Place
- D. General Contractor's General Conditions \$_____ Per Day
 - 1. Provide Unit Price per day to perform management of the work per the construction contract. This price shall include all project management and supervision labor, as well as material and services required to operate on the jobsite. In the event of schedule delays or scope changes beyond the Contractor's control, this unit price shall be used without markup to cover the Contractor's job expenses.
 - 2. This unit price may apply to additions, as well as deductions, in scope or Schedule.

END OF SECTION 01 27 00

Section 01 29 00 PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 1, of the Technical Specifications Section "Contingency and Allowances" for procedural requirements governing handling and processing of allowances.
 - 2. Division 1, of the Technical Specifications Section "Unit Prices" for administrative requirements governing use of unit prices.
 - 3. Division 1, of the Technical Specifications Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 4. Division 1, of the Technical Specifications Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms AIA G702.
 - b. Continuation Sheets (example of the Continuation Sheet form is in the Project Manual Heading VII Forms).
 - 2. Submit the Schedule of Values to the Consultant at earliest possible date but no later than fourteen (14) days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Sub-schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

- B. Format and Content: Use the 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 of the Technical Specifications Section and line item for potential billing against the Construction Contingency Allowance.
1. Identification: Include the following Project information on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Consultant.
 - c. Contract number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Technical Specifications Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractors.
 - d. Name of manufacturer or fabricator.
 - e. Name of suppliers.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 3. Group items that are "Non-Tangible & Non-Taxable and Tangible & Taxable Items" on the Schedule of Values (see VII. Forms, Continuation Sheet).
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include labor and materials and/or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
 7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. Closeout documentation: Provide a separate line item in the Schedule of Values for close out documentation as set forth in the Supplementary Conditions.
 9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Consultant and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involves additional requirements.
- B. Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.
- C. Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for material and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such material and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such material and equipment stored off the site.

The Contractor warrants that title to all Work covered by an Application and Certificate for payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application and Certificate for payment all work for which Certificates for payment have been previously issued and payment received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of claims of liens, claims, security, interests, or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work.

- D. Payment Application Times: Each Month, the County can make a partial payment to the Contractor on the basis of a duly notarized Application and Certification for Payment approved and certified by the Consultant.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. The Consultant 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 3. The County shall retain five (5%) percent of each payment to up fifty (50%) percent completion of the Contract.
 - a. The Owner shall not retain more than five percent (5%) of any periodic payment due a prime Contractor.

- b. When the project is fifty percent (50%) complete, the Owner, with written consent of the surety, **shall not retain any further** retainage from periodic payments due the Contractor if the Contractor continues to perform satisfactorily and any nonconforming work identified in writing prior to that time by the Consultant or Owner has been corrected by the Contractor and accepted by the Consultant and Owner. If the Consultant determines the Contractor's performance is unsatisfactory, the Owner may reinstate retainage for each subsequent periodic payment application as authorized in this subsection up to the maximum amount of five percent (5%). The project shall be deemed fifty percent (50%) complete when the Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the value of the contract, except the value of materials stored on-site shall not exceed twenty percent (20%) of the Contractor's gross project invoices for the purpose of determining whether the project is fifty percent (50%) complete.
- c. Within 60 days after the submission of a pay request and one of the following occurs, as specified in the contract documents, the Owner with written consent of the surety shall release to the Contractor all retainage on payments held by the Owner:
 - 1) The Owner receives a certificate of substantial completion from the Consultant in charge of the project; or (ii) the Owner receives beneficial occupancy or use of the project. However, the Owner may retain sufficient funds to secure completion of the project or corrections on any work. If the Owner retains funds, the amount retained shall not exceed two and one-half times the estimated value of the work to be completed or corrected. Any reduction in the amount of the retainage on payments shall be with the consent of the Contractor's surety.
- d. The existence of any third-party claims against the Contractor or any additive change orders to the construction contract shall not be a basis for delaying the release of any retainage on payments.
 - 1) Full payment, less authorized deductions, shall also be made for those trades that have reached one hundred percent (100%) completion of their contract by or before the project is fifty percent (50%) complete if the Contractor has performed satisfactorily. However, payment to the early finishing trades is contingent upon the Owner's receipt of an approval or certification from the Consultant of record or applicable engineer that the work performed by the subcontractor is acceptable and in accordance with the contract documents. At that time, the Owner shall reduce the retainage for such trades to **five-tenths percent (0.5%)** of the contract. Payments under this subsection shall be made no later than 60 days following receipt of the subcontractor's request or immediately upon receipt of the surety's consent, whichever occurs later. Early finishing trades under this subsection shall include structural steel, piling, caisson, and demolition. The early finishing trades for which line-item release of retained funds is required shall not be construed to prevent an Owner or an Owner's representative from identifying any other trades not listed in this subsection that are also allowed line-item release of retained funds. Should the Owner or Owner's representative identify any other trades to be afforded line-item release of retainage, the trade shall be listed in the original bid documents. Each bid document shall list the inspections required by the Owner before accepting the work, and any financial information required by the Owner to release payment to the trades,

except the failure of the bid documents to contain this information shall not obligate the Owner to release the retainage if it has not received the required certification from the Consultant of record or applicable engineer.

- 2) Notwithstanding 3-a & b of this section, following fifty percent (50%) completion of the project, the Owner shall be authorized to withhold additional retainage from a subsequent periodic payment, not to exceed five percent (5%) as set forth in 3-a of this section, in order to allow the Owner to retain two and one-half percent (2.5%) total retainage through the completion of the project. In the event that the Owner elects to withhold additional retainage on any periodic payment subsequent to release of retainage pursuant to 3-d-i of this section, the General Contractor may also withhold from the subcontractors remaining on the project sufficient retainage to offset the additional retainage held by the Owner, notwithstanding the actual percentage of retainage withheld by the Owner of the project as a whole.
 - 3) Neither the Owner's nor Contractor's release of retainage on payments as part of a payment in full on a line-item of work under 3-d-i of this section shall affect any applicable warranties on work done by the Contractor or subcontractor, and the warranties shall not begin to run any earlier than either the Owner's receipt of a certificate of substantial completion from the Consultant in charge of the project or the Owner receives beneficial occupancy.
 - e. Nothing in this section shall prevent the prime Contractor at the time of application and certification to the Owner from withholding application and certification to the Owner for payment to the subcontractor for unsatisfactory job progress; defective construction not remedied; disputed work; third party claims filed or reasonable evidence that claim will be filed; failure of subcontractor to make timely payments for labor, equipment, and materials; damage to prime Contractor or another subcontractor; reasonable evidence that subcontract cannot be completed for the unpaid balance of the subcontract sum; or a reasonable amount for retainage not to exceed the initial percentage retained by the Owner.
 - f. Nothing in this section shall prevent the Owner from withholding payment to the Contractor in addition to the amounts authorized by this section for unsatisfactory job progress, defective construction not remedied, disputed work, or third-party claims filed against the Owner or reasonable evidence that a third-party claim will be filed.
 4. Provide a separate line item in the Schedule of values for close out documentation as set forth in the Supplementary Conditions.
- F. Transmittal: Submit one (1) signed and notarized electronic (pdf format) copy of each Application for Payment to the Consultant.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. With each Application and Certification for payment, the Contractor must furnish for themselves, as well as for all Subcontractors, certified statements stating the cost of the property purchased

from each vendor and the amount of sales and/or use taxes paid. See General Conditions, Sales and Use Tax for additional information.

- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
- I. Neither Final payment nor any remaining retained percentage shall become due until the Contractor submits the following to the Consultant for approval:
 - 1. An affidavit that payrolls, bills for material and other indebtedness connected with the Work has been paid or otherwise satisfied,
 - 2. A certificate evidencing that insurance required by the Contract Document to remain in force after Final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,
 - 3. Consent of surety to Final payment and
 - 4. If required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of claim of liens, claims security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If the Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such claim of lien. If such claim of lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such claim, including all costs and reasonable attorneys' fees.
 - 5. BDI Form H (To be included with all pay applications, including Final Payment)
 - 6. A list of all suppliers and subcontractors that were involved with the project. As part of the list, the Contractor shall include the address, phone number, what they supplied or Work performed, and a contact name.
 - 7. "As-Built" Drawings and all other specified closeout documents.
 - 8. Maintenance and Operation instructions and guarantees.
- J. Final Payment Application: Submit one (1) electronic copy (pdf format) of the final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Warranties and Test results required by the Contract Documents.
 - 2. Updated final statement, accounting for final changes to the Contract Sum.
 - 3. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 4. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 5. AIA Document G707, "Consent of Surety to Final Payment."

6. Additional Evidence that claims have been settled if required by the Owner. An example of the evidence could be a letter from a subcontractor indicating that he has been paid in full for the work that he has performed.
7. Certificates from all local and State Governing Agencies as required by Law.
8. Final liquidated damages settlement statement.
9. List of Subcontractors and Suppliers that has contributed to the completion of the Work. The list shall include:
 - a. Material they supplied or type of construction they performed.
 - b. Address
 - c. Contact person
 - d. Phone number
10. BDI Form H for Final Payment
11. Final Sales Tax Form.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

Section 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General Project coordination procedures.
 - 2. Coordination Drawings.
 - 3. Requests for Information.
 - 4. Project meetings.
- B. See Division 01 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various 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 with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors 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.

1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
 - 1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or 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 required installation sequences.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 - 2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 - 3. Number of Copies: Submit two opaque copies of each submittal. Architect will return one copy.
 - 4. Digital Submittals: Digital PDF submittals are acceptable if coordinated and approved in advance with Architect. Architect must approve an adequate digital procedure for Contractor to verify Drawing review in lieu of Contractor's physical submittal stamp.
 - 5. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.
- C. Requests for Information: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation" unless otherwise directed by Owner or Architect.
- D. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
- E. RFI's shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
- F. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- G. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1. Project Name
 - 2. Date
 - 3. Name of Contractor
 - 4. Name of Consultant.
 - 5. RFI number, numbered sequentially.

6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
- D. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
- E. RFI Format: Contractor's standard form, submitted as hard-copy or PDF electronic submittal.
- F. Standard Form
1. Identify each page of attachments with the RFI number and sequential page number.
- G. Consultant's Action: Consultant will review each RFI, determine action required, and return it. Allow seven (7) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of substitutions.
 - b. Requests for coordination information already indicated in the Contract Documents.
 - c. Requests for adjustments in the Contract Time or the Contract Sum.
 - d. Requests for interpretation of Consultant's actions on submittals.
 - e. Incomplete RFIs or RFIs with numerous errors.
 2. Consultant's action may include a request for additional information, in which case Architect's time for response will start again.
 3. Consultant's action on RFI's that may result in a change to the Contract Time or the Contract Sum does not constitute an approval to proceed with the additional Work. Contractor must submit a Change Proposal and receive written approval to proceed according to Division 1 Section "Contract Modification Procedures".
 - a. If Contractor believes the RFI response warrants a change in the Contract Time or the Contract Sum, notify Consultant in writing within five (5) days of receipt of the RFI response.
- H. On receipt of Consultant's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
- I. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log biweekly. Include the following:
1. Project Name
 2. Name and address of Contractor.
 3. Name and address of Consultant.
 4. RFI number including RFI's that were dropped and not submitted.
 5. RFI description
 6. Date the RFI was submitted.
 7. Date Consultant's response was received.

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

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
 1. Include special personnel required for coordination of operations with other contractors.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.
- B. Preconstruction Conference: Schedule 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. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.
 - n. Equipment deliveries and priorities.
 - o. First aid.
 - p. Security.
 - q. Progress cleaning.
 - r. Working hours.

- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Regulation.
 - s. Testing and inspecting requirements.
 - t. Required performance results.
 - u. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements.
 4. 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 semi-monthly intervals, or as determined by the Architect and Owner. Coordinate dates of meetings with preparation of payment requests.
1. 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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. 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.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.

- 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Requests for interpretations (RFIs).
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
3. Minutes: Record the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - 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 01 31 00

Section 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Daily construction reports.
 - 4. Field condition reports.

1.3 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- B. Contractor's Construction Schedule: Submit two printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.
- C. Daily Construction Reports: Submit one copy at weekly intervals.
- D. Field Condition Reports: Submit one copy at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Within 10 days after date of Agreement, submit a preliminary construction schedule for review by Architect and Owner.
 - 1. Include written certification that major subcontractors have reviewed and accepted proposed schedule.
- B. Within 10 days after joint review and comments by Architect and Owner, submit complete schedule.
- C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- D. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 30 days, unless specifically allowed by Architect.
 - 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 3. Startup and Testing Time: Include not less than 14 days for startup and testing, unless otherwise directed by Architect / Owner.
 - 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.
- E. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 - 2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 3. Work Restrictions: Show the effect on the schedule of the following:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Use of premises restrictions.
 - e. Provisions for future construction.
 - f. Seasonal variations.
 - g. Environmental control.
 - 4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.

- h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
- 5. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was 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 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. Approximate count of personnel at Project site.
 - 3. High and low temperatures and general weather conditions.
 - 4. Accidents.
 - 5. Meetings and significant decisions.
 - 6. Unusual events (refer to special reports).
 - 7. Stoppages, delays, shortages, and losses.
 - 8. Meter readings and similar recordings.
 - 9. Emergency procedures.
 - 10. Orders and requests of authorities having jurisdiction.
 - 11. Change Orders received and implemented.
 - 12. Construction Change Directives received.
 - 13. Services connected and disconnected.
 - 14. Equipment or system tests and startups.
 - 15. Partial Completions and occupancies.
 - 16. Substantial Completions authorized.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information on sample form

included in Project Manual. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: Update schedule every 14 days 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 Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, subcontractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility. If problems are anticipated by projections shown, instruct recipients to promptly report to Contractor in writing.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

Section 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. 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. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
 - 1. Unless otherwise indicated, schedule all submittals to Architect for initial review within 60 calendar days of date of Notice to Proceed.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
 - 1. Initial Review: Allow 15 calendar days for initial review of each submittal unless otherwise indicated. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Allow 15 calendar days for processing each resubmittal.
 - 4. No extension of the Contract Time will be authorized because of failure to transmit submittals adequately in advance of the Work to permit processing.
 - 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 calendar days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- D. Digital Submittals: Digital PDF submittals are acceptable if coordinated and approved in advance with Architect. Architect must approve an adequate digital procedure for Contractor to verify Drawing review in lieu of Contractor's physical submittal stamp.

- E. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
 - 1. Do not submit additional copies for maintenance manuals.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
 - 1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 - 2. Transmittal Form: Use AIA Document G810, CSI Form 12.1A, or other form acceptable to Architect.
 - 3. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked "Approved," "Approved as noted," or "No exceptions taken."
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Submit four copies of submittal for portions of work designed by consulting design professionals. Architect will return two copies. Mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. Do not submit product data unless specifically required.
 2. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 3. Mark each copy of each submittal to show which products and options are applicable.
 4. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Operational range diagrams.
 - h. Compliance with recognized trade association standards.
 - i. Compliance with recognized testing agency standards.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
- D. Coordination Drawings: Comply with requirements in Division 01 Section "Project Management and Coordination."
- E. Samples: Prepare physical units of materials or products, including the following:
 1. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.

2. 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. Submit two full sets 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.
 3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, 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. Submit two sets of Samples. Architect will retain one Sample sets; remainder will be returned.
 4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side.
 5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed. Submit samples requiring selection at same time.
 6. 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.
- F. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
 4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.
- G. Delegated-Design Submittal: Comply with requirements in Division 01 Section "Quality Requirements."
- H. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation."
- I. Application for Payment: Comply with requirements in Division 01 Section "Payment Procedures."
- J. Schedule of Values: Comply with requirements in Division 01 Section "Payment Procedures."
- K. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A or other form acceptable to Architect.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.

2. Certificates and Certifications: Provide a notarized 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.
3. Test and Inspection Reports: Comply with requirements in Division 01 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, 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.
- L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. 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.
- M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 01 Section "Closeout Procedures."
- O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.

- R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- S. Construction Photographs: Comply with requirements in Division 01 Section "Construction Progress Documentation."

2.3 DELEGATED DESIGN

- 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 Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of 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.
 - 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.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. 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. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. REVIEWED. Fabrication and installation may proceed. Do not resubmit shop drawings.
 - 2. REVIEWED AS NOTED. Fabrication and installation may proceed, in accordance with comments indicated. Re-submittal not required.
 - 3. REVISE AS NOTED/RESUBMIT. Correct and resubmit shop drawings for final review. Do not fabricate or install.
 - 4. REJECTED/RESUBMIT. Major nonconformance with requirements. Prepare new shop drawings. Do not fabricate nor install.
 - 5. NOT REVIEWED. Architect's action is not required or submittal is outside Architect's scope.
- C. 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.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

Section 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting 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 quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. See Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. 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.
- B. 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. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

- J. 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, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision 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.

1.5 SUBMITTALS

- A. Qualification Data: 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.
- B. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 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. Ambient conditions at time of sample taking and testing and inspecting.
 - 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.
- C. Permits, Licenses, and Certificates: For Owner's records, 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.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. 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.
- D. 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.
- 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 to those indicated for this Project in material, design, and extent.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- 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. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory 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 in location and of size indicated or, if not indicated, as directed by Architect.

2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated or directed by Architect.

1.7 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 the types of testing and inspecting 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. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these 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 inspecting 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 inspecting 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.
- C. 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.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- E. 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. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.

4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies 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 inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. 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 inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
 2. Do not install finishes until required inspection of concealed construction is completed and work approved.
 - a. Coordinate in-wall and above-ceiling inspection by authorities having jurisdiction and observation by Architect.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
- I. 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, and as follows:
 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- 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 01 40 00

Section 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 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," "approved," "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": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- J. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- K. "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.

1.3 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.

- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
1. 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.
- D. Copies of Standards: Each entity engaged in construction on Project must 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 and make them available on request.
- E. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG	Americans with Disabilities Act (ADA)
AGC	Associated General Contractors of America (The)
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials International
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
SMCNA	Sheet Metal and Air Conditioning Contractors' National Association
TCNA	Tile Council of North America, Inc.
UL	Underwriters Laboratories, Inc.

1.4 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 Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

IAPMO	International Association of Plumbing and Mechanical Officials (The)
ICBO	International Conference of Building Officials
ICC	International Code Council, Inc.

SBCCI Southern Building Code Congress International, Inc. (See ICC)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

Section 01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Fencing.
- D. Stairs, ramps, scaffolding and hoists.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.
- G. Project identification sign.
- H. Field offices.

1.3 RELATED SECTIONS

- A. Division 01 Section "Temporary Utilities" for additional temporary facilities and controls requirements.

1.4 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
 - 2. Mobile Cellular Lines: One line, minimum per supervisory personnel.
 - 3. Internet Connections: Minimum of one; DSL modem or faster.
 - 4. Email: Account/address for all personnel of General Contractor.

1.5 TEMPORARY SANITARY FACILITIES

- A. The General Contractor shall provide and maintain in a neat and sanitary condition chemical type toilet facilities which comply with the requirements and regulations of the Department of Health or of other bodies having jurisdiction. These facilities shall be available to all workers on the job.
- B. Maintain daily in clean and sanitary condition.

1.6 TEMPORARY INTERNAL BARRIERS SEPARATING OCCUPIED AREAS FROM AREAS STILL UNDER CONSTRUCTION

- A. Provide temporary wall with passage door at corridor of temporary barriers.
- B. Permanent finished doors, which act as a temporary barrier shall be locked from occupant side. Use at all times until barrier requirement is listed.
- C. Clearly mark all barriers to prevent occupant access

1.7 FENCING

- A. The General Contractor shall provide a suitable construction fence around work area within Contract limits, located so as to permit sufficient area for storage of materials and conduct of work by all trades.
- B. Materials and methods of fence construction shall be adequate to provide for the safety and security of the project site and shall be the General Contractor's responsibility to select; however, as a minimum standard, fence shall be chain link type, minimum seven feet high, consisting of 9 gauge wire fabric supported on posts set firmly in the ground at 10 feet o.c. minimum. Provide gates as required. No barbed wire will be permitted.
- C. Remove and relocate fence when it interferes with the work of any trade.
- D. Keep gates closed at all times and locked during non-working hours. Owner shall be given copy of key to gate.

1.8 STAIRS, RAMPS, SCAFFOLDING AND HOISTS

- A. Each Subcontractor shall provide and maintain temporary scaffolding, ramps, and runways as required.
- B. Hoisting of materials and equipment shall be provided by the contractor requiring such hoisting.
- C. All apparatus, equipment, and construction included in this article shall be in accordance with all applicable state and local laws.
- D. The General Contractor shall provide roof protection as necessary where scaffolds and chutes are used.

1.9 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.10 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 FIELD OFFICES

- A. Contractor's Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.
- B. Locate offices as directed by the Architect and Owner.

1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 50 00

Section 01 51 00

TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Utilities for construction: Electricity, lighting, heat, ventilation, and water.

1.3 RELATED SECTIONS

- A. Division 01 Section "Temporary Facilities and Controls" for additional temporary utilities requirements.

1.4 ELECTRICITY

- A. Cost: By Owner.
- B. Contractor may utilize existing power in the facility. However no construction usage may interrupt or interfere with any power needs of the Owner's operations.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
- D. Permanent convenience receptacles may be utilized during construction.
- E. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.5 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 1 watt/sq ft or in accordance with OSHA requirements.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Maintain lighting and provide routine repairs.
- D. Relocate lighting as required and as deemed necessary for progress of construction to maintain lighting levels specified.

1.6 HEAT, VENTILATION AND AIR CONDITIONING

- A. As each area of the building are brought to Satisfactory Enclosure, provide temporary heat and ventilation to protect each area and its contents, to prevent freezing within the area, to dry out the area, and to provide suitable working conditions for the installation and curing of materials at temperatures in the range of not less than 55 degrees F. nor more than 75 degrees F. and in conformance with requirements of the various sections of the technical specifications.
- B. The temporary heating system shall be of adequate capacity to properly heat the area, and shall be vented as required so as not to produce fumes or vapors damaging to the building, its contents, or personnel. Temporary ventilation equipment shall be adequate to produce the necessary air movement to dry out and ventilate the area during those times when temporary heating or air conditioning is not required.
- C. Provide air conditioning as necessary to maintain 70 deg. F. and humidity conditions approximating those specified for the completed project during the final stages of the work in each area. The permanent air conditioning system may be used for when the building is "closed-in", all dust producing

work such as sawing, sanding, etc. has been completed and the building is clean. Approval by the Architect/Engineer and Contractor is required prior to use.

- D. Provide the necessary materials, equipment, labor, and operating personnel required to operate the temporary heating, ventilating, and air conditioning system (or permanent system when such is complete and ready for use) throughout the required interval of construction when temporary heating, ventilation, or air conditioning is required.
- E. When the permanent system is used for temporary heating, ventilating, and air conditioning provide proper operation and maintenance of the heating, ventilating, and air conditioning plant until Substantial Completion. Such items shall consist of but not be limited to maintenance of temporary filters in all equipment to prevent accumulation of dust and dirt in coils, housings, etc.; temporary protection of ductwork from dust, dirt, etc., through the use of cloth covers over duct openings or similar means; and prior to final inspection, replacement of temporary filters with new filters as specified. Provide a thorough cleaning of coils and other equipment of dust and dirt, putting the entire system into first class condition, including cleaning traps and devices and adjustment and renewal of any and all materials and/or equipment not functioning correctly.
- F. All guarantees including manufacturer's warranties for the permanent system shall commence on the Date of Substantial Completion. Provide without delay all electrical service required for the temporary heating and ventilating system (or permanent system when its use is desired).
- G. Payment of Utility Bills: Owner shall pay costs of all water, electric current, and natural gas required for the duration of the Work.

1.7 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Owner.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Connect to existing water source.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 51 00

Section 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitution limitations and procedures; maintenance materials, including extra materials, spare parts, and software.
- B. Related Sections include the following:
 - 1. Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 30 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project. Contract Documents shall not be used for submittals.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Store cementitious products and materials on elevated platforms.
 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.

1.6 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: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that 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 not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- B. Do not use products having any of the following characteristics:
1. Made using or containing CFC's or HCFC's.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions:
- D. Submit a request for substitution for any manufacturer not named.

2.3 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 SUBSTITUTION PROCEDURES

- A. Architect will consider requests for substitutions only within 30 days after date established in Notice to Proceed.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. A request for substitution constitutes a representation that the submitter:
 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 2. Will provide the same warranty for the substitution as for the specified product.
 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 5. Will reimburse the Architect and Engineers for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request submitted prior to shop drawing submittal, or when acceptance will require revision to the Contract Documents.
- F. Equivalent products from manufacturers used as equal to the primary specification must meet dimensional/weight/aesthetic qualities of the primary specification. The Project Coordinator shall provide the Architect documentation clearly demonstrating compliance.
- G. Substitution Submittal Procedure:

1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
3. Provide sample of substitution to Architect/Engineer as requested
4. The Architect will notify Contractor in writing of decision to accept or reject request.

END OF SECTION 01 60 00

Section 01 60 05A
SUBSTITUTION REQUEST FORM

Date: _____

To: FMK Architects
123 New Bern Street
Charlotte, NC 28203

From: _____
(General Contractor)

Re: Materials Recovery Facility Retrofit - 1007 Amble Drive, Charlotte, NC
Architect's Project No. 2411
Contractor's Project No. _____

Request Number: _____ **Title:** _____
Specification Section: _____
Drawing Numbers: _____
Subcontractor: _____
Supplier: _____

DESCRIPTION

REASON FOR SUBSTITUTION: Product not Available _____ Cost Savings to Owner _____
COST SAVINGS TO OWNER: _____ Dollars (\$ _____)

COMPARISON TO SPECIFIED ITEM:

Features of **Specified** Item: _____

Features of **Substituted** Item: _____

CERTIFICATION

The contractor certifies that the requested substitution meets or exceeds the performance of the specified item and that the effect of this substitution to other specified construction has been accounted for. There are no additional costs resulting from this substitution.

Signature: _____

Section 01 60 05

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 2. Substitution Request Form following this Section.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided in Project Manual.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.

- f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. 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 of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

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

- b. Requested substitution provides sustainable design characteristics that specified product provided.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. 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 30 days in advance of submittal for review. 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. Requested substitution provides sustainable design characteristics that specified product provided.
 - e. Substitution request is fully documented and properly submitted.
 - f. Requested substitution will not adversely affect Contractor's construction schedule.
 - g. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - h. Requested substitution is compatible with other portions of the Work.
 - i. Requested substitution has been coordinated with other portions of the Work.
 - j. Requested substitution provides specified warranty.
 - k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 05

Section 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. General installation of products.
 - 3. Coordination of Owner-installed products.
 - 4. Moisture and mold control.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.

1.3 SUBMITTALS

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, whenever hazardous waste is disposed of.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: 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, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: 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. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and 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.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on Request for Information form provided in the Project Manual.

3.3 CONSTRUCTION LAYOUT

- A. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- B. 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. Level foundations and piers from two or more locations.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until 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.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 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.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.6 MOISTURE AND MOLD CONTROL

- A. General: Coordinate requirements in Contractor's approved Material and Mold Control Plan as described in Division 01 Section "Product Requirements." Avoid trapping water in finished work. Document visible signs of mold that may appear during construction. Comply with recommendations contained in Associated General Contractors (AGC) document "Managing the Risk of Mold in the Construction of Buildings," including the following:
- B. Exposed Phase of Construction:
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.
 6. Use dunnage to create space between concrete decks and stored drywall.
- C. Partially Enclosed Phase of Construction:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Phase of Construction

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Utilize permanent HVAC system to control humidity.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- 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 assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- 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: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.9 PROTECTION 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. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water.
 - 1. 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 forty-eight hours are considered defective.
 - 2. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Indicate materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - 3. Remove such materials that are not completely restored to their manufactured moisture level within forty-eight hours.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

Section 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 2. Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. 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.

- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials 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 match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. 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.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- 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. 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 as small as possible, neatly to 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 diamondcore drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 5. Proceed with patching after construction operations requiring cutting are complete.
- C. 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 possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate 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.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

Section 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project As-Built documents.
 - 3. Operation and Maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's Personnel.
 - 6. Final cleaning, including cleaning of HVAC system.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner, if so required in Division 08 Section "Door Hardware." Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise Owner of changeover in heat and other utilities.
 - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.
 - 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 - 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 4. Submit pest-control final inspection report and warranty.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 2. The Contractor shall take immediate steps to correct the stated deficiencies, and send a written notice to the Consultant, certifying the Project is complete, at which time the Consultant will re-inspect the Work. This review and additional reviews by the Consultant where the Work is not considered Substantial Completion or Final Completion will be considered an additional service from the Consultant. The Contractor will be charged for these additional services incurred by such failure including travel time, observation time, and administrative time at the Consultant's hourly rate, as well as all expenses associated with the distribution of a written notice stating the reasons for failure to reach final completion.
 - 3. In the event the Contractor is granted Substantial Completion by the Architect and the Contractor fails to complete and/or correct all the items listed in the Substantial Completion within **30** calendar days of the date of Substantial Completion, the liquated damages shall start to accrue until all the items on the Substantial Completion list are completed and/or corrected and have been approved by the Architect.
 - 4. If the Consultant is required to make more than two inspections for the project to achieve Substantial Completion, the Contractor shall pay for the Consultant's time and expenses.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit one electronic copy in PDF format 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. Use CSI Form 14.1A or similar.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.6 PROJECT RECORD DOCUMENTS

- A. The Contractor shall provide Project Record Documents, Operations & Maintenance Manuals, "As-Builts" Drawings, and Warranties as indicated in Division 01 of the Technical Specifications and specifically according to Sections 01 78 23 – Operations and Maintenance Data and 01 78 38 – Project Record Documents.

1.7 WARRANTIES

- B. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- C. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- D. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 1. Submit electronic copies of all contractor's, sub-contractor's and manufacturer's warranty documents and certifications in PDF format.
 2. Each warranty document file to be clearly named as to scope or product warranted.
 3. Where a particular assembly carries multiple product warranties, group said warranties together under the scope of that assembly.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates. Remove paint or other matter obscuring labels.
 - m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction or if inspection indicates units are not in clean, like-new condition.
 - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

Section 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Operation manuals for systems, subsystems, and equipment.
 - 3. Maintenance manuals for the care and maintenance of products, materials, and finishes and systems and equipment.

1.3 SUBMITTALS

- A. Initial Submittal: Submit 1 draft digital copy of each manual, in PDF format, at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory and bookmarked sections for navigation. Architect will return one copy of draft and indicate whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit 1 digital copy of each manual, in electronic PDF format, in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit 1 digital copy, in PDF format, of each corrected manual within 15 days of receipt of Architect's comments.

1.4 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, *"Preparation of Operating and Maintenance Documentation for Building Systems."*

2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system.
- B. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- C. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name, address, and telephone number of Contractor.
 6. Name and address of Architect.
 7. Cross-reference to related systems in other operation and maintenance manuals.
- D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Drawings: Attach digital copies of any drawings, in PDF format.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. Re-ordering information for parts.
 11. Standard printed maintenance instructions and bulletins.
 12. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement and re-assembly.
 13. Identification and nomenclature of parts and components.

14. List of items recommended to be stocked as spare parts.
 15. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

3.1 EMERGENCY MANUAL PREPARATION

- A. Emergency Manual: Assemble a complete digital set of emergency information, in PDF format, indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

END OF SECTION 01 78 23

Section 01 78 38

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one digital copy, in PDF format, of marked-up Record Prints.
- B. Record Specifications: Submit one digital copy, in PDF format, of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one digital copy, in PDF format, of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings.
 - 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 prepare the 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 understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Scan completed Record Prints containing recorded changes and save data in current Portable Document Format (PDF) file required by Owner. Deliver files on CDROM or DVD medium.
 - 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 below first floor.
 - 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.
 - 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 or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross reference on the Contract Drawings.
4. Mark record sets 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.

2.2 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. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples 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.

END OF SECTION 01 78 38

SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Form-facing material for cast-in-place concrete.
 - 2. Shoring, bracing, and anchoring.

1.2 DEFINITIONS

- A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
- B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction, movement, contraction, and isolation joints
 - c. Forms and form-removal limitations.
 - d. Shoring and reshoring procedures.
 - e. Anchor rod and anchorage device installation tolerances.

1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following:
 - 1. Exposed surface form-facing material.
 - 2. Concealed surface form-facing material.
 - 3. Forms for cylindrical columns.
 - 4. Form ties.
 - 5. Waterstops.
 - 6. Form-release agent.

- B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.
 - 1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
 - 2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.
 - a. Location of construction joints is subject to approval of the Architect.
 - 3. Indicate location of waterstops.
 - 4. Indicate form liner layout and form line termination details.
 - 5. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing and inspection agency.
- B. Research Reports: For insulating concrete forms indicating compliance with International Code Council Acceptance Criteria AC308.
- C. Field quality-control reports.
- D. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

- A. Testing and Inspection Agency Qualifications: An independent agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.
- B. Design, engineer, erect, shore, brace, and maintain insulating concrete forms in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
1. Design cross ties to transfer the effects of the following loads to the cast-in-place concrete core:
 - a. Wind Loads: As indicated on Drawings.
 - 1) Horizontal Deflection Limit: Not more than 1/240 of the wall height.

2.2 FORM-FACING MATERIALS

- A. As-Cast Surface Form-Facing Material:
1. Provide continuous, true, and smooth concrete surfaces.
 2. Furnish in largest practicable sizes to minimize number of joints.
 3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
 - a. Plywood, metal, or other approved panel materials.
 - b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - 1) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
 - 2) APA Plyform Class I, B-B or better; mill oiled and edge sealed.
- B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
1. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class.
1. Provide forms with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

2.3 WATERSTOPS

- A. Flexible PVC Waterstops: U.S. Army Corps of Engineers CRD-C 572, for embedding in concrete to prevent passage of fluids through joints, with factory fabricate corners, intersections, and directional changes.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BoMetals, Inc.
 - b. Sika Corporation.
 - c. Vinylex Waterstop & Accessories.
 - 2. Profile: Flat dumbbell with center bulb.
 - 3. Dimensions: 4 inches by 3/16 inch thick; nontapered.

2.4 RELATED MATERIALS

- A. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- C. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
 - 2. Form release agent for form liners shall be acceptable to form liner manufacturer.
- D. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

PART 3 – EXECUTION

3.1 INSTALLATION OF FORMWORK

- A. Comply with ACI 301.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.
- C. Limit concrete surface irregularities as follows:
 - 1. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.
- D. Construct forms tight enough to prevent loss of concrete mortar.
 - 1. Minimize joints.
 - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
 - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
 - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
 - 1. Provide and secure units to support screed strips
 - 2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
 - 1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
 - 2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete unless otherwise noted or shown.

- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
 - 1. Determine sizes and locations from trades providing such items.
 - 2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
 - 1. Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 3. Place joints perpendicular to main reinforcement.
 - 4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
 - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 6. Space vertical joints in walls as indicated on Drawings.
 - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
 - 1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
 - 2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 - 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
 - 5. Clean embedded items immediately prior to concrete placement.

3.3 INSTALLATION OF WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.
 - 1. Install in longest lengths practicable.
 - 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
 - 3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 033000 "Cast-In-Place Concrete."
 - 4. Secure waterstops in correct position at 12 inches on center.
 - 5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.
 - a. Miter corners, intersections, and directional changes in waterstops.
 - b. Align center bulbs.
 - 6. Clean waterstops immediately prior to placement of concrete.
 - 7. Support and protect exposed waterstops during progress of the Work.

3.4 REMOVING AND REUSING FORMS

- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work.
1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 2. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
1. Align and secure joints to avoid offsets.
 2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 SHORING AND RESHORING INSTALLATION

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.

2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 03 10 00

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel reinforcement bars.
 - 2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction contraction and isolation joints.
 - c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of steel reinforcement.
 - 2. Bar supports.
 - 3. Mechanical splice couplers.
- B. Shop Drawings: Comply with ACI SP-066:
 - 1. Include placing drawings that detail fabrication, bending, and placement.
 - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

- B. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Store reinforcement to avoid contact with earth.
- B. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
- C. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

PART 2 – PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.
- C. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

- a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- C. Mechanical Splice Couplers: ACI 318 Type 1, same material of reinforcing bar being spliced; tension-compression type.
- D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.
 - 1. Finish: Plain.

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 – EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.

- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.
 - 3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel-reinforcement placement.
 - 2. Steel-reinforcement mechanical splice couplers.
 - 3. Steel-reinforcement welding.

END OF SECTION 03 20 00

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
 - 2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with fly ash.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - 2. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Vapor-retarder installation.

