Leon County Courthouse Parking Garage Fire Sprinklers

Leon County Courthouse
Tallahassee, Florida

PROJECT SPECIFICATIONS

Construction Documents August 30, 2011

Engineer Project No. 11-08

Architect Project No. 12061

H2Engineering, Inc.

114 East 5th Avenue
Tallahassee, Florida 32303
850 · 224 · 7922 (Phone)
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www.H2Engineering.com

BARNETT FRONCZAK BARLOWE ARCHITECTS

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SECTION 000101 - PROJECT TITLE PAGE

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SECTION 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

ENGINEER **Ryan L. Chewning**
FL 63103
The following Sections:
Sections 01, 09, 21 & 26

END OF DOCUMENT 000107

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SECTION 011000 - SUMMARY

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:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Leon County Courthouse Parking Garage Sprinklers.

1. Project Location: Leon County Courthouse, 301South Monroe Street, Tallahassee, FL 32301.

B. Owner: Leon County.

1. Owner's Representative: Albert Sessions (850) 509-1745.

C. Engineer: H2Engineering, Inc. of 114 East 5th Avenue, Tallahassee, Florida 32309

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Replacement of the existing dry-pipe sprinkler system in the Leon County Courthouse parking garage. The parking garage consists of 5 levels labeled P0-P4. Each parking level is divided into 7 independent dry-pipe zones.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. Owner will provide fire watch for interrupted sprinkler zones during construction. Owner will only be responsible for fire watch within the approved construction schedule. If additional fire watch is required outside of the approved construction schedule the contractor shall be responsible for the cost of additional fire watch.

1.6 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits, as indicated by requirements of this Section and as directed by the Owner.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to the parking levels P0-P4.

a. Coordinate access to secure parking area on level P4 with Owner.

2. Limits: The contractor shall not occupy or block any parking access during normal business hours. Areas for storage and staging will be provided as directed by the Owner.

3. Driveways, Walkways and Entrances: Keep parking garage driveways, loading areas and entrances 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.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.7 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used

facilities without written permission from Owner and approval of authorities having jurisdiction.

2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Construction work shall be completed after normal business hours. The parking garage will be occupied during normal business hours. The available work hours are as follows:

1. Monday through Friday (Excluding Tuesday): 6:00pm-6:00am
2. Tuesday: No Work Allowed
3. Saturday and Sunday: All Day

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

G. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

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 governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:
1. Unit-cost allowances.

C. Related Requirements:

1. Section 012200 "Unit Prices" for procedures for using unit prices.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Engineer 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 Engineer'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 Engineer from the designated supplier.

1.4 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 UNIT-COST ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Engineer under allowance and shall include freight and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: 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 Engineer, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

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.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Unit-Cost Allowance: Replace doors for electrical equipment rooms to meet 1-1/2-hour fire rating as shown on Drawings.

1. This allowance includes material cost receiving, handling, and installation and Contractor overhead and profit.
2. Coordinate quantity allowance adjustment with corresponding unit-price requirements in Section 012200 "Unit Prices."

END OF SECTION 012100

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SECTION 012200 - UNIT PRICES

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 unit prices.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or 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, overhead, and profit.

B. 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 surveyor acceptable to Contractor.

C. List of Unit Prices: A schedule of unit prices is included in Part 3.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price 1: Replace doors for electrical equipment rooms.

1. Description: Replace doors for electrical equipment rooms to meet 1-1/2 hour fire rating if existing doors are not fire rated as required.
2. Unit of Measurement: Per door.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

END OF SECTION 012200

SECTION 012300 - ALTERNATES

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 alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Schedule 40 Black Steel Pipe.

1. Base Bid: Schedule 40 galvanized steel for pipe sizes 6” and smaller as specified in Section 211316 "Dry-Pipe Systems."
2. Alternate: Schedule 40 black steel for pipe sizes 6” and smaller, painted to meet protective coating requirements as specified in Section 099113.1 “Exterior Painting for Mechanical and Electrical Systems.”

B. Alternate No. 2: Schedule 40 and Schedule 10 Galvanized Steel Pipe.

1. Base Bid: Schedule 40 galvanized steel for pipe sizes 6” and smaller as specified in Section 211316 "Dry-Pipe Systems."
2. Alternate: Schedule 40 galvanized steel for pipe sizes 2” and smaller and schedule 10 galvanized steel for pipe sizes 2-1/2” and larger.

C. Alternate No. 3: Paint for Galvanized Steel Pipe.

1. Base Bid: No work
2. Alternate: Paint galvanized steel pipe as specified in Section 099113.1 “Exterior Painting for Mechanical and Electrical Systems.”

END OF SECTION 012300

SECTION 012600 - CONTRACT MODIFICATION 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 handling and processing Contract modifications.

B. Related Requirements:

1. Section 210115 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use forms acceptable to Engineer.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 210115 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Engineer.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 .

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Engineer may issue a Construction Change Directive on AIA Document G714 . Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

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SECTION 012900 - PAYMENT 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 necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
4. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction 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. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with continuation sheets.
b. Submittal schedule.
c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Engineer at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

   a. Project name and location.
   b. Name of Engineer.
   c. Engineer's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703 .
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

      1) Labor.
      2) Materials.
      3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

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 materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

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. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
10. 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 either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: Submit Application for Payment to Engineer by the 20th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month .

1. Submit draft copy of Application for Payment seven days prior to due date for review by Engineer.

D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

G. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).

8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire Owner's insurance.

J. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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SECTION 013100 - 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 other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:
1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 210160 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. 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. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

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, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. 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. Project closeout activities.
7. Startup and adjustment of systems.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Engineer.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 or Software-generated form with substantially the same content as indicated above, acceptable to Engineer.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow ten working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Engineer's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.

3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly . Software log with not less than the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Engineer.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Engineer's response was received.

F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

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

1.7 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 Engineer of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Engineer, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner and Engineer; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Lines of communications.
    f. Procedures for processing field decisions and Change Orders.
    g. Procedures for RFIs.
    h. Procedures for testing and inspecting.
    i. Procedures for processing Applications for Payment.
    j. Distribution of the Contract Documents.
    k. Submittal procedures.
    l. Preparation of record documents.
    m. Use of the premises and existing building.
    n. Work restrictions.
    o. Working hours.
    p. Owner's occupancy requirements.
    q. Responsibility for temporary facilities and controls.
    r. Procedures for disruptions and shutdowns.
    s. Construction waste management and recycling.
    t. Parking availability.
    u. Office, work, and storage areas.
    v. Equipment deliveries and priorities.
    w. First aid.
    x. Security.
    y. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Engineer, but no later than 30 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner and Engineer; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of record documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Submittal of written warranties.
    d. Requirements for preparing operations and maintenance data.
    e. Requirements for delivery of material samples, attic stock, and spare parts.

f. Requirements for demonstration and training.
g. Preparation of Contractor's punch list.
h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
i. Submittal procedures.
j. Coordination of separate contracts.
k. Owner's partial occupancy requirements.
l. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

D. Progress Meetings: Conduct progress meetings at regular intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Status of submittals.
3) Deliveries.
4) Off-site fabrication.
5) Access.
6) Site utilization.
7) Temporary facilities and controls.
8) Progress cleaning.
9) Quality and work standards.
10) Status of correction of deficient items.
11) Field observations.
12) Status of RFIs.
13) Status of proposal requests.
14) Pending changes.
15) Status of Change Orders.
16) Pending claims and disputes.
17) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    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 013100

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

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 documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Special reports.

B. Related Requirements:
1. Section 210120 "Submittal Procedures" for submitting schedules and reports.
2. Section 210130 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Engineer.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.

B. Startup construction schedule.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Daily Construction Reports: Submit at weekly intervals.

H. Material Location Reports: Submit at monthly intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Special Reports: Submit at time of unusual event.

K. Qualification Data: For scheduling consultant.

1.5 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. 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.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 210120 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.

6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. 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. Phasing: Arrange list of activities on schedule by phase.
2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Use of premises restrictions.

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. Construction Areas: 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. Completion of fire protection installation.
    b. Completion of electrical installation.
    c. Substantial Completion.

D. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

E. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within 14 days of date established for the Notice of Award.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice of Award. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 45 days after date established for the Notice to Proceed .

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Engineer's approval of the schedule.

2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Purchase of materials.
    d. Delivery.
    e. Fabrication.
    f. Utility interruptions.
    g. Installation.
    h. Work by Owner that may affect or be affected by Contractor's activities.
    i. Testing and commissioning.
    j. Punch list and final completion.
    k. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.

2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

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. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. Accidents.
7. Meetings and significant decisions.
8. Unusual events (see special reports).
9. Stoppages, delays, shortages, and losses.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Construction Change Directives received and implemented.
14. Services connected and disconnected.
15. Equipment or system tests and startups.
16. Partial completions and occupancies.
17. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Engineer Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 015000 - 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 other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, engineer, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, staging areas, and parking areas for construction personnel.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

1.5 QUALITY ASSURANCE

A. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
1. Maintain support facilities until Engineer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

C. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

D. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

D. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

END OF SECTION 015000

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

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 the following:

1. Disposing of nonhazardous demolition and construction waste.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

3.2 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT 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 contract closeout, including, but not limited to, the following:

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

B. Related Requirements:
1. Section 210160 "Execution" for progress cleaning of Project site.
2. Section 210170 "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Section 210180 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
4. Section 210190 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

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

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

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

1.6 SUBSTANTIAL COMPLETION PROCEDURES

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

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

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer . Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Engineer's signature for receipt of submittals.
5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

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

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 210190 "Demonstration and Training."
6. Participate with Owner in conducting inspection and walkthrough with local emergency responders.

7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
8. Complete final cleaning requirements, including touchup painting.
9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 Engineer, 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.

1.7 FINAL COMPLETION PROCEDURES

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

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

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

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

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

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

1. Organize list of spaces in sequential order, 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 Engineer.
    d. Name of Contractor.
    e. Page number.

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

    a. PDF electronic file. Engineer will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

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

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

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

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

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

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. 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.
e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
f. Sweep concrete floors broom clean in unoccupied spaces.
g. Remove labels that are not permanent.
h. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
i. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

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

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

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

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

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

END OF SECTION 017700

SECTION 099113.1 - EXTERIOR PAINTING FOR MECHANICAL AND ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Steel Pipe.
2. Galvanized Pipe.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. VOC content.

1.5 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 (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are 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, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

D. Colors: As indicated in a color schedule.

2.2 METAL PRIMERS

A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.

B. Primer, Alkyd, Quick Dry, for Metal: MPI #76.

C. Primer, Galvanized, Water Based: MPI #134.

D. Primer, Quick Dry, for Aluminum: MPI #95.

2.3 SOLVENT-BASED PAINTS

A. Alkyd, Exterior Gloss (Gloss Level 6): MPI #9.

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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. 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 in "MPI Manual" applicable to substrates and paint systems indicated.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized pipe by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

3. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. 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.

D. Painting Fire Suppression Work:

1. Paint the following work where exposed to view:

a. Uninsulated metal piping (Bare copper piping not required to be painted unless noted otherwise).

1) Fire Protection (Red)
2) Compressed Air (Yellow)
3) Other (To be determined by Engineer)

b. Metal conduit.
c. Tanks that do not have factory-applied final finishes.

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.

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 engineer, 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 EXTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Alkyd System:

a. Prime Coat: Primer, alkyd, anticorrosive for metal, MPI #79.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Alkyd, exterior, gloss (Gloss Level 6), MPI #9.

B. Galvanized-Metal Substrates:

1. Alkyd System:

a. Prime Coat: Primer, galvanized metal, as recommended in writing by topcoat manufacturer for exterior use on galvanized-metal substrates with topcoat indicated.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Alkyd, exterior, gloss (Gloss Level 6), MPI #9.

END OF SECTION 099113.1

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SECTION 210100 - GENERAL PROVISIONS FOR FIRE SUPPRESSION

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. Applicable provisions of this section apply to all sections of Division 21.

1.2 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Drawn to scale, on which space competing systems are shown and coordinated with each other, using input from installers of the items involved.

B. Qualification Data: For Installer and manufacturer.

C. Furnish a copy of the installer’s warranty.

D. Furnish a copy of the manufacturer's warranty for each piece of equipment.

E. Operating and Maintenance Instructions

1. Secure three copies of operating and maintenance instructions, service manuals, and parts lists applicable to each item of equipment furnished. Deliver three bound sets for the Owner's use. Include nameplate data and design parameters in operation and maintenance manuals. Clearly distinguish between information which applies to the equipment and information which does not apply. Delivery of required documents is a condition of final acceptance.
2. Provide detailed, step-by-step written instructions to direct the operator in operating procedures for initial start-up, normal shutdown, extended shutdown and extreme ambient temperature condition. Provide four copies of these instructions with laminated plastic protective cover.

1.3 QUALITY ASSURANCE

A. General:

1. It is the intent of the plans and specifications to obtain a complete, operable and satisfactory installation.
2. All materials shall be new, be properly labeled and/or identified and be in full compliance with the contract documents.
3. All work shall comply with applicable Codes and Standards.
4. Manufacturer's model names and numbers used in these specifications are subject to change per manufacturer's action. Contractor shall therefore verify them with manufacturer's representative before ordering any product or equipment

B. Manufacturer Qualifications: Company regularly engaged in manufacture of general use equipment with characteristics required, whose products have been in satisfactory use in similar service for not less than five years.

C. Installer Qualifications: Company with at least three years of successful installation experience on projects with installation work similar to that required for the project.

D. Furnish new and unused materials and equipment manufactured in the U.S.A. Where two or more units of the same type or class of equipment are required provide units of a single manufacturer.

E. Only manufacturer's products specified hereinafter or listed in an addendum, prior to the acceptance of bids, shall be furnished and installed under this contract.

F. All products used in this project installation shall be new and currently under manufacture and shall have been applied in similar installations for a minimum of two years. This installation shall not be used as a test site for any new products unless explicitly approved by the Owner in writing. Spare parts shall be available for at least five years after completion of this contract.

1.4 CODE REQUIREMENTS

A. Perform work in accordance with the following codes and any applicable statutes, ordinances, codes, and regulations of governmental authorities having jurisdiction.

1. Occupational Safety and Health Regulations (OSHA).
2. National Fire Codes
    a. NFPA 1 Uniform Fire Code
    b. NFPA 13 Standard for the Installation of Sprinkler Systems
    c. NFPA 25 Water Based Fire Protection Systems
    d. NFPA 70 National Electrical Code
    e. NFPA 101 Life Safety Code
    f. NFPA 1963 Standards for Screw Threads and Gaskets for Fire Hose Connections
3. Florida Building Codes 2007 Edition w/ 2008 & 2009 Supplements
4. Florida Administrative Code
    a. Chapter 61C-5 Florida Elevator Safety Code
    b. Chapter 61G15-32 Responsibility Rules of Professional Engineers Concerning the Design of Fire Protection Systems
    c. Chapter 69A-3 Fire Prevention – General Provisions
    d. Chapter 69A-47 Uniform Fire Safety Standards for Elevators
    e. Chapter 69A-48 Fire Safety Standards for Fire Alarm Systems
    f. Chapter 69A-60 The Florida Fire Prevention Code
5. ADA Accessibility Guidelines for Buildings (ADAAG)

B. Resolve, in writing, any code violation discovered in contract documents with the Engineer prior to bidding. After award of the contract, make any correction or addition necessary for compliance with applicable codes at no additional cost to Owner.

C. The installer shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus and drawings required to comply with all applicable laws, ordinances, rules and regulations.

1.5 REFERENCE SPECIFICATIONS AND STANDARDS

A. Materials which are specified by reference to Federal Specifications; ASTM, ASME, ANSI, or AWWA Specifications; Federal Standards; or other standard specifications must comply with latest editions, revisions, amendments or supplements in effect on date bids are received. Specifications and standards are minimum requirements for all equipment, material and work. In instances where capacities, size or other feature of equipment, devices or materials exceed these minimums, meet listed or shown capacities.

B. Whenever a reference is made to a standard, installation and materials shall comply with the latest published edition of the standard at the time project is bid unless otherwise specified herein

1.6 PERMITS FEES AND INSPECTIONS

A. Obtain and pay for all permits, fees, tap fees, connection charges, demand charges, systems charges, impact fees and inspections.

B. Deliver all certificates of inspection issued by authorities having jurisdiction to the Engineer.

1.7 WARRANTY

A. Warranty work and equipment for one year from the date of final acceptance of the project. During the warranty period provide labor and materials to make good any faults or imperfections that may arise due to defects or omissions in materials or workmanship.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 SUBSTITUTIONS AND PRIOR APPROVAL

A. Requests for substitutions shall be submitted to the Engineer's office at least ten (10) days prior to the date for receipt of bids. These requests will be reviewed by the Engineer and an addendum, listing acceptable manufacturers, shall be issued prior to receipt of bids. The listing of acceptable manufacturers only allows a manufacturer to bid the project with a product that meets the Engineer's specifications as interpreted by the Engineer. Said product shall be called an "approved equal" product. All information submitted shall contain information identical to shop drawing submittals and shall list any and all differences from the specified item. Failure to make this listing shall automatically disqualify the product submitted.

B. Substitutions submitted after the prescribed time for prior approval will not be considered.

C. All substitutes or alternate manufacturers' products must meet detailed specifications, size and arrangement of equipment specified. Equipment must fit allocated space. Only products equal to that specified will be considered.

D. If the approved equal substitution contains differences or omissions not specifically called to the attention of the Engineer, those features shall be added to the substituted product at the Contractor's expense.

E. Design is based on equipment as described in the drawings and specifications. Any required changes in foundation bases, electrical requirements, wiring, conduit, connections, piping, controls, openings, etc., shall be paid for by this Contractor.

3.2 CONTRACT DOCUMENTS

A. Examine all drawings and specifications carefully before submitting a bid. If discrepancies or conflicts occur between drawings, or between drawings and specifications, notify the Engineer in writing prior to bid date; however, the most stringent requirement shall govern.

B. For purposes of clearness and legibility, drawings are essentially diagrammatic and, although size and location of equipment are drawn to scale wherever possible, Contractor shall make use of all data in all of the contract documents and shall verify this information at the building site.