- e. Anchor rod and anchorage device installation tolerances.
- f. Cold and hot weather concreting procedures.
- g. Concrete finishes and finishing.
- h. Curing procedures.
- i. Forms and form-removal limitations.
- j. Shoring and reshoring procedures.
- k. Concrete repair procedures.
- l. Concrete protection.
- m. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
- n. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following.
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Aggregates.
 - 4. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
 - 5. Vapor retarders.
 - 6. Floor and slab treatments.
 - 7. Liquid floor treatments.
 - 8. Curing materials.
 - 9. Joint fillers.
 - 10. Repair materials.
- B. Design Mixtures: For each concrete mixture, include the following:
 - 1. Mixture identification.
 - 2. Minimum 28-day compressive strength.
 - 3. Durability exposure class.
 - 4. Maximum w/cm.
 - 5. Calculated equilibrium unit weight, for lightweight concrete.
 - 6. Slump limit.
 - 7. Air content.

8. Nominal maximum aggregate size.
 9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
 10. Intended placement method.
 11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Shop Drawings:
1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Engineer of Record.
- D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:
1. Concrete Class designation.
 2. Location within Project.
 3. Exposure Class designation.
 4. Formed Surface Finish designation and final finish.
 5. Final finish for floors.
 6. Curing process.
 7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For the following:
1. Installer: Include copies of applicable ACI certificates.
 2. Ready-mixed concrete manufacturer.
 3. Testing agency: Include copies of applicable ACI certificates.
- B. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
 2. Admixtures.
 3. Curing compounds.
 4. Floor and slab treatments.
 5. Bonding agents.
 6. Adhesives.
 7. Vapor retarders.
 8. Semirigid joint filler.

- 9. Joint-filler strips.
- 10. Repair materials.
- C. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Aggregates.
- D. Research Reports:
 - 1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
 - 2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.
- E. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician.
 - 1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.
- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.

4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 – PRODUCTS

2.1 CONCRETE, GENERAL

- a. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Source Limitations:
1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
 3. Obtain aggregate from single source.
 4. Obtain each type of admixture from single source from single manufacturer.
- B. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type I/II, gray.
 2. Fly Ash: ASTM C618, Class C or F.
- C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.

- c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
 - 2. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C260/C260M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 2. Retarding Admixture: ASTM C494/C494M, Type B.
 - 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 - 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- F. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Barrier-Bac; Inteplast Group.
 - b. ISI Building Products.
 - c. Poly-America, L.P.
 - d. Reef Industries, Inc.
 - e. Stego Industries, LLC.
 - f. Tex-Trude.
 - g. W.R. Meadows, Inc.

2.4 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation.
 - b. ChemMasters, Inc.
 - c. ChemTec International.
 - d. Concrete Sealers USA.
 - e. Dayton Superior.
 - f. Euclid Chemical Company (The); an RPM company.
 - g. Kaufman Products, Inc.
 - h. Laticrete International, Inc.
 - i. Nox-Crete Products Group.
 - j. PROSOCO, Inc.
 - k. SpecChem, LLC.
 - l. US SPEC, Division of US MIX Company.
 - m. Vexcon Chemicals Inc.
 - n. V-Seal Concrete Sealers & Specialty Coatings.
 - o. W.R. Meadows, Inc.
 2. Products shall comply with the 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."

2.5 CURING MATERIALS

- a. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- 1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a) BASF Corporation.
 - b) Bon Tool Co.
 - c) ChemMasters, Inc.
 - d) Dayton Superior.
 - e) Euclid Chemical Company (The); an RPM company.
 - f) Kaufman Products, Inc.
 - g) Lambert Corporation.

- h) Laticrete International, Inc.
 - i) Metalcrete Industries.
 - j) Nox-Crete Products Group.
 - k) Sika Corporation.
 - l) SpecChem, LLC.
 - m) TK Products.
 - n) Vexcon Chemicals Inc.
 - o) W.R. Meadows, Inc.
- b. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1) Color:
 - a) Ambient Temperature Below 50 deg F: Black.
 - b) Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c) Ambient Temperature Above 85 deg F: White.
- c. Water: Potable or complying with ASTM C1602/C1602M.
- d. Clear, Waterborne, Membrane-Forming, Non-dissipating Curing Compound: ASTM C309, Type 1, Class B, certified by curing compound manufacturer to not interfere with bonding of floor covering.
 - 1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a) Anti-Hydro International, Inc.
 - b) BASF Corporation.
 - c) ChemMasters, Inc.
 - d) Dayton Superior.
 - e) Euclid Chemical Company (The); an RPM company.
 - f) Kaufman Products, Inc.
 - g) Lambert Corporation.
 - h) Laticrete International, Inc.
 - i) Metalcrete Industries.
 - j) Nox-Crete Products Group.
 - k) SpecChem, LLC.
 - l) TK Products.
 - m) Vexcon Chemicals Inc.
 - n) W.R. Meadows, Inc.
- e. Clear, Waterborne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
 - 1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a) ChemMasters, Inc.
 - b) Concrete Sealers USA.
 - c) Dayton Superior.
 - d) Euclid Chemical Company (The); an RPM company.
 - e) Kaufman Products, Inc.
 - f) Lambert Corporation.
 - g) Laticrete International, Inc.
 - h) Metalcrete Industries.
 - i) Nox-Crete Products Group.
 - j) Right Pointe.
 - k) SpecChem, LLC.
 - l) TK Products.
 - m) Vexcon Chemicals Inc.
 - n) W.R. Meadows, Inc.
- 2) Products shall comply with the 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."

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4,100 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. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 4. Compressive Strength: Not less than 5,000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.8 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash: 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for parking structure slabs, and concrete with a w/cm below 0.50.

2.9 CONCRETE MIXTURES

- A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
 1. Exposure Class: ACI 318 F0, S0, W0, C0.
 2. Minimum Compressive Strength: 3,000 psi at 28 days.
 3. Maximum w/cm: 0.55.

4. Slump Limit: 4 inches, plus or minus 1 inch, before adding high-range water-reducing or plasticizing admixtures at the Project site (8 inches, plus or minus 1 inch thereafter).
 5. Air Content: 2.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4 inch nominal maximum aggregate size.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
- B. Class B: Normal-weight concrete used for foundation walls and slabs-on-ground.
1. Exposure Class: ACI 318 F1, S0, W0, C0.
 2. Minimum Compressive Strength: 4,500 psi at 28 days.
 3. Maximum w/cm: 0.45.
 4. Slump Limit: 4 inches, plus or minus 1 inch, before adding high-range water-reducing or plasticizing admixtures at the Project site (8 inches, plus or minus 1 inch thereafter).
 5. Air Content:
 - a. Exposure Class F1: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.
 6. Air Content: Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
- C. Class F: Normal-weight concrete used for exterior pads.
1. Exposure Class: ACI 318 F2, S0, W1, C0.
 2. Minimum Compressive Strength: 4,500 psi at 28 days.
 3. Maximum w/cm: 0.45.
 4. Minimum Cementitious Materials Content: 540 lb/cu. yd.
 5. Slump Limit: 4 inches, plus or minus 1 inch.
 6. Air Content:
 - a. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.
 7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 - 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 - 1. Daily access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 - 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.4 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 - 2. Face laps away from exposed direction of concrete pour.
 - 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
 - 4. Lap joints 6 inches and seal with manufacturer's recommended tape.

5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by the Engineer of Record.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints:
 1. Install dowel bars and support assemblies at joints where indicated on Drawings.
 2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Engineer of Record and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer of Record in writing, but not to exceed the amount indicated on the concrete delivery ticket.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 - 1. If a section cannot be placed continuously, provide construction joints as indicated.
 - 2. Deposit concrete to avoid segregation.
 - 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Do not place concrete floors and slabs in a checkerboard sequence.
 - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 3. Maintain reinforcement in position on chairs during concrete placement.
 - 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 5. Level concrete, cut high areas, and fill low areas.
 - 6. Slope surfaces uniformly to drains where required.

7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

- A. As-Cast Surface Finishes:
 1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces not exposed to public view.
- B. Related Unformed Surfaces:
 1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
 2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish:
 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
 3. Apply scratch finish to surfaces to receive concrete floor toppings and to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish:
 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.

2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 (ACI A117M) tolerances for conventional concrete.
 3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.
 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) 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.
 - b. Suspended Slabs:
 - 1) Specified overall values of flatness, F_F 35; and of levelness, F_L 20; with minimum local values of flatness, F_F 24; and of levelness, F_L 15. Levelness requirements may be waived for slabs on metal deck.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 - 2. Coordinate required final finish with Architect before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
 - 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 - 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 - 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Construct concrete bases 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
 - 3. Minimum Compressive Strength: As indicated herein.
 - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 - 6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.10 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 - 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 - 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305.1, before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 - 2. If forms remain during curing period, moist cure after loosening forms.
 - 3. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Begin curing immediately after finishing concrete.
 - 2. Interior Concrete Floors:
 - a. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface,

- install prewetted absorptive cover over entire area of floor.
- a) Lap edges and ends of absorptive cover not less than 12 inches.
- b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
- 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- b. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

3.11 TOLERANCES

- A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than seven days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 - 4. Rinse with water; remove excess material until surface is dry.
 - 5. Apply a second coat in a similar manner if surface is rough or porous.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month.
 - 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 - 1. Repair and patch defective areas when approved by Architect.
 - 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. 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 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.
- 6. 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.
- 7. 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.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - a. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.

- b. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - c. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - d. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - e. Project name.
 - f. Name of testing agency.
 - g. Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - h. Name of concrete manufacturer.
 - i. Date and time of inspection, sampling, and field testing.
 - j. Date and time of concrete placement.
 - k. Location in Work of concrete represented by samples.
 - l. Date and time sample was obtained.
 - m. Truck and batch ticket numbers.
 - n. Design compressive strength at 28 days.
 - o. Concrete mixture designation, proportions, and materials.
 - p. Field test results.
 - q. Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - r. Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
 - a. Headed bolts and studs.
 - b. Verification of use of required design mixture.
 - c. Concrete placement, including conveying and depositing.
 - d. Curing procedures and maintenance of curing temperature.
 - e. Verification of concrete strength before removal of shores and forms from beams and slabs.

- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
- a. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - 1) When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - b. Slump: ASTM C143/C143M:
 - 1) One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 2) Perform additional tests when concrete consistency appears to change.
 - c. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; ASTM C173/C173M volumetric method, for structural lightweight concrete.
 - 1) One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - d. Concrete Temperature: ASTM C1064/C1064M:
 - 1) One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 - e. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - 1) One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - f. Compression Test Specimens: ASTM C31/C31M:
 - 1) Cast and laboratory cure two sets of four 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
 - g. Compressive-Strength Tests: ASTM C39/C39M.
 - 1) Test one set of two laboratory-cured specimens at seven days and three sets of two specimens at 28 days.
 - 2) A compressive-strength test shall be the average compressive strength from a set of two specimens

obtained from same composite sample and tested at age indicated.

- h. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- i. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5,000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5,000 psi.
- j. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- k. Additional Tests:
 - 1) Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer of Record.
 - 2) Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Engineer of Record.
 - a) Acceptance criteria for concrete strength shall be in accordance with ACI 301, section 1.6.6.3.
- l. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- m. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.16 PROTECTION

- A. Protect concrete surfaces as follows:
 - 1. Protect from petroleum stains.
 - 2. Diaper hydraulic equipment used over concrete surfaces.
 - 3. Prohibit vehicles from interior concrete slabs.

4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 03 30 00

Section 04 22 00
CONCRETE MASONRY UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Decorative concrete masonry units.
 - 3. Mortar and grout.
 - 4. Steel reinforcing bars.
 - 5. Masonry-joint reinforcement.
 - 6. Embedded flashing.
 - 7. Miscellaneous masonry accessories.
 - 8. Masonry-cell fill.
- B. Related Requirements:
 - 1. Section 07 62 00 "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
- C. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

- D. Samples for Initial Selection:
 - 1. Decorative CMUs, in the form of small-scale units.
- E. Samples for Verification: For each type and color of the following:
 - 1. Decorative CMUs.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include data on material properties and, if required by authorities having jurisdiction, material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - 2. Cementitious materials. Include name of manufacturer, brand name, and type.
 - 3. Mortar admixtures.
 - 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - 5. Grout mixes. Include description of type and proportions of ingredients.
 - 6. Reinforcing bars.
 - 7. Joint reinforcement.
 - 8. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 - 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
 - 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C1314.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

2. Provide square-edged units for outside corners unless otherwise indicated.

B. CMUs: ASTM C90

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi unless otherwise indicated on the Structural Drawings.
2. Density Classification: Lightweight unless otherwise indicated on the Structural Drawings.
3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

C. Decorative CMUs: ASTM C90

1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
 - a. Eschelon Masonry; Trenwyth Architectural Masonry; Trattino 4106.
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi, unless otherwise required by the Structural Drawings.
3. Density Classification: Lightweight, unless otherwise required by the Structural Drawings.
4. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.
5. Pattern and Texture:
 - a. Exterior Decorative CMUs: Standard pattern, with manufacturer's standard weathered travertine-like finish.
 - b. Interior Decorative CMUs: Smooth-faced.
6. Color: Trattino 4106.
7. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.

2.5 CONCRETE AND MASONRY LINTELS

- A. General: Provide one of the following:
- B. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.
- C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- E. Aggregate for Grout: ASTM C404.
- F. Water: Potable.

2.7 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A951/A951M.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.187-inch diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch diameter.
 - 5. Spacing of Cross Rods: Not more than 16 inches o.c.
 - 6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8- inch cover on outside face.

- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
 2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
 3. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.105-inch-thick steel sheet, galvanized after fabrication.
 - a. 0.064-inch- thick, galvanized-steel sheet may be used at interior walls unless otherwise indicated.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.
 3. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch-thick steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete.
 - a. 0.064-inch- thick, galvanized sheet may be used at interior walls unless otherwise indicated.
- E. Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

2.9 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
 2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 4. Fabricate through-wall flashing with sealant stop where indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
 5. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 6. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
 7. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
 8. Solder metal items at corners.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Copper Sealtite 2000.
 - 2) Hohmann & Barnard, Inc; Copper Fabric Flashing NA or Copper Fabric Flashing SA.
 - 3) STS Coatings, Inc.
 - 4) Wire-Bond; Copper Seal Flashing #4140.
 - 5) York Manufacturing, Inc; Multi-Flash 500.
 2. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Hohmann & Barnard, Inc; Flex-Flash.
 - 2) Hyload, Inc.; Hyload Cloaked Flashing System.
 - 3) Mortar Net Solutions; Total Flash.
 - 4) Wire-Bond; Rhino Bond Flashing #4123.
 - b. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick.
 - c. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch-thick coating of adhesive.

- d. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch-thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches from edge.
 - 1) Color: As selected by the Architect from the manufacturer's full range.
 - e. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
- C. Application: Unless otherwise indicated, use the following:
- 1. Where flashing is indicated to receive counterflashing, use metal flashing.
 - 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 - 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge or flexible flashing with a metal drip edge.
 - 4. Where flashing is fully concealed, use metal flashing or flexible flashing.
- D. Solder and Sealants for Sheet Metal Flashings:
- 1. Solder for Stainless Steel: ASTM B32, Grade Sn60, with acid flux of type recommended by stainless steel sheet manufacturer.
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- F. Termination Bars for Flexible Flashing: Stainless steel bars 0.075 inch by 1 inch or stainless steel sheet 0.019 inch by 1-1/2 inches with a 3/8 inch sealant flange at top.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.11 MASONRY-CELL FILL

- A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime mortar unless otherwise indicated.
 - 3. For exterior masonry, use portland cement-lime mortar.
 - 4. For reinforced masonry, use portland cement-lime mortar.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type S.
 - 3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 - 4. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
 - 1. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
 - 2. Mix to match Architect's sample.
 - 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
 - 1. Mix to match Architect's sample.
 - 2. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:

- a. Decorative CMUs.
- F. Grout for Unit Masonry: Comply with ASTM C476.
- 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
 - 4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
 - 3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

- C. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- F. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-CELL FILL

- A. Pour loose-fill insulation into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet.
- B. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.7 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 - 1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.10 LINTELS

- A. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.11 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At lintels, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric

- sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.
4. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.
 5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.12 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades,

sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.
- E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.14 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.15 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of

masonry waste. Fill material is indicated on the Civil Drawings.

3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 22 00

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Shrinkage-resistant grout.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303 "Code of Standard Practice for Steel Buildings and Bridges".

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data:
 - 1. Structural-steel materials.
 - 2. High-strength, bolt-nut-washer assemblies.
 - 3. Anchor rods.
 - 4. Threaded rods.
 - 5. Shop primer.
 - 6. Shrinkage-resistant grout.
- B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 2. Include embedment Drawings.
 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
- C. Delegated-Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
1. For Fabricator, see either 1.8.A.1 or 1.8.A.2 for informational submittals needed to satisfy qualification requirements.
 2. For Erector, see either 1.8.B.1 or 1.8.B.2 for informational submittals needed to satisfy qualification requirements.
- B. Welding certificates, as used by either the Fabricator or the Erector.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural-steel materials, including chemical and physical properties.
- E. Product Test Reports: For the following:
1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 2. Direct-tension indicators.
 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 4. Shear stud connectors.

1.7 QUALITY CONTROL

- A. Fabricator Qualifications: The Fabricator must meet at least one of the two following requirements.

1. A Fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Accreditation Criteria 172). The Fabricator shall also have a minimum of 5 years of experience in fabricating structural steel like that indicated for this project (with a record of successful service performance) and sufficient capacity to fabricate the structural steel without delaying the work. Qualification requirements shall be satisfied by submittal of the following:
 - a. Completed project history for Fabricator, specifically focused on projects whose structural steel is like that for this project. Project history shall include Owner and Structural Engineer (as well as primary contacts) for each project listed. This qualification requirement shall be submitted as part of the bidding process.
 - b. Current AISC or IAS certification documents.
 2. A Fabricator that has an established and maintained quality control program to ensure that the work is performed in accordance with the requirements in ANSI/AISC 303 "Code of Standard Practice for Steel Buildings and Bridges", ANSI/AISC 360 "Specification for Structural Steel Buildings", and the Contract Documents. Program shall at a minimum address inspection of the items noted in ANSI/AISC 360 N2. The Fabricator shall also have a minimum of 5 years of experience in fabricating structural steel like that indicated for this project (with a record of successful service performance) and sufficient capacity to fabricate the structural steel without delaying the work. Qualification requirements shall be satisfied by submittal of the following:
 - a. Completed project history for Fabricator, specifically focused on projects whose structural steel is like that for this project. Project history shall include Owner and Structural Engineer (as well as primary contacts) for each project listed. This qualification requirement shall be submitted as part of the bidding process.
 - b. A written quality control manual that shall include (at a minimum) procedures for material control, inspection, and non-conformances.
 - c. Quality Control Inspector (QCI) qualifications.
- B. Erector Qualifications: The Erector must meet at least one of the two following requirements.
1. An Erector who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE. The Erector shall also have a minimum of 5 years of experience in erecting structural steel like that indicated for this project (with a record of successful service

performance) and sufficient capacity to erect the structural steel without delaying the work. Qualification requirements shall be satisfied by submittal of the following:

- a. Completed project history for Erector, specifically focused on projects whose structural steel is like that for this project. Project history shall include Owner and Structural Engineer (as well as primary contacts) for each project listed. This qualification requirement shall be submitted as part of the bidding process.
 - b. Current AISC certification documents.
2. An Erector that has an established and maintained quality control program to ensure that the work is performed in accordance with the requirements in ANSI/AISC 303 "Code of Standard Practice for Steel Buildings and Bridges", ANSI/AISC 360 "Specification for Structural Steel Buildings", and the Contract Documents. Program shall at a minimum address inspection of the items noted in ANSI/AISC 360 N2. The Erector shall also have a minimum of 5 years of experience in erecting structural steel like that indicated for this project (with a record of successful service performance) and sufficient capacity to erect the structural steel without delaying the work. Qualification requirements shall be satisfied by submittal of the following:
- a. Completed project history for Erector, specifically focused on projects whose structural steel is like that for this project. Project history shall include Owner and Structural Engineer (as well as primary contacts) for each project listed. This qualification requirement shall be submitted as part of the bidding process.
 - b. A written quality control manual that shall include (at a minimum) procedures for material control, inspection, and non-conformances.
 - c. Quality Control Inspector (QCI) qualifications.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303 “Code of Standard Practice for Steel Buildings and Bridges”.
 - 2. ANSI/AISC 360 “Specification for Structural Steel Buildings”.
 - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts".
- B. Connection Design Information:
 - 1. Design connections and final configuration of member reinforcement at connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer.
 - a. Use Load and Resistance Factor Design; data are given at factored-load level.
- C. Construction: As indicated.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Channels, Angles: ASTM A36/A36M.
- C. Plate and Bar: ASTM A36/A36M, and ASTM A572/A572M, Grade 50 as indicated.
- D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.
- E. Steel Pipe: ASTM A500/A500M, Grade B.
 - 1. Weight Class: Standard, or as indicated.

2. Finish: Black except where indicated to be galvanized.

- F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, **Grade A325**, Type 1, heavy-hex steel structural bolts; **ASTM A563, Grade DH**, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
- B. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 RODS

- A. Unheaded Anchor Rods: ASTM F1554, Grade 36, or Grades 55 and 105 as indicated on the Drawings.
 1. Configuration: Straight.
 2. Nuts: **ASTM A563** heavy-hex carbon steel.
 3. Plate Washers: ASTM A36/A36M carbon steel.
 4. Washers: **ASTM F436**, Type 1, hardened carbon steel.
 5. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.
- B. Threaded Rods: ASTM A36/A36M.
 1. Nuts: **ASTM A 63** heavy-hex carbon steel.
 2. Washers: **ASTM F436**, Type 1, hardened carbon steel.
 3. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

2.5 PRIMER

- A. Steel Primer:
 1. Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanized-Steel Primer: MPI#134.
 1. Etching Cleaner: MPI#25, for galvanized steel.
 2. Galvanizing Repair Paint: ASTM A780/A780M.

2.6 SHRINKAGE-RESISTANT GROUT

- A. Non-metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, non-metallic aggregate grout, non-corrosive and non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

2.7 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.
 - 3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 - 4. Mark and match-mark materials for field assembly.
 - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 1.
- F. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
- H. Inspection Requirements: Quality control inspection tasks shall be performed by the Fabricator's QCI in accordance with ANSI/AISC 360 N5.4 (Inspection of Welding), N5.6 (Inspection of High-Strength Bolting), and N5.7 (Inspection of Galvanized Structural Steel Main Members). Tasks in Tables N5.4-1 through N5.4-3 and Tables N5.6-1 through N5.6-3 listed for quality control (QC) are those inspections performed by the QCI(s) to ensure that the work is performed in accordance with the Contract Documents.
1. Non-destructive testing (NDT) of welded joints provided during fabrication shall be performed by either an independent and qualified testing agency or the qualified QCI(s). All testing reports shall be submitted to the Owner for review.
 - a. Conduct NDT of all welded joints primarily supporting gravity loads (i.e. cantilevers). Reduction in the rate of NDT per N5.5e is prohibited.
 - b. For Risk Category II structures, conduct NDT of 10% of remaining CJP groove welds for materials 5/16" thick and greater per ANSI/AISC 360 N5.5b.
 - c. For Risk Category III and IV structures, conduct NDT of all remaining CJP groove welds for materials 5/16" thick and greater per ANSI/AISC 360 N5.5b.
 - d. Conduct NDT of all welded joints subject to fatigue, where required by ANSI/AISC 360 Appendix 3, Table A-3.1. Reduction in the rate of NDT per N5.5e is prohibited.
- I. Special Inspections: Where special inspections are required by the Contract Documents, the Owner will engage the Special Inspector to perform an audit of the fabrication and quality control practices employed by the Fabricator. Where the Fabricator is qualified through the option noted in 1.8.A.1, the requirement for this audit during fabrication shall be waived.
1. The Fabricator shall meet all requirements of ANSI/AISC 303 8.5 to accommodate an audit of the fabrication shop.
 2. Prior to the commencement of fabrication, the Special Inspector shall submit to the Owner for review a written plan identifying the frequency and extent of visits to the fabrication shop.
 3. At a minimum, the audit by the Special Inspector shall include review of the following:
 - a. The Fabricator's quality control manual and procedures for material control, inspection, and non-conformances.

- b. Material test reports for all members, fasteners, and consumables.
 - c. The steel fabrication process including member fit-up, material selection, welding procedures and personnel, etc. Records need to be maintained for all material sources, members using the noted materials, consumables used, welder(s) employed, dates of completion, and when the QCI completed the inspection.
 - d. Inspections representing a sampling of the before, during, and after QA tasks noted in ANSI/AISC 360 N5.5, N5.6, and N5.8.
- J. At the completion of fabrication, the Fabricator shall submit a certificate of compliance to the Owner stating that the materials supplied and work performed by the Fabricator are in accordance with the Contract Documents. All testing/inspection reports generated as part of 2.7.I or 2.7.J shall also be submitted for review at the completion of fabrication.

2.8 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.
 - 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
 - 2. Galvanize items as indicated on the Drawings.

2.10 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of **2 inches**.
 2. Surfaces to be field welded.
 3. Surfaces of high-strength bolted, slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 5. Galvanized surfaces.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
1. SSPC-SP 2.
- C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of **1.5 mils**. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Base Plates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Inspection Requirements: Quality control inspection tasks shall be performed by the Erector's QCI in accordance with ANSI/AISC 360 N5.4 (Inspection of Welding), N5.6 (Inspection of High-Strength Bolting), and N5.7 (Inspection of Galvanized Structural Steel Main Members). Tasks in Tables N5.4-1 through N5.4-3 and Tables N5.6-1 through N5.6-3 listed for quality control (QC) are those inspections

performed by the QCI(s) to ensure that the work is performed in accordance with the Contract Documents.

1. Non-destructive testing (NDT) of welded joints provided during erection shall be performed by an independent and qualified testing agency (see 3.3.J). All testing reports shall be submitted to the Owner for review.
 - a. Conduct NDT of all welded joints primarily supporting gravity loads (i.e. cantilevers). Reduction in the rate of NDT per N5.5e is prohibited.
 - b. For Risk Category II structures, conduct NDT of 10% of remaining CJP groove welds for materials 5/16" thick and greater per ANSI/AISC 360 N5.5b.
 - c. For Risk Category III and IV structures, conduct NDT of all remaining CJP groove welds for materials 5/16" thick and greater per ANSI/AISC 360 N5.5b.
 - d. Conduct NDT of all welded joints subject to fatigue, where required by ANSI/AISC 360 Appendix 3, Table A-3.1. Reduction in the rate of NDT per N5.5e is prohibited.
- I. Special Inspections: Where special inspections are required by the Contract Documents, the Owner will engage a Special Inspector to perform the tasks noted in the Statement of Special Inspections during erection. These inspections shall be considered to satisfy the quality assurance requirements of ANSI/AISC 360 Chapter N.
- J. Testing Agency: The Owner will engage an independent and qualified testing agency to perform tests and inspections.
 1. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts".
 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M. Non-destructive testing (NDT) methods (as required) are as follows:
 - a. Liquid Penetrant Inspection: ASTM E165/E165M.
 - b. Magnetic Particle Inspection: ASTM E709, performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not acceptable.
 - c. Ultrasonic Inspection: ASTM E164.
 - d. Radiographic Inspection: ASTM E94/E94M.
- K. At the completion of erection, the approved Erector shall submit a certificate of compliance to the Owner stating that the materials supplied and work performed by the Erector are in accordance with the Contract Documents.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning.

END OF SECTION 05 12 00

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Structural engineering services provided by the cold-formed metal framing fabricator.
 - 2. Exterior and interior load-bearing stud framed walls.
 - 3. Exterior and interior nonload-bearing stud framed walls and curtainwalls.
 - 4. Connections of light gage metal components to each other, and to their supports, are included in this section.
- B. Products Supplied But Not Installed Under This Section:
 - 1. Anchor Bolts.
- C. Products Installed But Not Supplied Under This Section:
 - 1. Insulation in inaccessible framing spaces.

1.02 SYSTEM REQUIREMENTS

- A. Design Requirements:
 - 1. Structural Design: Prepare complete structural design calculations for framing members and accessories by qualified Professional Engineer.
 - 2. Design system to accommodate 3/4 inch (19 mm) vertical deflection of structural building frame, live loading, seasonal and day/night temperature ranges, and construction tolerances.
- B. Performance Requirements:
 - 1. Performance:
 - a. Design wind loads shall be in accordance with the current edition of the appropriate Building Code and local governing agencies.
 - b. Wind load pressures shall be scaled in accordance with the height of the structure, multiplied by all applicable shape factors. These pressures shall be based on the requirements of the appropriate Building Code, latest edition.
 - 2. Size components to withstand design loads as shown on Drawings, and following deflection limits:
 - a. Exterior Load-Bearing Walls: horizontal deflection of 1/240 of wall height for non-masonry walls or 1/600 for masonry walls, per applicable building code.
 - b. Interior Load-Bearing Walls: horizontal deflection of 1/240 of wall height as noted in applicable building code.
 - c. Exterior Non-Load-Bearing Curtainwall: horizontal deflection per manufacturer recommendations.
 - d. Floor Joists or Trusses: Vertical deflection of 1/240 of joist span for non-plaster ceilings or 1/360 for plaster ceilings, per applicable building code.
 - e. Roof Trusses: Vertical deflection of 1/360 of joist span.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connections failure, undue strain on fasteners and anchors, or other detrimental effects when subjected to a maximum ambient temperature change of 120 deg F (67 deg C).

1.03 SUBMITTALS

- A. Reference Section 01330• Submittal Procedures; submit following items:
 1. Submit manufacturer's product information and installation instructions for each item of lightgage framing and accessories.
 2. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, open framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 - a. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer registered in the appropriate state who was responsible for their preparation.
 3. Quality Assurance/Control Submittals:
 - a. Qualifications: Proof of manufacturer, installer, and welder qualifications.
 - b. Structural Design Calculations.
 - c. Certificates:
 - 1) Mill certificates signed by framing member/accessory manufacturer certifying compliance with material requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, and galvanized-coating thickness.
 - 2) Welder certificates.
 - d. Manufacturer's Installation Instructions for framing members and framing accessories.
- B. Closeout Submittals: Reference Section 01780• Closeout Submittals; submit following items:
 1. Record Drawings.

1.04 QUALITY ASSURANCE

- A. Overall Standards:
 1. Calculate structural properties of cold-formed metal framing and accessories in accordance with AISI "Specification for the Design of Cold-Formed Steel Structural Members."
 2. Provide structural design calculations sealed and signed by a Professional Engineer licensed in the state where the Project is located.
 3. Welding Standards: Comply with AWS D1.1 "Structural Welding Code• Steel," and AWS D1.3 "Structural Welding Code• Sheet Steel."
 4. Mill certificates signed by steel sheet producer indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and galvanized-coated thickness.
 5. Fire-Test-Response Characteristics: Where metal framing is part of a fire-

resistance- rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

- a. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory," or by Warnock Hersey or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Qualifications:

1. Manufacturers' Qualifications: Minimum five years experience in producing products of the type specified.
2. Installer Qualifications: Minimum three years experience in installation of the type of products specified.
3. Welder Qualifications: Current AWS Certificates for welding processes required.

C. Pre-Installation Meeting:

1. Convene meeting at project site within one week of scheduled start of installation with representatives of the following in attendance: Owner, Architect, General Contractor, and metal framing Sub-Contractor.
2. Review substrate conditions, requirements of related work, installation instructions, storage and handling procedures, and protection measures.
3. Keep minutes of meeting including responsibilities of various parties and deviations from specifications and installation instructions. Distribute minutes to attendees within 72 hours.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling. Store cold-formed metal framing off the ground, protect with a waterproof covering, and ventilate to avoid condensation. Deliver to the project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type, and grade.
- B. Follow manufacturer's instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Studs, Tracks, Joists, Trusses: Any manufacturer providing materials complying with requirements specified herein.
- B. Framing Accessories: The STEEL Network, Inc.(TSN), Raleigh NC, (888) 474-4876; e-mail: tsn@steelnetwork.com; website: www.steelnetwork.com.
- C. With each type of metal framing required, provide manufacturer's standard steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners and accessories as recommended by the manufacturer for applications indicated, as needed to provide a complete metal framing system.
- D. Substitutions: None allowed.

2.02 FRAMING MEMBERS

- A. Studs: ASTM A 653/653 M steel, G60 (Z180) or G90 (Z275) galvanized as noted on drawings, channel shaped with lipped flanges, punched web, size as shown on Drawings, thickness and grade as required by structural design calculations.
- B. Tracks: ASTM A 653/653 M steel, same designation, coating, and thickness as studs except as otherwise noted, channel shaped, solid web, depth compatible with studs, size, thickness and grade as required by structural design calculations.
- C. Joists and Rafters: ASTM A 653/653 M steel, G60 (Z180) or G90 (Z275) galvanized as noted on drawings, channel shaped with lipped flanges, solid web, size as shown on Drawings, thickness and grade as required by structural design calculations.
- D. Trusses: ASTM A 653/653M steel, G60 (Z180) or G90 (Z275) galvanized as noted on drawings. Provide manufacturer's standard chord and web member profiles with mechanical properties as required by structural design calculations. Shop fabrication required.
 - 1. Design trusses in accordance with AISI "Design Guide for Cold-Formed Steel Trusses, Publication RG-9518."
 - 2. Determine mechanical properties by testing in accordance with ASTM A 370.
 - 3. Configure web members as required by structural design calculations.

2.03 FRAMING ACCESSORIES

- A. Material: ASTM A 653 (653M) steel; SS Grade 50 (340), Class 1, 50 ksi (340 MPa) minimum yield strength, 65 ksi (450 MPa) minimum tensile strength, G60 (Z180) hot-dipped galvanized coating, except as otherwise noted.
- B. Stamp manufacturer's name on each accessory item.
- C. Provide screws with accessories designated for screw attachment.
- D. Connector Devices:
 - 1. Vertical Deflection Clips: VertiClip®, including step bushings. Rigid attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement. 68 mils (1.72 mm) minimum thickness, size as required by structural design calculations.
 - 2. Drift System Clips: DriftClip™, including step bushings. 68 mils (1.72 mm) minimum thickness, size as required by structural design calculations.
 - a. Screw attachment to stud web using step-bushings to permit frictionless vertical movement.
 - b. Screw attachment to structure using step-bushings to permit frictionless movement in the plane of the wall.
 - 3. Rigid Clip Angles: StiffClip™. Rigid attachment to structure and stud web.
 - 4. Floor Ties: Floor to floor strap ties, 2 inches (50 mm) by 54 mils (1.37 mm) thick. Screw attachment to stud flanges. Length as required by structural design calculations.
 - 5. Hip Angle• 135 degree: Rigid attachment to webs of hip framing members. Length and thickness as required by structural design calculations.
 - 6. Roof Ties: Fabricate for screw attachment to joist web and top track/stud flanges. Size and thickness as required by structural design calculations.

- E. Bridging:
 - 1. Cold rolled Channel: 1-1/2 by 1/2 inch by 56 mil thick (38 by 13 by 1.42 mm).
 - a. Bridging Clip: BridgeClip®. Provide attachment through stud punch-out clamping onto stud web and wrapping around bridging channel. Provide holes for screw attachment to stud web and channel.
 - 2. Flat Strap. Width and thickness as required by structural design calculations. Rigid attachment to stud flange.
 - 3. Solid Bridging: Channel shaped bridging with lipped flanges and integral formed clips. Screw attachment to stud. 33 mils (0.84 mm) minimum thickness, size as required by structural design calculations.
 - 4. Cross Bridging: Fabricate members for specific joist depth and spacing with one screw to each joist flange and one to each joist web. Provide bridging sized to joist depth and spacing, 36 mils (0.91 mm) minimum thickness, as required by structural design calculations.
- F. Miscellaneous Items:
 - 1. Joist Hangers: Rigid attachment to structure and joist web, 68 mils (1.72 mm) thick. Provide hanger type and size as required by structural design calculations.
 - 2. Joist Plate: Hole reinforcing plates designed for screw attachment to joist or stud webs. Provide size and thickness as required by structural design calculations.
 - 3. Web Stiffeners: Channel shaped stiffener. Screw attachment to joist or stud webs. Provide size and thickness as required by structural design calculations.

2.04 FASTENERS

- A. Screws: Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by structural design calculations, or as recommended by The STEEL Network for the specific condition and thickness of materials being joined.
- B. Anchor Bolts and Studs: ASTM A 307, Grade A, carbon steel, with hex-head carbon steel nuts and flat steel washers. Hot-dip zinc coated in accordance with ASTM A 153. Provide bolt or stud type and size as required by structural design calculations.
- C. Expansion Anchors: Federal Specification FF-S-325, Group II, Type 4, Class 1.
 - 1. Provide bolts listed or approved by one or more of the following and of diameter and length as required by structural design calculations.
 - a. Underwriters Laboratory.
 - b. Factory Mutual.
 - c. International Conference of Building Officials.
 - d. Southern Building Code Congress.
 - e. City of Los Angeles.
 - f. Metro-Dade County Florida.
 - 2. Expansion Anchors fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Powder Actuated Fasteners: Federal Specification FF-P-395b. Manufacturer from AISI 1062 or 1065 steel, austempered to a minimum core hardness of 50 to 54 HRC and zinc plated in accordance with ASTM B 633.

1. Provide fasteners listed or approved by one or more of the following and of type, diameter and length as required by structural design calculations:

- a. Underwriters Laboratory.
 - b. Factory Mutual.
 - c. International Conference of Building Officials.
 - d. Southern Building Code Congress.
 2. Powder-Actuated Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
1. Head Type: Low profile head beneath sheathing, manufacturer's standard elsewhere.

2.05 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Compound: SSPC-Paint 20, spray-can applicator.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and a 30-minute working time.

2.06 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.
1. Fabricate framing assemblies in jig templates.
 2. Cut framing members by sawing or shearing; do not torch cut.
 3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to cold-framed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or distortion.
- C. Fabrication Tolerances: Fabricate assemblies to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates upon which work will be installed.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Commencement of work by installer is acceptance of substrate.
- D. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.02 GENERAL INSTALLATION

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.
- C. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
 1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
- D. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.
- E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- F. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

- G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.03 FRAMING MEMBER INSTALLATION

- A. Studs:
 - 1. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs 16 inches unless noted otherwise on the drawings.
 - 2. Install studs at spacing as shown on Drawings or as required by structural design calculations, at each side of openings, and not more than 2 inches (50 mm) from abutting walls.
 - a. Frame corners with three studs.
 - b. Frame wall openings wider than stud spacing with double stud at each jamb.
 - 3. Set studs plumb except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
 - 4. Isolate steel framing from building structure at locations indicated to prevent transfer of vertical loads while providing lateral support.
 - a. Install "deep leg" deflection track and anchor to building structure.
 - b. Connect studs with vertical slide clips to continuous angles or supplementary framing anchored to building structure.
 - 5. Install horizontal bridging in curtainwall studs, spaced in rows not more than 48 inches (1219 mm) apart. Fasten at each stud intersection.
 - a. Install additional row of horizontal bridging in curtainwall stud beneath "deep leg" deflection track when curtainwall studs are not fastened to an additional top track.
 - b. Bridging: Cold-rolled steel channel, clip angle fastened to webs of punched studs.
 - 6. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable curtainwall-framing system.
- B. Joist Installation:
 - 1. Install joists at spacing as shown on Drawings or required by structural design calculations, and not more than 2 inches (50 mm) from abutting walls.
 - 2. Locate end bearing directly over load bearing studs or provide load-distributing member as required by structural design calculations.
- C. Rafter Installation:
 - 1. Install rafters at spacing as shown on Drawings or required by structural design calculations.
 - 2. Locate end bearing directly over load bearing studs or provide load-distributing member as required by structural design calculations.
- D. Truss Installation:

1. Install trusses at spacing as shown on Drawings or required by structural design calculations.
2. Locate end bearing directly over load bearing studs or provide load-distributing member as required by structural design calculations.
3. Do not remove, cut, or otherwise alter truss members or connections.
4. Install, bridge, and brace trusses according to Shop Drawings and requirements in this Section.
5. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.
6. Erect trusses without damaging framing members or connections.
7. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings.

3.04 FRAMING ACCESSORY INSTALLATION

- A. Install accessories as required by structural design calculations. Provide appropriate fasteners in all predrilled holes backed by another framing member.
 1. For Partitions, Bridging Clip for Cold Rolled Channel Bridging: Secure to stud web by inserting tabs through web slots. Secure to channel with one screw.
 2. For Load Bearing Walls, Bridging Clip for Cold Rolled Channel Bridging: Secure to stud web by inserting tabs through web slots and with 2 screws. Secure to channel with one screw.

3.05 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.
- B. Testing: Field and shop welds are subject to testing by an independent testing agency in accordance with Section 01450• Quality Control.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and Replace work that does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed at determine compliance of corrected work with specified requirements.

3.06 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and install cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Touchup Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on fabricated and installed prime-painted, cold-formed metal framing. Paint framing surfaces with same type of shop paint used on adjacent surfaces.

- C. Protect paper-surfaced gypsum sheathing that will be exposed to weather for more than 30 days by covering exposed exterior surface of sheathing with a securely fastened air-infiltration barrier. Apply covering immediately after sheathing is installed.
- D. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.
- E. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

3.07 CLEANING

- A. Reference Section 01 70 00 – Execution Requirements.

END OF SECTION 05 40 00

**SECTION 07 42 13.13
FORMED METAL WALL PANELS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Concealed-fastener, lap-seam metal wall panels.

1.3 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.
 - 1. Include Samples of trim and accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.

- D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical metal panel assembly, including corner, supports, attachments, and accessories.
 - 2. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2.
 - 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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: 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. 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

2.1 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 Structural Drawings.
 - 2. Other Design Loads: As indicated on Structural Drawings.

3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- D. 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.
- E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 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 and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.
 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
 - a. Metal Sales; Architectural Metal Panels.
 - b. Products and Profiles: As indicated on the Drawings.
 2. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: 0.040 inch.
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish: Two-coat minimum fluoropolymer.
 - d. Color: As selected by Architect from manufacturer's full range.

3. Panel Coverage: As selected by the Architect from the manufacturer's full range.
 4. Panel Height: As selected by the Architect from the manufacturer's full range.
- C. Creased-Rib-Profile, Concealed-Fastener Metal Wall Panels: Formed with raised, center-creased, trapezoidal major ribs; with reveal joint between panels.
1. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: 0.040 inch.
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish: Two-coat minimum fluoropolymer.
 - d. Color: As selected by Architect from manufacturer's full range.
 2. Panel Coverage: As selected by the Architect from the manufacturer's full range.
 3. Panel Height: As selected by the Architect from the manufacturer's full range.

2.3 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.

- E. 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. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.4 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. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. 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.
- E. 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 Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 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.

2.5 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. Aluminum Panels and Accessories:
 - 1. Two- or Three-Coat Fluoropolymer: AAMA 2605. 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.

PART 3 - EXECUTION

3.1 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.

3.2 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.

3.3 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.
 - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 - 1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or 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. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 - 4. 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.
 - 5. 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).

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.
- D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.
- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.5 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 07 42 13.13

Section 07 92 00 JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
 - 1. Exterior and interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 2. Exterior and interior joints in horizontal traffic surfaces.
 - 3. Joints in glazed nontraffic surfaces.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and waterresistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- 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.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. Qualification Data: For testing agency.
- F. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- G. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Field Test Report Log: For each elastomeric sealant application.
- I. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

- J. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40° F.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquidapplied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric 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 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 100/50; for Use NT.
 - 1. Products:
 - a. Dow Corning Corporation; 790.
 - b. Momentive (formerly GE Advanced Materials) - Silicones; SilPruf LM SCS2700.
 - c. Pecora 890NST/890FTS.
 - d. Tremco; Sptrem 1.
- F. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 50; for Use NT.
 - 1. Products for Glazing:
 - a. Dow Corning Corporation; 795.
 - b. Momentive (formerly GE Advanced Materials); 2000.
 - c. Pecora 895NST.
- G. Single-component, nonsag, urethane sealant, ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 - 1. Products:
 - a. Pecora Corporation; Dynatrol I-XL.
 - b. Sika Corporation, Construction Products Division; Sikaflex – 1a.
 - c. Tremco Incorporated; Dymonic.
- H. Multicomponent, nonsag, urethane sealant, ASTM C 920, Type M, Grade NS, Class 25, for Use T.
 - 1. Products:
 - a. Pecora Corporation; Dynatred.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 2c NS.
 - c. Tremco Incorporated; Vulkem 227.

2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Products:
 - a. Pecora Corporation; AC-20+.
 - b. Schnee-Morehead, Inc.; SM 8200.
 - c. Tremco Incorporated; Tremflex 834.

2.5 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Products:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.

2.6 PREFORMED JOINT SEALANTS

- A. Preformed Silicone Sealant System: Manufacturer's standard consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.
 - 1. Products:
 - a. Dow Corning Corporation; 123 Silicone Seal.
 - b. Momentive (formerly GE Silicones); UltraSpan US1100.
 - c. Pecora Corporation; Sil-Span.

2.7 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin); Type B (bicellular material with a surface skin), 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 for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on 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 with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

- 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 C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type recommended by manufacturer 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 below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise indicated.
- G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.

3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- H. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, 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 C 919 and with manufacturer's written recommendations.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT SEALANT SCHEDULE

- A. General: Provide Joint-Sealant Applications as applicable for conditions indicated on Drawings.
- B. Joint-Sealant Application: Exterior vertical control and expansion joints in unit masonry, exterior joints in vertical surfaces, and horizontal nontraffic surfaces.
1. Joint Sealant: Single Component silicone sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- C. Joint-Sealant Application: Joints in glazed nontraffic surfaces.
1. Joint Sealant: Single Component nonsag silicone sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- D. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
1. Joint Sealant: Multicomponent nonsag urethane sealant (for large-size applications).
 2. Joint Sealant: Single Component nonsag urethane sealant (for small-size applications).
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- E. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant: Acoustical sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces, interior perimeter joints of exterior openings, and perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
1. Joint Sealant: Latex sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 07 92 00

Section 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Interior standard steel doors and frames.
 - 2. Exterior standard steel doors and frames.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.4 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.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:

1. Elevations of each door type.
 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of each different wall opening condition.
 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 7. Details of anchorages, joints, field splices, and connections.
 8. Details of accessories.
 9. Details of moldings, removable stops, and glazing.
- C. Samples for Initial Selection: For hollow-metal doors and frames with factory-applied color finishes.
- D. 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.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
1. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.
- B. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.
- C. Field quality control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:
1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.
- B. Egress Door Inspector Qualifications: Inspector for field quality control inspections of egress door assemblies shall meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.9 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

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Baron Metal Industries Inc.; an Assa Abloy Group company.
 - 2. Ceco Door; ASSA ABLOY.
 - 3. Curries Company; ASSA ABLOY.
 - 4. DKS Steel Door & Frame Systems, Inc.
 - 5. Fleming Door Products Ltd.; Assa Abloy Group Company.
 - 6. Karpen Steel Custom Doors & Frames.
 - 7. Mesker Door Inc.
 - 8. Pioneer Industries.
 - 9. Republic Doors and Frames.
 - 10. Steelcraft; an Allegion brand.

2.2 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.
 - 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. Thermally Rated Door Assemblies for Insulated Doors: Provide door assemblies with U-factor as

selected by the Architect.

2.3 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. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B.
 - 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 0.042 inch.
 - d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Core: Manufacturer's standard.
 - g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener or laminated mineral board core for fire-rated doors.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded, unless otherwise indicated.
 - 3. Exposed Finish: Prime.

2.4 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 A40 coating.
 - d. Edge Construction: Model 1, Full Flush.
 - 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.
 - i. Fire-Rated Core: Manufacturer's standard vertical steel stiffener with insulation or laminated mineral board core for fire-rated doors.
 - j. Insulation: Provide insulation to meet R-value requirements as approved by the Architect.
2. Frames:
- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
 - b. Construction: Full profile welded, unless otherwise indicated.
3. Exposed Finish: Prime.

2.5 BORROWED LITES

- A. Fabricate of uncoated or metallic-coated steel sheet to match adjacent door and frame, minimum thickness of 0.053 inch.
- B. Construction: Full profile welded, unless otherwise indicated.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 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.

2.7 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- 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.
- F. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.8 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. 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. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. 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.
 4. Terminated Stops (Hospital Stops): Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

- C. 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.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
 - 1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 - 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 - 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.9 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.

2.10 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
 - 1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 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.

3.2 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 or NAAMM-HMMA 840 as required by standards specified.
 - 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. Fire-Rated Openings: Install frames according to NFPA 80.
 - 3. 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.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - 5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors.
 - 6. 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, NAAMM-HMMA 841, and NAAMM-HMMA guide specification indicated.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, Section 5.2.
 - 2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements according to NFPA 101, Section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 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.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 11 13

Section 08 14 16
FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Five-ply flush wood doors for opaque finish.
 2. Factory priming flush wood doors.
 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
1. Section 099123 "Interior Painting" for field finishing doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
1. Door core materials and construction.
 2. Door edge construction
 3. Door face type and characteristics.
 4. Door louvers.
 5. Door trim for openings.
 6. Door frame construction.
 7. Factory-machining criteria.
 8. Factory-priming specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
1. Door schedule indicating door location, type, size, fire protection rating, and swing.
 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 3. Details of frame for each frame type, including dimensions and profile.
 4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.

5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Doors to be factory primed and application requirements.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
3. Louver blade and frame sections, 6 inches long, for each material and finish specified.
4. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For door inspector.

1. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.

B. Field quality-control reports.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.6 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.
 - 4. Warranty Period for Hollow-Core Interior Doors: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door and Frame 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 and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
 - 1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards." and ANSI/WDMA I.S. 1A. as specified.
 - 1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD DOORS FOR OPAQUE FINISH

- A. Interior Solid-Core Doors:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lambton Doors.
 - b. Masonite Architectural.
 - c. Oshkosh Door Company.
 - d. VT Industries Inc.
 - 2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
 - 3. ANSI/WDMA I.S. 1A Grade: Premium.
 - 4. Faces: MDO, any closed-grain hardwood of mill option, hardboard, or MDF.
 - a. Apply MDO to standard-thickness, closed-grain, hardwood face veneers or directly to high-density hardboard crossbands.
 - b. Hardboard Faces: ANSI A135.4, Class 1 (tempered) or Class 2 (standard).
 - c. MDF Faces: ANSI A208.2, Grade 150 or Grade 160.
 - 5. Exposed Vertical and Top Edges: Any closed-grain hardwood.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors: Provide formed-steel edges and astragals with intumescent seals.
 - 1) Finish steel edges and astragals with baked enamel same color as doors.
 - 6. Core for Non-Fire-Rated Doors:
 - a. Either glued wood stave or WDMA I.S. 10 structural composite lumber.

7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as follows:
 - 1) 5-inch top-rail blocking.
 - 2) 5-inch bottom-rail blocking, in doors indicated to have protection plates.
 - 3) 5-inch midrail blocking, in doors indicated to have armor plates.
 - 4) 4-1/2-by-10-inch lock blocks or 5-inch midrail blocking, in doors indicated to have exit devices.
8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
 1. Wood Species: Same species as door faces.
 2. Profile: Manufacturer's standard shape.
 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- C. Wood Louvers: Door manufacturer's standard solid-wood louvers unless otherwise indicated.
 1. Wood Species: Same species as door faces.
 2. Profile: Flat.
- D. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.
 1. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, factory primed for paint or with baked-enamel- or powder-coated finish.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
1. Locate hardware to comply with DHI-WDHS-3.
 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA- 156.115-W, and hardware templates.
 3. Coordinate with hardware mortises in frames, to verify dimensions and alignment before factory machining.
 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
 5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Transom and Side Panels:
1. Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
 2. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
 3. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails.
 4. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Factory cut and trim openings through doors.
1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."
 3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY PRIMING

- A. Doors for Opaque Finish: Factory prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 099123" Interior Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
 - 1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
 - 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.
 - 3. Install fire-rated doors and frames in accordance with NFPA 80.
 - 4. Install smoke- and draft-control doors in accordance with NFPA 105.
- D. Job-Fitted Doors:
 - 1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
 - 2. Machine doors for hardware.
 - 3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 4. Clearances:
 - a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
 - b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
 - 5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 - 6. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
 - 2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

**Section 08 71 00
DOOR HARDWARE**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.
 - 2. Cylinders for door hardware specified in other Sections.
 - 3. Electrified door hardware.

1.3 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Conference participants shall include Installer's Architectural Hardware Consultant and Owner's security consultant.

- B. Keying Conference: Conduct conference at Project site.
 - 1. Conference participants shall include Installer's Architectural Hardware Consultant and Owner's security consultant.
 - 2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - a. Flow of traffic and degree of security required.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For electrified door hardware.
 - 1. Include diagrams for power, signal, and control wiring.
 - 2. Include details of interface of electrified door hardware and building safety and security systems.
- C. Samples: For each exposed product in each finish specified, in manufacturer's standard size.
 - 1. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- D. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Submittal Sequence: Submit door hardware schedule after or concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - 2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
 - 3. Content: Include the following information:

- a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - e. Fastenings and other installation information.
 - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - g. Mounting locations for door hardware.
 - h. List of related door devices specified in other Sections for each door and frame.
- E. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Certificates: For each type of electrified door hardware.
 - 1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Door Hardware: Types and quantities as approved by the Owner.
 - 2. Electrical Parts: Types and quantities as approved by the Owner.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC).

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.

- c. Manual Closers: 10 years from date of Substantial Completion.
- d. Concealed Floor Closers: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of door hardware from single manufacturer.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
 - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 - 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at

least 1.5 seconds to move to the closed position.

2.3 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

2.4 SELF-CLOSING HINGES AND PIVOTS

- A. Self-Closing Hinges and Pivots: BHMA A156.17.

2.5 CONTINUOUS HINGES

- A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch-thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
- B. Pin-and-Barrel-Type Hinges.
- C. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

2.6 CONCEALED HINGES

- A. Concealed Hinges: Fully concealed within mortises in the door edge and frame and allowing door to swing open 180 degrees.

2.7 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Mortise Locks: Minimum 3/4-inch latchbolt throw.
 - 2. Deadbolts: Minimum 1-inch bolt throw.
- C. Lock Backset: 2-3/4 inches unless otherwise indicated.
- D. Lock Trim:
 - 1. Levers: Cast.
 - 2. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

2.8 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

2.9 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

2.10 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic Flush Bolts: BHMA A156.3, Type 25; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge.
- B. Self-Latching Flush Bolts: BHMA A156.3, Type 27; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge.

2.11 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.

2.12 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.
- C. High-Security Lock Cylinders: BHMA A156.30; Grade 1 permanent cores that are removable; face finished to match lockset.
- D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.13 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
 - 1. Master Key System: Change keys and a master key operate cylinders.
 - a. Provide three cylinder change keys and five master keys.
 - 2. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
 - a. Provide three cylinder change keys and five each of master and grand master keys.
 - 3. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."

2.14 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; aluminum unless otherwise indicated.

2.15 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.
- B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- C. Astragals: BHMA A156.22.

2.16 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.17 MECHANICAL STOPS AND HOLDERS

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- A. Wall- and Floor-Mounted Stops: BHMA A156.16.

2.18 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire-alarm system for labeled fire-rated door assemblies.

2.19 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.

2.20 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- B. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 0.3-inch wg, as follows:
1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
 3. Gasketing on Double Doors: 0.50 cfm per ft. of door opening.

2.21 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

2.22 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick aluminum; with manufacturer's standard machine or self-tapping screw fasteners.

2.23 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.

2.24 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.
1. Manufacturer's identification is permitted on rim of lock cylinders only.

- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.25 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. 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 the 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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated on Drawings and to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30

inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as directed by Owner.
 - 2. Furnish permanent cores to Owner for installation.
- F. Key Control System:
 - 1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- G. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, in equipment room. Verify location with Architect.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."
- I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to

ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
 2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
 3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

- A. Engage Installer to train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.9 DOOR HARDWARE SCHEDULE

- A. Door Hardware Schedule: Engage a qualified Architectural Hardware Consultant to provide door hardware schedule.

END OF SECTION 08 71 00

Section 09 91 23
INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems, including primers, finish coatings, floor sealers, and dry fall coatings for the following interior substrates:
 - 1. Concrete.
 - 2. Cement board.
 - 3. Concrete masonry units (CMUs).
 - 4. Steel and iron.
 - 5. Galvanized metal.
 - 6. Aluminum (not anodized or otherwise coated).
 - 7. Wood.
 - 8. Fiberglass.
 - 9. Plastic.
 - 10. Gypsum board.
 - 11. Bituminous-coated surfaces.
- B. Related Requirements:
 - 1. Section 09 96 00 "High-Performance Coatings" for epoxy coatings on interior gypsum board on wet walls in toilet rooms as indicated.

1.3 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 each type of topcoat product.
- C. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 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.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products by one of the following as approved by the Architect:
 - 1. Benjamin Moore & Co.
 - 2. PPG Architectural Coatings.
 - 3. Sherwin-Williams Company (The).
- B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 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 the Finish Schedule.

PART 3 - EXECUTION

3.1 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. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. 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.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. 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.
- C. 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.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. 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.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.

4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 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.
 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.
 - e. Metal conduit.

- f. Plastic conduit.
 - g. 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.

3.4 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.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
 - 4. Collect waste paint by type and deliver to recycling or collection facility.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. 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.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Latex System:
 - a. Prime Coat: Alkali-resistant, water-based primer.

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- b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior latex paint.
 - 1) Sheen: As selected by the Architect.
 - B. Concrete Substrates, Traffic Surfaces:
 - 1. Water-Based Concrete Floor Sealer System:
 - a. First Coat: Matching topcoat.
 - b. Topcoat: Water-based concrete floor sealer.
 - 1) Sheen: As selected by the Architect.
 - C. CMU Substrates:
 - 1. Latex System:
 - a. Block Filler: Interior/exterior latex block filler.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - D. Steel Substrates:
 - 1. Latex System, Alkyd Primer:
 - a. Prime Coat: Alkyd quick-dry primer for metal.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - E. Galvanized-Metal Substrates:
 - 1. Latex System:
 - a. Prime Coat: Cementitious galvanized primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - F. Aluminum (Not Anodized or Otherwise Coated) Substrates:
 - 1. Latex System:
 - a. Prime Coat: Quick-dry primer for aluminum.
 - b. Intermediate Coat: Matching topcoat.

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- c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - G. Wood Substrates:
 - 1. Latex over Latex Primer System:
 - a. Prime Coat: Interior latex primer for wood.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - H. Fiberglass Substrates:
 - 1. Latex System:
 - a. Prime Coat: Water-based and solvent-based bonding primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - I. Plastic Substrates:
 - 1. Latex System:
 - a. Prime Coat: Solvent-based bonding primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - J. Gypsum Board Substrates: See Section 09 96 00 "High-Performance Coatings" for epoxy coatings on wet walls at toilet rooms as indicated.
 - 1. Latex over Latex Sealer System:
 - a. Prime Coat: Interior latex primer sealer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.
 - K. Bituminous-Coated Substrates:
 - 1. Latex System:
 - a. Prime Coat: Water-based rust-inhibitive primer.

- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Interior, latex.
 - 1) Sheen: As selected by the Architect.

END OF SECTION 09 91 23

Section 10 14 00

SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Signage for Code compliance:
 - a. Coordinate with Owner-furnished signage requirements.
- B. Related Documents include the following:
 - 1. See Mechanical Drawings for labels, tags, and nameplates for mechanical equipment.
 - 2. See Electrical Drawings for labels, tags, and nameplates for electrical equipment.
 - 3. See Electrical Drawings for illuminated exit signs, and for electrical service and connections for illuminated characters and for access to remote transformers, if required.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.
- B. Shop Drawings: Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.
 - 1. Provide message list for each sign, including large-scale details of wording, lettering, and braille layout.
 - 2. Wiring Diagrams: For signs with illuminated characters.
- C. Samples for Initial Selection: For each type of sign material indicated that involves color selection.
- D. Maintenance Data: For signage cleaning and maintenance requirements to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each sign type through one source from a single manufacturer.
- B. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where sizes of signs are determined by dimensions of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. For signs supported by or anchored to permanent construction, advise installers of anchorage devices about specific requirements for placement of anchorage devices and similar items to be used for attaching signs.
 - 1. For signs supported by or anchored to permanent construction, furnish templates for installation of anchorage devices.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Interior Code Signage: Provide signage as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
 - 1. Illuminated Exit Signs.
 - 2. Fire Doors.
 - 3. Signs for Accessible Spaces.
- B. Manufacturer: Coordinate with Owner-furnished signage.
- C. Cast-Acrylic Sheet: Manufacturer's standard and as follows:
 - 1. Color: As selected by Architect from manufacturer's full range.
- D. Cast Characters: Form individual letters and numbers by casting. Produce characters with smooth flat faces, sharp corners, and precisely formed lines and profiles, free from pits, scale, sand holes, and other defects. Cast lugs into back of characters and tap to receive threaded mounting studs. Comply with requirements indicated for finish, style, and size.
 - 1. Material: Cast- or formed-acrylic sheet.

2.2 ACCESSORIES

- A. Mounting Methods: Use concealed fasteners fabricated from materials that are not corrosive to sign material and mounting surface.
- B. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.3 FINISHES, GENERAL

- A. Protect mechanical finishes on exposed surfaces from damage by applying 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 range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

- B. Verify that items, including anchor inserts, provided under other sections of Work are sized and located to accommodate signs.
- C. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
- B. Bracket-Mounted Units: Provide manufacturer's standard brackets, fittings, and hardware as appropriate for mounting signs that project at right angles from walls and ceilings. Attach brackets and fittings securely to walls and ceilings with concealed fasteners and anchoring devices to comply with manufacturer's written instructions.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 10 14 00

SECTION 27 05 00
COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
 - 1. Section 260533 "Raceways and Boxes for Electrical Systems" for work relating to sleeves.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Cleanup.
 - 2. Damages.
 - 3. Delivery, storage, and handling.
 - 4. Telecom equipment coordination and installation.
 - 5. Fire stopping.
 - 6. Intent of drawings and specifications.
 - 7. Painting and caulking.
 - 8. Phasing.
 - 9. Rough-in.

1.3 SUBMITTALS

- A. Product Data: Fire stopping as indicated below:
 - 1. Shop drawings shall indicate proposed UL systems materials, anchorage, methods of installation, and actual adjacent construction.
 - 2. Provide a copy of each UL illustration of each proposed system indicating manufacturer approved modifications.
 - 3. Provide manufacturer's specifications, recommendations, installation instructions and maintenance instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FIRE STOPPING

- A. Fire stopping materials shall be safety barriers designed to block the spread of fire and smoke through penetrations created by telecom installations to fill holes, spaces, and voids in fire rated walls and floors. Products may be in the form of mortar, sealant, caulk, putty, wrap, strip, sheet, or devices. Materials shall be flame, toxic fume and water resistant and shall have a UL fire rating to match that of the wall or floor being penetrated. Fire rating shall be defined by tests conducted by ASTM, UL or other testing and inspection agencies acceptable to Authorities Having Jurisdiction. Fire stopping materials shall also provide adhesion to substrates and maintain fire and smoke seal under normal expected movements of substrates, conduits, and cables. Contractor to coordinate with building fire stopping.
- B. Acceptable Manufacturers:
 - 1. Specified Technologies, Inc. (STI)
 - 2. Tremco, Inc.
 - 3. 3M Inc.
 - 4. Hilti, Inc.
 - 5. Nelson Firestop Products.
 - 6. Wiremold.
- C. Materials:
 - 1. Pre-Manufactured 4" Sleeves:
 - a. STI EZ Stop.
 - b. Wiremold Flamestopper

PART 3 - EXECUTION

3.1 CLEANUP

- A. This Contractor shall be responsible for daily cleanup of all their telecom product debris. This includes but is not limited to: empty cardboard boxes, scrap wire and insulation, scrap conduit, etc.
- B. This Contractor shall be responsible for final cleanup and wipe down of telecom items in their scope. These items include but are not limited to: low voltage system cabinets, outlets, etc.

3.2 DAMAGES

- A. The Contractor will be held responsible for any and all damages to portions of the building caused by it, its employees and subcontractors, including, but not limited to:
 - 1. Damage to any portion of the building caused by the movement of tools, materials, or equipment.
 - 2. Damage to any component of the construction of spaces “turned over” to the Contractor.
 - 3. Damage to the telecom distribution system and/or other space “turned over” to the Contractor.
 - 4. Damage to the electrical, mechanical and/or life safety, or other systems caused by inappropriate operation or connections made by the Contractor or other actions of the Contractor.
 - 5. Other damage to the materials, tools, and/or equipment of the Owner, its consultants, General Contractor, subcontractors, Architect, and other contractors, agents, and leases.

3.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect equipment during transit, storage, and handling to prevent damage, theft, soiling, and misalignment. Coordinate with the Owner for secure storage or equipment and materials or provide secured remote storage.
- B. Do not store equipment where conditions fall outside manufacturer’s recommendations for environmental conditions. Secure all sensitive electronic equipment in temperature and humidity controlled areas.
- C. Wherever possible, store indoors. Where necessary to store outdoors, store sufficiently above grade and enclose with watertight wrapping.

- D. Handle equipment carefully to prevent physical damage to equipment and components. Remove packaging, including the opening of crates and containers, avoiding the use of excessive hammering and jarring which would damage the telecom equipment contained therein. Do not install damaged equipment; remove from site and replace damaged equipment with new equipment.
- E. Have conduit and all items in cardboard boxes shipped and stored on wooden pallets. Have boxes labeled from the factory to easily indicate materials inside and what telecom designation they are for. Utilize factory-fabricated type containers or wrappings for equipment and components which protect them from damage.
- F. Coordinate shipping of large equipment with the construction timing of the building to ensure building is "dried in" or equipment can be moved in or out of building easily. If equipment needs to be assembled and/or reassembled to get it out or into the building, then do so without voiding any manufacturer's warranty. Field verify all existing passageways, door ways, elevator sizes and capacities, window openings, etc. prior to bid to determine how to move equipment in and out. Modify openings as required to move equipment in and out.
- G. Coordinate receiving of large items with unloading equipment on site or obtain rental equipment as required. Coordinate location, size, and weight of all large equipment items located inside the building with the Structural Engineer.

3.4 TELECOM EQUIPMENT COORDINATION AND INSTALLATION

- A. When noted in the specifications or on the drawings that a certain manufacturer was the "basis of design," the engineer has designed the project around the manufacturer (while allowing equals manufacturers where noted). The contractor and equal named manufacturers are responsible for coordinating equipment/programming/dimensions/weights/capacity, etc. differences for providing equipment from an equal named manufacturer as opposed to the manufacturer used as the "basis of design."
- B. When two or more items of the same equipment are required (i.e. cabling, outlets, jacks, patch panels, cabinets, etc.), they shall be of the same manufacturer.
- C. Comply with NECA 1.
- D. Coordinate arrangement, mounting, and support of telecom equipment so connecting cables, runways, j-hooks, etc. will be clear of obstructions and of the working and access space of other equipment.

- E. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- F. Coordinate telecom testing so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.
- G. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- H. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements. Install additional conduit, cable tray, busway, pullboxes, splice boxes, etc. where required to obtain maximum headroom or to avoid conflict with other work without additional cost to the Owner.
- I. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both telecom equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- J. Right of Way: Give to raceways and piping systems installed at a required slope. Provide addition trenching, conduit, sleeves, fittings, etc. as required to accommodate adjacent systems.
- K. Before installing any work, this Contractor shall see that it does not interfere with clearance required for finish on beams, columns, pilasters, walls or other structural or architectural members, as shown on Architectural Drawings. If any work is so installed and it later develops that Architectural design cannot be followed, Contractor shall, at his own expense, make such changes in his work as the Architect may direct to permit completion of Architectural work in accordance with plans and specifications.
- L. Report any interferences between work under this division and that of any other Contractors to the Architect as soon as they are discovered. The Architect will determine which equipment shall be relocated, regardless of which was first installed, and his decision shall be final.
- M. Contractor shall coordinate with the Owner for the Owner to make required applications for internet, telephone, etc. services in a timely fashion so as to not impede the flow of work.
- N. Verify all dimensions by field measurements.

- O. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for telecom installations.
- P. Sequence, coordinate, and integrate installations of telecom materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- Q. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
- R. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components.
- S. Secure all ceiling mounted devices tightly to ceiling.
- T. Install telecom 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.
- U. J-hooks, cable runways, etc., installed above ceilings or on exposed ceilings shall be supported from the building structure and shall be installed symmetrical with the axis of the space (do not cross room at an angle).

3.5 FIRE STOPPING

- A. All fire and smoke rated walls/floors/partitions penetrated by telecom raceways, exposed conductors, etc. shall be properly sleeved and fire sealed. Perform fire stopping to re-establish the original fire resistance rating of the assembly at the penetration. Refer to architectural drawings for all fire rated floors and walls for location, hour rating, and construction type. Verify with Architect the ratings of existing walls and floors to determine the proper U.L. assembly required.
- B. All fire stopping will be installed in accordance to the U.L. rated system and State requirements designed for the application.
- C. Unapproved grout, mortar, or gypsum products shall not be installed in lieu of fire stopping material specified herein.
- D. Sleeves: Install sleeves during the erection of walls. Install telecom conductors, etc. through sleeves.

- E. Contractor to verify that cabling and other penetrating elements and supporting devices have been completely installed and temporary lines and cables have been removed prior to fire stopping installation.
- F. Contractor to perform all necessary coordination with other trades constructing floors, walls, or other partitions of building construction with respect to size and shape of each opening to be constructed, wall/floor construction type, and device or system approved for use in each instance.
- G. Coordinate each firestop selection with adjacent work for dimensional or other interference and for feasibility. In areas accessible to public and other "finished" areas, firestop systems work shall be selected, installed, and finished to the quality of adjacent surfaces of building construction being penetrated.
- H. Provide damming materials, plates, wires, restricting collars, and devices necessary for proper installation of fire stopping. Remove combustible installation aids after fire stopping material has cured.
- I. Provide daily sign off in a formalized log on site of each penetration created and firestopped.
- J. Provide fire stopping in the following areas at a minimum:
 - 1. Where penetrations including conduit, cable, wire, or other elements which pass through one or both outer surfaces of a fire rated floor or wall.
 - 2. Except for floor on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof.
 - 3. Where a penetration occurs through fire-rated walls, or partitions of hollow-type construction, provide fire stopping to completely fill spaces around the penetration, on each side of the wall or partition.
 - 4. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, fire stop annular space, if any, between sleeve and wall opening.
 - 5. Apply fire stopping to all telecom penetration voids in wall or floor or between sleeve and penetrating material left over from the demolition phase, whether the voids were existing or created by this Contractor.
 - 6. If required by inspecting authorities:
 - a. Expose and remove fire stopping to the extent directed by inspecting authority to permit his or her inspection.

- b. Reinstall new fire stopping and restore Work where removed for inspection.
- 7. Apply watertight fire stopping sealant between cables and associated conduit penetrations into a manhole. Wrap exposed cables in manhole with approved fire-wrapping tape.
- 8. Apply fire stop putty around 4" square outlet boxes serving opposite rooms but sharing a common fire rated wall, where the boxes are less than 24" apart (edge to edge), regardless of whether they are separated by metal studs or not.

3.6 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable telecom systems in every respect.
- B. The drawings are diagrammatic only, intending to show general arrangement and location of system components. Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets and fittings may not be shown, but shall be provided at no change in contract price.
- C. All work shall be accurately laid out and coordinated with other trades to avoid conflicts and to provide maximum accessibility for operation and maintenance.

3.7 PAINTING AND CAULKING

- A. Coordinate and schedule painting of exposed raceways, boxes, and fittings with G.C. to avoid unnecessary trips by the G.C. and/or their subcontractor. All field painting shall be performed by the G.C. according to Division 09 "Painting" unless otherwise noted herein or on the drawings.
- B. Suitable finish coatings shall be provided under this section of the Specifications on all items of telecom equipment and wiring which are exposed. This shall consist of either an approved factory applied finish or an acceptable finish applied during or after installation. Equipment which is furnished in finishes such as stainless steel or satin aluminum is not to be painted. Exposed equipment and/or wiring in finished areas such as panel covers or surface raceway shall be supplied with factory applied prime coat and shall be professionally painted or enameled as directed to result in a completely coated and attractively finished manner. All such finishing shall be as directed and shall be satisfactory to the Architect/Engineer.

- C. All factory-finished steel surfaces; boxes, enclosures, etc., shall be cleaned and retouched or repainted as necessary to provide a rust-resistant coating. Where painting or galvanizing is not specifically specified, ferrous devices, bolts, nuts, inserts, etc., shall be galvanized.
- D. All nameplates and specially colored telecom equipment (such as fire alarm devices) shall be left unpainted and in a clean condition.
- E. Coordinate installation of wiring devices and covers with G.C. to avoid overspray onto devices and/or covers. Provide temporary protection over the wiring devices, if installed ahead of painting, as required to prevent such overspray.
- F. All caulking shall be performed by the G.C. unless otherwise noted herein or on the drawings. G.C. shall be responsible for caulking, and then painting, around all openings in walls that the G.C. cut larger than the device cover plate will cover up.