C. The drawings indicate required size and points of termination of pipes, conduits and ducts and suggest proper routes to conform to structure avoid obstructions and preserve clearances. However, it is not intended that drawings indicate all necessary offsets, and it shall be the responsibility of the Contractor to make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instructions or cost to the Owner.

D. Furnish, install and/or connect with appropriate services all items shown on any drawing without additional compensation.

E. Consider the terms "provide" and "install" as synonymous with "furnish and install".

F. Any and all questions about a subcontractor's scope of work responsibility shall be addressed to and answered by the Prime Contractor.

G. Questions about Construction Documents: Any and all questions shall be submitted through the proper channels IN WRITING and, in turn, shall be answered by the Engineer in writing. All telephone conversations shall be considered unofficial and, as such, shall not be considered official or binding responses to Contractor's questions.

3.3 EXAMINATION

A. Each Contractor shall visit the project site and fully familiarize himself with existing conditions and account for these conditions in the submitted bids

B. Examine conditions, with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Included within the scope of Division 21 is work where equipment and/or materials are furnished or required by this Division and installed under another Division (designated by the Contractor). It is the responsibility of the Contractor to see that all such work is included in the contract bid amount and completed during construction.

3.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver and store equipment and products in factory wrapped packages which properly protect equipment against weather, dirt and damage. Materials shall not be stored in contact with ground or floor.

B. Handle equipment carefully to avoid damage to motors, components, enclosures and finish. Do not install damaged units; replace and return damaged units to manufacturer.

3.5 INSTALLATION

A. Install materials and equipment in a professional manner. The Engineer may direct replacement of items which, in his opinion, do not present a professional appearance. Replace or reinstall items at the expense of the Contractor.

B. Examine all work installed by others where it applies to work of Division 21. Notify the Engineer if conditions exist which prevent satisfactory results. Start of work by the Contractor shall be construed as acceptance by him of all claims or questions as to suitability of the work of others to receive his work.

C. Conflicts: Where there is a conflict between the contract document and an applicable "CODE", the "CODE" shall govern except where the requirements of the contract documents are more stringent; where there is a conflict between the contract drawings and the contract specifications, the most stringent shall govern.

D. Damage to Other Work and Personnel

1. Adequately protect work, equipment, fixtures, and materials. At work completion, all work must be clean and in good condition.
2. Carry insurance as prescribed by law and as required in this specification for protection of employees, other persons, materials and equipment on the building site.
3. Contractor shall pay for all damages caused by his personnel, including his subcontractors.

E. Obstructions

1. The drawings indicate certain information pertaining to surface and subsurface obstructions which has been taken from available drawings. Such information is not guaranteed, however, as to accuracy of location or complete information.
2. Before any cutting or trenching operations are begun, verify with Owner's representative, utility companies, municipalities, and other interested parties that all available information has been provided. Verify locations given.

3. Should obstruction be encountered, whether shown or not, alter routing of new work, reroute existing lines, remove obstruction where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of the new work and leave existing services and structures in a satisfactory and serviceable condition.
4. Assume total responsibility for and repair any damage to existing utilities or construction, whether or not such existing facilities are shown.

F. Cutting, Patching and Excavation

1. Cut and patch all walls, partitions, floors, pits and chases in wood and masonry as indicated or required by the contract documents or as directed by the Engineer.
2. Obtain approval of Engineer prior to cutting of steel, wood or other structural member.
3. Complete all necessary excavation and backfilling incidental to work of Division 21.
4. Openings through concrete structures shall be "core bored"; where 3 or more openings penetrate in the same location the concrete may be sawed.

G. Where "rated" walls, floor, roofs and ceilings are penetrated or cut to install equipment, materials, devices, etc. the Contractor shall provide and install all materials required to re-establish the rating of the wall, floor, roof or ceiling to the satisfaction of the authority having jurisdiction.

H. Space Requirements: Consider space limitations imposed by contiguous work in selection and location of equipment and material. Do not provide equipment or material which is not suitable in this respect.

I. Select equipment to operate with minimum noise and vibration. If objectionable noise or vibration is produced or transmitted to or through the building structure by equipment, piping, ducts or other parts of work, rectify such conditions without cost to the Owner.

J. Wiring Method: Install cables in raceways and cable trays except low voltage network cable above accessible ceilings. Conceal raceway and cables except in unfinished spaces.
1. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceways and Boxes for Electrical Systems."

K. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

L. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Project Record Documents

1. Preparation: Maintain at the job site a separate set of white prints of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those

portions of work in which actual construction is significantly at variance with the contract drawings. Mark the drawings with a No. B or softer pencil. Prepare, as the work progresses and upon completion of work, drawings clearly indicating locations of various piping, valves, equipment, and other pertinent items, as installed. Record underground and underslab piping installed, dimensioning exact location and elevation of such piping.

2. Deliver: At conclusion of project, provide without cost to Owner as-built reproducibles of original mechanical drawings. Delivery of as-built reproducibles is a condition of final acceptance. In addition to final as-built drawings, each month during construction deliver current marked–up prints to the Engineer.

C. Tests

1. Include all tests specified and/or required under laws, rules and regulations of all departments having jurisdiction. Tests shall also be performed as indicated herein and other sections of the specifications.
2. After all mechanical systems have been completed and put into operation, subject each system to an operating test under design conditions to insure proper sequence and operation throughout the range of operation. Make adjustments as required to insure proper functioning of all systems.
3. All parts of the work and associated equipment shall be tested and adjusted to work properly and be left in perfect operating condition.
4. Correct defects disclosed by these tests without any additional cost to the Owner. Repeat tests on repaired or replaced work.
5. Maintain a log of all tests being conducted and have it available for review by the Engineer. Log to indicate date, type of tests, duration, and defects noted and when corrected.
6. Special tests on individual systems are specified under individual sections.

3.7 ADJUSTING

A. Adjust moving parts to function smoothly, and lubricate as recommended by manufacturer.

3.8 CLEANING

A. During construction keep the job site clean and remove all rubbish.

B. Upon completion of work leave the premises and work in a clean and acceptable condition. Remove all tools, scaffolding, materials and rubbish from the building and site. Clean all pipe chases. Remove all plaster, concrete, cement, etc. from exposed and concealed pipe, hangers and equipment prior to painting and/or concealment.

3.9 MAINTENANCE SERVICE

A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of systems and equipment Installer or manufacturer's authorized service representative. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as

required for proper operation. Parts and supplies shall be manufacture's authorized replacement parts and supplies.

3.10 DEMONSTRATION

A. Upon completion of work, and at time designated by the Owner's representative, provide services of competent representatives of the Contractor to instruct Owner's representative in the operation and maintenance of the entire system.

B. Training sessions shall be videotaped and tapes given to the Owner.

END OF SECTION 210100

SECTION 210110 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.

B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 210115 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 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.

1.3 PROCUREMENT SUBSTITUTIONS

A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.

B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Engineer; otherwise requests will be returned without action:

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

A. Procurement Substitution Request: Submit to Engineer . Procurement Substitution Request must be made in writing in compliance with the following requirements:

1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
2. Submittal Format: Submit two copies of each written Procurement Substitution Request, using CSI Substitution Request Form 1.5C.

a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:

1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
2) Samples where applicable or when requested by Engineer.
3) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. 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.
4) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.

c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Engineer's Action:

1. Engineer may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Engineer will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

C. Engineer's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 210110

SECTION 210115 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

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 CSI Form 13.1A.
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. 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.
h. Cost information, including a proposal of change, if any, in the Contract Sum.
i. 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.
j. 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. Engineer’s Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor through Construction Manager 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 Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 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: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer 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. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Engineer.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer 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 Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 210115

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SECTION 210120 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and other Division 21 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 210170 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
2. Section 210180 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Engineer for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. 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. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LCCPGS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LCCPGS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner**,** containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.

d. Name of Contractor.
e. Name of firm or entity that prepared submittal.
f. Names of subcontractor, manufacturer, and supplier.
g. Category and type of submittal.
h. Submittal purpose and description.
i. Specification Section number and title.
j. Specification paragraph number or drawing designation and generic name for each of multiple items.
k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Related physical samples submitted directly.
n. Indication of full or partial submittal.
o. Transmittal number, numbered consecutively.
p. Submittal and transmittal distribution record.
q. Other necessary identification.
r. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

E. Options: Identify options requiring selection by Engineer.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. 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 with approval notation from Engineer's action stamp.

H. 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.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Engineer's FTP site specifically established for Project.

a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. PDF electronic file.

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: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

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 42 inches.
3. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Maintenance Data: Comply with requirements specified in Section 210170 "Operation and Maintenance Data."

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.

F. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit four paper copies of certificate, 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. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

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 ENGINEER'S ACTION

A. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Engineer without action.

END OF SECTION 210120

SECTION 210130 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and other Division 21 Specification Sections apply to this Section.

1.2 SUMMARY

A. 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. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

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 Engineer.

C. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

F. 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. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

G. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: 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 conflicting requirements that are different, but apparently equal, to Engineer 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 Engineer for a decision before proceeding.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. 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.

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 products that are similar in material, design, and extent to those indicated for this Project.

F. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

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.