3.8 PHASING

- A. Perform work in separate phases as required by the Architect/Engineer according to criteria herein or in Division 01 along with architectural/ telecom drawings.

3.9 ROUGH-IN

- A. In general, all rough-in is to be performed by the E.C., unless otherwise noted.

END OF SECTION 270500

SECTION 27 10 00
STRUCTURED CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, apply to this Section.

1.2 SUMMARY

- A. Provide a Hubbell Mission Critical cabling and connectivity solution.
- B. This Section includes the following items for wiring systems used as signal pathways for voice and high-speed data transmission:
 - 1. Mounting elements.
 - 2. Unshielded twisted-pair cabling.
 - 3. Fiber-optic cabling.
 - 4. Workstation outlets.
 - 5. Identification products.
 - 6. Electronics

1.3 DEFINITIONS

- A. Backbone: A facility (e.g., pathway, cable, or conductors) between telecommunications rooms or floor distribution terminals, the entrance facilities, and the equipment rooms within or between buildings.
- B. BICSI: Building Industry Consulting Service International.
- C. CP: Consolidation Point.
- D. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- E. EMI: Electro Magnetic Interference.
- F. Horizontal Cabling: Cabling between and including the telecommunications outlet/connector and the horizontal cross-connect. Also, the cabling between and

including the building automation system outlet or the first mechanical terminations on the horizontal connection point and the horizontal cross-connect.

- G. IDC: Insulation displacement connector.
- H. LAN: Local area network.
- I. MUTOA: Multi-User Telecommunications Outlet Assembly.
- J. RCDD: Registered Communications Distribution Designer.
- K. TP: Transition Point.
- L. TR: Telecom Room.
- M. UTC: Undercarpet Telecommunications Cabling.
- N. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

- A. Product Data: For features, ratings, and performance of each component specified.
 - 1. For cabling, include the following installation data for each type used:
 - a. Nominal OD.
 - b. Minimum bending radius.
 - c. Maximum pulling tension.
- B. Shop Drawings:
 - 1. Include dimensioned plan and elevation views of telecommunications equipment rooms, labeling each individual component. Show equipment rack assemblies, layout of patch panels, wire management, etc. within each rack, method of field assembly, workspace requirements, and access for cable connections. Coordinate equipment being furnished by Owner (such as routers, hubs, switches, UPSs, etc.) and include provisions in the rack layouts. Without having equipment cut sheets for the Owner's electronics, figure at least 24" depth for switches and 32" depth for UPSs. Lay out racks in the telecommunications equipment rooms to allow for 36" clearance between rows of racks.
 - 2. Include write up of meeting minutes with Owner in Coordination section below.
 - 3. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.

4. Cabling Administration Drawings.
5. Wiring diagrams to show typical wiring schematics including the following:
 - a. Workstation outlets, jacks, and jack assemblies.
 - b. Patch panels.
 - c. Fiber-optic enclosures.
 - d. Cabinets.
 - e. Wire management.
- C. Testing Equipment: Provide proposed test equipment make and model. Provide proof of recent calibration testing and results.
- D. Samples, as requested by Architect/Engineer: For workstation outlets, jacks, jack assemblies, patch cords, in specified finish, one for each size and outlet configuration and faceplates for color selection and evaluation of technical features.
- E. Manufacturer Seismic Qualification Certification: Submit certification that distribution racks, patch panels, and their components will withstand seismic forces as required by the manufacturer.
- F. Qualification Data: For Installer see Quality Assurance below.
- G. Field quality-control test reports as listed in Field Quality Control below.

1.5 QUALITY ASSURANCE

- A. Contractor Qualifications:
 1. List of all company and employee certifications from BICSI and Hubbell as a certified installer.
- B. Installer Qualifications:
 1. Resume and current certification of responsible BICSI certified Registered Technician on staff assigned to project from installation standpoint.
 2. Resumes and current certifications indicating all installers are at least Manufacturer certified with the products that they are installing.
 3. Update and confirm certifications so that they remain in good standing throughout the duration of the project.
 4. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by a Registered Technician.

5. Installation Supervision: Installation shall be under the direct supervision of a BICSI certified Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
 6. Installer: Company specializing in installing products specified in this section with minimum five years documented experience on projects utilizing infrastructure work similar to that required for this project, and with service facilities within 100 miles of project.
 7. The Installer shall be an experienced firm regularly engaged in the layout and the installation of cabling infrastructure systems. Documentation shall be provided to show that the Contractor has successfully completed projects of similar size and scope within the previous twelve months.
 8. The Telecommunication Project Manager shall:
 - a. Be certified as BICSI Registered Technician
 - b. Be experienced in this type of project and provide technical support
 - c. Attend monthly progress meetings and additional meetings as scheduled or required.
- C. Telecom Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NFPA 70 "National Electrical Code", specifically Article 800.

1.6 CODES AND STANDARDS

- A. All materials shall comply with the applicable sections of the following Codes for installation of telecommunications cabling:
1. State Building Code (NCBC)
 2. National Electrical Code (NEC/NFPA 70)
 3. Local Codes, amendments, and ordinances.
- B. All materials and installation practices shall comply with the applicable sections of the following Telecommunications Industry Standards:
1. ANSI/TIA-568-0.D
 2. ANSI/TIA-568.1-D
 3. ANSI/TIA-568.2-D
 4. ANSI/TIA-568.3-D
 5. ANSI/TIA-568.4-D

6. ANSI/TIA-569-D
7. ANSI/TIA-606-D
8. ANSI/TIA-607-C
9. ANSI/TIA-862-B
10. ANSI/TIA-942-A
11. ANSI/TIA-1005-A
12. ANSI/TIA-1179.
13. BICSI Telecommunications Distribution Methods (TDM) Manual, 13th Edition.

1.7 COORDINATION

- A. Coordinate layout and installation of voice and data communication cabling with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier.
 1. Meet jointly with telecommunications and LAN equipment suppliers, and Owner's I.T. staff to exchange information and agree on details of equipment arrangements and installation interfaces. Coordinate labeling, icons, cable jacket color, test format, etc.
 2. Record agreements reached in meetings, distribute to other participants, and include write up with shop drawing submission.
 3. Adjust arrangements and locations of distribution frames and cross-connect and patch panels in equipment rooms and wiring closets to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

1.8 WARRANTY

- A. Provide Hubbell's standard 25 year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SYSTEM REQUIREMENTS

- A. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

2.3 MOUNTING ELEMENTS

- A. Racks: 4-Post, full height, full depth, aluminum units designed for telecommunications and security rack mounted equipment along with Owner's UPS. Coordinate dimensions of units to be supported.
 - 1. Manufacturers: ChatsWorth, Panduit, B-Line, Homaco, or Middle Atlantic.
 - 2. Module Dimension: Width compatible with EIA 310 standard 19-inch panel mounting, 84-inch tall.
 - 3. Static Weight Capacity: 500lbs.
- B. Wire Management:
 - 1. Cable management panels shall be sized to accommodate the maximum number of patch cables for the patch panels.
 - 2. Minimum 4"W/8"W x 6"D single/double vertical and 3" x 3" / 2" x 5" front/rear horizontal cable management channels with covers.
 - 3. Flexible fingers.
 - 4. Duct to be made out of plastic with aluminum base.
- C. Cable Bundle Wraps:
 - 1. Provide black hook and loop adjustable wraps for securing of cable bundle of the same type (jacket color) every 10'.
 - 2. Size as required to accommodate cable or bundle.
- D. Innerduct:
 - 1. Provide fabric type innerduct for each run fiber optic cable.
 - 2. Size as indicated on drawings.
 - 3. Provide manufacturer stamped footage on the jacket.
 - 4. Provide rating as required for installation: outside plant, riser or indoor.
 - 5. Provide integral 900 lb pull string for all innerduct.
 - 6. Must be UL compliant.
- E. Copper Patch Panel: Comply with TIA-568.2-D, meeting or exceeding cable performance. Provide offset horizontal lacer bars for each patch panel across the

width of the patch panel to support cabling prior to termination. Modular unpopulated style panels with blank inserts for terminating of RJ-45 jacks. Refer to workstation outlet jack and icon requirements for further information, as they will be the same.

1. Number of Jacks per Field: One for each four-pair UTP cable indicated.

F. Fiber Enclosures:

1. Modular, rack-mountable panels housing multiple-numbered, duplex fiber modules and connectors.
2. Refer to drawings for rack unit allowances.
3. Suitable for loose tube, tight buffered and ribbon cables.
4. Suitable for ST, SC, LC and MT-RJ connectors as required.
5. Multiple locations for jumper egress.
6. Removable, durable, clear polycarbonate tinted front door.
7. Lock can be field installed.
8. Accepts standard 6-pack fiber panels and modules.
9. Open top of housing for vertical pigtail or jumper exiting.
10. Provide splice trays as required.
11. Meets requirements of ANSI/TIA-568.0-D and TIA – 606-D.
12. Include buffer tube fan out kits as required on loose tube, OSP patch panels.

2.4 UNSHIELDED TWISTED-PAIR DATA CABLING

A. Data Connectivity Solution Manufacturers:

1. CAT6 - Hubbell (Owner's standard).
2. Extended CAT6 – Paige Communications Gamechanger.

B. Data Cabling Solution Manufacturers (Must be partnered and certified with connectivity manufacturer):

1. CAT6 - Hubbell (Owner's standard).
2. Extended CAT6 – Paige Communications Gamechanger.

C. Comply with UL 444 and ANSI/TIA-568.2-D, Mid Grade Category 6E rated at 550 MHz.

1. NFPA 70, type CMP.
2. Cable Jacket Color: Refer to drawings. Provide separate colors for each system as required.

- D. Data Jacks and Jack Assemblies: Modular, color-coded, 8-position, 8-conductor, RJ-45 receptacle units with integral IDC-type terminals. All installers must be properly trained and certified by the manufacturer to install jacks according to manufacturer's recommendations.
- E. Horizontal Voice/Data Telecommunications Copper Cable:
 - 1. No. 24 AWG, 100 ohm, solid conductor, balanced, unshielded twisted four pair Category 6E.
 - 2. Plenum rated.
 - 3. Provide patch cords per the drawings.
 - 4. Provide insulation colors per the drawings.
 - 5. Shall be of the traditional round design, with or without flute, capable of supporting:
 - a. Voice, Analog Base band Video/Audio, Facsimile, Modem,
 - b. Switched-56, T-1, ISDN, RS-232, RS-422, RS-485
 - c. 10BASE - T Ethernet, Token Ring, 100Mbps TP-PMD
 - d. 100BASE - T Ethernet, 155 Mbps ATM, AES/EBU Digital Audio
 - e. 1000BASE – T Ethernet
 - f. 270 Mbps Digital Video, 622 Mbps 64-CAP ATM, and emerging high-bandwidth applications, including 1 Gbps Ethernet and gigabit ATM.
- F. Backbone Voice Telecommunications Copper Cable:
 - 1. No. 24 AWG, 100 ohm, solid conductor, balanced, unshielded twisted four pair Category 5E.
 - 2. Riser rated or plenum rated as required.
 - 3. Shall be of the traditional round design, with or without flute, capable of supporting:
 - a. Voice, Analog Base band Video/Audio, Facsimile, Modem,
 - b. Switched-56, T-1, ISDN, RS-232, RS-422, RS-485
 - c. 10BASE - T Ethernet, Token Ring, 100Mbps TP-PMD
 - d. 100BASE - T Ethernet, 155 Mbps ATM, AES/EBU Digital Audio
 - e. 1000BASE – T Ethernet
 - f. 270 Mbps Digital Video, 622 Mbps 64-CAP ATM, and emerging high-bandwidth applications, including 1 Gbps Ethernet and gigabit ATM.

2.5 FIBER-OPTIC CABLING

- A. Cable, Terminal, and Connector Product Manufacturers:

-
- B. Fiber Optic Cabling Solution Manufacturers (Must be partnered and certified with Connectivity manufacturer):
1. Hubbell.
- C. Fiber-Optic Cable: 50/125-micrometer, multi-mode type indoor/outdoor, riser rated, direct burial rated or plenum rated as required.
- D. Fiber-Optic Jacket Colors: Black for outdoor fiber. Aqua for indoor fiber.
- E. Backbone Fiber Cable OutSide Plant: Refer to drawings for quantity of strands of fibers of MMF.
1. Comply with TIA-492A loose tube, indoor/outdoor, 900um rated.
 2. NFPA 70, Type OFNR complying with UL 1666.
 3. Provide integral rip cord.
 4. Maximum Insertion Loss for 50/125um M/M OM3 fiber: 3.0 dB/km at 850 nm; 1.0 dB/km at 1300 nm.
 5. Minimum Bandwidth for 50/125um M/M fiber: 2000 MHz-km at 850 nm; 500 MHz-km at 1300nm.
- F. Backbone Fiber Cable Intrabuilding Backbone: Refer to drawings for quantity of strands of fibers of MMF.
1. Comply with TIA-492A tight buffered, indoor, armored, 250um rated.
 2. NFPA 70, Type OFNR complying with UL 1666.
 3. Provide integral rip cord.
 4. Maximum Insertion Loss for 50/125um M/M OM3 fiber: 3.00 dB/km at 850 nm; 1.00 dB/km at 1300 nm.
 5. Minimum Bandwidth for 50/125um M/M OM3 fiber: 2000 MHz-km at 850 nm; 500 MHz-km at 1300nm.
- G. Cable Connecting Hardware:
1. Comply with ANSI/TIA-568.3-D.
 2. Insertion loss not more than 0.75 dB max, 0.3dB average.
 3. Connectors:
 - a. UNICAM, mechanical type, composite housing, white tip ceramic ferrules, no-epoxy, no-polish, integral pre-polished fiber stub, integral index matching gel, duplex type SC couplers.
 4. Splices:
 - a. Fusion type couplers with heat shrink.

2.6 WORKSTATION OUTLETS (WO)

- A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, modular, RJ-45 style, rated for Category 6, with integral IDC-type terminals. Comply with ANSI/TIA-568.1-D.
 - 1. Colors: See drawings.
- B. Workstation Outlets: Multiple jack-connector assemblies mounted in single faceplate. All faceplates shall be 4 port, unless otherwise noted. Provide blank inserts on all inactive voice/data ports.
 - 1. Faceplate: Match the electrical device plates.
 - 2. Mounting: Flush and vertically oriented, unless otherwise indicated. For floor boxes and potentially modular furniture outlets, coordinate with associated Contractor and provide standard 106 frame duplex receptacle or Decora (GFI) style device plates or as required.
 - 3. Legend: Machine-printed, adhesive tape label identifying the circuit.
 - 4. Jacks: Color per drawings. Flush vertical mounted in faceplate.

2.7 GROUNDING AND BONDING

- A. Materials: Comply with NFPA 70, ANSI/TIA-607-D, and UL 467.
- B. Refer to Telecom Details and Diagrams drawing for further information

2.8 IDENTIFICATION PRODUCTS

- A. Manufacturers:
 - 1. Brady Worldwide, Inc.
 - 2. HellermannTyton.
 - 3. Kroy LLC.
 - 4. Panduit Corp.
- B. Comply with ANSI/TIA-606-D and the drawings. Labeling shall be provided for all outlets, cables, racks, IDC punchdown blocks, patch panels, MUTOAs, CPs, and TPs.
- C. Cable Labels: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations.

2.9 SOURCE QUALITY CONTROL

- A. Multi-Mode Fiber-Optic Cable: Each cable spool tested at factory before shipping at 850 and 1300 nm.
- B. UTP Cable Verification of Performance: Test every cable package or reel at factory to verify that cable complies with ANSI/TIA-568.2-D requirements.

2.10 ELECTRONICS

- A. Unless otherwise indicated, all electronics such as hubs, routers, switches, local UPSs, phone systems, etc. and associated connections shall be furnished and installed by the Owner.

PART 3 - EXECUTION

3.1 INSTALLATION STANDARDS

- A. Comply with BICSI TCI, ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, ANSI/TIA-568.3-D, and ANSI/TIA-569-D.

3.2 EXAMINATION

- A. Examine pathway elements intended for cables.
 - 1. Verify proposed routes of pathways. Check raceways, cable trays, and other elements for compliance with space allocations, clearances, installation tolerances, hazards to cable installation, and other conditions affecting installation. Verify that cabling can be installed complying with EMI clearance requirements.
 - 2. Prepare wall penetrations and verify that penetrations of rated fire walls are made using products labeled for type of wall penetrated.
 - 3. Identify plan to support cables and raceways in suspended ceilings. Verify weight of individual types and sizes of cables. Verify that load capacity of cable support structures is adequate for each pathway.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 APPLICATION OF MEDIA

- A. Backbone Cable for Data Service: Use MMF cable for runs between equipment rooms and wiring closets and for runs between wiring closets.
- B. Horizontal Cable for Data Service: Use UTP Category 6 cable for runs between wiring closets and workstation outlets.

3.4 INSTALLATION

- A. The pin assignments on RJ-45 voice/data jacks shall conform to TIA 568-B standard T568B. Confirm with Owner prior to termination.
- B. Provide flooded/gel filled type cable for all wet locations including any underslab locations such as to floor boxes. Provide flooded/gel filled type cable the entire distance to the rack if possible. If having to run overhead, provide consolidation point in the ceiling consisting of 210 blocks to transition to dry plenum dry rated cable as required. Warranty from Hubbell shall cover these wet location cables along with all other cabling.
- C. Comply with NECA 1.
- D. Wiring Method: Install cables entirely in raceway and cable tray except within consoles, cabinets, desks, and counters.
- E. Cable Installation:
 - 1. Install cables to dedicated patch panels as indicated.
 - 2. All copper cable slack shall be in "S" or "U" configurations and not coiled up in circles to control the effects of noise on the cables.
 - 3. All fiber slack at termination cabinet drawer to be in figure 8 configuration.
 - 4. Provide 10 feet of slack in each station cable and dress slack according to minimum bending radii at the telecommunications rack prior to termination.
 - 5. Provide 12 inches of slack in each station cable and dress slack according to minimum bending radii at the telecommunications outlet.
 - 6. Provide 20 feet of slack in each OutSide Plant fiber cable at the service entrance data rack.
 - 7. Install cables in exposed areas in conduit and route conduit parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.
 - 8. Install cables from outlet to j-hook to cabinet.
 - 9. Secure cables to dedicated j-hooks with cable wraps every 5'.

10. Install cables in dedicated 2" minimum diameter J-Hooks and support cables at intervals not exceeding 60 inches. These j-hooks are to be installed with minimum ¼" all thread and beam clamps or drop in anchors. The j-hooks are not to be installed with steel ceiling wire or tie wire.
11. Make terminations only at indicated cross-connects and patch panels.
12. No splices shall be allowed unless written approval is received from the Owner.
13. Pulling Cable: Do not exceed 25 ft-lb (110 N) of pulling tension for 4-pair UTP cable. Do not exceed manufacturer's written recommended pulling tensions for other types of cables. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable. Provide 1" minimum bending radius on all copper cabling. Provide a minimum bending radius of fifteen (15) times the cable diameter on all fiber optic cabling.
14. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
15. Secure exposed cables not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
16. Snip off excess horizontal copper UTP conductor just past the IDC connector at the back of copper patch panels.
17. Do not lay small quantity of fiber cables underneath large volume of copper cables in cable tray if at all possible.
18. Install UTP copper cables using techniques, practices, and methods that are consistent with UTP copper rating of components and that ensure UTP copper performance of completed and linked signal paths, end to end.
 - a. Do not untwist more than 1/2 inch (12 mm) of UTP copper conductors at connector terminations.
 - b. Do not strip more than 1 inch (25 mm) of UTP copper insulation at connector terminations.

F. Wiring within Wiring Closets and Enclosures:

1. Mount patch panels and other connecting hardware on wall and floor mounted cabinets.
2. Group connecting hardware for cables into separate logical fields.
3. Train conductors to terminal points with limited excess.
4. Using a standard 48 port copper patch panel as an example, provide hook and loop where each group of 24 horizontal cables route through the vertical wire management into the back ½ of the patch panel. Use hook and loop where each group of 24 cables split off into the upper and lower group of 12 IDC connectors.

- Use hook and loop where each group of 12 cables split off into the first group of 8 IDC connectors and the second ½ (4) group of 8 IDC connectors.
5. Use lacing bars on back of copper patch panels to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
- G. Separation from EMI Sources: Comply with BICSI TDM and ANSI/TIA-569-D recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment. Comply with the following minimum separation distances from possible sources of EMI:
1. Separation between unshielded power lines or electrical equipment in proximity to open cables or cables in nonmetallic raceways is as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: **5 inches (127 mm)**.
 - b. Electrical Equipment Rating between 2 and 5 kVA: **12 inches (300 mm)**.
 - c. Electrical Equipment Rating More Than 5 kVA: **24 inches (610 mm)**.
 2. Separation between unshielded power lines or electrical equipment in proximity to cables in grounded metallic raceways is as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: **2-1/2 inches (64 mm)**.
 - b. Electrical Equipment Rating between 2 and 5 kVA: **6 inches (150 mm)**.
 - c. Electrical Equipment Rating More Than 5 kVA: **12 inches (300 mm)**.
 3. Separation between power lines and electrical equipment located in grounded metallic conduits or enclosures in proximity to cables in grounded metallic raceways is as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: **3 inches (76 mm)**.
 - c. Electrical Equipment Rating More Than 5 kVA: **6 inches (150 mm)**.
 4. Electrical Motors and Transformers, 5 kVA or HP and Larger: **48 inches (1200 mm)**.
 5. Fluorescent Fixtures: **5 inches (127 mm)**.
- H. Conduit:
1. Furnished and installed by E.C.unless otherwise noted.
 2. Use manufactured conduit sweeps and long-radius ells on service entrance raceways (i.e. 48" radius on 4" PVC).
- I. Innerduct: Pull fiber optic cable(s) in innerduct and route through site conduit system.

- J. Install the following type of cable tray in telecom rooms. Furnish and install 18"x 1-1/2" tubular stringer type cable tray in telecom rooms suited for installation around the perimeter of the room and also directly over racks with associated relay rack runway support for wiring convenience. For underground service entrances, furnish and install 18"x 1-1/2" tubular stringer type cable tray with associated runway wall support isolation kits suited for installation on walls of telecom rooms directly over the through-floor sleeve penetrations to the overhead cable tray for wiring convenience. Provide all required butt splice kits, junction splice kits, wall angle support kits, cable runway ground straps kits, two mounting hole ground terminal blocks, vertical rack mounted cable tray supports, cable dropouts directly over the vertical wire management, etc. for a complete installation.] Provide d-rings along walls in Telecom Rooms for securing and training small groups of cables, not contained within the cable tray system.
- K. Secure all floor mounted racks rigidly to adjacent surface per the manufacturer's recommendations and seismic requirements.
- L. Cut holes for square sleeves per manufacturer's recommendations. Install just above cable runway inside telecom room.

3.5 GROUNDING

- A. Comply with ANSI/TIA 607-D.
- B. Grounding Points:
 - 1. Locate grounding terminals in each equipment room, wiring closet, rack, and cabinet.
 - 2. Telecommunications Style Grounding Busbars (not electrical style): Mount on wall of all telecommunications entrance facilities, equipment rooms, and closets, with standoff insulators. Terminate grounding conductors onto bar with 2 hole mechanical connectors, not 1 hole.
 - 3. Provide connector with grounding lug and plastic bushing on end of conduit to the cable tray and provide #6 THHN grounding conductor from bushing to cable runway.
 - 4. Provide connector with grounding lug and plastic bushing on end of each conduit sleeve through a wall or floor and provide #6 THHN grounding conductor from bushing to adjacent cable tray or telecom room bus bar.
- C. Bonding Conductors:
 - 1. Extend from grounding busbars to ground terminals in all equipment racks and cabinets.

2. Daisy chaining of the ground conductors is not acceptable.

D. Special Requirements:

1. Bonding conductors shall be insulated copper, No. 6 AWG minimum.
2. Install only in nonmetallic conduit, unless specifically required for protection of conductor. Metallic conduit, if used, shall be RMC. For RMC that exceeds **36 inches (915 mm)** in length, conductors shall be bonded at each end of conduit.
3. Bonding conductors shall be installed without splices unless approved by Engineer because of special circumstances. Where splices are necessary, they shall be accessible and shall be located in telecommunications spaces. Splices shall be by irreversible compression connectors or by exothermic welding.

3.6 IDENTIFICATION

- A. In addition to requirements in this Article, comply with NEC Article 800.113 and ANSI/TIA-606-D along with the drawings.
 1. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.
 2. No labels shall be hand written.
- B. Use logical and systematic designations for facility's architectural arrangement and nomenclature, and a consistent color-coded identification of individual conductors. Acquire and adhere to Owner's identification standards.
- C. Cable and Wire Identification:
 1. With a printed cable level, label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 3. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - a. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
 - b. Label each unit and field within distribution racks and frames.

4. Within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
 5. At Workstations: Label cables within outlet boxes.
- D. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- E. Cabling Administration Drawings: Show building floor plans with cable administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of ANSI/TIA-606-D. Furnish electronic record of all drawings, in software and format selected by Owner.

3.7 FIELD QUALITY CONTROL

- A. Testing equipment shall either be manufactured by Fluke or Agilent. Instruments shall be Certified and documented within the past twelve (12) months.
- B. Perform the following field tests and inspections and prepare test reports:
- C. Category 5e UTP Cabling Tests:
1. Conduct tests from 1 to 100 MHz.
 2. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568.1-D and 2-D. Perform tests with a tester that complies with performance requirements in Annex I, complying with measurement accuracy specified in Annex H. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 3. Adjust NVP setting in meter for exact cable being used.
 4. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 5. Wire-map (pin to pin connectivity) test that reports open circuits, short circuits, crossed pairs, reversed pairs, split pairs, and improper terminations.
 6. Channel and permanent link tests for each cable indicating: cable length, insertion loss, near-end crosstalk loss, power sum near-end crosstalk loss, equal-level far-end crosstalk loss, power sum equal-level far-end crosstalk, return loss,

propagation delay, and delay skew all from both directions. Performance shall comply with minimum criteria in ANSI/TIA-568.1-D and 2-D, Level IIe. Annex D requirements will be met for testing of all power sum Category 5e cabling.

D. Category 6 UTP Cabling Tests:

1. Tests shall include all tests of Category 6 conducted from 1 to 250 MHz.
2. Channel and permanent link tests shall be performed with a certified Category 6 cable tester Level III that complies with performance requirements in ANSI/TIA-568.1-D and 2-D, Level III. Include tests for longitudinal or transverse conversion loss.
3. Performance shall comply with minimum criteria in ANSI/TIA-568.1-D and 2-D.

E. Extended Category 6 UTP Cabling Tests:

1. Tests shall include all tests of Category 6 conducted from 1 to 250 MHz at 1Gb/s.
2. Channel and permanent link tests shall be performed with a certified Extended Category 6 cable tester Level III that complies with performance requirements in ANSI/TIA-568.1-D and 2-D, Level III. Include tests for longitudinal or transverse conversion loss. Fluke DSX-8000 or equal by AEM, Trend Networks, NETSCOUT or Viavi.
3. Performance shall comply with minimum criteria in ANSI/TIA-568.1-D and 2-D.

F. Fiber-Optic Cable Tests:

1. OTDR certified test instruments shall meet or exceed applicable requirements in ANSI/TIA-568.1-D. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Calibrate light source and power meter in the field prior to testing.
4. Link End-to-End Insertion Loss Tests:
 - a. Multi-mode link measurements: Test at 850 and 1300 nm in both directions according to ANSI/TIA.
 - b. Readings must not be higher than the "Optimal Insertion Loss". Insertion Loss test results shall be less than that calculated according to equation in ANSI/TIA.

G. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, transferred

from the instrument to the computer, saved as text files, copied to a CD, and printed and submitted.

- H. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
- I. Retest and inspect cabling to determine compliance of replaced or additional work with specified requirements.
- J. All testing must meet Hubbell's warranty requirements.

3.8 DEMONSTRATION

- A. Train Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets. Refer to Division 27 "Basic Communications Requirements."

3.9 PROJECT CLOSEOUT

- A. Prepare record documents in accordance with the requirements in Section 270100 "Basic Communications Requirements". In addition to requirements specified in Section 270100, indicate installed conditions for:
 - 1. Backbone and horizontal cabling; station layouts; layout of ER and TR's; all labeling of all cabling, connectors, connectors, equipment, conduits, cable trays, etc.
 - 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 - 3. Approved substitutions, contract modifications, and actual equipment and materials installed.
 - 4. As-built drawings for all underground pathways and installations.
- B. Documentation: The Cabling contractor shall provide the following documentation to the Owner within two weeks following the completion of the installation:

1. Marked up floor plans identifying as-built cable routing for all horizontal backbone cabling. These will be submitted in a finalized as-built electronic format (AutoCAD) along with a hard copy plot.
 2. Marked up floor plans with station outlet identifier listed adjacent to each station outlet. These will be submitted in electronic format (AutoCAD) and a hard copy plot. All required full size drawings shall be installed as required in each TR and ER and ER to reference all station outlets being served by a specific ER or TR.
 3. Test results for each jack in each station outlet compiled in a binder with the ANSI/TIA tests listed in numerical order grouped by ER/TR. Provide three 8-1/2"x11" hardcopies in notebooks and three CD copies.
 4. Test results for all horizontal and backbone UTP, coaxial, and fiber cables compiled in a binder with the tests grouped by the backbone cable. Provide three 8-1/2"x11" hardcopies in notebooks and three CD copies.
- C. A scaled plan of each building showing the placement of each individual item of equipment as well as raceway size and routing; junction boxes; and conductor size, quantity and color in each raceway.
- D. Final as-built details and drawings, cable routes, and outlet/connector labels shall be provided.

3.10 DAMAGES

- A. The Contractor will be held responsible for any and all damages to portions of the building caused by it, its employees and subcontractors, including, but not limited to:
1. Damage to any portion of the building caused by the movement of tools, materials, or equipment.
 2. Damage to any component of the construction of spaces "turned over" to the Contractor.
 3. Damage to the electrical distribution system and/or other space "turned over" to the Contractor.
 4. Damage to the electrical, mechanical and/or life safety, or other systems caused by inappropriate operation or connections made by the Contractor or other actions of the Contractor.
 5. Other damage to the materials, tools, and/or equipment of the Owner, its consultants, General Contractor, subcontractors, Architect, and other contractors, agents, and leases.

END OF SECTION 27 10 00

SECTION 28 01 00
BASIC SECURITY REQUIREMENTS

PART 1 - GENERAL

1.1 ABBREVIATIONS

- A. S.C. – Security Contractor

1.2 SUMMARY

- A. This Section includes the following:
1. Change Orders.
 2. Closeout Documentation.
 3. Codes, Permits & Inspections, and Labeling.
 4. Color Selections.
 5. Contractor Qualifications.
 6. Coordination Drawings.
 7. Definitions.
 8. Deliveries.
 9. Discrepancies.
 10. Electronic Media.
 11. Job Site Safety
 12. Job Site Security
 13. Keys.
 14. Operating and Maintenance Manuals.
 15. Pre-Bid Meeting.
 16. Record Documents and As-Built Drawings.
 17. Requests For Information.
 18. Shop Drawings.
 19. Spare Parts.
 20. Substitutions.
 21. Training.
 22. Warranties.

1.3 CHANGE ORDERS

- A. Change orders will be reviewed by the Engineer, when requested. The format for each change shall consist of the breakout of all labor, material, and equipment rental per unit and extended along with quotations from the respective suppliers for all quoted items. The bottom summary including taxes, labor rates, profit, overhead, etc. shall comply with the Division 01 specifications and local laws. Without this detailed breakdown, the change order cannot be properly evaluate by the Engineer. Any change order that the Contractor proceeds to complete, without a formally approved written change order from the Architect/Engineer, are taking a risk at their own expense.

1.4 CLOSEOUT DOCUMENTATION

- A. Submit electronically all of the information listed below at a minimum along with all the requirements stated elsewhere in Division 01 and Division 28:
 - 1. Operations and Maintenance (O&M) manuals as outlined below in this specification.
 - 2. Certification letter that all security equipment has been tested and is operational according to the plans and specifications.
 - 3. Certification letter that all punch list items have been corrected.
 - 4. Certification letter that all clean-up relating to security work has been performed.
 - 5. Certification letter that no asbestos or any materials containing asbestos have been used in the security portion of the work.
 - 6. Contractor's notarized affidavit of payment of debts and claims.
 - 7. Contractor's notarized affidavit of release of liens.

1.5 CODES, PERMITS & INSPECTIONS, AND LABELING

- A. S.C. shall be responsible for contacting Mecklenburg County Code Enforcement for scheduling all required tests and inspections.
- B. All work shall be performed in accordance with the NEC and applicable federal, state, county, and city codes and requirements by the Local Authority Having Jurisdiction.
- C. Both the Contractor and installing technician are reminded that since the NEC is by statutory inclusion a part of the laws of the state, they bear a prime responsibility to comply with it even when the plans or specifications denote an apparent

violation. This should be observed carefully and continuously, particularly during estimating for proposal, and any discrepancies should be brought to the attention of the engineer for resolution.

- D. Contractor shall include in his/her bid all costs for building permits, inspections, and prepays including utility fees unless otherwise noted herein or in Division 01.
- E. Contractor shall coordinate and schedule all required State, County, City, and Engineer inspections in a timely manner so as to not “cover up” work to be inspected and to not “hold up” work to be performed by other trades.
- F. All security equipment, materials, devices, and appliances shall be labeled by a NC approved third party testing agency.
- G. Anticipated inspections made by the design engineer:
 - 1. Overhead/In-Wall – Contractor to notify engineer one week prior to installing gypsum board walls/ceilings and acoustical lay-in ceilings and while typical masonry wall rough-in work is being performed for potential inspections. At this time, the following list below shall be ready for the engineer to review. If this phase of the project in given major areas of the building are not complete at this time, engineer reserves the right to be compensated for additional site visits to complete the OH/IW rough-in inspection if necessary.
 - a. All j-hooks, cabling, fittings, supports, boxes, etc. must be complete.
 - b. All power and low voltage wiring must be complete.
 - 2. Final – Contractor to notify engineer one week prior to need for potential final inspections. At this time, the following list below shall be ready for the engineer to review. If project is not complete at this time, engineer reserves the right to be compensated for additional site visits to complete the final inspection if necessary.
 - a. Contractor’s own punchlist of outstanding items.
 - b. All cables are to be terminated.
 - c. All grounding and bonding connections completed for Engineer’s review.
 - d. All cables, cabinets, patch panels, ground bars, and outlets are to be labeled.
 - e. All low voltage systems checkout and testing reports by the respective manufacturers.
 - f. Ladder for engineer’s use.

- H. After site observations are made, the Engineer will provide field reports and generate deficiency logs to the Contractor through the Architect. These items are to be addressed by the Contractor to the Architect within (14) days of receipt, unless otherwise agreed upon in writing. When the items are corrected, the items shall be initialed and dated by the security “foreman” and not by the security “project manager.”

1.6 COLOR SELECTIONS

- A. All security equipment involving a color selection shall be brought to the attention of the Architect, via a shop drawing submittal, for their direction. Contractor shall provide the Architect with a list full range of colors that can be selected from. Contractor shall provide color chips, samples, color brochures, etc. for the Architect’s use.
- B. All security equipment involving color selection shall be submitted at one time, along with the other finishes for other disciplines needing a color selection so that the Architect has all the information together to make a complete decision.
- C. Some examples of security equipment needing a color selection are:
 - 1. Devices and security outlets.

1.7 CONTRACTOR QUALIFICATIONS

- A. Contractor shall have been in business for at least five years and have completed at least three projects of similar size and scope.
- B. Contractor shall have proper business and employee licenses in order to perform work in the state.
- C. Refer to individual specification sections for additional qualifications relevant to each specification section.
- D. Contractor to provide sufficient qualified technicians who are thoroughly experienced with the materials and methods specified and familiar with the design requirement.
- E. Contractor shall be certified by S2, DMP and their proposed camera manufacturer. Certificates shall be provided during the shop drawing review phase.

- F. In acceptance or rejection in any portion of the security work, no allowance will be made for lack of skill on the part of the workmen.

1.8 COORDINATION DRAWINGS

- A. A meeting shall be arranged by the General Contractor and take place prior to the G.C. starting the coordination drawings. This meeting shall include at a minimum the G.C., Architect, Owner's representative, and Engineers such that we can confirm the requirements of the coordination drawings prior to them being submitted.
- B. S.C. shall coordinate with the G.C. and other trades so that the following lists of items can be indicated on a common set of plans. Floor plans and sections are to be drawn to scale in all congested areas (such as corridors, chases, and equipment rooms) and specific areas noted in these documents. These shall be submitted collectively from all disciplines into one overall document for review by the Engineer on an as needed basis or where specifically directed within the Contract Documents. These coordination drawings shall be submitted for review prior to any other individual product data or fabrication drawings. Show the following at a minimum:
 - 1. Cable runway and J-hook layout.
 - 2. Clearances required for access above and to side of cable runway, j-hooks and cabinets.
 - 3. Large security conduits and/or pull boxes.
 - 4. Cabinet elevations with equipment.
 - 5. Security outlets dedicated for cabinets.
 - 6. Security outlets associated with security and A/V outlets.
- C. It is important to note that ductwork/piping/cable tray, etc. cannot be fabricated, until the coordination drawings have been compiled, submitted, and approved. Any material procurement or installation work commenced prior to approval is taken at the risk of the Contractor and may have to be modified/moved at their cost.

1.9 DEFINITIONS

- A. Where the word "Architect" is used herein, it shall be construed to mean the Engineer in charge of the project.

- B. Where the word “provide” is used relating to a system or piece of equipment, it shall be understood to mean the furnishing and installing of the system or equipment.
- C. Where the word “furnish” is used relating to a system or piece of equipment, it shall be understood to mean supply to the project only, for installation under other Divisions as part of this contract.
- D. Where the word “install” is used relating to a system or piece of equipment, it shall be understood to mean to place and put in service equipment furnished under other Divisions as part of this contract.
- E. Where the phrase “as directed” is used, it shall be understood to mean direction given to the Contractor by the Architect, Engineer, or Owner.
- F. Where the phrase “as indicated” is used, it shall be understood to mean as shown on drawings by notes, graphics or schedules, or written into other portions of contract documents. Terms such as “shown”, “noted”, “scheduled” and “specified” have the same meaning as “indicated”, and are used to assist the reader in locating particular information.
- G. Where the word “Contractor” is used, it shall be understood to mean the contractor responsible for all Division 28 specifications and security drawings, unless otherwise noted. For projects where one prime contract is awarded, the Prime Contractor shall be responsible for all Division 28 work included in these specifications and security drawings.
- H. Where the term “S.C.” is used, it shall be taken as a guide for the scope normally performed by the Security Contractor, whereas when the term “S.C.” is used, it shall be taken as a guide for the scope normally performed by the Security subContractor. For projects where multiple prime contracts are awarded, the Security Contractor shall be responsible for all Division 28 work included in these specifications and security drawings.

1.10 DELIVERIES

- A. All deliveries for equipment ordered by the Contractor shall be accommodated by the Contractor. Contractor shall coordinate deliveries and storage space for equipment during hours that the Contractor is on site. The Owner will not be responsible for receiving/unloading equipment whether during working hours or after hours, unless otherwise closely coordinated up front with the Owner. Contractor shall also provide their own means of unloading equipment.

1.11 DISCREPANCIES

- A. This specification section is not meant to contradict other specification sections that describe similar scopes of work. The intent of this section is to clarify any basic issues that may have been omitted in other Divisions or are not entirely clear as to how they affect the Contractor(s) of this Division.
- B. Should it appear that there is a discrepancy between the Division 28 drawings and/or specifications with other Division drawings and/or specifications, and such discrepancy is not brought to the Architect/Engineer's attention during Bidding for a formal written Addendum clarification, this Contractor shall base his/her bid on performing the work in the manner having the higher cost or more stringent option. The Architect/Engineer shall then have the option during construction of selecting either of the manners shown and/or specified at no additional cost to the Owner. In the event the lower cost manner is selected, a credit shall be due the Owner in the amount of the difference between the lower cost and higher cost manner. All discrepancies shall be called to the attention of the Architect before proceeding with work affected thereby.
- C. The design drawings, as submitted, are diagrammatic and are not intended to show exact location of equipment, security devices above and below counters, floor boxes, poke-throughs, power poles, wall mounted lights, A/V outlets and receptacles, etc. unless dimensions are given. Drawings are not to be scaled. Verify all exact locations with Architect prior to rough-in. Verify mounting heights of all surface raceways in finished areas and heights of wiring devices above or below casework with the Architect prior to rough-in.
 - 1. Equipment shall be installed along the general arrangement indicated on the drawings, and in accordance with the manufacturer's instructions.
 - a. Provide at least the minimum manufacturer's recommended and code required clearance around the equipment for normal maintenance.
 - b. Locate and arrange equipment in relationship to other system components to assure that the equipment will be operating under the best possible conditions to meet the scheduled performance requirements.
 - 2. Raceways are to be installed along the general plans shown on the drawings keeping in mind the constraints of the available space and the need to coordinate with the work of other trades. Additional bends, pull and splice boxes shall be provided as necessary to meet space constraints and to facilitate the work of other trades.

- D. Security equipment, specified hereinafter as shown on the drawings shall be furnished and installed by this Contractor, unless specifically indicated to the contrary.
- E. Occasionally, certain references may be indicated on the Drawings to items which are suggested to be furnished and/or installed by various subcontractors. This is done to assist the applicable Prime Contractor in organizing his subcontractor's bids. However, no attempt has been made, nor is it implied, that this specification or plans are attempting to specifically divide all responsibilities for subcontractors. It is the Prime Contractor's responsibility that all items covered on security plans and Division 28 specifications are included in his bid and are coordinated with his subcontractors. No consideration will be given for Prime Contractor's failure to include all applicable security work in his bid.
- F. Where more than one manufacturer is named for major items of equipment, the manufacturer noted on the Drawings has been used as a basis for design. If another manufacturer is used, other than the one named on the Drawings, it shall be the responsibility of this contractor to ensure that the equipment will fit the space with all legal clearances, or bear the expense to change the space and structure to accommodate equipment used.

1.12 ELECTRONIC MEDIA

- A. Where the Contractor is required to produce full size drawings for shop drawings, as-builts, or to outline the work involved for his/her use (i.e. voice/data, etc.), the electronic drawings will be available to the contractor. The contractor will have to fill out and sign a waiver/release form from the engineer. The engineer will provide electronic CAD or PDF drawings for the fee of \$25/sheet. This requirement is not intended to restrict the contractor from preparing shop/coordination drawings in a timely fashion. If the contractor deems this requirement to restrictive, then the contractor shall proceed as if the electronic drawings are not available. The file type will be coordinated with the Engineer.

1.13 JOB SITE SAFETY

- A. The Contractor and not the Engineer is responsible for all job site safety relating to his or her work. The Contractor shall be familiar with all safety requirements, such as OSHA regulations, and comply accordingly. The Contractor shall coordinate providing of all personal protection equipment with their employees.

1.14 JOB SITE SECURITY

- A. The Contractor shall be responsible for all security of their employees, materials, tools, and equipment. Contractor shall lock up and store materials, tools, and equipment accordingly.

1.15 KEYS

- A. During construction, this Contractor shall keep the keys for any and all cabinets, etc. As part of the closeout procedures, this Contractor shall turn over to the Owner six identical key rings with a full set of spare keys on each. Each key shall be labeled with its corresponding designation on a hand written or machine printed label. If six keys of each type do not come with the equipment for the project, have the manufacturer produce additional keys to fill the set.

1.16 OPERATING AND MAINTENANCE MANUALS

- A. As part of closeout procedures the Contractor shall turn over to the Architect/Engineer for approval a minimum of three (3) copies of operation and maintenance manuals. Refer to Division 01 for quantity of O&M manuals that may exceed the minimum three. The approved manuals shall then be turned over to the Owner, upon review of the Architect/Engineer. These O&M manuals shall consist of 3-ring binders with loose leaf information, permanent covers, clearly identified and indexed with table of contents, tabs for each section, containing the following at a minimum:
 - 1. Complete list of personnel and contact info for any related warranty work.
 - 2. Complete description of the automatic operation, manual operation, and safety features built into the system.
 - 3. Step-by-step procedures for start-up, operation, and shut-down for each system and piece of equipment.
 - 4. Complete list of diagnostic and troubleshooting procedures for systems and major equipment.
 - 5. Recommended preventative maintenance program for each piece of mechanical equipment, and each system, including items to be inspected and serviced, frequency of inspection and servicing, the type of servicing required, and types of lubricants to be used.
 - 6. As-built material list including make and model numbers.
 - 7. Catalog brochures for all components with specific parts used, marked clearly.

8. Supplier's and manufacturer's conformance of specifications and drawings certificates.
9. Copy of all test reports by manufacturer and contractor.
10. Performance data, curves, ratings.
11. Dimensional drawings.
12. Wiring and block diagrams, indicating factory wiring separate from field wiring.
13. Required settings.
14. Manufacturer's descriptive literature.
15. Manufacturer's maintenance and service manuals.
16. Multiple copies of Manufacturer's original installation and maintenance manual that comes with the equipment itself.
17. Spare parts bill of material.
18. Owner's sign off sheets for receipt of spare parts and training.
19. Name of service agency and installer complete with an emergency service phone number for nights, weekends and holidays.
20. Final approved shop drawings.
21. Warranties and guarantees.
22. Copies of all inspection reports and checkout forms by AHJs, inspectors, utilities, manufacturers, NFPA 72 Record of Compliance Form, etc.
23. Owner's training video tapes, if applicable.
24. Any other pertinent information that the Contractor or Manufacturer feels is important for the Owner to know about the security equipment or system.

1.17 PRE-BID MEETING

- A. All persons wishing to submit quotations for work in accordance with these plans and specifications are strongly urged to attend the pre-bid meeting for further insight into the project.

1.18 RECORD DOCUMENTS AND AS-BUILT DRAWINGS

- A. The Contractor shall maintain on site at all times a dedicated space for a current set of red-lined as-built specifications and drawings to record revisions to the original set of construction documents. These revisions shall include, but are not limited to: major interior conduit routings, all exterior underground raceways, manholes, and handholes, all Architect's Supplemental Instructions, all Bulletin drawings, all Addenda descriptions and drawings, all Change Orders, all Construction Change Directives, all Contractor field revisions such as circuiting changes, etc.

- B. The Engineer or Owner may at any time ask to review the as-built drawings and specifications during construction.
- C. These as-built plans and specifications shall be in addition to the sets used by the installing technicians in carrying out their day to day work on the project. The projected location of every outlet, raceway, or item of equipment to be installed under this contract shall be checked against the plans and specifications of all the other trades as well as by daily conference with workmen and supervisors of all other trades to the extent that any conflicts or uncertainties about locations are resolved before work is installed, particularly sprinkler head locations, etc. ceiling construction installation shall be made in accord with reflected ceiling plans and/or instructions by the Architect's representatives on the site. Moving of items from locations shown, rerouting, or changes to accomplish any work as shown on plans or specifications in order to accomplish this coordination shall not be a cause for claim for additional compensation for the work.
- D. As part of the closeout procedures, the Contractor shall take a clean set of drawings and produce one set of as-built specifications and drawings in red ink with a signed Record Drawing stamp.

1.19 REQUESTS FOR INFORMATION

- A. When a question, clarification, or discrepancy arises after the Bid has been awarded, the Contractor shall submit in writing to the Architect an RFI to document the issue. The RFI must indicate the drawings and/or specification sections being referenced and eluded to. Upon receipt, the Engineer will then respond back to the RFI in writing as soon as possible given the circumstances of the RFI. Contractor shall take proper measures to initiate RFI in a timely fashion in order for the Engineer to properly evaluate.

1.20 SHOP DRAWINGS

- A. Within 30 calendar days following Contract approval or Notice To Proceed and prior to submitting shop drawings, this Contractor shall submit to the Engineer a list of proposed manufacturers and (sub)Contractors for each specification section and each major piece of equipment for approval. Along with the above information, Contractor to submit the Pay Application Schedule Of Values and a Shop Drawing Submittal Schedule to the Engineer for their review coordination.

- B. All shop drawings shall be submitted to the Architect for review within 30 days of receiving a contract, so as not to delay the project.
- C. This Contractor shall review, stamp and sign with his/her approval and submit in an orderly sequence so as to cause no delay in the work or in the work of any other Contractor, all submittal information and samples required by the contract documents. Submittal information not stamped with Contractor approval will be returned for reprocessing.
- D. Contractor shall not begin fabrication or rough-in work or release of materials until return of submittals with Engineer's approval. This is especially important for rough-in items below slab (such as floorboxes) and inside poured walls (such as recessed light fixture rough-in boxes).
- E. In approving the submittals, the Contractor guarantees that the submittals accurately and completely represent the equipment and materials to be installed.
- F. Shop drawings shall be submitted for ALL material items as outlined in these specifications. Any deviations from contract requirements must be clearly indicated on shop drawings, and justification for their consideration must be included.
- G. Acceptance of submittal items will not preclude rejection of those items upon later discovery that their suitability for the application or ability to meet the requirements of these specifications was misrepresented in the submittals.
- H. Submittals for equipment shall include detailed dimensional drawings which completely and accurately represent the specific piece of equipment to be supplied and all required clearances. When more than one piece of similar equipment is to be supplied, provide accurate dimensional drawings for each unique size and/or configuration of the equipment.
- I. In checking shop drawings, the Engineer will make every effort to detect and correct errors, omissions and inaccuracies in such drawings, but his/her failure to detect errors, omissions and inaccuracies shall not relieve the Contractor of responsibility for the proper and complete installation in accordance with the intent of the Contract Documents.
- J. The shop drawings will be reviewed by the Engineer per specification section. The Contractor shall bind together multiple specification section shop drawings if they so desire, however a separate shop drawing review sheet shall be issued for each section. This will help identify the issues involved with each item, rather than

accepting or rejecting the entire submittal as a whole. However, a single specification section shop drawing shall not be broken out and submitted as partial shop drawings as the entire shop drawing for that specification section must be submitted together. If the Contractor submits multiple copies of partial shop drawings, they will not be reviewed by the Engineer and will be sent back as rejected.

- K. In the event of multiple shop drawing (re)submissions for the same equipment or specification section, the Engineer reserves the right to require additional fee for a third review of the same shop drawing if the Contractor continues to not adhere to the shop drawing requirements listed in the specifications and the Engineer's prior review comments.
- L. Contractor shall maintain at the site a complete set of all shop drawings, fixture and equipment cut sheets, manufacturer's wiring diagrams, and installation data. Installing personnel shall study this data before and during installation and rough-in so as to prepare for the proper fit and function upon completion.
- M. Coordinate the quantity of shop drawings to be submitted with Architect at the outset of the project, ensuring that the Engineer can retain at least one copy for his/her records.
- N. The shop drawings shall indicate factory wiring separate from field wiring.
- O. The shop drawings need to illustrate all required rough-in box sizes.
- P. The Engineer will perform due diligence in reviewing shop drawings as quickly as they are received. However, if the majority of the shop drawings are received at the same time, the Contractor shall provide the Engineer with a priority list for their use in reviewing the shop drawings in that order to best expedite the project.
- Q. Contractors options:
 - 1. For products specified only by reference standard, Contractor shall select any product meeting that standard.
 - 2. For products specified by naming several manufacturers or manufacturer's make and model numbers, select any one of the products or manufacturers named. Be aware that just because a manufacturer is listed does not guarantee that they comply with all of the specifications. The manufacturer still has to illustrate through shop drawings that they meet all the required criteria in the specifications prior to approval.

3. For products specified by naming one or more products or manufacturers and "or equal", Contractor must submit a request for substitutions for any product or manufacturer not specifically named during the Bidding process for formal pre-approval.

1.21 SPARE PARTS

- A. Refer to individual specification sections for quantity and description of required spare parts.
- B. Label each box of spare parts clearly identifying the contents and turn over to Owner. Prepare a bill of material for all spare parts and have Owner sign off receiving the inventory. Include the spare parts sign off sheet as part of the closeout documents.

1.22 SUBSTITUTIONS

- A. Bids concerning the use of substitute products must be accompanied by complete specifications and performance characteristics covering these products, together with such available test data and experience records as may be helpful to the Engineer in evaluating the quality and/or suitability of the proposed products, including:
 1. Comparison of the qualities of the proposed substitution with that specified.
 2. Changes required in other elements of the work because of the substitution.
 3. Effect on the construction schedule.
 4. Cost data comparing the proposed substitution with the product specified.
 5. Availability of maintenance service, and source of replacement materials.
- B. A request for a substitution constitutes a representation that the Contractor:
 1. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 2. Will provide the same warranties or bonds for the substitution as for the product specified.
 3. Will coordinate the installation of an accepted substitution into the work, and to make the work complete in all respects.
 4. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

5. Absorb all costs incurred by the substitution when affecting other trades, including but not limited to electrical, structural and architectural, etc.
 6. Absorb any cost incurred by the Architect/Engineer in review of the substituted product if the acceptance of the substituted item creates the need for system modification and/or redesign, or if the substituting contractor exhibits negligence in his substituting procedure thus submitting inferior, misapplied or missized equipment. In the event of additional engineering costs, the billing structure shall be agreed upon prior to review by all involved parties.
- C. Where more than one make or name is mentioned as being acceptable, it shall be understood that only the name or make referring to the manufacturer's model numbers or sizes shall be considered the "Specified Standard." It shall be further understood that other makes and names, even though mentioned, have not been checked for detail and that their size and arrangement are the Contractor's responsibility the same as a proposed substitute item.
- D. The intent of this section is to make the specifications open to all available makes of material and apparatus during the bidding period. Substitutions will only be allowed to be submitted for pre-approval to the Engineer up to ten days prior to bid opening. The substitutions will be reviewed at that time by the Engineer with reasonable promptness. Substitution materials and equipment will only be incorporated into the project if the Engineer pre-approves the intent of the shop drawing(s) and lists the manufacturer's make and model on an official written and distributed Addendum. No substitutions will be reviewed by the Engineer during construction.

1.23 TRAINING

- A. Refer to individual specification sections for quantity and description of required Owner's Training.
- B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain equipment.
- C. Contact and schedule with the Owner two weeks ahead of time for all training. Stress to the Owner to have any and all relevant personnel, teaching staff, and maintenance staff available for the training.
- D. Personnel conducting training shall be: trained and experienced in maintenance and operation of equipment, familiar with specification requirements, skilled as a

technical writer to the extent required to communicate essential data, and skilled as a draftsman competent to prepare required drawings.

- E. Distribute and review operations and maintenance manuals, shop drawings, record drawings, warranties, spare parts, keys, etc. at that time. Provide hands on demonstration of equipment operation, maintenance, troubleshooting, programming, alignment, focusing, and features. Review spare parts inventory and contact information for future maintenance. Prepare a written sign off sheet for all attendees to sign having witnessed the training. Include the training sign off sheet as part of the closeout documents. Video record all training and provide videotape to Owner as part of the closeout procedure.
- F. Conduct a minimum of 4 hours of training on each specification section.

1.24 WARRANTIES

- A. Refer to individual specification sections for quantity and description of required Warranties.
- B. Prepare and deliver to the Owner all formal written certificates of warranty clearly stating the scope of the warranty and time period.
- C. All warranties to commence at the time of Final Completion regardless of startup time or turnover to the Owner. Provide monies in the bid as required to accommodate the start of this warranty period.
- D. All equipment under this Division of work shall be warranted for a minimum of one year or manufacturer's minimum warranty whichever is greater, unless otherwise noted. During this warranty period, the Contractor shall replace any and all defective equipment and parts at no additional cost to the Owner.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 28 01 00

SECTION 28 05 00
COMMON WORK RESULTS FOR SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Access doors.
 - 2. Cleanup.
 - 3. Cutting and patching.
 - 4. Damages.
 - 5. Delivery, storage, and handling.
 - 6. Security equipment coordination and installation.
 - 7. Intent of drawings and specifications.
 - 8. Painting and caulking.
 - 9. Site visits.

1.3 SUBMITTALS

- A. Product Data: Access panels of each type, sleeves of each type, and fire stopping as indicated below:
 - 1. Shop drawings shall indicate proposed UL systems materials, anchorage, methods of installation, and actual adjacent construction.
 - 2. Provide a copy of each UL illustration of each proposed system indicating manufacturer approved modifications.
 - 3. Provide manufacturer's specifications, recommendations, installation instructions and maintenance instructions.

1.4 QUALITY ASSURANCE

- A. Test Equipment Suitability and Calibration: Comply with NETA ATS, "Suitability of Test Equipment" and "Test Instrument Calibration."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 ACCESS PANELS

- A. Manufacturers:
 - 1. Bar-Co, Inc.
 - 2. J.L. Industries.
 - 3. Karp Associates, Inc.
 - 4. Larsens Manufacturing Company.
 - 5. Mifab Manufacturing Company.
 - 6. Milcor Div., Inryco. Inc.
 - 7. Nystrom Building Products.
- B. Coordinate keying, color, and type with Architect to match all other trades.
- C. Unless specified differently by Architect, provide GFRC door and frame, continuous piano hinged access panels, common mortise keyed cylinder.
- D. Provide non-fire rated or fire-rated access doors according to the specific installation requirements.
- E. The size of the access panels shall be kept to a bare minimum for required accessibility. The minimum size is 12" x 12".

PART 3 - EXECUTION

3.1 ACCESS PANELS

- A. Security Contractor shall be responsible for providing all access panels required for his/her work.
- B. Coordinate location of access panels and doors for security items needing access for service and maintenance, such as junction boxes, pull boxes, duct smoke detectors, etc. that are behind finished surfaces or otherwise concealed.
- C. In general, access panels are not normally shown on the security drawings as the location of these access panels is a means and methods issue for the Contractor to determine.
- D. Notify and coordinate with Architect of each planned access panel prior to installation for their review via coordination drawings. Ordering, fabrication, and installation of all access panels shall not proceed until the coordination drawings have been reviewed by the Architect and Engineer.
- E. Coordinate with other Contractors to combine adjacent equipment access from a common access panel to reduce the amount of panels in a given space.

3.2 CLEANUP

- A. This Contractor shall be responsible for daily cleanup of all their security product debris. This includes but is not limited to: empty cardboard boxes, scrap wire and insulation, scrap conduit, etc.
- B. This Contractor shall be responsible for final cleanup and wipe down of security items in their scope. These items include but are not limited to: cameras, card readers, motion sensors, etc.

3.3 CUTTING AND PATCHING

- A. Perform cutting, fitting, and patching of security equipment and materials required to:
 - 1. Uncover work to provide for installation of ill-timed work.
 - 2. Remove and replace defective work.
 - 3. Remove and replace work not conforming to requirements of the Contract Documents.

4. Install equipment and materials in existing structures.
 5. Upon written instructions from the Architect or Engineer, uncover and restore work to provide for Architect or Engineer observation of concealed work.
- B. Cut, remove, and legally dispose of security equipment, components, and materials, including but not limited to security items to be removed and items made obsolete by the new work.
 - C. Protect the structure, furnishings, finishes, and adjacent materials not to be removed.
 - D. Where existing construction such as floors, walls, ceilings, etc., must be cut to relocate, remove or add raceways and/or equipment, such construction to be restored to original condition to satisfaction of Architect, by this Contractor using workmen skilled in respective trade.
 - E. General penetrations through walls, floors, slab, etc. will be patched with materials to match the surrounding surface (i.e. vinyl concrete patch for concrete surfaces, joint and patching compound for dry wall surfaces, etc.). If the penetrated surface is a fire or smoke barrier, refer to "Installation of Fire Stopping Materials" in this section.

3.4 DAMAGES

- A. The Contractor will be held responsible for any and all damages to portions of the building caused by it, its employees and subcontractors, including, but not limited to:
 1. Damage to any portion of the building caused by the movement of tools, materials, or equipment.
 2. Damage to any component of the construction of spaces "turned over" to the Contractor.
 3. Damage to the security distribution system and/or other space "turned over" to the Contractor.
 4. Damage to the security, mechanical and/or life safety, or other systems caused by inappropriate operation or connections made by the Contractor or other actions of the Contractor.
 5. Other damage to the materials, tools, and/or equipment of the Owner, its consultants, General Contractor, subcontractors, Architect, and other contractors, agents, and leases.

3.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect equipment during transit, storage, and handling to prevent damage, theft, soiling, and misalignment. Coordinate with the Owner for secure storage of equipment and materials or provide secured remote storage.
- B. Do not store equipment where conditions fall outside manufacturer's recommendations for environmental conditions. Secure all sensitive electronic equipment in temperature and humidity controlled areas.
- C. Wherever possible, store indoors. Where necessary to store outdoors, store sufficiently above grade and enclose with watertight wrapping.
- D. Handle equipment carefully to prevent physical damage to equipment and components. Remove packaging, including the opening of crates and containers, avoiding the use of excessive hammering and jarring which would damage the security equipment contained therein. Do not install damaged equipment; remove from site and replace damaged equipment with new equipment.
- E. Have conduit and all items in cardboard boxes shipped and stored on wooden pallets. Have boxes labeled from the factory to easily indicate materials inside and what security designation they are for. Utilize factory-fabricated type containers or wrappings for equipment and components which protect them from damage.
- F. Coordinate shipping of large equipment with the construction timing of the building to ensure building is "dried in" or equipment can be moved in or out of building easily. If equipment needs to be assembled and/or reassembled to get it out or into the building, then do so without voiding any manufacturer's warranty. Field verify all existing passageways, door ways, elevator sizes and capacities, window openings, etc. prior to bid to determine how to move equipment in and out. Modify openings as required to move equipment in and out.
- G. Coordinate receiving of large items with unloading equipment on site or obtain rental equipment as required. Coordinate location, size, and weight of all large equipment items located inside the building with the Structural Engineer.

3.6 SECURITY EQUIPMENT COORDINATION AND INSTALLATION

- A. When noted in the specifications or on the drawings that a certain manufacturer was the "basis of design," the engineer has designed the project around the manufacturer (while allowing equals manufacturers where noted). The contractor and equal named manufacturers are responsible for coordinating equipment/programming/dimensions/weights/ capacity, etc. differences for providing

equipment from an equal named manufacturer as opposed to the manufacturer used as the “basis of design.”

- B. When utilizing existing low voltage head-end equipment to serve new devices or equipment, Contractor/Manufacturer to verify existing equipment is capable of being reused and extended from prior to bid. Contractor/Manufacturer to provide any and all additional equipment, programming, power supplies, servers, monitors, racks, capacity, amplifiers, annunciation points, etc. to make new devices shown operate from the existing head-end equipment. No additional compensation will be made for equipment found out to be insufficient during construction.
- C. When two or more items of the same equipment are required (i.e. switchgear, wiring devices and plates, low voltage systems, cameras, card readers of the same type, etc.), they shall be of the same manufacturer.
- D. Comply with NECA 1.
- E. Coordinate arrangement, mounting, and support of security equipment so connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- F. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- G. Coordinate security testing of security, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.
- H. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- I. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements. Install additional conduit, cable tray, busway, pullboxes, spliceboxes, etc. where required to obtain maximum headroom or to avoid conflict with other work without additional cost to the Owner.
- J. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both security equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

- K. Right of Way: Give to raceways and piping systems installed at a required slope. Provide addition trenching, conduit, sleeves, fittings, etc. as required to accommodate adjacent systems.
- L. Before installing any work, this Contractor shall see that it does not interfere with clearance required for finish on beams, columns, pilasters, walls or other structural or architectural members, as shown on Architectural Drawings. If any work is so installed and it later develops that Architectural design cannot be followed, Contractor shall, at his own expense, make such changes in his work as the Architect may direct to permit completion of Architectural work in accordance with plans and specifications.
- M. Report any interferences between work under this division and that of any other Contractors to the Architect as soon as they are discovered. The Architect will determine which equipment shall be relocated, regardless of which was first installed, and his decision shall be final.
- N. Contractor shall coordinate with the Owner for the Owner to make required applications for security, telephone, cable television, etc. services in a timely fashion so as to not impede the flow of work.
- O. Verify all dimensions by field measurements.
- P. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for security installations.
- Q. Sequence, coordinate, and integrate installations of security materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- R. Coordinate connection of security 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.
- S. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
- T. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components.
- U. Secure all ceiling mounted devices tightly to ceiling (i.e. cameras, motion sensors, etc.)

- V. Install security 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.
- W. Raceways, cable trays, conductors, etc., installed above ceilings or on exposed ceilings shall be supported from the building structure and shall be installed symmetrical with the axis of the space (do not cross room at an angle).

3.7 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable security and mechanical systems in every respect.
- B. The drawings are diagrammatic only, intending to show general arrangement and location of system components. Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets and fittings may not be shown, but shall be provided at no change in contract price.
- C. All work shall be accurately laid out and coordinated with other trades to avoid conflicts and to provide maximum accessibility for operation and maintenance.

3.8 PAINTING AND CAULKING

- A. Coordinate and schedule painting of exposed raceways, boxes, and fittings with G.C. to avoid unnecessary trips by the G.C. and/or their subcontractor. All field painting shall be performed by the G.C. according to Division 09 "Finishes" unless otherwise noted herein or on the drawings.
- B. Suitable finish coatings shall be provided under this section of the Specifications on all items of security equipment and wiring which are exposed. This shall consist of either an approved factory applied finish or an acceptable finish applied during or after installation. Equipment which is furnished in finishes such as stainless steel or satin aluminum is not to be painted. Exposed equipment and/or wiring in finished areas such as panel covers or surface raceway shall be supplied with factory applied prime coat and shall be professionally painted or enameled as directed to result in a completely coated and attractively finished manner. All such finishing shall be as directed and shall be satisfactory to the Architect/Engineer.
- C. All factory-finished steel surfaces; boxes, enclosures, etc., shall be cleaned and retouched or repainted as necessary to provide a rust-resistant coating. Where painting

or galvanizing is not specifically specified, ferrous devices, bolts, nuts, inserts, etc., shall be galvanized.

- D. All nameplates and specially colored security equipment (such as fire alarm devices) shall be left unpainted and in a clean condition.
- E. Coordinate installation of wiring devices and covers with G.C. to avoid overspray onto devices and/or covers. Provide temporary protection over the wiring devices, if installed ahead of painting, as required to prevent such overspray.
- F. All caulking shall be performed by the G.C. unless otherwise noted herein or on the drawings. G.C. shall be responsible for caulking, and then painting, around all openings in walls that the G.C. cut larger than the device cover plate will cover up.
- G. Where new security metallic equipment (i.e. surface raceway, conduit, boxes, panelboard tubs, etc. and not non-metallic surface raceway) is exposed on walls or ceilings to be painted, S.C. shall coordinate the timeliness of this work with the G.C. to ensure all is painted.

3.9 ROUGH-IN

- A. In general, all rough-in is to be performed by the E.C.
- B. Details and notes specify “standard” mounting heights for these items. Contractor shall carefully study elevations of all walls and cabinet work as shown on architectural plans and locate outlets to given space and avoid all conflicts. Outlets shall always be located above, and not in, backsplashes. Coordinate location of outlets with other trades to avoid conflicts. Any conflict that cannot be resolved in the field shall be brought to the attention of the Architect prior to rough-in.
- C. In general, the security drawing symbols and locations are not shown to an exact scale for legibility reasons. Field verify with Architect prior to rough-in, exact location and mounting heights of all security items such as card readers, cameras, cctv monitors, cameras poles, etc., in all finished areas.
- D. Where coursing of masonry block precludes the specified mounting height of an outlet such that the rough-in box would be located in the center of a cell, Contractor shall have the ability to adjust mounting heights slightly to work out with the coursing so that the rough-in box sits on the bottom or top of a course.
- E. Refer to lintel schedule on Structural Drawings for requirements when penetrating wall with raceways.

3.10 SITE VISITS

- A. All persons proposing to submit quotations for work in accordance with these plans and specifications are expected to visit the site of the work covered by the plans and specifications and are to familiarize themselves with existing conditions as they affect the work of this section of the specifications. Claims resulting from a failure to visit the site or inspect the existing conditions will not be considered. Existing wall/floor thicknesses and types shall be verified for required penetrations. Existing head-end equipment for low voltage systems being reused shall be verified by the prospective (sub) Contractors to ensure that they include any and all necessary equipment and programming costs in their Bid. Where existing switchgear is being modified or added onto, Contactor shall verify existing equipment and requirements for modifications/additions.

3.11 TEMPORARY PROTECTION OF SECURITY EQUIPMENT

- A. This contractor shall temporarily protect all security equipment from construction dust, dirt, debris, overspray, mud, etc. This equipment includes but it not limited to: sensitive electronic devices such as cameras, motions sensors, etc. Contractor shall remove temporary covering for testing purposes and once the final building cleanup has been performed.

END OF SECTION 28 05 00

SECTION 28 13 00
PHYSICAL ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including:
 - 1. Related Specification Sections
 - a. Section 28 16 00 "Intrusion Detection System"
 - b. Section 28 23 10 "Video Management System"
 - c. Section 08 71 00 "Door Hardware"

1.2 SUMMARY

- A. Mecklenburg County has standardized on an LENEL/S2 security management system. Mecklenburg County owns and operates an LENEL/S2 Global system with multiple connected virtual and physical LENEL/S2 Enterprise SMS systems. The PACS system for this project will tie into the existing LENEL/S2 Global system.
- B. Use existing remote virtual server provided by the Owner. Integrator shall provide new portal licensing.
- C. Section includes LENEL/S2 Security Corporation Global Enterprise® Security Management System (SMS) shared with the Video Management System consisting of LENEL/S2 Extreme box appliance, computer hardware, current software versions that integrates with the current County system, and associated licensing and equipment for monitoring, recording, and managing Electronic Access Control System (EACS) and Integrated Systems (IS) data and functionality.
- D. The LENEL/S2 Security Corporation Global Enterprise® Security Management System (SMS) shall be programmed to fully integrate with the existing County LENEL/S2 system, including video event call up upon intrusion/duress/lock down alarms with full floor plans and symbology.
- E. The SMS includes the following sub-components:

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1. Operating Systems (OS) software and firmware
 2. Application Software
 3. Database Software
 4. Network connected Server
 5. Network connected field level controllers
- F. Owner to provide partitions to Integrator in blocks, where new card readers are being added.
- G. Provide system according to LENEL/S2 guidelines and criteria described within these specifications
- H. Upon completion of the software installation, the Integrator shall set up, program, test and demonstrate the functionality and performance of all software, including programming of badges. Owner to provide the associated Peak 10 database programming at the head end.
- I. The Integrator shall provide an Excel spreadsheet to the Mecklenburg County Security department, having columns for the following:
1. Device Name/Number
 2. Manufacturer's Name
 3. Model Number
 4. Serial Number
 5. IP Address (left blank for the County to fill out)
 6. MAC Address
 7. Firmware Version
 8. Building Name
 9. Building Suite Name (if applicable)
 10. Device Floor # Location
 11. Device Room Name Location

12. Device Room/Door # Location
 13. Telecom/Security Equipment Room # Location
 14. Device Equipment Cabinet Number
 15. Camera Cable # (long identification number bases on labeling section)
 16. Comments
- J. Integrator to prepare and submit a complete Excel spreadsheet with each device's IP addresses (given by the County) and MAC addresses, along with any County required device name abbreviations, building name abbreviations, area name abbreviations, etc.
- K. The Integrator shall then complete the spreadsheet based on the final installation and submit as part of the Closeout Documents.
- L. Mecklenburg County Security department, with assistance from the integrator, shall upload all card user data into the system, to include access level assignment. The integrator shall create all time zones, holiday schedules, reader groups, and access levels in the system per County guidance.
- M. Hardware
1. The Integrator shall be responsible for determining the appropriate hardware to ensure compatibility with the LENEL/S2 Global Enterprise SMS. Each door controller wiring shall consist of traditional multi-conductor low-voltage wiring in lieu of POE wiring. All electrified door hardware shall be 24VDC. All electrified door hardware shall be wired fail secure. See drawings for quantities and locations.
- N. Administrative Controls
1. In an Excel spreadsheet to the AFM Security Services Division, the Integrator shall setup administrative rights for staff in the AFM Security Services Division only, and for other user client access on a case-by-case basis as determined and approved by the AFM Security Services Division.
 2. Contractor to turn over all login and password information to County Security immediately after installation. This includes all NVRs, cameras, or other devices that have a default password in place. All devices capable of secure login/password should be installed and programmed to require such login.

O. Licenses

1. Provide all required S2 licenses for software, hardware, equipment, etc. for a fully functioning and operational system upon turnover to the Owner.

P. Commissioning

1. Integrator shall be required to test and commission the head end and all system edge devices, in the presence of County Security, to ensure all doors, alarm points, etc. are functioning properly and fully integrated after system is brought online with the LENEL/S2 Global Enterprise SMS. A written report with signature shall be required to be submitted to owner verifying testing and validation of the above has been completed. Contractor to confirm that County Security and see all cameras and card readers from their end.