1.6 QUALITY CONTROL

A. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections.

B. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -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.

E. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Engineer, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: 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 Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's, Commissioning Authority'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.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

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 210130

SECTION 210150 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and other Division 21 Specification Sections apply to this Section.

1.2 SUMMARY

A. 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; and comparable products.

B. Related Requirements:

1. Section 210115 "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 210120 "Submittal Procedures."
    b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 210120 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

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

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

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 determine compliance with the Contract Documents and to determine 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. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of engineers and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 210150

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SECTION 210160 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 21 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Installation of the Work.
2. Cutting and patching.
3. Progress cleaning.
4. Starting and adjusting.
5. Protection of installed construction.
6. Correction of the Work.

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 construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection. Coordinate all floor and structural penetrations with structural strengthening drawings provided in Appendix A. Do not damage, penetrate or compromise the structure in areas where reinforcing material is present.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

a. Primary operational systems and equipment.
b. Fire separation assemblies.
c. Air or smoke barriers.
d. Fire-suppression systems.
e. Control systems.
f. Communication systems.
g. Fire-detection and -alarm systems.
h. Conveying systems.
i. Electrical wiring systems.
j. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

a. Water, moisture, or vapor barriers.
b. Membranes and flashings.
c. Exterior curtain-wall construction.
d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.
h. Structural reinforcing as indicated in Appendix A drawings.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

B. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. 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.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer.

3.3 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 and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

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. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces 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: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to 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.

3.6 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 210130 "Quality Requirements."

3.7 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 and relative humidity.

END OF SECTION 210160

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SECTION 210170 - 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 other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Section 210120 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Engineer will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Engineer.

    a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    b. Enable inserted reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 60 days before commencing demonstration and training. Engineer will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Engineer will return copy with comments.

1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. 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 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

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. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. 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 and contact information for Contractor.
6. Name and contact information for Engineer.
7. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. 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.

D. 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.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Water leak.
4. Power failure.
5. Water outage.
6. System, subsystem, or equipment failure.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 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. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

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.

2.5 PRODUCT MAINTENANCE MANUALS

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 and drawing or schedule designation or identifier where applicable.

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.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

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 and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard 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 video recording, 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.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Section 210180 "Project Record Documents."

END OF SECTION 210170

SECTION 210180 - PROJECT RECORD DOCUMENTS

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 project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 210170 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints and one set of prints.
2) Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit PDF electronic files of scanned record prints and three set(s) of prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Locations and depths of underground utilities.
    d. Revisions to routing of piping and conduits.
    e. Revisions to electrical circuitry.
    f. Actual equipment locations.
    g. Pipe size and routing.
    h. Locations of concealed internal utilities.
    i. Changes made by Change Order or Construction Change Directive.
    j. Changes made following Engineer's written orders.
    k. Details not on the original Contract Drawings.
    l. Field records for variable and concealed conditions.
    m. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record 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.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Engineer for resolution.
4. Engineer will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 210120 "Submittal Procedures" for requirements related to use of Engineer's digital data files.
    b. Engineer will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Engineer.
    e. Name of Contractor.

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.

B. Format: Submit record Specifications as annotated PDF electronic file .

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.

B. Format: Submit record Product Data as annotated PDF electronic file .

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

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.

B. Format: Submit miscellaneous record submittals as PDF electronic file .

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

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 revisions to project record documents as they occur; do not wait until 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 Engineer's reference during normal working hours.

END OF SECTION 210180

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SECTION 210190 - DEMONSTRATION AND TRAINING

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 instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Engineer.
d. Name of Contractor.
e. Date of video recording.

2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to

corresponding training components. Include name of Project and date of video recording on each page.

3. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on flash drive.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Engineer.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.

g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.

5. Adjustments: Include the following:

   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

   a. Diagnostic instructions.
   b. Test and inspection procedures.

7. Maintenance: Include the following:

   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 210170 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Engineer will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Engineer, with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

D. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video: Provide minimum 640 x 480 video resolution converted to .mp4 format file type , on electronic media.

1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. E-mail address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 210190

SECTION 210517 - SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING

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. Sleeves.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

B. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

2.2 SLEEVE-SEAL SYSTEMS

1. Manufacturers: Subject to compliance with requirements, Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. Metraflex Company (The).
4. Pipeline Seal and Insulator, Inc.
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

1. Presealed Systems.

B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
2. Cut sleeves to length for mounting flush with both surfaces.

    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.

3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

C. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.

D. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

3.4 SLEEVE SCHEDULE

A. Use sleeves for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:

   a. Piping Smaller Than NPS 6 (DN 150) : Galvanized-steel-pipe sleeves .
   b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-pipe sleeves .

2. Concrete Slabs-on-Grade:

   a. Piping Smaller Than NPS 4 (DN 100) : Sleeve-seal fittings .

      1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

   b. Piping NPS 4 (DN 100) and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system .

1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

3. Interior Partitions:

a. Piping Smaller Than NPS 6 (DN 150) : Galvanized-steel-pipe sleeves .

END OF SECTION 210517

SECTION 210518 - ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING

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. Escutcheons.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated and rough-brass finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

D. Split-Casting Brass Type: With polished, chrome-plated and rough-brass finish and with concealed hinge and setscrew.

E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, finished floors and ducts.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Insulated Piping: One-piece, stamped-steel type .
c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
d. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
e. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
f. Bare Piping in Equipment Rooms: One-piece, cast-brass type with rough-brass finish.

2. Escutcheons for Existing Piping:

a. Insulated Piping: Split-plate, stamped-steel type with concealed hinge.
b. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
c. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
d. Bare Piping in Unfinished Service Spaces: Split-casting brass type with rough-brass finish.
e. Bare Piping in Equipment Rooms: Split-casting brass type with rough-brass finish.

3.2 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 210518

SECTION 210548 - VIBRATION CONTROLS FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

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. Isolation pads.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amber/Booth Company, Inc.
2. Kinetics Noise Control.
3. Mason Industries.

B. Pads : Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.

1. Resilient Material: Oil- and water-resistant neoprene .

PART 3 - EXECUTION (Not Used)

END OF SECTION 210548

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SECTION 210553 - IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

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. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Valve tags.
5. Warning tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment-Label Schedule: Include a listing of all equipment to be labeled and the proposed content for each label.

D. Valve Schedules: Valve numbering scheme.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, with predrilled holes for attachment hardware.
2. Letter Color: White.

3. Background Color: Red.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

C. Equipment-Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

D. Provide equipment labels at a minimum for the following equipment:
1. Dry pipe valves with zone number
2. Air compressors
3. Inspector test stations (also include zone number)
4. Auxiliary drains

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, with predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: Yellow.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Pipe-Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; pipe size; and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

D. Pipe-Label Colors:

1. Background Color: Red.
2. Letter Color: White.

2.4 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping-system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: Brass, 0.032 inch (0.8 mm) thick, with predrilled holes for attachment hardware.
2. Fasteners: Brass wire-link chain S-hook.
3. Valve-Tag Color: Red.
4. Letter Color: White.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.5 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: Approximately 4 by 7 inches (100 by 178 mm) .
2. Fasteners: Brass grommet and wire .

3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 LABEL INSTALLATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install or permanently fasten labels on each major item of mechanical equipment.

D. Locate equipment labels where accessible and visible.

E. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection excluding short takeoffs. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

3.3 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems. List tagged valves in a valve-tag schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and with captions similar to those indicated in "Valve-Tag Size and Shape" Subparagraph below:

1. Valve-Tag Size and Shape:
   a. Dry-Pipe Sprinkler System: 1-1/2 inches (38 mm) , round.

3.4 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 210553

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SECTION 211316 - DRY-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Fire-protection valves.
3. Sprinkler specialty pipe fittings.
4. Sprinklers.
5. Alarm devices.
6. Manual control stations.
7. Control panels.
8. Pressure gages.

B. Related Sections:

1.3 DEFINITIONS

A. Standard-Pressure Sprinkler Piping: Dry-pipe sprinkler system piping designed to operate at working pressure 175 psig (1200 kPa) maximum.

1.4 SYSTEM DESCRIPTIONS

A. Dry-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing compressed air. Opening of sprinklers releases compressed air and permits water pressure to open dry-pipe valve. Water then flows into piping and discharges from sprinklers that are open.

1.5 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig (1200-kPa) minimum working pressure.

B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Sprinkler system design shall be approved by authorities having jurisdiction.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
2. Sprinkler Occupancy Hazard Classifications:

    a. Automobile Parking Areas: Ordinary Hazard, Group 1 .
    b. Building Service Areas: Ordinary Hazard, Group 1 .
    c. Electrical Equipment Rooms: Ordinary Hazard, Group 1 .
    d. General Storage Areas: Ordinary Hazard, Group 1 .
    e. Mechanical Equipment Rooms: Ordinary Hazard, Group 1 .
    f. Office and Public Areas: Light Hazard .
    g. Diesel Tank Storage: Extra Hazard, Group 2.
    h. Generator Room: Extra Hazard, Group 2.

3. Minimum Density for Automatic-Sprinkler Piping Design:

    a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. (4.1 mm/min. over 139-sq. m) area.
    b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. (6.1 mm/min. over 139-sq. m) area.
    c. Extra-Hazard, Group 2 Occupancy: 0.40 gpm over 2500-sq. ft. (16.3 mm/min. over 232-sq. m)] area.

4. Maximum Protection Area per Sprinkler: Per UL listing, NFPA 13 recommendations or as noted below.

    a. Office Spaces: 225 sq. ft. (20.9 sq. m) .
    b. Storage Areas: 130 sq. ft. (12.1 sq. m) .
    c. Mechanical Equipment Rooms: 130 sq. ft. (12.1 sq. m) .
    d. Electrical Equipment Rooms: 130 sq. ft. (12.1 sq. m) .
    e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:

    a. Light-Hazard Occupancies: 100 gpm (6.3 L/s) for 30 minutes .
    b. Ordinary-Hazard Occupancies: 250 gpm (15.75 L/s) for 60 to 90 minutes .
    c. Extra-Hazard Occupancies: 500 gpm (31.5 L/s) for 90 to 120 minutes .

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For dry-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and professional engineer.

B. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.

C. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

D. Field quality-control reports.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project. Locate cabinet in valve room or as direct by owner.

2. Sprinklers and Piping: Provide allowance equal to 10% of sprinkler and piping on project to be located by Engineer or AHJ as building components are installed to provide adequate coverage around obstructions or to otherwise coordinate with competing systems.

1.10 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test and annual fire pump test data.

a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

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. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."

1.11 PROJECT CONDITIONS

A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without Owner's written permission.
3. All requirements associate with providing a fire watch as coordinated with the AHJ must be met. Owner will provide fire watch based on contractors approved construction schedule. If additional fire watch is required outside of the approved construction schedule, the contractor will be responsible for the cost of additional fire watch.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 STEEL PIPE AND FITTINGS

A. S, Galvanized-Steel Pipe: ASTM A 53/A 53M, Type E , Grade B . Pipe ends may be factory or field formed to match joining method.

B. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.

C. Galvanized, Steel Couplings: ASTM A 865, threaded.

D. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.

E. Malleable- or Ductile-Iron Unions: UL 860.

F. Grooved-Joint, Steel-Pipe Appurtenances:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

    a. Anvil International, Inc.
    b. Tyco Fire & Building Products LP.
    c. Victaulic Company.

2. Pressure Rating: 175 psig (1200 kPa) minimum.
3. Galvanized, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick .

1. Class 125, Cast-Iron and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
2. Class 250, Cast-Iron and Class 300, Raised-Face Flanges: Ring-type gaskets.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

2.4 LISTED FIRE-PROTECTION VALVES

A. General Requirements:

1. Valves shall be UL listed or FM approved.
2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig (1200 kPa).

B. Ball Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO, Inc.; KG/KT-505-W-8 or comparable product by one of the following:

    a. Anvil International, Inc.
    b. Milwaukee Valve Company

2. Standard: UL 1091 except with ball instead of disc.
3. Valves NPS 1-1/2 (DN 40) and Smaller: Bronze body with threaded ends.
4. Valves NPS 2 and NPS 2-1/2 (DN 50 and DN 65): Bronze body with threaded ends or ductile-iron body with grooved ends.

C. Check Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO, Inc.; F-908-W or G-917-W or comparable product by one of the following:

    a. Anvil International, Inc.
    b. Milwaukee Valve Company.

c. Mueller Co.; Water Products Division.
d. Tyco Fire & Building Products LP.

2. Standard: UL 312
3. Pressure Rating: 250 psig (1725 kPa) minimum .
4. Type: Swing check.
5. Body Material: Cast iron.
6. End Connections: Flanged or grooved.

2.5 TRIM AND DRAIN VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig (1200 kPa) minimum.

B. Angle Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Fire Protection Products, Inc.
b. United Brass Works, Inc.

C. Ball Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Anvil International, Inc.
b. Conbraco Industries, Inc.; Apollo Valves.
c. Milwaukee Valve Company.
d. NIBCO INC.
e. Tyco Fire & Building Products LP.

D. Globe Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

a. Fire Protection Products, Inc.
b. United Brass Works, Inc.

2.6 SPECIALTY VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating:

    a. Standard-Pressure Piping Specialty Valves: 175 psig (1200 kPa) minimum.

3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

B. Dry-Pipe Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Tyco Fire & Building Products LP; DPV-1 or comparable product by one of the following:

    a. Reliable Automatic Sprinkler Co., Inc.
    b. Viking Corporation.

2. Standard: UL 260
3. Design: Differential-pressure type.
4. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
5. Accelerator:
    a. For dry systems exceeding 500 gallons provide an accelerator to meet the maximum time of water delivery to the system test connection as required by NFPA 13. An accelerator is not required if the maximum time of water delivery to the system test connection meets the requirements of NFPA 13.

    b. Basis-of-Design Product: Subject to compliance with requirements, provide Tyco Fire & Building Products LP; ACC-1 or comparable product by one of the following:

        1) Reliable Automatic Sprinkler Co., Inc.
        2) Viking Corporation.

    c. Standard: UL 1486.
    d. Type: Mechanical, pressure differential.

6. Air-Pressure Maintenance Device:

    a. Basis-of-Design Product: Subject to compliance with requirements, provide General Air Products Inc.; AMD-1 or comparable product by one of the following:

        1) Tyco Fire & Building Products LP.
        2) Reliable Automatic Sprinkler Co., Inc.
        3) Viking Corporation.

    b. Standard: UL 260.
    c. Type: Automatic device to maintain minimum air pressure in piping.

d. Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig (95- to 410-kPa) adjustable range, and 175-psig (1200-kPa) outlet pressure.

7. Air Compressor:

a. Basis-of-Design Product: Subject to compliance with requirements, provide General Air Products Inc.; LT2000500B or comparable product by one of the following:

1) Gast Manufacturing Inc.
2) Viking Corporation.

b. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
c. Motor Horsepower: 5.
d. Power: 460-V ac, 60 Hz, three phase.

C. Automatic (Ball Drip) Drain Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Tyco Fire & Building Products LP; AD-2 or comparable product by one of the following:

a. Reliable Automatic Sprinkler Co., Inc.

2. Standard: UL 1726.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Type: Automatic draining, ball check.
5. Size: NPS 3/4 (DN 20).
6. End Connections: Threaded.

2.7 SPRINKLER SPECIALTY PIPE FITTINGS

A. General Requirements for Dry-Pipe-System Fittings: UL listed for dry-pipe service.

B. Flow Detection and Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

a. Reliable Automatic Sprinkler Co., Inc.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.

2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Pressure Rating: 175 psig (1200 kPa) minimum .
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.

5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

C. Branch Line Testers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

   a. Elkhart Brass Mfg. Company, Inc.
   b. Fire-End & Croker Corporation.
   c. Potter Roemer.

2. Standard: UL 199.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Body Material: Brass.
5. Size: Same as connected piping.
6. Inlet: Threaded.
7. Drain Outlet: Threaded and capped.
8. Branch Outlet: Threaded, for sprinkler.

D. Sprinkler Inspector's Test Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

   a. Tyco Fire & Building Products LP.
   b. Victaulic Company.
   c. Viking Corporation.

2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Pressure Rating: 175 psig (1200 kPa) minimum .
4. Body Material: Cast- or ductile-iron housing with sight glass.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

2.8 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

1. Reliable Automatic Sprinkler Co., Inc.
2. Tyco Fire & Building Products LP.
3. Viking Corporation.

B. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Automatic Sprinklers: 175 psig (1200 kPa) minimum.

C. Automatic Sprinklers with Heat-Responsive Element:

1. Nonresidential Applications: UL 199 .
2. Characteristics: Nominal 1/2-inch (12.7-mm) orifice with discharge coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

D. Sprinkler Finishes:

1. Chrome plated.
2. Bronze.
3. Painted.

E. Sprinkler Guards:

1. Standard: UL 199.
2. Type: Wire cage with fastening device for attaching to sprinkler.

2.9 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Pressure Switches:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

   a. Potter Electric Signal Company.
   b. System Sensor; a Honeywell company.
   c. Tyco Fire & Building Products LP.
   d. Viking Corporation.

2. Standard: UL 346.
3. Type: Electrically supervised water-flow switch with retard feature.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design Operation: Rising pressure signals water flow.

2.10 MANUAL CONTROL STATIONS

A. Description: UL listed or FM Global approved, hydraulic operation, with union, NPS 1/2 (DN 15) pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

2.11 PRESSURE GAGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

1. AMETEK, Inc.; U.S. Gauge Division.
2. Ashcroft, Inc.
3. WIKA Instrument Corporation.

B. Standard: UL 393.

C. Dial Size: 3-1/2- to 4-1/2-inch (90- to 115-mm) diameter.

D. Pressure Gage Range: 0 to 250 psig (0 to 1725 kPa) minimum .

E. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.

F. Air System Piping Gage: Include retard feature and "AIR" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Engineer before deviating from approved working plans.

B. Piping Standard: Comply with requirements in NFPA 13 for installation of sprinkler piping.

C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.

E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.