1.3 DEFINITIONS

1. API: Application Programming Interface
2. AVI: Audio Video Interleave
3. CA: Certificate Authority
4. CAC: Common Access Card
5. CE: European Union Conformity
6. CPU: Central Processing Unit
7. CSV: Comma Separated Values
8. DNS: Domain Name Server
9. DSM: Door Status Monitor
10. DVR: Digital Video Recorder
11. EACS: Electronic Access Control System
12. EPS: Events Per Second
13. FCC: Federal Communications Commission
14. FIPS: Federal Information Processing Standard

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- 15. FIFO: First In – First Out
 - 16. FTP: File Transfer Protocol
 - 17. FRAC: First Responder Authentication Credential
 - 18. GB: Gigabyte
 - 19. GSOC: Global Security Operations Center
 - 20. HA: High Availability
 - 21. HTML: Hypertext Markup Language
 - 22. H.264: Video Compression Standard
 - 23. H.265: Video Compression Standard
 - 24. I²C: Inter-Integrated Circuit
 - 25. IEEE: Institute of Electrical and Electronics Engineers
 - 26. Integrator: Security Contractor
 - 27. I/O: Input/Output
 - 28. IP: Internet protocol
 - 29. IS: Integrated System
 - 30. JPEG: Joint Photographic Experts Group
 - 31. LAN: Local area network
 - 32. LDAP: Lightweight Directory Access Protocol
 - 33. MB: Megabyte
 - 34. MJPEG: Motion JPEG
 - 35. MSATA: Mini-Serial Advanced Technology Attachment
 - 36. MSO: Mobile Security Officer
 - 37. MTBF: Mean-Time Between Failure

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38.	NAS:	Network Attached Storage
39.	NBAPI:	NetBox Application Programming Interface
40.	NECA:	National Electric Code Association
41.	NFPA:	National Fire Protection Association
42.	NVR:	Network Video Recorder
43.	ODBC:	Open Database Connectivity
44.	OS:	Operating System
45.	OVID:	Open Video Integration Driver
46.	PDF:	Portable Document Format
47.	PIN:	Personal Identification Number
48.	PIV:	Personal Identity Verification
49.	PoE:	Power over Ethernet
50.	PTZ:	Pan-tilt-zoom
51.	RAID:	Redundant Array of Inexpensive Disks
52.	RAM:	Random Access Memory
53.	REX:	Request to Exit
54.	RFID:	Radio Frequency Identification
55.	RoHS:	Restriction of Hazardous Substances
56.	ROM:	Read Only Memory
57.	RU:	Rack Unit
58.	S.C.:	Security Contractor
59.	SFTP:	Secure File Transfer Protocol
60.	SHA:	Secure Hash Algorithm

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- 61. SIO: Serial Input/Output
 - 62. SLA: Sealed Lead-Acid
 - 63. SMS: Security Management System or Short Message Service (text messaging)
 - 64. SSL: Secure Sockets Layer
 - 65. SUSP: Software Upgrade and Support Plan
 - 66. TCP: Transmission control protocol - connects hosts on the Internet
 - 67. TIA: Telecommunications Industry Association
 - 68. TWIC: Transportation Worker Identification Credential
 - 69. UI: User Interface
 - 70. UPS: Uninterruptible power supply
 - 71. UTP: Unshielded Twisted Pair
 - 72. VMS: Video Management System
 - 73. WAN: Wide area network
 - 74. Wi-Fi: Wireless Network

1.4 PERFORMANCE REQUIREMENTS

- A. The LENEL/S2 SMS shall be certified by to meet the following standards:
 - 1. UL294 Listed
 - 2. ISO 9000 Listed
 - 3. CE
 - 4. FCC Part 15
 - 5. RoHS

1.5 ACTION SUBMITTALS

- A. Product Data: Provide details and technical specifications for each product indicated. Include physical dimensions, features, performance, electrical characteristics, ratings, software versions, and operating system details.
- B. Shop Drawings: Include system line diagrams, equipment locations, installation details, and system integration plans.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types, quantities, and sizes.
 - 3. Plans and Elevations: Dimensioned plans and elevations of equipment racks, enclosures, and conduit interconnections, including access and workspace requirements.
 - 4. Data Calculations: Provide data bandwidth and storage calculations, including data backup and archive configuration details meeting the minimum project requirements as described herein.
 - 5. Power and Heat Load Calculations: Provide power and heat load calculations for all equipment and door hardware, including UPS capacity calculations.
 - 6. Wiring Diagrams: For power and signal wiring.
- C. Equipment and Software List: Include every piece of equipment and software by product/model name and/or number, manufacturer, serial number, revision number, location, and date of original installation. If factory and/or bench testing regimens are required by the project plan, add pretesting record of each piece of equipment and software, listing name of person testing, date of test, and adjustments made.

1.6 INFORMATIONAL SUBMITTALS

- A. UL and ISO9000 Listing Certificates: For SMS components, from manufacturer.
- B. Field quality-control reports.
- C. Warranty: Sample of product warranty for each system component.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For all SMS components and software to include in emergency, operation, and maintenance manuals. Include the following:
 - 1. Lists of spare parts and replacement components recommended to be stored at the site for ready access.
 - 2. Operating system, database and application software, including installation, and system configuration backup and recovery data on CD or DVD media.
 - 3. Equipment and Software List: Include every piece of equipment and software by product/model name and/or number, manufacturer, serial number, revision number, location, and date of original installation.
- B. As Built Drawings
 - 1. The Integrator shall provide as-built drawings of the installed system (using owner provided floor plan drawings), to include:
 - a. Overall network with locations (buildings and facilities and rooms).
 - b. All equipment (new and existing including make, model and serial numbers, date installed, MAC addresses and assigned IP addresses).
 - c. Wiring and cabling terminations (labeling required).
 - d. Front-end, badging stations.
 - e. Labeling, consistent with the established County standard, is required for all newly installed equipment (panels, NVRs, etc.)
 - f. As-built drawings must include direct reference to hardware and termination labeling.

1.8 QUALITY ASSURANCE

- A. All work, equipment, materials, construction, and installation provided under the Contract shall comply with the current applicable rules, regulations, standards, and ordinances of the local Authorities Having Jurisdiction (AHJ).
- B. Electrical Components, Devices, Accessories, and Installation shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1. Comply with NECA 1.
 2. Comply with NFPA 70.
 3. Comply with NFPA 101.
- C. Software integration between the SMS, VMS, and all other integrated system components shall be tested and certified for interoperability by the manufacturers of each system.
- D. Contractor shall be an LENEL/S2 certified installer and provide current certifications of company and at least two (2) installers during the shop drawing phase.
- E. Two or more employees of the Contractor shall be cleared to access and program the LENEL/S2 remote servers.
- F. The Contractor shall have had Lenel/S2 certification for a minimum of (3) years and have completed a minimum of (3) successful projects of similar size and scope within Mecklenburg County within the past (3) years.

1.9 PROJECT CONDITIONS

- A. **Work must be performed while the building is being occupied.**

1.10 WARRANTY

- A. All SMS systems and components shall be provided with an explicit manufacturer warranty of one year for software and two years for hardware.

PART 2 - PRODUCTS

2.1 OPERATIONAL REQUIREMENTS

- A. The Owner's LENEL/S2 Global Enterprise SMS shall be implemented through network appliance architecture with a three-tiered modular hardware hierarchy and embedded three-tier software architecture.
1. The network appliance shall be capable of running on an existing TCP/IP network and shall be accessible, configurable, and manageable from any network-connected PC with a browser.

2. Browser access for configuration and administration of the system shall be possible from a PC on the same subnet, through routers and gateways from other subnets, and from the Internet. Control and management of the system shall therefore be geographically independent.
 3. Security of the data communicated over the network to and from the browser, Network Controller, and nodes shall be protected by encryption (SSL 128-bit) or authentication (SHA-1).
 4. The top hardware tier shall be the LENEL/S2 Enterprise Server. Embedded on the Network Controller shall be an operating system, a web server, an existing virtual server, LENEL/S2 Enterprise security application software on the existing virtual server, and the database of personnel and system activity. Converged Video Access systems shall also include fully functional network video recorder.
- B. The LENEL/S2 SMS shall integrate, within a browser interface, access control, alarm monitoring, and video monitoring applications. These applications shall be embedded in a three-tier software architecture.

2.2 FUNCTIONAL REQUIREMENTS

- A. The system shall support LENEL/S2's Global SMS product offering.
- B. System Partitioning: The system administrator shall have the ability to divide the LENEL/S2 SMS into partitions, allowing subsets of the overall population and/or resources to be managed separately.
- C. DMP Intrusion Panels - DMP Intrusion Panels – An LENEL/S2 compliant DMP panel shall be installed and shall be integrated into the LENEL/S2 SMS, to include integration between DMP and the LENEL/S2 Video Management System as well. The IDS system itself is specified in Section 28 16 00 Intrusion Detection System.
1. Security administrators shall use events from a DMP panel, including: zone reporting into an alarm state to trigger events in the LENEL/S2 SMS.
 2. Monitors can use the Intrusion Panel widget to view configuration and status information for a DMP panel. They shall also be able to arm and disarm areas, bypass and reset zones, and activate and deactivate outputs associated with the panel.
 3. The DMP panels shall communicate their status to the system using port 6000 (PC Logging)

4. The system shall assign precedence to arm/disarm commands sent from the LENEL/S2 UI to the DMP panels.
5. DMP system messages shall identify the panel that generated the message.
6. Communication errors between the DMP panels and the LENEL/S2 SMS shall be re-tried after one minute.
7. Perimeter card readers shall be programmed to disarm the IDS panel prior to entering the building.
 - a. Contractor shall provide a dedicated output (Normally Open) which will serve as a disarm input to the Intrusion Detection System (IDS). Output will be momentarily triggered (closed) by a valid card read and entry, which will disarm the IDS system through area programming for 1 hour. Contractor shall program this event/output for all card reader doors.
 - b. Contractor shall provide and install door monitoring switches and request to exit devices on all card reader doors, unless noted on plans or in specifications as provided by others.
 - c. Contractor shall program events for “door held” and “door forced” on card reader doors, which shall trigger dedicated outputs for each corresponding card reader door, which will be wired to the IDS panel as dedicated alarm zone inputs. In this manner, door held and door forced alarms in ACS will report as IDS door alarms. Valid card read and entry, and request to exit signals, will not trigger an output to IDS.

2.3 VIDEO MANAGEMENT SYSTEM INTEGRATION

- A. General: The LENEL/S2 SMS shall support the integration of certain Network Video Recorders (NVR). This integration shall allow the viewing of live streaming video in the browser interface and recorded video playback. Viewing live streaming video shall require the Java™ 2 Runtime Environment version 1.4.2 or version 5.0.
 1. Events in the alarm subsystem can initiate video recording. Video motion detection, camera up and camera down messages from the VMS can initiate alarms.
 2. It shall be possible to monitor DVR and NVR cameras in the same views as IP cameras. VMS events shall be logged in the system activity log. It shall be possible to view recorded video of events from the Activity Log.

3. It shall be possible to view live cameras through floor plans, on the camera view pages, on the Monitoring and Widget Desktops.
4. It shall be possible to pull up recorded video through reports.
5. The LENEL/S2 SMS shall be programmed to fully integrate with the existing County LENEL/S2 system, including video event call up upon intrusion/duress/lock down alarms with full floor plans and symbology.

B. NVR Appliances:

1. NVR appliances must integrate with LENEL/S2 Security systems access control, event monitoring, and video management into a single user interface for: live viewing, forensic searching and video exporting.
2. Shall use browser-based functionality; compatible with Internet Explorer and Google Chrome
3. Natively supports the quantity of cameras indicated, dependent on design.
4. Shall meet the following requirements:
 - a. Real-time surveillance video integrated on the home page, the Monitoring Desktop, and the Widget Desktop
 - b. Viewer-adjustable single camera and multi-camera views (2x2 or 1+7), presets, and camera tours
 - c. Calling up cameras through events and through floor plans
 - d. Where PTZ cameras are specified, adjust cameras with PTZ controls, enabled through UI controls, using mouse or joy stick
 - e. Adjust video quality and frame rate in video viewer
 - f. Browse video from anywhere that has permitted access to the network and has the accelerator installed
 - g. Displays a blue border when there is motion in the frame
 - h. Provides the ability to organize surveillance tools using favorite cameras, camera categories, and change sort order.
5. Shall meet the following requirements:

- a. Supports video recording and playback
- b. Provides tools to search through recorded video from multiple cameras and NVR appliances to quickly locate one or more video clips pertaining to a security event
- c. Provides graphical frame displays of individual camera streams
- d. Allows use of a Forensic Activity Log to get to a particular event
- e. Allows the use of date/time or camera thumbnails to search for video
- f. Provides an adjustable thumbnail stride length to select the interval of the clips searched
- g. Displays yellow vertical bars between thumbnails to indicate there is a gap greater than the stride length
- h. Displays a yellow outline of the viewer window to indicate recorded video is displayed
- i. Can play back video by clicking icons in the forensic activity log, use date/time, access control reader, alarm, person's name
- j. Play video in segments or frame-by-frame
- k. Can build cases by saving multiple clips into a case file, which is then cataloged in the case library
- l. Clip view displays all the clips in a case
- m. Can print individual frames, including metadata and implied data
- n. Create, save, and export clips of interest
- o. Can export clips in proprietary format with a digital signature, or as AVI file with included video player provided
- p. Allows video searches using the metadata within the Forensic Activity Log, such as searching for events related to a person or a portal.
- q. Supports Codecs, H.264, H.265 and MJPEG.

C. UPS specification (only need one when both IDS and PACS systems are present):

1. Labeled and designated for only security equipment
 2. True on-line double conversion type
 3. Rack mounted
 4. Minimum backup time of 60 minutes, provide additional battery modules as required
 5. Diagnostic port connected to the network
 6. Plug into rack mounted PDU with a minimum of 6 receptacles
 7. 120V in, 120V out, VA sized per project requirements, coordinate dedicated circuit and receptacle with electrical engineer
- D. PDU specifications (only need one when both IDS and PACS systems are present:
1. Labeled and designated for only security equipment
 2. Rack mounted
 3. Sized to power and connect to the following equipment:
 4. Spectrum box
 5. NVR server
 6. Analytics server, where applicable
 7. CCTV Cameras via a separate County IT POE switch dedicated to cameras, as required
 8. Access controls electronics cabinet

2.4 HARDWARE INTEGRATION

- A. The LENEL/S2 SMS shall support the integration of Mercury door control hardware within a Life Safety Power panel.
- B. The following hardware components shall work with the LENEL/S2 Controller:
1. Panels:
 - a. Mercury open architecture, Series 3, “red” controllers.

- b. Intelligent Controller: 32 MB RAM, Ethernet
 - c. Intelligent Dual Reader Controller: 16 MB RAM, Ethernet, 2 readers) 8 inputs, 4 relays
 - d. Current firmware version supported on the above panels.
 - e. Controller must have LENEL/S2 OEM codes with a LENEL/S2 license such that software updates have be accomplished through the S2 software and not through a 3rd party.
2. Interface Boards:
- a. Reader Interface Module: 1 reader (magnetic stripe or Wiegand), 2 inputs, 2 relays
 - b. Reader Interface Module: 2 readers (magnetic stripe or Wiegand), 8 inputs, 6 relays
 - c. Input Monitor Module: 16 inputs (zones), 2 relays
 - d. Relay Output Control Module: 16 relays

2.5 CARD READERS

- A. Provide HID Global Signo 40, 13.56MHz, contactless type smart card readers, red light when door is locked, green light when door is unlocked, with or without keypad as noted on the drawings. Brand labeled card readers by other manufacturers, other than HID, are not acceptable.
- B. Valid card presentation shall shunt the associated access controlled door alarm and unlock electric lock.
- C. Where there is an associated IDS system, exterior card readers shall be programmed to disarm the interior IDS system upon entry into the building. A card reader is to be installed and programmed to arm the system from the front of the IDS control panel.

2.6 THIRD PARTY SSL CERTIFICATE SUPPORT

- A. Integrator shall configure this with the County's self-signed SSL certificate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine cable pathways including conduit, raceways, cable trays, and other pathway elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. Examine rough-in for control cable and conduit systems to controllers, card readers, and other EACS components to verify conduit and back-box locations prior to installation of EACS devices
- C. Examine available network capacity and support infrastructure. Consult with network administrator for compliance with network standards and capacity.
- D. Examine install location for compliance with space allocations, installation tolerance, hazards to safe system operation, and other conditions affecting installation.
- E. Examine roughing-in for LAN, WAN, and IP network before device installation.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with SIA CP-01 Control Panel Standard.
- B. Comply with ANSI/TIA-606-B Labeling Standard.
- C. Prepare detailed project planning forms for programming and configuration of the SMS. Fill in all data available from project plans and specifications and publish as project planning documents for review and approval. These may include (but are not limited to):
 - 1. Define SMS Partitions.
 - 2. For each Location, record setup of controller features and access requirements.
 - 3. Propose start and stop times for time zones and holidays, and match up access levels for doors.
 - 4. Set up groups, facility codes, software triggers, and list inputs and outputs for each controller.

5. Assign action message names and compose messages.
 6. Set up alarms. Establish trigger actions between events and video surveillance features.
 7. Develop user-defined fields.
 8. Develop screen layout formats.
 9. Contractor to coordinate the following with the Owner:
 - a. Different badge access levels
 - b. Different schedules
 - c. Room names (per door controlled)
 - d. Personnel.
 10. Owner to provide excel spreadsheet to the Contractor with all the above data once all the information is received.
 11. Complete system diagnostics and operation verification.
 12. Prepare a specific plan for system testing, startup, and demonstration.
 13. Develop acceptance test concept and, on approval, develop specifics of the test.
 14. Develop cable and asset-management system details; input data from construction documents. Include system schematics and technical drawings in electronic format.
- D. In meetings with Engineer and Owner, present Project planning documents and review, adjust, and prepare final programming and configuration documents. Use final documents to program and configure SMS software.
- E. The Integrator shall provide all system setup and programming as required and as agreed to by Mecklenburg County. The Integrator shall build out partitions corresponding to the various buildings, facilities and client users (as approved by Mecklenburg County Security); create holiday schedules, create access levels, upload card users, etc. label and alarm points / zones, doors, cameras, duress buttons, panels, etc. corresponding with equipment labels and proper naming protocol, software mapping and video monitor camera displays; video camera event linking to any door/alarm points, card holder records, verify and input all zone descriptions for

access control, intrusion detection, etc. Programming shall be completed at central server.

- F. Include a .pdf floor/site plan map upload to the LENEL/S2 system with all security equipment marked for map call-up on any intrusion/access control alarms.
- G. Label all devices and ensure VAR/integrator properly inserts the label/description within the software when programming. Admin default password should be changed by VAR/integrator once installed and integrator should pass credentials/password information to County Security.

3.3 CABLING

- A. Comply with NECA 1, "Good Workmanship in Electrical Construction".
- B. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters. Conceal raceway and wiring except in unfinished spaces.
- C. Install LAN cables using techniques, practices, and methods that are consistent with Category 6 rating of components and fiber-optic rating of components, and that ensure Category 6 and fiber-optic performance of completed and linked signal paths, end to end.
- D. Junction boxes and enclosures containing security-system components or cabling, and which are easily accessible to employees or to the public, shall be provided with tamper resistant fasteners and/or tamper detection switches. In addition, hinged enclosure doors shall be equipped with locking hardware. Boxes above ceiling level in occupied areas of the building shall not be considered accessible. Junction boxes and small device enclosures below ceiling level and easily accessible to employees or the public shall be covered with a suitable cover plate and secured with tamperproof screws.
- E. Install end-of-line resistors at the field device location and not at the controller or panel location.
- F. Provide cabling per manufacturer's recommendations.

3.4 CABLE APPLICATION

- A. Comply with TIA 569-C, "Commercial Building Standard for Telecommunications Pathways and Spaces."

B. Card Readers and Keypads and Peripheral Devices:

1. Install number of conductor pairs recommended by device manufacturer for the functions specified.
2. Follow device manufacturer's installation requirements for maximum cable distances and sizes.

3.5 IDENTIFICATION

- A. In addition to requirements in this article, comply with applicable requirements in ANSI/TIA 606-B.
- B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
 2. On the outside of each edge device, PACS Labeling Scheme shall be as follows and specific abbreviations shall be coordinated with Mecklenburg County Security:
 - a. DEV#-TR#-R#-PP#-P#
 - 1) DEV# = Device Name/Number (i.e. CR01, DC01)
 - 2) TR# = Telecom/Security Equipment Room Number
 - 3) R# - Rack Number (i.e. R1)
 - 4) PP# - Patch Panel Letter (i.e. A)
 - 5) P# - Port Number (i.e. 1)
 - b. Program and Label each device in the software per County Security direction, prior to a generic assignment.
- C. At completion, cable and asset management documentation shall reflect as-built conditions.

3.6 SYSTEM SOFTWARE AND HARDWARE

- A. Develop, install, and test software and hardware, and perform database tests for the complete and proper operation of systems involved. Assign software license to Owner.

- B. County Security is then responsible for programming all personnel badges based on the completed spreadsheet.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections:
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Commissioning: Onsite visit by the Manufacturer's Certified in-house personnel to inspect, test, and assess system programming, functionality, and performance.
- C. Tests and Inspections:
 - 1. LAN Cable Procedures: Inspect for physical damage and test each conductor signal path for continuity and shorts. Test for faulty connectors, splices, and terminations. Test according to TIA/EIA 568-C, "Commercial Building Telecommunications Cabling Standards - Part 1: General Requirements." Link performance for UTP cables must comply with minimum criteria in TIA/EIA 568-C.
 - 2. Test each circuit and component of each system. Tests shall include, but are not limited to, measurements of power-supply output under maximum load, signal loop resistance, and leakage to ground where applicable. System components with battery backup shall be operated on battery power for a period of not less than 10 percent of the calculated battery operating time. Provide special equipment and software if testing requires special or dedicated equipment.
 - 3. Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed. Test each access controlled door to ensure valid card presentation shunts door alarm and unlocks electronic lock. Test each exit device in each access controlled door. Test each door contact for forced entry and door propped open. Test integration with the IDS system alarms and Surveillance cameras.
- D. Devices and circuits will be considered defective if they do not pass tests and inspections.
- E. Testing and Validation

1. Integrator shall be required to test and document all system edge devices to ensure all card readers, door contacts, electric locks/strikes, alarms, integrations with the IDS system, etc. are functioning properly after system is brought online with the LENEL/S2 SMS system. A written report with signature shall be required to be submitted to owner verifying testing and validation of the above has been completed.

3.8 STARTUP SERVICE

- A. Provide onsite visit by factory authorized representative personnel to train Owner's operations personnel.
- B. Complete installation and startup checks according to approved procedures that were developed in "Preparation" Article and with manufacturer's written instructions.
- C. Enroll and prepare badges and access cards for Owner's operators, management, and security personnel.

3.9 COMMISSIONING

- A. The contractor shall certify completion in writing and schedule the owner/engineer commissioning walk-through. The contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

3.10 ADJUSTING

- A. Occupancy Adjustments: When requested within 30 days of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project for this purpose. Tasks shall include, but are not limited to, the following:
 1. Check cable connections.
 2. Check proper operation of card readers, intrusion sensors, integrated systems, and database configuration. Verify SMS configuration and adjust settings needed.
 3. Recommend changes to SMS configuration and settings to improve Owner's use of SMS.
 4. Provide a written report of adjustments and recommendations.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the SMS equipment.
- B. Develop and provide separate training modules for the following:
 - 1. Computer system administration personnel to manage and repair the LAN and databases and to update and maintain software.
 - 2. Operators who prepare and input credentials, monitor the SMS, and to enroll personnel.
 - 3. Security personnel.
 - 4. Hardware maintenance personnel.
 - 5. Corporate management.
 - 6. Web browser based software access and navigation.

END OF SECTION 28 13 00

SECTION 28 16 00
INTRUSION DETECTION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Intrusion detection with multiplexed, modular, microprocessor-based controls, panels, circuit boards, cabinets, intrusion sensors and detection devices, and communication links to perform monitoring, alarm, and control functions. The installation shall result in a completed coordinated, logical and satisfactorily operating system. All items of equipment, hardware, raceway, wiring, etc. necessary to accomplish this shall be furnished whether every such item is specifically mentioned or not.
 2. The Control Panel shall have detection points as required to monitor doors, windows, inventory and showrooms, as well as security devices. Each user can have a personalized passcode to turn the system on or off, or to silence alarms. Users can also have a wireless key fob to turn on the system from a parking area or to turn off the system when carrying items. The control panel provides control and communication functions to easily: view system status, silence alarms, turn the system on and off.
 3. This system is primarily a perimeter based glassbreak and door contact intrusion detection system, along with motion sensors in specific rooms.
 4. Where there is also an access control system(ACS), Contractor to fully integrate with the Lenel/S2 access control system with dedicated inputs, outputs, and programming:
 - a. Contractor to set up IDS auto arm on a schedule, and also set up a disarm time (not automatic) on a schedule provided by the county, with a "Late Arm Delay" of 1 hour.
 - b. Contractor shall dedicate a normally open IDS input and program as a "disarm zone"(key-switch function), which will disarm the area when it's state momentarily changes to closed. A dedicated ACS output will be programmed to momentarily activate the disarm zone for a valid card read and entry. In this manner, a valid card

holder receiving an access granted and opening a card reader door will disarm the intrusion detection system for 1 hour.

- c. Contractor will not directly wire access control door position switches to alarm zones, but will provide dedicated IDS inputs to correspond to dedicated ACS outputs in the access control system. The access control system will trigger the intrusion detection system for card reader doors via programming, where a "door held" or "door forced" is an alarm condition to the intrusion detection system. Entering a card reader door with a valid read, or exiting a card reader door with a valid request to exit signal will not trigger the intrusion detection system.
- 5. Where there is not an access control system, Contractor to set up for manual arm via the keypad built into the IDS control panel.
- B. Provide system according to LENEL/S2 SMS guidelines and criteria described within these specifications. The Integrator shall be responsible for determining the appropriate hardware to ensure compatibility with the LENEL/S2 SMS Security System.
- C. The Integrator's proposal shall include all hardware necessary to replace existing hardware that is not compatible with the LENEL/S2 Enterprise Security System
- D. The intrusion detection system shall be capable of full integration with the LENEL/S2 physical access control system specified in Section 28 13 00 "Physical Access Control System."
- E. The intrusion detection system shall be capable of full integration with the LENEL/S2 video management system specified in Section 28 23 10 "Video Management System."

1.2 DEFINITIONS

- A. LCD: Liquid-crystal display.
- B. LED: Light-emitting diode.
- C. PIR: Passive infrared.
- D. RFI: Radio-frequency interference.
- E. UPS: Uninterruptible power supply.

- F. Protected or Protection Zone: A space or area for which an intrusion must be detected and uniquely identified, the sensor or group of sensors assigned to perform the detection, and any interface equipment between sensors and communication link to central-station control unit.
- G. Standard Intruder: A person who weighs **250 lb** or less and whose height is **72 inches** or less; dressed in a long-sleeved shirt, slacks, and shoes.
- H. Standard-Intruder Movement: Any movement, such as walking, running, crawling, rolling, or jumping, of a "standard intruder" in a protected zone.

1.3 SUBMITTALS

- A. Product Data: Components for sensing, detecting, and control, including dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
 - 1. Batteries: Sizing calculations.
 - 2. Site and Floor Plans to Scale: Indicate final outlet and device locations, routing of raceways and cables inside and outside the building.
 - 3. Device Address List and Naming: Coordinate with Owner during final system programming.
 - 4. System Wiring Diagrams: Include system diagrams unique to Project. Show wiring types, sizes, conductors, jacketing, and connections for all devices, components, and auxiliary equipment. Include diagrams for equipment and for system with all terminals, interconnections, and electrical requirements identified.
 - 5. Details of surge-protection devices and their installation.
 - 6. Sensor detection patterns and adjustment ranges.
 - 7. Manufacturers Installation Instructions: Indicate application conditions and limitations of use stipulated by a Product Testing Agency. Include instructions for storage, handling, protection, examination, preparation, installation and starting of product.
- B. Equipment and System Operation Description: Include method of operation and supervision of each component and each type of circuit. Show sequence of operations for manually and automatically initiated system or equipment inputs. Description must cover this specific Project; manufacturer's standard descriptions for generic systems are not acceptable.
- C. Qualification Data: For installer and manufacturer.

- D. Operation and Maintenance Data: For intrusion detection system to include in emergency, operation, and maintenance manuals. Include the following:
 - 1. Include data for each type of product, including features and operating sequences, both automatic and manual.
 - 2. Central-station control-unit hardware and software data.
 - 3. Indicate satisfactory completion of Owner's Training and testing required tests and inspections.
- E. Warranties: Special warranties specified in this Section.
- F. Other Information Submittals:
 - 1. Test Plan and Schedule: Test plan defining all tests required to ensure that the system meets technical, operational, and performance specifications within 60 days of date of Contract award.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A certified technician accredited by the National Burglar & Fire Alarm Association via a state license who is an authorized service representative of central-station control-unit manufacturer. Installer must be certified by the manufacturer.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain a service center capable of providing training, parts, and emergency maintenance repairs for overall system at Project site with eight hours maximum response time.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NFPA 70.

1.5 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
 - 1. Altitude: Sea level to 4000 feet.

2. Central-Station Control Unit: Rated for continuous operation in an ambient of 60 to 85 deg F (16 to 29 deg C) and a relative humidity of 20 to 80 percent, noncondensing.
3. Interior, Controlled Environment: System components, except central-station control unit, installed in air-conditioned interior environments shall be rated for continuous operation in ambients of 36 to 122 deg F (2 to 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing.
4. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambients of minus 30 to plus 122 deg F (minus 34 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, condensing. Comply with UL 294 and UL 639 for outdoor-use equipment. Rate for continuous operation when exposed to rain as specified in NEMA 250.

B. Work must be performed while the building is occupied.

1.6 WARRANTY

- A. Warranty: After Final Completion, the Contractor shall maintain the perfect operating condition of all equipment by providing a full year of maintenance at no additional expense to the Owner. This warranty coverage shall include parts, labor and travel to and from the job site.

1.7 QUALITY ASSURANCE

- A. The Contractor shall have had Lenel/S2 certification for a minimum of (3) years and have completed a minimum of (3) successful projects of similar size and scope within Mecklenburg County within the past (3) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS OF CONTROL PANELS

- A. Control Panels: DMP #XR150 or #XR550, as needed to support the quantity of devices/zones required.
- B. Under Desk Panic Buttons: United Security Products HUB2SA with momentary SPDT contacts, label as PANIC BUTTON.

- C. Wall Mounted Panic Buttons: Securitron PB4L-2 with momentary DPDT contacts and LED light, label as PANIC BUTTON.
- D. Glass Breaks: Bosch DS1101i.
- E. Lockdown Button: United Security Products HUB2SA, label as PANIC BUTTON.

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

- A. Must be LENEL/S2 compliant.
- B. Control/Communicator Units: Control panel based system to supervise system components continuously for normal, alarm, and trouble conditions. Indicate deviations from normal conditions at any location in system. Indication includes identification of device or circuit in which deviation has occurred and whether deviation is an alarm or malfunction.
- C. Central-Station Control Units: PC based system to supervise system components continuously for normal, alarm, and trouble conditions. Indicate deviations from normal conditions at any location in system. Indication includes identification of device or circuit in which deviation has occurred and whether deviation is an alarm or malfunction.
- D. System Control: Control/Communicator unit shall directly monitor intrusion detection devices and connecting wiring.
- E. Operator Commands:
 - 1. Help with System Operation: Display all commands available to operator. Help command, followed by a specific command, shall produce a short explanation of the purpose, use, and system reaction to that command.
 - 2. Acknowledge Alarm: To indicate that alarm message has been observed by operator.
 - 3. Place Protected Zone in Access: Disable all intrusion-alarm circuits of a specific protected zone. Tamper circuits may not be disabled by operator.
 - 4. Place Protected Zone in Secure: Activate all intrusion-alarm circuits of a protected zone.
 - 5. Protected Zone Test: Initiate operational test of a specific protected zone.
 - 6. System Test: Initiate system-wide operational test.
 - 7. Print Reports.

- F. Timed Control of Control/Communicator: Allow automatically timed "secure" and "access" functions of selected protected zones.
- G. Maximum Permissible Signal Time Elapse: Two seconds between actuation of any alarm and its indication at central-station control unit.
- H. Circuit Supervision: Supervise all signal and data transmission lines, links with other systems, and sensors from central-station control unit. Indicate circuit and detection device faults with both protected zone and trouble signals, sound a distinctive audible tone, and illuminate an LED. Maximum permissible elapsed time between occurrence of a trouble condition and indication at central-station control unit is 20 seconds. Initiate an alarm in response to opening, closing, shorting, or grounding of a signal or data transmission line.
- I. Programmed Secure-Access Control: System shall be programmable to automatically change status of various combinations of protected zones between secure and access conditions at scheduled times. Status changes may be preset for repetitive, daily, and weekly; specially scheduled operations may be preset up to a year in advance. Manual secure-access control stations shall override programmed settings.
- J. Manual Secure-Access Control: Coded entries at manual stations shall change status of associated protected zone between secure and access conditions.
- K. Telephone Cord or Termination Block: For patching to local telephone outlet/connection.
- L. Panel to have internal 12VDC power supply.

2.3 SYSTEM COMPONENT REQUIREMENTS

- A. **Provide zone expansion module daisy-chained per device to interface with the LENEL/S2 SMS system.**
- B. Field devices shall all be wired and compatible with control panel.
- C. Provide Life Safety Power or equal wall mounted 24VDC power supplies with internal Mercury boards. Provide required 8 or 16 door reader boards as required for the project.
- D. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal,

- control, or sensing leads. Include surge protection for external wiring of each conductor entry connection to components.
- E. Interference Protection: Components shall be unaffected by radiated RFI and electrical induction of 15 V/m over a frequency range of 10 to 10,000 MHz and conducted interference signals up to 0.25-V RMS injected into power supply lines at 10 to 10,000 MHz.
 - F. Tamper Protection: Tamper switches on detection devices, control units, annunciators, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled and when entering conductors are cut or disconnected. Central-station control-unit alarm display shall identify tamper alarms and indicate locations.
 - G. Self-Testing Devices: Automatically test themselves periodically, but not less than once per hour, to verify normal device functioning and alarm initiation capability. Devices transmit test failure to central-station control unit.
 - H. Addressable Devices: Transmitter and receivers shall communicate unique device identification and status reports to central-station control unit.
 - I. Provide two (2) network interface cards, one to be monitored by the network and the other to be monitored by LENEL/S2.
 - J. Include in the bid \$1,100 to hire the Owner's existing 3rd party integrator to furnish and install a DMP cellular card integral the DMP intrusion panel, so that the existing County wide virtual keypad app can access this card. Include one year of monitoring service as well.
 - K. UPS specification (only need one when both IDS and PACS systems are present):
 - 1. Labeled and designated for only security equipment
 - 2. True on-line double conversion type
 - 3. Rack mounted
 - 4. Minimum backup time of 60 minutes, provide additional battery modules as required
 - 5. Diagnostic port connected to the network
 - 6. Plug into rack mounted PDU with a minimum of 6 receptacles
 - 7. 120V in, 120V out, VA sized per project requirements, coordinate dedicated circuit and receptacle with electrical engineer
 - L. PDU specifications (only need one when both IDS and PACS systems are present):
 - 1. Labeled and designated for only security equipment

2. Rack mounted
3. Sized to power and connect to the following equipment:
4. Spectrum box
5. NVR server
6. Analytics server, where applicable
7. CCTV Cameras via a separate County IT POE switch dedicated to cameras, as required
8. Access controls electronics cabinet

2.4 ENCLOSURES

- A. Interior Sensors: Enclosures that protect against dust, falling dirt, and dripping noncorrosive liquids.
- B. Interior Electronics: NEMA 250, Type 12.
- C. Exterior Electronics: NEMA 250, Type 4X fiberglass.
- D. Corrosion Resistant: NEMA 250, Type 4X stainless steel.

2.5 ELECTRICAL POWER

- A. Normal System Power Supply: 120 V, 60 Hz, through an isolation transformer in central-station control unit. Control/Communicator unit shall supply power to all components connected to it, unless otherwise indicated.
- B. Power Continuity for Control/Communicator Units: Batteries in power supplies of central-station control units and individual system components shall maintain continuous system operation during outages of both normal and backup ac system supply.
 1. Batteries: Rechargeable, valve-regulated, recombinant, sealed, lead-acid type with nominal 10-year life expectancy. Capacity adequate to operate portion of system served, including audible trouble signal devices for up to 4 hours and audible and visual alarm devices under alarm conditions for an additional 10 minutes.
 2. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Charger shall recharge fully discharged battery within 24 hours. Provide heavy duty 3-wire cord and 3-wire plug.
 3. Cabinet: Provide separate cabinet if required to allow space for the batteries.