F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

G. Install sprinkler piping with drains for complete system drainage.

H. Connect compressed-air supply to dry-pipe sprinkler piping.

I. Connect air compressor to the following piping and wiring:

1. Pressure gages and controls.
2. Electrical power system.
3. Fire-alarm devices, including low-pressure alarm.

J. Install alarm devices in piping systems.

K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements in NFPA 13 for hanger materials.

L. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 (DN 8) and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

M. Drain dry-pipe sprinkler piping.

N. Pressurize and check dry-pipe sprinkler system piping and air-pressure maintenance devices and air compressors.

O. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

Q. Install escutcheons for piping penetrations of walls, ceilings, floors and ducts. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."

3.2 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.

C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.

D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

H. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.

I. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

J. Copper-Tubing Grooved Joints: Roll rounded-edge groove in end of tube according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

K. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.3 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

D. Specialty Valves:

1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
2. Dry-Pipe Valves: Install trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, fill-line attachment and accelerator attachment as required.

    a. Install air compressor and compressed-air supply piping.
    b. Air-Pressure Maintenance Device: Install shutoff valves to permit servicing without shutting down sprinkler system; bypass valve for quick system filling; pressure regulator or switch to maintain system pressure; strainer; pressure ratings with 14- to 60-psig (95- to 410-kPa) adjustable range; and 175-psig (1200-kPa) maximum inlet pressure.
    c. Install compressed-air supply piping from building's compressed-air piping system.
    d. Install accelerator and associated piping to dry-pipe valve and system as required.

3.4 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

B. Identify system components, wiring, cabling, and terminals.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Start and run air compressors.
6. Coordinate with fire-alarm tests. Operate as required.
7. Coordinate with fire-pump tests. Operate as required.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.6 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

3.8 PIPING SCHEDULE

A. Standard-pressure, dry-pipe sprinkler system, NPS 2 (DN 50) and smaller , shall be one of the following:

1. Schedule 40, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
2. Schedule 40, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

B. Standard-pressure, dry-pipe sprinkler system, NPS 2-1/2 to NPS 4 (DN 65 to DN 100) , shall be one of the following:

1. Schedule 40, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

C. Standard-pressure, dry-pipe sprinkler system, NPS 5 and NPS 6 (DN 125 and DN 150) , shall be one of the following:

1. Schedule 40, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.9 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms without Ceilings: Upright sprinklers .
2. Rooms with Suspended Ceilings: Dry recessed, and concealed sprinklers as indicated.
3. Wall Mounting: Dry sidewall sprinklers.
4. Spaces Subject to Freezing: Upright, dry pendent sprinklers; and dry sidewall sprinklers as indicated .
5. Special Applications: Extended-coverage and quick-response sprinklers where indicated or required .

B. Provide sprinkler types in subparagraphs below with finishes indicated.

1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
2. Recessed Sprinklers: Painted white, with painted white escutcheon.
3. Upright, Pendent, and Sidewall Sprinklers: Painted white in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

END OF SECTION 211316

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SECTION 260100 - GENERAL PROVISIONS FOR ELECTRICAL

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. Applicable provisions of this section apply to all sections of Division 26, Electrical.

1.2 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Furnish a copy of the installer’s warranty.

C. Furnish a copy of the manufacturer's warranty for each piece of equipment.

1.3 QUALITY ASSURANCE

A. General:

1. It is the intent of the plans and specifications to obtain a complete, operable and satisfactory installation.
2. All materials shall be new, be properly labeled and/or identified and be in full compliance with the contract documents.
3. All work shall comply with applicable Codes and Standards.
4. Manufacturer's model names and numbers used in these specifications are subject to change per manufacturer's action. Contractor shall therefore verify them with manufacturer's representative before ordering any product or equipment

B. Manufacturer Qualifications: Company regularly engaged in manufacture of general use equipment with characteristics required, whose products have been in satisfactory use in similar service for not less than five years.

C. Installer Qualifications: Company with at least three years of successful installation experience on projects with installation work similar to that required for the project.

D. Furnish new and unused materials and equipment manufactured in the U.S.A. Where two or more units of the same type or class of equipment are required provide units of a single manufacturer.

E. Only manufacturer's products specified hereinafter or listed in an addendum, prior to the acceptance of bids, shall be furnished and installed under this contract.

F. All products used in this project installation shall be new and currently under manufacture and shall have been applied in similar installations for a minimum of two years. This installation shall not be used as a test site for any new products unless explicitly approved by the Owner in writing. Spare parts shall be available for at least five years after completion of this contract.

1.4 CODE REQUIREMENTS

A. Perform work in accordance with the following codes and any applicable statutes, ordinances, codes, and regulations of governmental authorities having jurisdiction.

1. Occupational Safety and Health Regulations (OSHA).
2. National Fire Codes

    a. NFPA 1 Uniform Fire Code
    b. NFPA 70 National Electrical Code
    c. NFPA 101 Life Safety Code

3. Florida Building Codes 2007 Edition w/ 2008 & 2009 Supplements

    a. Building Code - Chapter 11 Florida Accessibility Code
    b. Building Code - Chapter 13 Energy Efficiency Code

4. Florida Administrative Code
    a. Chapter 69A-3 Fire Prevention – General Provisions
    b. Chapter 69A-60 The Florida Fire Prevention Code

5. ADA Accessibility Guidelines for Buildings (ADAAG)

B. Resolve, in writing, any code violation discovered in contract documents with the Engineer prior to bidding. After award of the contract, make any correction or addition necessary for compliance with applicable codes at no additional cost to Owner.

C. The installer shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus and drawings required to comply with all applicable laws, ordinances, rules and regulations.

1.5 REFERENCE SPECIFICATIONS AND STANDARDS

A. Materials which are specified by reference to Federal Specifications; ASTM, ASME, ANSI, or AWWA Specifications; Federal Standards; or other standard specifications must comply with latest editions, revisions, amendments or supplements in effect on date bids are received. Specifications and standards are minimum requirements for all equipment, material and work. In instances where capacities, size or other feature of equipment, devices or materials exceed these minimums, meet listed or shown capacities.

B. Whenever a reference is made to a standard, installation and materials shall comply with the latest published edition of the standard at the time project is bid unless otherwise specified herein

1.6 PERMITS FEES AND INSPECTIONS

A. Obtain and pay for all permits, fees, tap fees, connection charges, demand charges, systems charges, impact fees and inspections.

B. Deliver all certificates of inspection issued by authorities having jurisdiction to the Engineer.

1.7 WARRANTY

A. Warranty work and equipment for one year from the date of final acceptance of the project. During the warranty period provide labor and materials to make good any faults or imperfections that may arise due to defects or omissions in materials or workmanship.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 CONTRACT DOCUMENTS

A. Examine all drawings and specifications carefully before submitting a bid. If discrepancies or conflicts occur between drawings, or between drawings and specifications, notify the Engineer in writing prior to bid date; however, the most stringent requirement shall govern.

B. For purposes of clearness and legibility, drawings are essentially diagrammatic and, although size and location of equipment are drawn to scale wherever possible, Contractor shall make use of all data in all of the contract documents and shall verify this information at the building site.

C. The drawings indicate required size and points of termination of pipes, conduits and ducts and suggest proper routes to conform to structure avoid obstructions and preserve clearances. However, it is not intended that drawings indicate all necessary offsets, and it shall be the responsibility of the Contractor to make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instructions or cost to the Owner.

D. Furnish, install and/or connect with appropriate services all items shown on any drawing without additional compensation.

E. Consider the terms "provide" and "install" as synonymous with "furnish and install".

F. Any and all questions about a subcontractor's scope of work responsibility shall be addressed to and answered by the Prime Contractor.

G. Questions about Construction Documents: Any and all questions shall be submitted through the proper channels IN WRITING and, in turn, shall be answered by the Engineer in writing. All telephone conversations shall be considered unofficial and, as such, shall not be considered official or binding responses to Contractor's questions.

3.2 EXAMINATION

A. Each Contractor shall visit the projects site and fully familiarize himself with existing conditions and account for these conditions in the submitted bids

B. Examine conditions, with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Included within the scope of Division 26 is work where equipment and/or materials are furnished or required by this Division and installed under another Division (designated by the Contractor). It is the responsibility of the Contractor to see that all such work is included in the contract bid amount and completed during construction.

3.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver and store equipment and products in factory wrapped packages which properly protect equipment against weather, dirt and damage. Materials shall not be stored in contact with ground or floor.

B. Handle equipment carefully to avoid damage to motors, components, enclosures and finish. Do not install damaged units; replace and return damaged units to manufacturer.

3.4 INSTALLATION

A. Install materials and equipment in a professional manner. The Engineer may direct replacement of items which, in his opinion, do not present a professional appearance. Replace or reinstall items at the expense of the Contractor.

B. Examine all work installed by others where it applies to work of Division 26. Notify the Engineer if conditions exist which prevent satisfactory results. Start of work by the Contractor shall be construed as acceptance by him of all claims or questions as to suitability of the work of others to receive his work.

C. Conflicts: Where there is a conflict between the contract document and an applicable "CODE", the "CODE" shall govern except where the requirements of the contract documents are more stringent; where there is a conflict between the contract drawings and the contract specifications, the most stringent shall govern.

D. Damage to Other Work and Personnel

1. Adequately protect work, equipment, fixtures, and materials. At work completion, all work must be clean and in good condition.
2. Carry insurance as prescribed by law and as required in this specification for protection of employees, other persons, materials and equipment on the building site.
3. Contractor shall pay for all damages caused by his personnel, including his subcontractors.

E. Obstructions

1. The drawings indicate certain information pertaining to surface and subsurface obstructions which has been taken from available drawings. Such information is not guaranteed, however, as to accuracy of location or complete information.
2. Before any cutting or trenching operations are begun, verify with Owner's representative, utility companies, municipalities, and other interested parties that all available information has been provided. Verify locations given.
3. Should obstruction be encountered, whether shown or not, alter routing of new work, reroute existing lines, remove obstruction where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of the new work and leave existing services and structures in a satisfactory and serviceable condition.
4. Assume total responsibility for and repair any damage to existing utilities or construction, whether or not such existing facilities are shown.

F. Cutting and Patching

1. Cut and patch all walls, partitions, floors, pits and chases in wood and masonry as indicated or required by the contract documents or as directed by the Engineer.
2. Obtain approval of Engineer prior to cutting of steel, wood or other structural member.
3. Openings through concrete structures shall be "core bored"; where 3 or more openings penetrate in the same location the concrete may be sawed.

G. Where "rated" walls, floor, roofs and ceilings are penetrated or cut to install equipment, materials, devices, etc. the Contractor shall provide and install all materials required to re-establish the rating of the wall, floor, roof or ceiling to the satisfaction of the authority having jurisdiction.

H. Space Requirements: Consider space limitations imposed by contiguous work in selection and location of equipment and material. Do not provide equipment or material which is not suitable in this respect.

I. Select equipment to operate with minimum noise and vibration. If objectionable noise or vibration is produced or transmitted to or through the building structure by equipment, piping, ducts or other parts of work, rectify such conditions without cost to the Owner.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Tests

1. Include all tests specified and/or required under laws, rules and regulations of all departments having jurisdiction. Tests shall also be performed as indicated herein and other sections of the specifications.
2. After all electrical systems have been completed and put into operation, subject each system to an operating test under design conditions to insure proper sequence and operation throughout the range of operation. Make adjustments as required to insure proper functioning of all systems.
3. All parts of the work and associated equipment shall be tested and adjusted to work properly and be left in perfect operating condition.

4. Correct defects disclosed by these tests without any additional cost to the Owner. Repeat tests on repaired or replaced work.
5. Maintain a log of all tests being conducted and have it available for review by the Engineer. Log to indicate date, type of tests, duration, and defects noted and when corrected.
6. Special tests on individual systems are specified under individual sections.

3.6 MAINTENANCE SERVICE

A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of systems and equipment Installer or manufacturer's authorized service representative. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacture's authorized replacement parts and supplies.

END OF SECTION 260100

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.

3. Senator Wire & Cable Company.
4. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper . Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits: Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

3.4 CONNECTIONS

A. 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. The contractor shall prepare a table listing the manufacturer’s published torque tightening values and the installed torque tightening values as measured during installation for each feeder. The contractor shall submit this table for the Engineer’s review at the time of substantial completion. The contractor shall take any corrective action required by the Engineer to ensure torque tightening values match the manufacturer’s published values.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors, for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. The contractor shall ensure that each cable and conductor tested is under a minimum of 50% of the connected load indicated on the current construction documents.

Any cables or conductors not meeting this requirement should be listed in the submitted test reports.

a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
b. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Equipment supports.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps .

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts .
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 PAINTING

A. Touchup: Comply with requirements in Section 099113.1 "Exterior Painting for Mechanical and Electrical Systems" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Metal wireways and auxiliary gutters.
3. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

A. GRC: Galvanized rigid steel conduit.

B. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

A. Product Data: For wireways and fittings, hinged-cover enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. GRC: Comply with ANSI C80.1 and UL 6.

C. IMC: Comply with ANSI C80.6 and UL 1242.

D. EMT: Comply with ANSI C80.3 and UL 797.

E. FMC: Comply with UL 1; zinc-coated steel .

F. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

G. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Fittings for EMT:

a. Material: Steel or die cast.
b. Type: Setscrew or compression.

H. Joint Compound for IMC, GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Wireway Covers: Screw-cover type unless otherwise indicated.

D. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

1. Cooper Technologies Company; Cooper Crouse-Hinds.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman; a Pentair company.
5. Hubbell Incorporated; Killark Division.
6. O-Z/Gedney; a brand of EGS Electrical Group.
7. RACO; a Hubbell Company.
8. Robroy Industries.
9. Spring City Electrical Manufacturing Company.
10. Thomas & Betts Corporation.
11. Wiremold / Legrand.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy , Type FD, with gasketed cover.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC or IMC .
2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC .
3. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R .

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Severe Physical Damage: EMT .
2. Exposed and Subject to Severe Physical Damage: GRC or IMC. Raceway locations include the following:

    a. Mechanical rooms.

3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
4. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in damp or wet locations.

C. Minimum Raceway Size: 1/2-inch (16-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. EMT: Use setscrew or compression, steel cast-metal fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

G. Support conduit within 12 inches (300 mm) of enclosures to which attached.

H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

I. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

J. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

L. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

N. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

O. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where otherwise required by NFPA 70.

P. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC in damp or wet locations not subject to severe physical damage.

Q. Locate boxes so that cover or plate will not span different building finishes.

R. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. PROTECTION

B. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

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SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

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. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

END OF SECTION 260544

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Identification for conductors.
2. Equipment identification labels.
3. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1.

B. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with location of access panels and doors.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

3.2 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in pull and junction boxes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.

b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

B. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

C. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

D. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer.
b. Disconnect switches.
c. Enclosed circuit breakers.

END OF SECTION 260553

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Appendix A

Structural Strengthening Drawings

H2Engineering, Inc.

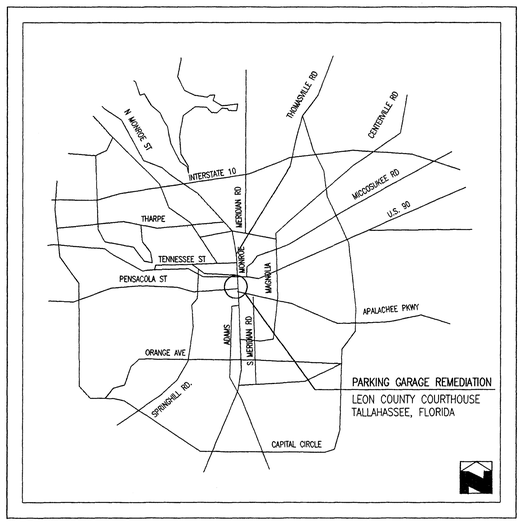
114 East 5th Avenue
Tallahassee, Florida 32303
850 · 224 · 7922 (Phone)
850 · 224 · 5876 (Fax)
www.H2Engineering.com

BARNETT FRONCZAK BARLOWE ARCHITECTS

AS BUILT
CONSTRUCTION DOCUMENTS

PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE

BOARD OF COUNTY COMMISSIONERS
LEON COUNTY, FLORIDA



PROJECT TEAM:

DATE: NOVEMBER 12, 2004

STRUCTURAL ENGINEER

STRUCTURAL DIAGNOSTICS AND
FORENSIC ENGINEERING, INC.
1221 W. THARPE STREET
TALLAHASSEE, FLORIDA 32303
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CONTRACTOR

STRUCTURAL PRESERVATION
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SARASOTA, FLORIDA 34243
941.358.6600 941.358.6662 F
WWW.STRUCTURALPRESERVATION.NET

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F E
ENGINEERS, INC.

STRUCTURAL PRESERVATION SYSTEMS

AS-BUILT DRAWINGS
11/04/05

CS-01

GENERAL STRUCTURAL NOTES

GENERAL NOTES:

1. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH CONTRACT DOCUMENTS AND SPECIFICATIONS.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, PRIOR TO PERFORMING WORK.
3. THE CONTRACTOR SHALL WORK STRUCTURAL DRAWINGS TOGETHER WITH EXISTING CONDITIONS TO LOCATE DEPRESSED SLABS, SLOPES, DRAINS, BOLT SETTINGS, GRADES, ETC.. ANY DISCREPANCIES SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
4. ALL DETAILS AND SECTIONS SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL BE CONSTRUED TO APPLY TO ANY SIMILAR SITUATION ELSEWHERE ON THE PROJECT, EXCEPT WHERE A DIFFERENT DETAIL IS SHOWN.
5. CONTRACTOR SHALL PROVIDE ADEQUATE BRACING, SHORING AND OTHER TEMPORARY SUPPORTS AS REQUIRED TO SAFELY COMPLETE THE WORK.