- C. Annunciation: Indicate a change in system condition and switching of system or component to backup power.

2.6 KEYPADS

- A. Wired Keypad and Display Module: Arranged for entering and executing commands for system-status changes and for displaying system-status and command-related data.

2.7 DURESS-ALARM SWITCHES

- A. Description: A wired switch with a shroud over the activating lever that allows an individual to covertly send a duress signal to control unit, with no visible or audible indication when activated. Switch shall lock in activated position until reset with a key.
 - 1. Minimum Switch Rating: 50,000 operations.
 - 2. Push Button: Finger activated, suitable for mounting on horizontal or vertical surface.

2.8 DOOR CONTACTS

- A. Roll Up Door or Gate Description: Wired, Surface mounted, wide gap, armored.
- B. Conventional Door Description: Wired, Flush door frame mounted, 1" diameter.
- C. Must be resistant to all internal and external magnetic defeat/tampering and to high voltage defeat/permanent contact welding.

2.9 GLASS BREAK DETECTORS

- A. Description: Wired, Surface wall or ceiling mounted.
- B. Range: 25 foot radius coverage, minimum.

2.10 PROGRAMMING

- A. Upon completion of the software installation, the Integrator shall set up, program, test and demonstrate the functionality and performance of all IDS software and associated integration with LENEL/S2.

- B. The Integrator shall provide an Excel spreadsheet to the Mecklenburg County Security department, having columns for the following:
1. Device Name/Number
 2. Manufacturer's Name
 3. Model Number
 4. Serial Number
 5. IP Address (left blank for the County to fill out)
 6. MAC Address
 7. Firmware Version
 8. Building Name
 9. Building Suite Name (if applicable)
 10. Device Floor # Location
 11. Device Room Name Location
 12. Device Room/Door # Location
 13. Telecom/Security Equipment Room # Location
 14. Device Equipment Cabinet Number
 15. Camera Cable # (long identification number bases on labeling section)
 16. Comments
- C. Mecklenburg County Security department will receive list from vendor and send to IT for IP address assignment. Once complete and returned to IT, they will send back to the Integrator, along with any comments on the proposed building name abbreviation, etc. with program labeling instructions.
- D. The Integrator shall then complete the spreadsheet based on the final installation and turn into the County as part of the Closeout Documents.

2.11 CABLING

- A. Provide per manufacturer's recommendations.

2.12 LICENSES

- A. Provide all required licenses for software, hardware, equipment, etc. for a fully functioning and operational system upon turnover to the Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of intrusion detection.
 - 1. Examine roughing-in for embedded and built-in anchors to verify actual locations of intrusion detection connections before intrusion detection installation.
 - 2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of intrusion detection.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Coordinate mounting of door and/or gate locks/contacts with G.C.

3.2 INSTALLATION

- A. Comply with UL 681.
- B. Wiring Method: Install wiring in raceways and j-hooks the entire distance. Conceal wiring in raceways in unfinished spaces and as indicated. **Provide plenum rated cables listed for use in air handling environments where cables are not installed in conduit.** Minimum conduit size shall be 3/4 inch (19 mm). Control and data transmission wiring shall not share conduit with other building wiring systems.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Use lacing bars and distribution spools. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- D. Wires and Cables:
 - 1. Conductors: Size as recommended in writing by system manufacturer, unless otherwise indicated.
 - 2. 120-V Power Wiring: By E.C. unless otherwise indicated.
 - 3. Control and Signal Transmission Conductors: Install unshielded, twisted-pair cable of quantity and size indicated by the manufacturer.

4. Jacketing: Provide separate individual insulation jacket colors for burglar alarm data loop cables, low voltage power cables, and various other cable types. Color coding will be maintained consistently throughout the installation and no exceptions will be allowed.
 5. No wire splices shall be allowed unless at terminal connections. If absolutely required, Contractor shall solder cables with full insulation, provide strain relief, and indicate on the as-built drawings.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. All wires shall have a wire marker number placed at each termination point.
- F. Connections: Comply with torque-tightening values specified in UL 486A.
- G. Install power supplies and other auxiliary components for detection devices at control units, unless otherwise indicated or required by manufacturer. Do not install such items near devices they serve.
- H. Identify components with engraved, laminated-plastic or metal nameplate for central-station control unit and each terminal cabinet, mounted with corrosion-resistant screws.
- I. Equipment: All new equipment shall be UL listed for the intended use.
- J. All work shall conform to all applicable Federal, State and local codes and the manufacturers installation instructions whether specifically mentioned or not. Special emphasis should be given those codes that specifically relate to the installation of low voltage systems such as wire support, penetration of fire walls, fire stopping, etc.
- K. The keypads are to be flush mounted and installed 54" above finished floor level at the locations indicated on the plan.
- L. All wall-mounted sensors are to be located as high as possible. An exception might be where light fixtures, ducts, pipes or other items would block the view of the sensor. Any exception to these heights must be approved by the Owner. All wall-mounted sensors are to be installed on a single gang box using the gimbals mount. In gyms or multi-purpose rooms, the contractor will provide and install a wire cage to protect the wall-mounted sensors.
- M. All sensors are to be powered by central power supply(s) with a minimum of 7AH battery backup. The specified power supply is to be located at the

control/communicator and will use a heavy duty, 3-wire line cord with a 3-prong plug used to plug into an AC receptacle. The power supply(s) will be adjusted for no more than 14 volts DC output voltage. If additional power supplies are needed to insure that all sensors have at least 12 volts, the contractor will provide such additional power supplies and their locations shall be coordinated with the Owner.

- N. All sensors are to be wired normally closed and shall be wired for tamper proofing according to the manufacturers specifications. EOL resistors shall be installed at the sensors.
- O. This Contractor shall require the fire alarm installer to provide a normally closed relay output from the fire alarm system via a control relay to the intrusion detection alarm control to report after-hours activations of the fire alarm system and to provide a signal upon a general alarm condition to open secured doors to temporarily disable system.
- P. The control/communicator and other head-end equipment will be surface mounted on $\frac{3}{4}$ " type A/C plywood with finish grade on the front side.
- Q. The contractor shall require the telephone installer and data installer to provide a RJ31X jack for the telephone line and a RJ45 jack for a data line. These jacks will place in the immediate vicinity of the control panel. The telephone line will be for voice only and placed on the principal's private line. It will not share a line with any other type of equipment such as FAX or answering machines.
- R. Grid ceiling mounted devices such as motion detectors and break glass sensors shall be centered in the ceiling tile.

3.3 IDENTIFICATION

- A. In addition to requirements in this article, comply with applicable requirements in ANSI/TIA 606-B.
- B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - 1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.

2. On the outside of each edge device, PACS Labeling Scheme shall be as follows and specific abbreviations shall be coordinated with Mecklenburg County Security:
 - a. DEV#-TR#-C#
 - 1) DEV# = Device Name/Number (i.e. CR01, DC01)
 - 2) TR# = Telecom/Security Equipment Room Number
 - 3) C# - Controller Number (i.e. IDS1)
- C. Program and Label each device in the software per County Security direction, prior to a generic assignment.
- D. At completion, cable and asset management documentation shall reflect as-built conditions.

3.4 FIELD QUALITY CONTROL

- A. Pretesting: After installation, align, adjust, and balance system and perform complete pretesting to determine compliance of system with requirements in the Contract Documents. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.
 1. Report of Pretesting: After pretesting is complete, provide a letter certifying that installation is complete and fully operable; include names and titles of witnesses to preliminary tests.
 2. Final Test Notice: Notify Architect at least 10 days in advance of final acceptance testing.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- C. Integrator shall be required to test all system edge devices to ensure all doors, alarm points, etc. are functioning properly after system is brought online with the LENEL/S2 SMS system. A written report with signature shall be required to be submitted to owner verifying testing and validation of the above has been completed.

- C. Perform the following field tests and inspections and prepare reports:
1. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
 2. Operational Tests: Schedule tests after pretesting has been successfully completed. Test all modes of system operation and intrusion detection at each detection device. Test for detection of intrusion and for false alarms in each protected zone. Test for false alarms by simulating activities outside indicated detection patterns.
 3. Contractor shall provide a break glass sensor tester during testing that emits sound range to accurately trip each sensor device.
 4. Motion sensors shall be tested and the internal reflectors shall be adjusted in field as determined by Engineer/Owner to suit necessary conditions.
 5. Each door contact shall be tested.
 6. All alarms and annunciator labeling shall be verified.
 7. Electrical Tests: Comply with NFPA 72, Section A-7. Minimum required tests are as follows:
 - a. Verify the absence of unwanted voltages between circuit conductors and ground.
 - b. Test all conductors for short circuits using an insulation-testing device.
 - c. With each circuit pair, short circuit at the far end of circuit and measure circuit resistance with an ohmmeter. Record circuit resistance of each circuit on Record Drawings.
 - d. Verify that each control unit is in normal condition as detailed in manufacturer's operation and maintenance manual.
 - e. Test signal and data transmission circuits for proper signal transmission under open-circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
 - f. Verify that transient surge-protection devices are installed according to manufacturer's written instructions.
 - g. Test each initiating and indicating device for alarm operation and proper response at control unit.
 - h. Test both primary and secondary power. Verify, by test, that UPS is capable of operating the system for period and in manner specified.

- D. Report of Tests and Inspections: Prepare a written record of tests, inspections, and detailed test results in the form of a test log and include in the O&M manuals.
- E. Tag all equipment, stations, and other components for which tests have been satisfactorily completed.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain intrusion detection for a total of four (4) hours

3.6 COMMISSIONING

- A. The contractor shall certify completion in writing and schedule the owner/engineer commissioning walk-through. The contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

3.7 ON-SITE ASSISTANCE

- A. Occupancy Adjustments: Within one year of date of Substantial Completion, provide up to two Project-site visits, when requested by Owner, to adjust and calibrate components and to assist Owner's personnel in making program changes and in adjusting equipment and controls to suit actual conditions. Visits for this purpose shall be in addition to any required by warranty.

END OF SECTION 28 16 00

SECTION 28 23 00
VIDEO SURVEILLANCE CAMERAS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the furnishing, installing, licensing, programming and integrating functionally complete, multiplexed and integrated LENEL/S2 compliant video surveillance cameras per the LENEL/S2 Video Management Solution and camera Manufacturer's guidelines and criteria described within these specifications.
- B. Integrators shall be responsible for providing all licensing for all the cameras, including all portal licensing. Upon completion of the software installation, the Integrator shall set up, program, test and demonstrate the functionality and performance of all cameras. Owner to provide the associated Peak 10 database programming at the head end.
- C. Contractor to verify the latest firmware and software available from LENEL/S2 and implement into this project.

C. DEFINITIONS

- 1. CCTV: Closed-circuit television.
- 2. NTSC: National television system committee.
- 3. RF: Radio frequency.

1.2 SUBMITTALS

- A. Product Data: Include detailed manufacturer's specifications for each component specified. Include data on features, ratings, and performance.
 - 1. Manufacturer specific cabling.
 - 2. Rough-in and power requirements.
 - 3. Cameras and accessories.
 - 4. Poles, batteries, solar panels, chargers, radios, modems and accessories.
- B. Shop Drawings: For camera equipment. Include plans, elevations, sections, details, and attachments to other Work.

1. Design Calculations: Calculate requirements and perform structural analysis for installed products including selection of seismic restraints, signed and sealed by the qualified professional engineer responsible for their preparation.
 2. Include dimensioned plan and elevation views of components and enclosures, and details of control panels. Show access and workspace requirements.
 3. Show anticipate field of views on the plans for Owner/Engineer approval.
 4. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
- C. Product Certificates: Signed by manufacturers of camera equipment and components certifying that products furnished comply with requirements.
- D. Installer Certificates: Signed by Manufacturer certifying that each individual Installers has been trained along with dates of certification.
- E. Field Test Reports: Indicate and interpret test results for compliance with performance requirements of installed systems.
- F. Maintenance Data: For camera equipment and components to include in operations and maintenance manuals, including the following:
1. Detailed operating instructions covering operation under both normal and abnormal conditions.
 2. Routine maintenance requirements for system components.
 3. Lists of spare parts and replacement components recommended to be stored at the site for ready access.
- G. Warranties: Special warranties specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is an authorized LENEL/S2 installer and camera manufacturer installer for both installation and maintenance of units required for this Project and to supervise installation of the system.
1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.
- B. Product Options: Drawings indicate characteristics, sizes, profiles, and dimensional requirements of security equipment and are based on the specific system indicated.

- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NFPA 70.
- E. Comply with 47 CFR 15, 17, and 76.
- F. Comply with FCC.

1.4 PROJECT CONDITIONS

- A. **Work must be performed while the building is being occupied**

1.5 COORDINATION

- A. Coordinate layout and installation of equipment and suspension system components with other construction that penetrates ceilings or is supported by them.
- B. Coordinate installation of roof curbs, equipment supports, roof penetrations, camera poles, and rough-in.

1.6 WARRANTY

- A. Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
 - 1. Special Warranty for CCTV System and Components: Written warranty, signed by manufacturer and Installer agreeing to correct system deficiencies and replace components that fail in materials or workmanship within specified warranty period when installed and used according to manufacturer's written instructions. This warranty shall be in addition to, and not limiting, other rights Owner may have under other provisions of the Contract Documents.
 - 2. Special Warranty Period: Two (2) years from date of Substantial Completion.
 - 3. See Pole Section for Additional Specific Warranty.
- B. CLOSEOUT DOCUMENTATION
 - 1. As-built documentation for the video (detailing location of cameras, panels, etc., and all detailed wiring connecting to NVR, panels, etc.).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, that must be compatible with the LENEL/S2 access control system:
 - 1. VMS:
 - a. LENEL/S2, See Section 28 23 10 Video Management System.
 - 2. CCTV Cameras (must be fully compatible with LENEL/S2 and built by the manufacturer and not OEM'd by others and must be TAA compliant):
 - a. Avigilon
 - b. Axis
 - c. Hanwha (Basis of Design)

2.2 CCTV EQUIPMENT

- A. Description under this Section: Video cameras, pole, mounting brackets, antennae, radios, camera outlets and cabling.
- B. Description under Section 28 23 10 Video Management System: Camera controls, monitors, video switches, signal-processing equipment, NVR servers, RAID storage, control stations, distribution components, and accessories to generate video images, process them, and distribute them.

2.3 CCTV COMPONENTS

- A. Cameras: Silicon-target, color, charge-coupled-device imaging progressive scan RGB CMOS type with 1/3-inch (8.5-mm) minimum image format; capable of producing usable black/white video images with only 0.005 fc (0.05 lx), usable color video images with only 0.025 fc (0.25 lx), and of automatically setting the color by a digital adjustment control.
 - 1. Exposure Control including Automatic Gain Control.
 - 2. Lens Attachment: C or CS mount.
 - 3. Exposure Zones.
 - 4. RNC Tuning of behavior at different light levels.

5. Forensic Capture: up to 120dB depending on scene, Local Contrast, Text and Image Overlay, Mirroring of Images, Privacy Masks.
 6. Rotation: 0, 90, 180, 270, including corridor format.
 7. Minimum 2 streams of video.
 8. Nominal Impedance: Composite video signal termination is 100 ohms.
 9. Scanning Synchronization: External adjusted continuously to allow vertical synchronization in multiphase power installations, or internal crystal-lock reference.
 10. Electrical Connections: PoE or PoE+, unless otherwise noted.
 11. White Balance: Fixed or automatic through the lens sensing.
 12. Backlight Compensation: Switchable on or off.
 13. Auto Shutter: Switchable on or off; 5 selections from 1/60 to 1/90,000.
 14. Resolution: 2MP minimum, unless otherwise noted.
 15. Wide Dynamic Range.
 16. Cameras shall be H.265 ready.
 17. Standard Indoor Lens: ~3-9mm, unless otherwise noted.
 18. Standard Indoor Horizontal Viewing Angle: 92-34 degrees.
 19. Standard Indoor Vertical Viewing Angle: 50-20 degrees.
 20. Remote Focus and Zoom, P-Iris control, IR corrected.
 21. Automatic IR cut filter, unless otherwise specified to have built in IR.
 22. Vandal resistant where specified.
 23. Support brackets such as wall mount, ceiling mount, gooseneck, corner mount, etc. based on installation type as required.
 24. Internal microSD card storage
 25. Cameras shall be designed and selected to ensure the following horizontal Pixels Per Foot (PPF) are achieved at the far end of the Field Of View (FOV):
 - a. Interior = 10 PPF
 - b. Exterior = 30 PPF
- B. Lenses: Vari-focal, high-quality coated optics, matched to camera and designed specifically for camera application. Units have neutral-density spot filters and automatic iris controls that prevent image-bleaching effects, regardless of the light conditions within the scene.
- C. Camera-Supporting Equipment: Rated for load in excess of the total weight supported times a minimum safety factor of two.
1. Outdoor Units: Rated for a wind load of 100 mph (160 km/h).
- D. Protective Housings for Fixed and Movable Cameras: Steel, dustproof enclosures with internal camera mounting and connection provisions that are matched to camera/lens combination and mounting and installation arrangement of camera to be housed.

1. Camera Viewing Window: Polycarbonate lens aligned with camera lens.
2. Alignment Provisions: Camera mounting allows for easy camera aiming and permits removal and reinstallation of camera-lens unit without disturbing camera alignment.

2.4 SIGNAL TRANSMISSION COMPONENTS

- A. Cable for IP cameras less than 90 meters (295 feet) from source: CAT6 UTP.
- B. Cable for IP cameras greater than 90 meters (295 feet) from source: 50um OM3 multi-mode fiber, with power injectors on each end.
- C. Cable for IP PTZ or infrared cameras requiring more than PoE+ (30 watts of power): Multi-conductor cable for power separate than signal cable, fed from separate contractor provided CCTV power supply.
- D. Connectors: Match camera cable connectors.
- E. Wall Plates: Match materials and finish of power outlets in the same space.
- F. Multi-Conductor Cabling: For low voltage power and/or custom wiring per manufacturer's requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cable. Check raceways, cables trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. Examine walls, floors, roofs, equipment bases, and roof supports for suitable conditions where television equipment is to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Provide underground survey prior to any subsurface work.

3.2 INSTALLATION

- A. Outdoor Installation: Comply with ANSI C2, "National Electrical Safety Code."

- B. For exterior cameras mounted on roofs, walls, poles, etc., install in-line surge suppressors, where devices are not protected against voltage transients by integral surge suppressors specified in UL 1449. Install surge suppressors at the edge device. For cameras on roofs or building walls, install outlet just inside building and flex a jumper out to the camera. For cameras on poles, install suppressor in an appropriately sized mounting box at the camera.
- C. Wiring Method: Install cables in raceways in inaccessible walls or ceilings areas; or install cables in j-hooks or cable trays in accessible ceiling areas.
- D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- E. Pulling Cable: Do not exceed manufacturer's recommended pulling tensions. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
- F. Splices, Taps, and Terminations: For power and control wiring only, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B. No splices are allowed for Cat6 or fiber cabling.
- G. Grounding: Provide independent signal circuit grounding recommended by manufacturer. Ground each CCTV pole to a local ground rod.
- H. Outdoor Cable: Outdoor connections shall be installed in enclosures complying with NEMA 250, Type 3R or 4X. Connectors shall be corrosion resistant with properly designed to keep out moisture.
- I. Install CCTV poles a minimum of 4 feet into the ground.

3.3 CCTV SYSTEM INSTALLATION

- A. Install cameras at final locations defined by the drawings or as required to meet the existing field conditions. Change type of mounting to achieve required clearance.
- B. Set focus and pan-and-tilt-and-zoom to suit final camera position and to obtain the field of view as required by the Owner for each camera.

- C. Owner to review the initial camera views and naming either remotely via the LENEL/S2 system if they are on line or via emailed views from the Integrator. Owner to provide feedback to the Integrator for their final adjustments.
- D. Install power supplies and other auxiliary components at control stations. Do not install such items near the devices they serve, unless otherwise indicated.
- E. Grid ceiling mounted cameras shall be centered in the ceiling tile.
- F. Poles shall be installed per Manufacturer's recommendations.
- G. Configure radios per Manufacturer's recommendations to ensure unobstructed communications from radio to radio and from radio back to building head end antenna.
- H. Install and support roof and wall mounted antennae and camera, including any necessary roof or wall penetrations and waterproofing, so as not to void any warranties.

3.4 IDENTIFICATION

- A. In addition to requirements in this article, comply with applicable requirements in ANSI/TIA 606-B.
- B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - 1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
 - 2. On the outside of each edge device, PACS Labeling Scheme shall be as follows and specific abbreviations shall be coordinated with Mecklenburg County Security:
 - a. DEV#-LOC#
 - 1) DEV# = Device Name/Number (i.e. CAM01)
 - 2) LOC# = Device Location (i.e. LOBBY101)
 - b. Program and Label each device in the software per County Security direction, prior to a generic assignment.

- C. At completion, cable and asset management documentation shall reflect as-built conditions.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation and supervise pretesting, testing, and adjusting of camera equipment.
- B. Inspection: Verify that units and controls are properly installed, connected, and labeled and that interconnecting wires and terminals are identified.
- C. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Replace malfunctioning or damaged items. Retest until satisfactory performance and conditions are achieved. Prepare CCTV equipment for acceptance and operational testing as follows:
 - 1. CCTV Sources: Connect the cameras back to patch panels, and then patch into Owner supplied PoE/PoE+ switches.
- D. Test Schedule: Schedule tests after pretesting has successfully been completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
- E. Testing and Validation
 - 1. Integrator shall be required to test and document all system edge devices to ensure all cameras, antennae, etc. are functioning properly and labeled accordingly after system is brought online with the LENEL/S2 VMS system. A written report with signature shall be required to be submitted to owner verifying testing and validation of the above has been completed.
- F. CCTV Monitor Acceptance Tests: Include the following:
 - 1. Instrumentation: Use a field-strength meter rated for minus 40-dB mV measuring sensitivity and a frequency range of 54 to 812 MHz, minimum. Provide documentation of recent calibration against recognized standards.
 - 2. Signal Level: Use a field-strength meter to measure signal levels at CCTV monitor outlets. Readings on each of the channels designated to be received must be within specified limits. Adjust gain on amplifier and settings on taps/outlets to achieve proper signal strength.
 - 3. Signal-to-Noise-Ratio Test: Use a field-strength meter to make a sequence of measurements at the output of the last distribution amplifier or of another

agreed-upon location in system. With system operating at normal levels, tune meter to the picture carrier frequency of each of the designated channels in turn and record the level. With signal removed and input to corresponding head-end amplifier terminated at 75 ohms, measure the level of noise at the same tuning settings. With meter correction factor added to last readings, differences from first set must not be less than 45 dB.

4. Picture-Quality Test: Connect the monitor to each system outlet and observe picture quality on designated channels. No evidence of cross-channel intermodulation, ghost images, or beat interference should appear.
 5. Coordinate which cameras appear on the software video arrays at each monitor per the Owner's requirements.
- G. CCTV Camera Location Test: Install and support each camera at the indicated location and connect to monitor. Adjust camera location, mounting, field of view and vari-focal lens to provide required performance at monitor.
- H. Record test results.
- I. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

3.6 CLEANING

- A. Clean installed items using methods and materials recommended by manufacturer.
- B. Clean CCTV system components, including camera-housing windows, lenses, and monitor screens.

3.7 RECORD DOCUMENTS

- A. The Contractor shall provide one (1) set of reproducible record plans for the intrusion detection alarm system as part of the Closeout Procedures. **The plans shall be on both a CD and a hard paper print.** These drawings shall show the exact locations and designations of all security equipment, power supplies, cameras, surge suppressors, radios, antennae, etc. The drawings shall show the number, size and routing of all wires, conduits and sleeves. These drawings shall show only the security system components; no other systems shall be shown on these drawings.

3.8 COMMISSIONING

- A. The Contractor shall certify completion in writing and schedule the Owner/Engineer commissioning walk-through. The contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

3.9 ON-SITE ASSISTANCE

- A. Occupancy Adjustments: When requested by Owner within **one year** of date of Substantial Completion, provide on-site assistance in tuning and adjusting the system to suit actual occupied conditions and to optimize performance.

END OF SECTION 28 23 00

SECTION 28 23 10
VIDEO MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes a Video Management System (VMS) consisting of furnishing and installing a server with LENEL/S2 software, along with associated programming, integrating, and equipment for monitoring, recording, and managing surveillance camera system images and data.
- B. It is noted that the VMS appliance is the local recording device and is to be provided at each building project.
- C. The VMS shall be used to view live and recorded video from IP cameras connected to a common local and/or wide area network (LAN/WAN).
- D. Provide system according to LENEL/S2 NetVR Video Management Solution guidelines and criteria described within these specifications.
- E. The Integrator shall be responsible for determining the appropriate hardware to ensure compatibility with the LENEL/S2 NetVR Video Management Solution. The Integrator's proposal shall include all hardware necessary to replace existing hardware that is not compatible with the LENEL/S2 Enterprise Security System
- F. E. The NetVR VMS shall be integrated with a PACS system as specified in the following specifications sections:
 - 1. Section 28 13 00 Physical Access Control System
- G. F. The NetVR VMS shall be integrated with an IDS system as specified in the following specifications sections:
 - 1. Section 28 16 00 Intrusion Detection System

1.2 RELATED DOCUMENTS

- A. Security Drawings and general provisions of the Contract, including:
 - 1. Related Specification Sections:

- a. SPECIFIER NOTE: Delete or maintain below as necessary.
- b. Section 28 23 00 Video Surveillance System for camera integration.
- c. Section 28 16 00 Intrusion Detection System for IDS integration.

1.3 DEFINITIONS

- A. API: Application Programming Interface
- B. AVI: Audio Video Interleave
- C. CCTV: Closed Circuit TeleVision
- D. CE: European Union Conformity
- E. CD: Compact Disk
- F. CPU: Central Processing Unit
- G. DVD: Digital Video Disk
- H. DVR: Digital Video Recorder
- I. FCC: Federal Communications Commission
- J. FoV: Field-of-View
- K. GB: Gigabyte
- L. Gb: Gigabit
- M. HMAC: Hash Message Authentication Code
- N. H.264: Video Compression Standard
- O. IP: Internet protocol
- P. iSCSI: Internet Small Computer System Interface
- Q. JPEG: Joint Photographic Experts Group
- R. LAN: Local area network
- S. LCD: Liquid Crystal Display

T.	MAC:	Media Access Control
U.	MB:	Megabyte
V.	Mb:	Megabit
W.	MJPEG:	Motion JPEG
X.	NECA:	National Electric Code Association
Y.	NFPA:	National Fire Protection Association
Z.	NIC:	Network Interface Card
AA.	NTSC:	National Television System Committee
BB.	NVR:	Network Video Recorder aka Server
CC.	OS:	Operating System
DD.	OVID:	Open Video Integration Driver
EE.	OWNER:	Mecklenburg County Security Department
FF.	POS:	Point-of-Sale
GG.	PS:	Program Stream
HH.	PTZ:	Pan-tilt-zoom
II.	RAM:	Random Access Memory
JJ.	RF:	Radio Frequency
KK.	SC:	Security Contractor
LL.	SMS:	Security Management System
MM.	SUSP:	Software Upgrade and Support Plan
NN.	TB:	Terabyte
OO.	TCP:	Transmission control protocol - connects hosts on the
PP.	NET:	Internet
QQ.	UI:	User Interface

RR.	UPS:	Uninterruptible power supply
SS.	USB:	Universal Serial Bus
TT.	VMS:	Video Management System
UU.	WAN:	Wide area network

1.4 PERFORMANCE REQUIREMENTS

- A. The VMS shall be certified by to meet the following standards:
1. ISO 9000
 2. System shall be RoHS (Restriction of Hazardous Substances) compliant and meet proposed amendments to the reduction of toxic substances in manufacturing as stated in the Environmental Design of Electrical Equipment Act (EDEE)
 3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency and marked for intended location and application
 4. Installation shall comply with NECA 1-2010 "Standard Practice of Good Workmanship in Electrical Construction"
 5. Installation shall comply with NEC/NFPA 70E "Standard for Electrical Safety in the Workplace"
 6. Electronic data exchange between Video Surveillance System with an Access Control System shall comply with SIA TVAC
 7. Installation shall comply with FCC CFR 47 Part 15 Class A "Telecommunications, Radio Frequency, Digital Device Emission
 8. Installation shall comply with federal, state, and local codes and authorities having jurisdiction (AHJ)

1.5 SUBMITTALS

- A. Product Data: Provide details and technical specifications for each product indicated prior to release and installation. Include physical dimensions, features, performance, electrical characteristics, ratings, software versions, and operating system details.

- B. Shop Drawings: Include system line diagrams, equipment locations, installation details, and system integration plans
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection
 - 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types, quantities, and sizes
 - 3. Plans and Elevations: Dimensioned plans and elevations of equipment racks, including access and workspace requirements
 - 4. Data Calculations: Provide VMS bandwidth and storage calculations meeting the minimum project requirements as described herein
 - 5. Power and Heat Load Calculations: Provide power and heat load calculations for all hardware, including UPS capacity calculations
 - 6. Wiring Diagrams: For power and data wiring
 - 7. NVR Storage Calculations: For 30 day storage based on parameters herein
- C. Equipment and Software List: Include every piece of equipment and software by product/model name and/or number, manufacturer, serial number, revision number, location, and date of original installation. If factory and/or bench testing regimens are required by the project plan, add pretesting record of each piece of equipment and software, listing name of person testing, date of test, and adjustments made.

1.6 INFORMATIONAL SUBMITTALS

- A. ISO9000 Listing Certificates
- B. CE and FCC Compliance Certificates:
- C. Field quality-control reports
- D. Warranty: Software support and warranty information for all components, including Service Level Agreement (SLA) details, and duration of agreement from date of system acceptance by Owner
- E. Current LENEL/S2 Security Integrator Certification Letter

- F. Current LENEL/S2 Security Training Certificates (listing expiration dates) for at least two (2) technicians that will be working on the project
- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.7 CONTRACTOR REQUIREMENTS

- A. The Contractor shall have a supporting office within fifty (50) miles of the project location
- B. Certifications: Two (2) technicians shall hold current certifications with LENEL/S2 Security
- C. On-site maintenance and repair service shall be available locally and within four (4) hours of notification of condition
- D. On-site Contractor personnel shall hold all required local, state, and federal licenses
- E. On-site Contractor personnel shall hold current certifications with LENEL/S2 Security and provide as a submittal
- F. The Contractor shall provide three (3) references for completed projects of similar scope and provide as a submittal

1.8 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For all components and software to include in emergency, operation, and maintenance manuals.
 - 1. Extra Materials:
 - a. Return all left-over (unused) product and materials to the Owner
 - 2. Applicable operating system, database, client, and application software on portable storage media
 - 3. Full System Backup as of closeout date on portable storage media
 - 4. Submit one (1) printed and one (1) electronic copy of project binder in final form. This copy shall contain as a minimum:
 - a. Table of Contents for each element

- b. Contractor information - names phone numbers, and email for sales, technical support, and consumables reordering
- c. Lists of spare parts and replacement components recommended to be stored at the site for ready access
- d. Datasheets for all equipment
- e. Operation and maintenance manuals for all equipment
- f. Operation and maintenance procedures not covered in manufacture's manuals
- g. Training:
 - 1) Program Syllabus.
 - 2) Manual(s) and Material(s).

1.9 QUALITY ASSURANCE

- A. Installation shall comply with federal, state, and local codes and authorities having jurisdiction (AHJ)
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application
- C. All software and hardware shall be programmed and installed in accordance with manufacturer's specifications
- D. All equipment shall be new, in current production, and the standard products of a manufacturer of ESS equipment
- E. Manufacturer shall guarantee availability of parts, for a minimum of seven (7) years from date of shipment
- F. On-site maintenance and repair service shall be available locally and within four (4) hours of notification of condition
- G. Contractor shall review drawings and specifications
- H. Software integration between all integrated systems shall be tested and certified for interoperability by the manufacturer of each system.

- I. The Contractor shall have had Lenel/S2 certification for a minimum of (3) years and have completed a minimum of (3) successful projects of similar size and scope within Mecklenburg County within the past (3) years.

1.10 PERMITS

- A. All permits required for the specified performance and completion of the work shall be paid for, processed by and secured by the Contractor

1.11 INSPECTIONS

- A. All inspections required for the installation of the work shall be coordinated and scheduled with the Building Department, by the Contractor, and in a timely manner

1.12 PROJECT CONDITIONS

- A. Environmental Conditions: System components shall withstand the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
 1. Interior Environmentally Controlled Space: Rated for continuous operation in ambient temperatures of 32° to 95° F (0° to 35° C) dry bulb and a relative humidity of 20 to 80 percent, noncondensing.
- B. Existing Conditions / Exceptions:
 1. Work must be performed while the building is being occupied

1.13 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to service, repair or replace system components as needed for proper system operation as specified herein.
- B. Warranty Period: a 2-year warranty on hardware and a 1-year warranty on labor and software from date of date of Owner Acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturers: Subject to compliance with requirements, provide products by one of the following as noted below in paragraph 2.2.

2.2 SYSTEM REQUIREMENTS

- A. The Video Management System ("VMS") shall be a software package for comprehensive management of live and recorded video, and associated data.
- B. The VMS software shall have a client/server-based architecture. The system may be configured as a standalone VMS system (with the client software operating concurrently on the server hardware), the client software running on one or more network-connected TCP/IP workstations, or any combination thereof. Multiple client workstations shall be capable of simultaneously viewing live and/or recorded video from one or more servers. Multiple servers shall also be capable of simultaneously providing live and/or recorded video to one or more client workstations.
- C. System shall have software installed and display images at monitor/PC locations indicated on the drawings and provide for remote viewing/focus/control of video-camera images, both live and recorded.
- D. Manufacturers, with LENEL/S2 software:
 - 1. BCD Video (Basis of Design)
 - 2. Dell
 - 3. HP
 - 4. S2

2.3 GENERAL FUNCTIONALITY

- A. The VMS shall be available as an appliance
- B. The VMS shall support monitoring of video from IP cameras and encoding devices and data in real time over local and wide area networks
- C. The VMS shall support single-screen administration across multiple servers and systems
- D. The VMS shall support data integration with access control systems

- E. The VMS shall support e-mail and text (SMS) notifications
- F. The VMS shall offer an open architecture supporting IP cameras and encoders using standard ONVIF protocols
- G. The VMS system shall be configurable for recording based on video motion detection, so that video shall be recorded when the system detects motion within user-defined regions of interest within each camera's Field-of-View (FoV). The system shall also record pre-event and post-event video based on user-defined operating parameters
- H. The VMS system shall have video management features for monitoring video status of cameras based on user-defined operating parameters. Users shall have the ability to configure the system to annunciate "Loss of Video" status on one or more VMS clients by way of an on screen visual indicator.
- I. The VMS Client software shall support running multiple instances of the VMS Client application simultaneously on a single workstation for display on multiple monitors. Subject to limitations of commercially available computer workstation hardware, the VMS Client software shall support up to twelve (12) simultaneous instances of the VMS Client running simultaneously on a single workstation. Multiple monitors shall be configurable on a single workstation, with one (1) client application displayed on each monitor. The NetVR Client workstation hardware shall require multi-core processors and display adapters to support this functionality. The VMS Client workstation shall be equipped with one (1) CPU core for each instance of the VMS client application to be displayed.
- J. The VMS server software shall operate with the following operating system (verify with LENEL/S2):
 - 1. Linux Ubuntu 14.04 Debian Packages
- K. The VMS system licensing fees shall be determined by the total number of cameras configured on the system and by set of features available to the user. This licensing shall be based on the MAC address of a network card that is present on the system.
- L. The VMS shall not require the manufacturer to be contacted for a camera on the system to be replaced. The VMS shall allow users to replace cameras without the need for individual camera license keys.
- M. The VMS server software shall run as a service
- N. The VMS shall not require any applications to be running to operate
- O. The VMS shall support the use of panoramic lenses

P. Video Streaming

1. Video formats supported: MJPEG, H.264
2. Each video stream shall have the ability to be recorded, viewed live, saved to views, exported, and is available for search and playback
3. Streams shall be individually configurable for recording schedules and storage rules
4. Multi-streaming – The VMS shall allow the setting of multiple, independent video streams from the IP camera, when supported by camera model, each configurable for frame rate, resolution, and quality level
 - a. Each stream shall be able to be recorded, viewed live, saved to views, exported, and available for search and playback
 - b. All streams can be individually configurable for recording schedules and storage rules

Q. Recording

1. The NVR shall support continuous, uninterrupted and unattended recording of all video transmitted to the VMS, including during times of administration and configuration of any feature
2. The NVR shall support recording video based on metadata generated by an edge network device and included in the video stream sent to the VMS server
3. The NVR shall support the configuration of each video input's recording time on an hourly basis, to further allow the user to schedule when to record on motion, when to record on event and when to not record
4. The NVR shall support video recording based on access control events and activity
5. The NVR shall support recording of video and data files, as determined by rules, events, or manual selection
6. The NVR shall support recording video based on the following classifications
 - a. Continuous Recording (all video all the time)
 - b. Video associated with motion events as detected by the device

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- c. Video associated with triggered alarms as configured with an integrated access control solution (as supported by the manufacturer)
 - d. Activity from an access control system
 - 7. The NVR shall support the configuration of unique weekly recording schedules per camera
 - 8. The NVR shall support a graphical representation of drive status for associated RAID-based storage
 - 9. Storage Types
 - a. The NVR shall support local HDD disk storage
 - b. The NVR shall support JBOD, RAID5 and RAID6 storage configurations through hardware controller and shall not require operating system resources to manage storage
 - 10. Storage Retention
 - a. The NVR shall support configurable “At Most” rules that will automatically delete video for a camera after a specified amount of time
 - b. The NVR shall support configurable “At Least” rules that will delete newer video on other cameras to preserve older video from cameras with an “at least” rule specified
- R. Storage Calculations
- 1. Support local, remote and mobile viewing of all cameras. All cameras shall be monitored at a central location with automatic call up in the event of an access control or intrusion incident. Video recording shall be 12 frames per second (fps) on motion only, along with a continuous recording in time lapse mode of 1 frame per second; using H.264-10 compression.
 - 2. Network Video Recorder (NVR) storage capacity shall be consistent with camera availability 24/7 (motion recording) and 30-day retention. NVRs shall be programmed to delete any video footage beyond 40 days.
 - 3. VMS hardware shall be equipped with a minimum of three (3) hard drives in a RAID 5 array to allow failed hard drive to be “rebuilt” without loss of recorded information. Hard drives shall be “hot swappable”.

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4. When calculating storage requirements, the following calculator and parameters are required when conducting calculations:
 - a. LENEL/S2 VR Calculator located at:
<https://myaccount.Lenel/S2sys.com/video.aspx>
 5. Parameters
 - a. Camera Quantity: fill-in
 - b. Resolution: 1080p
 - c. 40% Motion Based Frames per second (FPS): 12
 - d. Simultaneous Continuous Motion Based Frames per second (FPS): 1
 - e. Format: H.264-10
 - f. Days: 30
 6. Video Storage/Retrieval
 - a. Stored video shall be date/time stamped and synchronized with the access control clock
 - b. Systems shall retrieve any stored data based on time/date inputs entered by authorized operator
 - c. System shall be programmed and capable of performing activity detection on stored video
 - d. Storage capacity shall have the required calculated RAID 5 storage along with 20% future capacity.
- S. File system and operations
1. The video file shall contain the data of the video, audio, and associated metadata
 2. The index file shall contain the index of the metadata from the network device
 3. When the NetVR searches for video, it shall retrieve and display the information in the index files
 4. When a client requests to display the video, the NetVR shall transmit the video file data from the server to the client
- T. Video Archiving
1. The NVR shall support the archiving of video and data files, as determined by rules, events, or manual selection
 2. Each archive target has its own set of rules for what cameras and video are archived and when

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- 3. The NVR shall support the archiving of video to multiple Network Attached Storage locations based on the camera name, event type, or an archive schedule
 - 4. Schedules – The NVR shall support continuous or scheduled archiving
 - a. Archive tasks shall continue until completion of the current requirement or terminate at a scheduled time.
 - b. Weekly schedules shall be supported.
 - U. Events - The NVR shall support events to initiate actions:
 - 1. Events:
 - a. Video motion, operating on the encoded video
 - b. Video loss of analog video signals
 - c. Device, server, and system health
 - d. IP camera connection
 - e. Date and time
 - 2. Actions:
 - a. Record video
 - b. Send an email
 - c. Move a PTZ camera to a preset position
 - 3. Users shall have the ability to create rules based on a combination of events

2.4 HARDWARE

- A. VMS appliance shall be based on Linux Ubuntu 14.04 LTS OS (verify with LENEL/S2)
- B. Ability to add and change hard-disk storage devices for repair or expansion purposes
 - 1. Hard disk operation shall be done through the NetVR GUI and shall not require the operator to initiate command line activity or interface with the operating system
- C. The NVR shall support a solid-state drive to store the application and configuration data. This SSD shall not be used to store video data
- D. Events in the access control system shall have the capability to initiate video recording. Video motion detection and camera status messages from the NetVR shall have the capability to initiate alarms.
- E. Provide product as required to meet the amount of ports and storage time required, unless otherwise noted.

- F. The NVR is a video management appliance that shall be designed to be integrated with a LENEL/S2 Enterprise Security Management System (SMS). The integration provides a single user interface for the SMS access control and monitoring capabilities and the NetVR video surveillance and forensics capabilities.
- G. The NVR is a fully self-contained video management appliance, or a single-box unit with both an access control system and a video management appliance. It includes a database, operating system, application software, and raw video storage.
- H. Multiple subordinate NVR appliances can be connected to an LENEL/S2 Security Management System:
- I. NetVR125 Hardware Specifications (minimum and basis of design):

1. Video Management
 - a. Max IP Camera Streams 64
 - b. IP Camera Resolution IP camera dependent
 - c. IP Camera Frame Rate IP camera dependent
 - d. Compression type MJPEG, H.264
2. Platform
 - a. Storage (internal) 16TB or 32TB with 4TB or 8TB removable drives
 - b. Storage Configuration RAID 5
 - c. Processor Intel Xeon E3-1220v5
 - d. RAM 8.0 GB DDR3
 - e. OS Ubuntu Linux 16.04 LTS
 - f. OS/Application Storage 150GB SSD
 - g. NIC (10/100/1000) 2 (expandable to 4)
 - h. Sustained Hard Drive Throughput 400Mbps
 - i. Certifications / Compliances UL, CE, FCC, RoHS
 - j. Warranty 2 Years (hardware)
 - k. Chassis 1U (with rail kit)
 - l. Dimensions (H, W, D) 1.75in x 19.0in x 21.8in (44 mm x 482mm x 553mm)
 - m. Weight 23lbs (10.4Kg)
 - n. Operation Temperature 50° - 95°F (10° - 35°C)
 - o. Storage Temperature -40° - 158°F (-40° - 70°C)
 - p. Operating Environment Humidity 85%, non-condensing
 - q. AC Input 100 - 240 VAC, 50/60 Hz, 6A/3A
 - r. MTBF 45,600 hours
 - s. BTU 1,075
3. Minimum Client Requirements

a.	Operating System	Microsoft Windows 10 Mac Yosemite (10) Mac El Capitan (11)
b.	Browser	Internet Explorer, V11 Chrome 58 Firefox 53 Safari 8, 9
c.	Processor	Intel Core i3
d.	RAM	8GB
e.	Hard Drive	100GB

2.5 LENEL/S2 SOFTWARE SOLUTION

- A. LENEL/S2 shall be deployable as software solution supporting up to 128 IP camera streams
- B. LENEL/S2 software solution shall support:
 - 1. Deployment as a stand-alone system
 - 2. Real-time video monitoring and recorded video playback integration with an LENEL/S2 access control platform
- C. LENEL/S2 software solution hardware requirements
 - 1. Support for 64 video streams
 - a. CPU: Intel Xeon E3-1220v3
 - b. Memory: 8GB
 - c. Storage: (Minimum 3 drives with 1TB storage per drive); RAID 5/6 configuration recommended
 - d. OS / Application Storage: 80GB SSD minimum
 - e. Operating System: 64-bit Ubuntu Linux 14.04 only
 - f. Network Interface: 2 10/100/1000 Ethernet ports
 - 2. Support for 128 video streams
 - a. CPU: Intel Xeon E3-1241v3
 - b. Memory: 8GB

- c. Storage: (Minimum 4 drives with 1TB storage per drive); RAID 5/6 configuration recommended
- d. OS / Application Storage: 80GB SSD minimum
- e. Operating System: 64-bit Ubuntu Linux 14.04 only
- f. Network Interface: 4 10/100/1000 Ethernet ports

2.6 CLIENT ACCESS

- A. Cameras to be viewed and controlled by software, via a web based browser.
- B. Monitoring
 - 1. The NVR software shall de-warp the image for both live and recorded video
 - 2. The NVR software shall display access control related data (from supported devices)
 - 3. Instant replay shall be available for any video on the operator screen with a single click
 - 4. The NVR software shall support displaying date, time, weather, road traffic, social media feed and other multimedia content
 - 5. The NVR software shall support virtual matrix functionality
- C. PTZ
 - 1. The NVR software shall support the following methods of controlling PTZ cameras:
 - a. PTZ graphics control windows
 - b. Live graphic overlay PTZ control icons
 - c. Keyboard control (up, down, left, right arrows; page up, page down for zoom)
 - d. PTZ preset triggers
 - e. Digital PTZ functions
 - f. USB joystick inputs

- g. Proportional PTZ control
- D. Forensics
 - 1. Ability to switch to forensic activity review based on the video selected.
 - 2. Ability to call other cameras and other saved views to populate the forensic investigation.
 - 3. The NVR software shall support Search and Playback.
 - 4. Export
 - a. The NVR software shall support exporting video without overwriting previous exports.
 - b. The NVR software shall support exporting a video segment from specific cameras onto a shared folder, application media folder or directly into a case for investigation purposes.

2.7 CONFIGURATION

- A. All configuration and setup shall be available through the NVR client software.
- B. The NVR client software shall support automatic identification and IP address assignment of compatible IP cameras and encoders.
- C. User administration
 - 1. Permissions
 - a. Authenticate the user's permission level by
 - 1) Active Directory or LDAP
 - 2) combination of user name and password
 - b. Allow for a user's permissions to be configured across multiple servers from a single screen
 - 2. The NVR client software shall support custom permissions
 - 3. The NVR client software shall support an audit trail of when users log in that shows what changes they have made, what video they have viewed, and what they have exported

- D. The NVR client software shall support the configuration of the video devices performed in the client and pushed out to the devices.
- E. The NVR client software shall support storing camera settings on both the camera and the VMS.
- F. The NVR client software shall support configuration of the following camera properties on supported cameras:
 - 1. Wide Dynamic range
 - 2. Auto-focus
 - 3. Flip/mirror/rotate
- G. Users shall have the ability to create logical groups of cameras connected to one or more systems.
- H. The NVR Client software shall support configuration of rules to set the maximum or minimum number of days on a per video stream basis.
- I. The NVR Client software shall support the selection and configuration of drives used for recording video, including local drives, direct attached storage drives, or iSCSI drives.
- J. All NVRs shall be programmed to trigger alerts/notification to owner when the system fails or has a trouble issue.
- K. All newly installed NVRs shall have an SSL certificate installed as dictated by County IT to ensure encrypted connection when viewing video from authorized client/browser.

2.8 WEB CLIENT

- A. The NVR software shall allow authorized users to view video through a web client interface. The web client interface shall allow authorized users to view live video; views recorded video, control pan-tilt zoom (PTZ) cameras, and activate event triggers. The web client interface shall allow connections to multiple NVR servers simultaneously.
- B. When operating the web client interface, the NVR server shall automatically transcode the requested video into a JPEG file size consistent with the browser screen resolution before making it available to the browser.
- C. The web client interface shall support the following browsers:

1. Internet Explorer 11 and later
2. Chrome 58 and later
3. Firefox 53 and later
4. Safari 8, 9 and later

2.9 MAGIC MONITOR

- A. The LENEL/S2 Magic Monitor Network Security Management System shall provide a single client management application for the security system
- B. Magic Monitor shall integrate with the following VMS and SMS systems:
 - a. LENEL/S2 NetBox Version 4.8 or later
- C. Magic Monitor software shall be available to be installed as a native client.
 1. Supported Operating Systems
 - a. Windows 10
 - b. MAC OS-EL-Capitan
 - c. MAC OS-Sierra
- D. There shall be no licensing fees associated with the number of concurrent Magic Monitors connected to one or more NVRs.
- E. The solution shall be based on a software package for comprehensive management of live and recorded video, real time access control and alarm management-and-notifications combined with digital signage management for public safety announcements.
- F. Magic Monitor shall interface with access control, video monitoring, alarm monitoring, digital signage, public safety messaging and temperature monitoring applications. These applications shall be made modular through hardware and embedded software architecture.
- G. Magic Monitor shall be able to interface and control any other Magic Monitor hardware appliances available on the network
 1. All configuration and setup shall be available through a remote connection and shall not require direct access to the appliance or software

2. In the event of power loss and restoral, the Magic Monitor appliance shall restart and display preprogrammed content in less than 30 seconds.
3. The Magic Monitor Brick appliance shall include all necessary hardware to be mounted on the TV or Wall
4. Magic Monitor shall integrate with the following VMS and SMS systems:
 - a. LENEL/S2 NetBox Version 4.8 or later
 - b. LENEL/S2 NetVR version 1.7 or later
 - c. Avigilon ACC5 and ACC6
 - d. ExacqVision version 7.0 or later Start, Professional, and Enterprise
 - e. Milestone Professional, Essentials, Enterprise and Corporate version 2014, 2016 and 2017
 - f. Magic Monitor clients or appliances
5. Magic Monitor Basic client shall offer the following features:
 - a. All access control capabilities shall be available with the Free version of the software, which is to be loaded on PC's (minimum of 1 at the main office) in buildings with less than 24 cameras
 - b. All access control capabilities shall be available with the Pro version of the software, which is to be loaded on PC's (minimum of 1 at the main office) in buildings with more than 24 cameras
6. Magic Monitor Professional shall, along with all the features offered by Basic, offer the following features:
 - a. Unlimited camera connectivity
 - b. Push data to additional Magic Monitor Clients or Appliances
 - c. Live weather viewing embedded in the Magic Monitor client
 - 1) Current conditions
 - 2) Radar Map
 - 3) 10 Days forecast
 - d. Live Commuter Road Traffic report
 - 1) Active Map with live road traffic report

2.10 LICENSES

- A. Integrators shall be responsible for providing all licensing for all software, hardware, equipment, etc. including all portal licensing for a fully functioning system upon turnover to the Owner. Upon completion of the software installation, the Integrator shall set up, program, test and demonstrate the functionality and performance of all software. Owner to provide the associated Peak 10 database programming at the head end.

2.11 PROGRAMMING

- A. The Integrator shall provide all system setup and programming as required and as agreed to by Mecklenburg County. The Integrator shall build out partitions corresponding to the various buildings, facilities and client users (as approved by Mecklenburg County Security); annotate cameras corresponding with equipment labels and proper naming protocol, software mapping and video monitor camera displays; video camera event linking to any door/alarm points. Programming shall be completed at central server and all Client Workstations as needed.
- B. Label all devices and ensure VAR/integrator properly inserts the label/description within the software when programming.
- C. Contractor to turn over all login and password info to County Security once installed.
- D. The Contractor shall provide an Excel spreadsheet to the Mecklenburg County Security department, having columns for the following:
 - 1. Device Name/Number
 - 2. Manufacturer's Name
 - 3. Model Number
 - 4. Serial Number
 - 5. IP Address (left blank for the County to fill out)
 - 6. MAC Address (left blank for the County to fill out)
 - 7. Firmware Version
 - 8. Building Name
 - 9. Building Suite Name (if applicable)

-
10. Camera Floor # Location (if applicable)
 11. Camera Room Name Location (if applicable)
 12. Camera Room or Site # Location
 13. Telecom/Security Equipment Room # Location (if applicable)
 14. Patch Panel Rack # (if applicable)
 15. Patch Panel Letter (if applicable)
 16. Patch Panel Port Number (if applicable)
 17. Switch Port Number (if applicable)
 18. Camera Cable # (identification number bases on labeling section)
 19. Comments
- E. Mecklenburg County Security department to fill in the IP and MAC addresses and send back to the Integrator, along with any comments on the proposed building name abbreviation, etc.
- F. The Integrator shall then complete the spreadsheet based on the final installation and turn into the County as part of the Closeout Documents.
- G. Administrative Controls
1. Integrator shall setup administrative rights for staff in the AFM Security Services Division only, and for other user client access on a case-by-case basis as determined and approved by the AFM Security Services Division.
 2. All administrative passwords shall be changed immediately after installation and provided to AFM Security Services Division. This includes all NVRs, cameras, or other devices that have a default password in place. All devices capable of secure login/password should be installed and programmed to require such login.
 3. All NVRs shall be programmed to trigger alerts/notification to owner when the system fails or has a trouble issue.
 4. All newly installed NVRs shall have a SSL certificate installed (if required by IT Security) to ensure encrypted connection when viewing video from authorized client/browser.

2.12 LENEL/S2 CUMULUS REMOTE MONITOR AND ADMINISTRATOR

- A. The system shall support cloud-based monitoring and administration of LENEL/S2 access control and video systems from a single management dashboard.
- B. LENEL/S2 Cumulus shall support LENEL/S2 NetBox, LENEL/S2 NetVR, LENEL/S2 Global, and LENEL/S2 Magic Monitor
- C. LENEL/S2 Cumulus shall support remote monitoring of the following:
 - 1. The last communication with Cumulus
 - 2. Status of the CPU
 - 3. Memory and network bandwidth usage
- D. LENEL/S2 Cumulus shall support the managing of system licenses, including:
 - 1. OS version
 - 2. LENEL/S2 software version
 - 3. SUSP expiration date
 - 4. Detailed license information
- E. LENEL/S2 Cumulus shall support remote updating of the system's software
- F. LENEL/S2 Cumulus shall be accessible through the LENEL/S2 Integrator Portal
- G. LENEL/S2 Cumulus shall not require ports to be opened for communications from the LENEL/S2 NVR or LENEL/S2 Magic Monitor
- H. LENEL/S2 Cumulus shall support the sending of email or text alerts to system users when a system has an error
 - 1. Alerts shall be able to be grouped together

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine cable pathways including conduit, raceways, cable trays, and other pathway elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. Examine rough-in for control cable and conduit systems to controllers, card readers, and other system components to verify conduit and back-box locations prior to installation of system devices.
- C. Examine available network capacity and support infrastructure. Consult with network administrator for compliance with network standards and capacity.
- D. Examine install location for compliance with space allocations, installation tolerance, hazards to safe system operation, and other conditions affecting installation.
- E. Examine roughing-in for LAN, WAN, and IP network before device installation.
- F. Provide wall mounted bracket supports for NVRs, not mounted in a standard vertical rack.

3.2 PREPARATION

- A. Prior to beginning system programming, prepare detailed project planning forms for programming and configuration of the system. Fill in all data available from project plans and specifications and publish as project planning documents for review and approval. These may include (but are not limited to):
 - 1. Define user (operator) types
 - 2. Define camera naming schema
 - 3. Determine storage requirements
 - 4. Determine FPS requirements
 - 5. Determine motion recording
 - 6. Define event programming
 - 7. Develop matrix layouts
 - 8. Prepare a project specific plan for system testing, startup, and demonstration
 - 9. Develop cable and asset-management system labeling plan
- B. In meetings with Engineer and Owner, present Project planning documents and review, adjust, and prepare final programming and configuration documents. Use final documents to program and configure software.

3.3 CABLING

- A. Comply with NECA 1, "Good Workmanship in Electrical Construction".
- B. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters. Conceal raceway and wiring except in unfinished spaces.
- C. Install LAN cables using techniques, practices, and methods that are consistent with Category 6 rating of components and fiber-optic rating of components, and that ensure Category 6 performance of completed and linked signal paths, end to end.
- D. Junction boxes and enclosures containing security-system components or cabling, and which are easily accessible to employees or to the public, shall be provided with tamper resistant fasteners and/or tamper detection switches. In addition, hinged enclosure doors shall be equipped with locking hardware. Boxes above ceiling level in occupied areas of the building shall not be considered accessible. Junction boxes and small device enclosures below ceiling level and easily accessible to employees or the public shall be covered with a suitable cover plate and secured with tamperproof screws.
- E. Provide per manufacturer's recommendations.

3.4 IDENTIFICATION

- A. In addition to requirements in this article, comply with applicable requirements in ANSI/TIA 606-B.
- B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - 1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
 - 2. On the outside of each edge device, PACS Labeling Scheme shall be as follows and specific abbreviations shall be coordinated with Mecklenburg County Security:
 - a. DEV#-LOC#
 - 1) DEV# = Device Name/Number (i.e. CAM01)
 - 2) LOC# = Device Location (i.e. LOBBY101)

- b. Program and Label each device in the software per County Security direction, prior to a generic assignment.
- C. At completion, cable and asset management documentation shall reflect as-built conditions.

3.5 SYSTEM SOFTWARE AND HARDWARE

- A. Develop, install, and test software and hardware, and perform tests for the complete and proper operation of systems involved
- B. Assign the software license(s) to Owner
- C. All default password shall be changed to those selected by the owner
 - 1. The contractor shall retain no records of passwords for the project
- D. Label all devices and ensure VAR/integrator properly inserts the label/description within the software when programming. Admin default password should be changed by VAR/integrator once installed and integrator should pass credentials/password information to County Security.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation and supervise pretesting, testing, and adjusting of VMS equipment.
- B. Tests and Inspections:
 - 1. Inspection: Confirm that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
 - 2. Pretesting: Configure and pretest NetVR components, wiring, and functions to confirm that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
 - a. Prepare equipment list
 - b. Confirm operation of all camera streams and check data storage configuration.
 - c. Confirm operation of all third-party integrated components and systems

- d. Set and name all camera streams and preset positions; consult Owner's personnel.
 - e. Confirm operation of monitoring equipment.
- 3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
- 4. Operational Tests: Perform operational system tests to confirm that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
- C. The system is considered defective and the project incomplete if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Testing and Validation
 - 1. Integrator shall be required to test all system edge devices to ensure all cameras, antennae, etc. are functioning properly after system is brought online with the LENEL/S2 enterprise system. A written report with signature shall be required to be submitted to owner verifying testing and validation of the above has been completed.

SPECIFIER NOTE: retain paragraph below only if required for commissioning projects

3.7 COMMISSIONING

- A. The contractor shall certify completion in writing and schedule the commissioning walk-through. The contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

3.8 ADJUSTMENTS

- A. Occupancy Adjustments: When requested within 30 days of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project for this purpose. Tasks shall include, but are not limited to, the following:
 - 1. Check cable connections
 - 2. Check proper operation of cameras streams and storage configuration

3. Confirm system configuration and adjust settings needed
4. Recommend changes to the system to improve Owner's use
5. Provide a written report of adjustments and recommendations

3.9 RECORD DRAWINGS

- A. The Integrator shall provide as-built drawings of the installed system (using owner provided floor plan drawings), to include:
 1. Overall network with locations (buildings and facilities and rooms).
 2. All equipment cameras, NVRs, etc. (new and existing including make, model and serial numbers, date installed, MAC addresses and assigned IP addresses).
 3. Wiring and cabling terminations (labeling required).
 4. Front-end, client workstations and badging stations.
 5. Labeling, consistent with the established County standard, is required for all newly installed equipment (panels, NVRs, etc.)
 6. As-built drawings must include direct reference to hardware and termination labeling.

3.10 MAINTENANCE

- A. The Contractor shall offer a Software Upgrade and Support Agreement (SUSP)
 1. The Contactor shall offer the SUSP in 1 year, 3 year, and 5 year increments.
 2. As part of the agreement, manufacture phone support shall be available from (9:00 AM – 7:00 PM) on a normal business day
 3. The option of 24/7 telephone support shall be offered.
 4. As part of the agreement, access to software patches and software upgrades shall be available.

END OF SECTION 28 23 10

FORMS

The following pages contain required forms as referenced in other sections of the Project Manual. General Contractor shall utilize these forms for appropriate purposes as required.

1. Bid Form
2. Certificate of Non-Discrimination
3. Contractor E-Verify Declaration
4. Schedule of Values Continuation Sheet
5. Sales Tax Certification
6. Change Proposal Request Form
7. Change Proposal Log
8. Certificate of Compliance – ADA
9. General Guarantee

**SINGLE PRIME CONTRACT
GENERAL CONSTRUCTION PROPOSAL**

MATERIALS RECOVERY FACILITY RETROFIT
For Mecklenburg County, Charlotte, NC

PREPARED BY:
FMK Architects
123 New Bern St
Charlotte, NC 28203

BID DATE: November 07, 2024

TO: Mecklenburg County
North Carolina

FROM: _____
Name of Bidder

The undersigned Bidder hereby declares that his Proposal is made without connection with any other person, company, or parties making a similar bid or proposal, and that it is in all respect fair and in good faith, without collusion or fraud. It is the Bidder's intention & purpose to enter into a Contract with Mecklenburg County. The Bidder signifies that his bid is all-inclusive to perform the Work to construct **MATERIAL RECOVERY FACILITY (MRF) RETROFIT** as illustrated in the Contract Documents package prepared by **FMK Architects** dated **10/09/2024**, including drawings dated 10/8/24 and Project Manual dated 10/9/24. The Bidder has carefully examined the Contract Document and Proposal Form and is familiar with the scope, details, intent, and conditions under which the Work, or any part of it, is to be done, and the conditions which must be fulfilled in the furnishing and/or erection or construction of any or all items of the Work. The Bidder hereby proposes to furnish all labor, materials, equipment and services necessary to perform the Work required in the Construction Document and terms of this Proposal for the amounts listed below.

A. Base Bid:

Demolition Services \$ _____

Excavation Services \$ _____

Cleaning, Interior/Exterior \$ _____

Concrete \$ _____

Electrical \$ _____

Flooring \$ _____

HVAC \$ _____

Insulation \$ _____

Painting \$ _____

Plumbing \$ _____

Roofing/Siding \$ _____

Cranes/Man Lifts – Rental/Lease \$ _____

Based Bid Total: \$ _____

B. Contingency Allowance: \$ _____
(10% Base Bid Total)

C. Total Bid: (A+B) \$ _____
(Herein referred to as the Total Bid)

UNIT PRICES:

Unit prices quoted and accepted shall apply throughout the life of the Contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of the changes in the scope of the Work all in accordance with the Contract Document. The Bidder is asked to provide the following unit prices to be used to adjust the Contract up or down if the scope of the Work changes.

Unit Price-1: Trench Rock	\$_____	per Cubic Yard
Unit Price-2: Mass Rock	\$_____	per Cubic Yard
Unit Price-3: Unsuitable Soils	\$_____	per Cubic Yard Haul Out
	\$_____	per Cubic Yard Haul In/Place
Unit Price-4: General Contractor's General Conditions	\$_____	per Day

The Bidder acknowledges that he shall utilize the following subcontractors on this project.

		LICENSE #
General Contractor	_____	_____
Mechanical Contractor	_____	_____
Plumbing Contractor	_____	_____
Electrical Contractor	_____	_____
Fire Protection Contractor	_____	_____

OTHER SUBCONTRACTORS:

List the names and licenses #s of all subcontractors not shown above which will be performing work for which the bidder is not licensed to perform.

CATEGORY	SUBCONTRACTOR	LICENSE #
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The undersigned further agrees to begin the work promptly upon receipt of Notice to Proceed and to pursue the work with an adequate work force to complete the work within 365 calendar days from the Notice to Proceed. Five Hundred Dollars (**\$500.00**) per calendar day is hereby agreed upon as the Liquidated Damages.

The undersigned also agrees to meet Key Milestones of the work as agreed to with the Equipment Vendor's demolition and installation requirements. If those dates are not met, Five Hundred

Dollars (\$5,000.00) per calendar day is hereby agreed upon as the Liquidated Damages.

Check, Cash, or Bond is attached in the amount of \$_____.

The undersigned Bidder further proposes and agrees to commence the work promptly upon notice to proceed, with adequate forces.

The Bidder acknowledges receipt of the following addenda:

Addendum No. _____	Dated _____
Addendum No. _____	Dated _____
Addendum No. _____	Dated _____
Addendum No. _____	Dated _____
Addendum No. _____	Dated _____

The undersigned has enclosed the following with this Proposal:

_____	Bid Bond or Bid Deposit
_____	Business Diversity and Inclusion (BDI) Form A – Listing of Good Faith Efforts (GFE)
_____	BDI Form B – Identification of Subcontractor Participation
_____	BDI Form C – Statement of Intent to Perform Contract with Own Workforce
_____	BDI Form D – MWBE Inclusion Plan
_____	Certificate of Nondiscrimination in Employment
_____	Contractor E-Verify Declaration
_____	Certificate of Compliance with the Americans With Disabilities Act

CONTRACTOR: _____

ADDRESS: _____

SIGNATURE: _____

TITLE: _____

NAME (Print): _____

NC LICENSE NUMBER: _____

**CERTIFICATION OF
NON-DISCRIMINATION IN EMPLOYMENT**

The undersigned, being a licensed Contractor in North Carolina, do hereby certify that we will not engage in prohibited discrimination. For purposes of this Certification, prohibited discrimination means discrimination against Contractor's employees providing services on County premises or in the solicitation, selection, and / or treatment of any subcontractor, vendor, or supplier providing services in connection with this Project which actions are illegal under either state or federal law. As a condition of entering into an Agreement with the County, the Contractor represents, warrants and agrees that it does not and will not engage in or condone prohibited discrimination with respect to any Contractor employees assigned to work on behalf of County and that prior to being deployed to a County assignment or premises, employees and subcontractors will review and agree to abide by the County's Harassment Policy as to the assigned employees.

Signed

Print or Type Name of Signing Official

Title

Firm

Address

City

State

Zip

Date

E-VERIFY AFFIDAVIT

I, _____ (the individual attesting below), being duly authorized by and on behalf of _____ (the entity bidding on project hereinafter "Employer") after first being duly sworn hereby swears or affirms as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25(5).
2. Employer understands that Employers Must Use E-Verify. Each employer, after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS§64-26(a).
3. Employer is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in this State. (mark Yes or No)
 - a. YES _____, or
 - b. NO _____
4. Employer's subcontractors comply with E-Verify, and if Employer is the winning bidder on this project Employer will ensure compliance with E-Verify by any subcontractors subsequently hired by Employer.

This ____ day of _____, 2024.

Signature of Affiant

Print or Type Name: _____

Signed and sworn to (or affirmed) before me, this the ____
day of _____, 2024.

My Commission Expires:

Notary Public

(Affix Official/Notarial
Seal)

CONTINUATION SHEET

APPLICATION AND CERTIFICATION FOR PAYMENT, containing
Contractor's signed Certification is attached.

APPLICATION NUMBER:
APPLICATION DATE:
PERIOD TO:
OWNER'S PROJECT NO:
CONTRACT DATE:

PROJECT NAME:

ITEM	DESCRIPTION OF WORK	MATERIAL VALUE	LABOR EQUIPMENT VALUE	SCHEDULED VALUE	WORK COMPLETED		TOTAL COMPLETED TO DATE	PERCENT COMPLETE	BALANCE TO FINISH	RETAINAGE
					TOTAL THIS PERIOD	TOTAL PREVIOUS MONTH(S)				
1				\$ -			\$ -	#DIV/0!	\$ -	\$ -
2				\$ -			\$ -	#DIV/0!	\$ -	\$ -
3				\$ -			\$ -	#DIV/0!	\$ -	\$ -
4				\$ -			\$ -	#DIV/0!	\$ -	\$ -
5				\$ -			\$ -	#DIV/0!	\$ -	\$ -
6				\$ -			\$ -	#DIV/0!	\$ -	\$ -
7				\$ -			\$ -	#DIV/0!	\$ -	\$ -
8				\$ -			\$ -	#DIV/0!	\$ -	\$ -
9				\$ -			\$ -	#DIV/0!	\$ -	\$ -
10				\$ -			\$ -	#DIV/0!	\$ -	\$ -
11				\$ -			\$ -	#DIV/0!	\$ -	\$ -
12				\$ -			\$ -	#DIV/0!	\$ -	\$ -
13				\$ -			\$ -	#DIV/0!	\$ -	\$ -
14				\$ -			\$ -	#DIV/0!	\$ -	\$ -
15				\$ -			\$ -	#DIV/0!	\$ -	\$ -
16				\$ -			\$ -	#DIV/0!	\$ -	\$ -
17				\$ -			\$ -	#DIV/0!	\$ -	\$ -
18				\$ -			\$ -	#DIV/0!	\$ -	\$ -
19				\$ -			\$ -	#DIV/0!	\$ -	\$ -
20				\$ -			\$ -	#DIV/0!	\$ -	\$ -
21				\$ -			\$ -	#DIV/0!	\$ -	\$ -
22				\$ -			\$ -	#DIV/0!	\$ -	\$ -
23				\$ -			\$ -	#DIV/0!	\$ -	\$ -
24				\$ -			\$ -	#DIV/0!	\$ -	\$ -
25				\$ -			\$ -	#DIV/0!	\$ -	\$ -
26				\$ -			\$ -	#DIV/0!	\$ -	\$ -
	TOTAL JOB COST	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!	\$ -	\$ -

(** Use tax percentage from county where Purchased and show percentage used.)

Mecklenburg County - LUESA
Change Proposal Request Form

Proposal Number _____

Select One

☐ *Project Contingency*

☐ *Contract Change Order*

Name of Contractor:		
Contract Number:		
Name of Project:		
Date:		
Description of Change: <i>Attach Additional Sheets as Necessary</i>		
SUB-CONTRACTOR		
1	Cost of Materials (Including sales tax)	\$ -
2	Rental Equipment	\$ -
3	Labor	\$ -
4	Insurance (Workman's Comp., Social Security or as Required/Specified)	\$ -
5	SubTotal	\$ -
6	Overhead & Profit (10% of Line 5)	\$ -
7	SUB-CONTRACTOR Total	\$ -
PRIME CONTRACTOR		
8	Cost of Materials (Including sales tax)	\$ -
9	Rental Equipment	\$ -
10	Labor	\$ -
11	Insurance (Workman's Comp., Social Security or as Required/Specified)	\$ -
12	Guarantee Bond	\$ -
13	SubTotal	\$ -
14	Overhead & Profit (10% of Line 7 + Line 13)	\$ -
15	PRIME CONTRACTOR Total	\$ -
16	PROPOSAL TOTAL (Sum of Lines 7 and 15)	\$ -

Additional Contract Time Required (Impact to Project Critical Path):

Days: _____

Submitted By:

Contractor's Representative

Date: _____

Verified and Approved By:

Consultant's Representative

Date: _____

Owner's Representative

Date: _____

CHANGE PROPOSAL REQUEST LOG								PROJECT CONTINGENCY		CONTRACT CHANGE ORDER	
								Allowance-1		Change Order-1	
								Allowance-2		Change Order-2	
								Allowance-3		Change Order-3	
								TOTAL	\$ -	TOTAL	\$ -
PROP #	ISSUE DESCRIPTION	DATE			STATUS	TIME (Days)	EFFECT	PROPOSAL AMOUNT	RUNNING BALANCE	PROPOSAL AMOUNT	RUNNING BALANCE
		Original Submitted	Revision Submitted	Final Response							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
								TOTAL DAYS	CONTINGENCY PROP TOTAL	C.O. PROP TOTAL	

CERTIFICATION OF
COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT

The undersign, being a licensed Contractor in North Carolina, do hereby agree to comply with all applicable requirements of the Americans With Disabilities Act throughout the duration of this contract.

Signed

Print or Type Name of Signing Official

Title

Firm

Address

City

State

Zip

Date

Date _____
(Date Project Accepted by Owner)

GENERAL GUARANTEE

(Name of Contractor) _____
guarantees all products and workmanship incorporated in the MATERIALS RECOVERY FACILITY
RETROFIT LOCATED AT 1007 AMBLE DRIVE, CHARLOTTE, NC.

_____ against defect due to faulty products or faulty workmanship or negligence for a period of (12) twelve months for the General Guarantee and a period of (24) twenty four months for incidental building watertightness not covered by specific Sections of the Project Manual as set forth in the General Conditions and the Supplementary Conditions or for such longer periods as may be designated by specific Sections of the Project Manual.

He shall, immediately upon notification by the Owner of water penetration, determine the source of water penetration and, at his own expense, do any and all work necessary to return the building to a watertight condition. He shall also, at his own expense, repair or replace any other damaged products, finishes, and furnishings, damaged as a result of this water penetration, to return the building to its original condition.

This guarantee is binding where defects occur due to normal usage conditions and does not cover willful or malicious damage, damage caused by acts of God, or other casualty.

(Contractor)

By: _____

Title: _____

Date: _____

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

Notary Public

My Commission Expires: _____