DESIGN CRITERIA

1. LOCATION: TALLAHASSEE, FLORIDA
2. BUILDING CODE: FLORIDA BUILDING CODE – 2001 EDITION W/ 2003 REVISIONS
3. DESIGN LOADS: (LOADS PROVIDED WERE THE BASIS OF THE ORIGINAL DESIGN)

   LIVE LOAD

PARKING AREAS AND RAMPS	50 PSF
OFFICE AREAS	50 PSF
MECHANICAL ROOMS	125 PSF
STAIRS AND LANDINGS	100 PSF
DUMPSTER AREA	PER LOADING REQUIREMENT (40 KIP DUMPSTER AND HAULING TRUCK)

   DEAD LOAD (SUPERIMPOSED)

PARKING AREAS AND RAMPS	20 PSF
OFFICE AREAS	30 PSF

4. MATERIAL PROPERTIES: (PROPERTIES WERE THE BASIS OF THE ORIGINAL DESIGN)

CONCRETE COMPRESSIVE STRENGTH	4000 PSI AT 28 DAYS
REINFORCING STEEL	ASTM A616, GRADE 60
STRUCTURAL STEEL	ASTM A36
WELDED WIRE FABRIC	ASTM A185
BOLTS	ASTM A325f
CONCRETE MASONRY UNITS	ASTM C90, GRADE N, TYPE 1

5. DESIGN LOADING AND MATERIAL PROPERTIES WERE PROVIDED ON SHT. S2.2 OF THE ORIGINAL DRAWINGS DATED FEBRUARY 14, 1985. THIS INFORMATION INCLUDING RECENT CONCRETE TEST RESULTS WERE UTILIZED FOR THE REPAIR DESIGN.

TESTING

1. CONTRACTOR SHALL PROVIDE TESTING AS DESCRIBED IN PROJECT SPECIFICATIONS.

SEQUENCE OF REPAIR

1. REMOVE MECHANICAL DUCT WORK, PIPING AND ELECTRICAL CONDUIT AND LIGHTS AS REQUIRED TO ALLOW PLACEMENT OF CFRP. MAIN ELECTRICAL CONDUIT AT P3 SOFFIT NOT TO BE DISTURBED.
2. IF DAMAGED CONCRETE IS PRESENT, REPAIR AS REQUIRED. REPAIR CRACKS W/ EPOXY.
3. PRIOR TO PLACING FRP, FILL BUG HOLES AND POCKETS IN AREAS WHERE IS FRP IS PLACED USING APPROVED EPOXY MORTAR.
4. MAKE SAW CUTS WHERE SPECIFIED BEFORE PLACEMENT OF NSM RODS.
5. APPLY CFRP REINFORCING RODS AND FABRIC AT REQUIRED LOCATIONS. AS REQUIRED BY THE MANUFACTURER, TESTS ARE TO BE PERFORMED. MECHANICALLY CLEAN AREAS WITH "NEEDLE SCALER" OR APPROVED METHOD AND BLOW OFF WITH AIR WHERE CFRP IS APPLIED.
6. PERFORM TESTING, SEE SPECIFICATIONS FOR TEST REQUIREMENTS.

CONCRETE – SECTION 03300

1. ALL CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION SECTION 03300 "CONCRETE WORK".
2. CONCRETE SHALL BE DESIGNED TO SECURE A STRENGTH OF 5000 PSI AT 28 DAYS.
3. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A–615 GRADE 60 (Fy=60 KSI).
4. ALL CONCRETE SHALL BE CONSOLIDATED BY USE OF A MECHANICAL VIBRATOR OR OTHER MEANS APPROVED BY THE ENGINEER.
5. ALL DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318–02.
6. ALL CONCRETE REINFORCEMENT SHALL BE DETAILED, FABRICATED, LABELED, SUPPORTED AND SPACED IN FORMS AND SECURED IN PLACE IN ACCORDANCE WITH THE PROCEDURES AND REQUIREMENTS OUTLINED IN THE LATEST EDITION OF THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE," ACI 318–02 AND THE "MANUALS OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES," ACI 315 LATEST EDITION.
7. ALL BAR SPLICES AND DOWELS SHALL LAP 30 BAR DIAMETERS (MIN.) UNLESS REQUIRED OTHERWISE BY CODE.

MASONRY – SECTION 04200

1. DESIGN, MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH "BUILDING CODE REQUIREMENTS FOR CONCRETE MASONRY STRUCTURES" OF THE ACI ACI 530–02.
2. MORTAR SHALL BE IN ACCORDANCE WITH ASTM C270, STANDARD SPECIFICATIONS FOR MORTAR FOR MASONRY.
3. GROUT TO BE 3000 PSI & SHALL BE IN ACCORDANCE WITH ASTM C476, STANDARD SPECIFICATIONS FOR GROUT FOR MASONRY.
4. CONCRETE MASONRY UNITS SHALL BE GRADE N, TYPE II, IN ACCORDANCE WITH ASTM C90, STANDARD SPECIFICATIONS FOR HOLLOW LOAD–BEARING CONCRETE MASONRY UNITS. THE NET COMPRESSIVE STRENGTH OF THE CMU BLOCK SHALL BE 1900 PSI FOR F'm = 1500 PSI.
5. ALL VERTICAL REINFORCING STEEL BARS IN CMU WALLS SHALL BE ANCHORED IN THE CONCRETE THICKENED SLAB, FOOTING OR BEAM (LINTEL) UPON WHICH THE WALL RESTS AND IN THE BEAM AT THE TOP OF THE WALL WITH STANDARD HOOKS AND SHALL BE CONTINUOUS THROUGH ALL INTERMEDIATE WALL BEAMS.
6. ALL VERTICAL CMU REINFORCING STEEL BARS SHALL BE CONTINUOUS WITH LAP SPLICES AT LEAST 48 BAR DIAMETERS.
7. VERTICAL CELLS TO BE GROUTED SHALL HAVE A MINIMUM CLEAR DIMENSION OF 2 INCHES AND CLEAR AREA OF 8 SQUARE INCHES FOR 8" CMU. GROUTING SHALL BE DONE IN A CONTINUOUS OPERATION IN LIFTS NOT EXCEEDING FIVE FEET.
8. ALL CMU ELEMENTS SHALL BE ADEQUATELY BRACED TO PROVIDE STABILITY UNTIL THE ENTIRE STRUCTURE IS COMPLETE AND TO PREVENT DAMAGE DURING CONSTRUCTION.

CARBON FIBER FABRIC

1. SIKAWRAP HEX 103C IS A HIGH MODULUS UNIDIRECTIONAL CARBON FIBER FABRIC. MATERIAL IS FIELD LAMINATED USING SIKADUR HEX 300 OR SIKADUR HEX 306 EPOXY TO FORM A CARBON FIBER REINFORCED POLYMER (CFRP) USED TO STRENGTHEN STRUCTURAL ELEMENTS.
2. SURFACE MUST BE CLEAN AND SOUND. IT MAY BE DRY OR DAMP, BUT FREE OF STANDING WATER AND FROST. REMOVE DUST, LAITANACE, GREASE, CURING COMPOUNDS, IMPREGNATIONS, WAXES, FOREIGN PARTICLES, DISINTEGRATED MATERIALS, AND OTHER BOND INHIBITING MATERIALS FROM THE SURFACE.
3. EXISTING UNEVEN SURFACES MUST BE FILLED WITH AN APPROPRIATE REPAIR MORTAR.
4. INJECT CRACKS. CRACKS GREATER THAN 0.25mm (0.010 in.) MUST BE STABILIZED USING EPOXY INJECTION METHODS.
5. THE ADHESIVE STRENGTH OF THE CONCRETE MUST BE VERIFIED AFTER SURFACE PREPARATION BY RANDOM PULL–OFF TESTING (ACI 503R) AT THE DISCRETION OF THE ENGINEER. MINIMUM TENSILE STRENGTH 200 PSI WITH CONCRETE SUBSTRATE FAILURE.
6. RADIUS CORNERS PERPENDICULAR TO THE FIBER ORIENTATION BY GRINDING MIN. 1/2" UNLESS NOTED OTHERWISE.
7. BLAST CLEAN, SHOTBLAST OR USE OTHER APPROVED MECHANICAL MEANS TO PROVIDE AN OPEN ROUGHENED TEXTURE ON CONCRETE SURFACE.
8. CONSULT SIKADUR HEX 300/306 DATA SHEET FOR INFORMATION ON MIXING EPOXY RESIN.
9. PRIOR TO PLACING THE FABRIC, THE CONCRETE SURFACE IS PRIMED AND SEALED USING SIKADUR HEX 300 EPOXY. MATERIAL MAY BE APPLIED BY SPRAY, BRUSH OR ROLLER. SIKAWRAP HEX 103C CAN BE IMPREGNATED USING EITHER THE SIKADUR HEX 300 OR SIKADUR HEX 306 EPOXY.
10. FABRIC CAN BE CUT USING A COMMERCIAL QUALITY HEAVY DUTY SCISSORS. SINCE DULL OR WORN CUTTING IMPLEMENTS CAN DAMAGE, WEAKEN OR FRAY THE FIBER, THEIR USE SHOULD BE AVOIDED. CONSULT MSDS FOR PROPER HANDLING PROCEDURES.
11. SYSTEM IS A VAPOR BARRIER. DON'T ENCAPSULATE CONCRETE IN AREAS OF FREEZE/THAW.
12. SIKAWRAP FABRIC IS NON–REACTIVE. HOWEVER, CAUTION MUST BE USED WHEN HANDLING SINCE A FINE "CARBON DUST" MAY BE PRESENT ON THE SURFACE. GLOVES MUST THEREFORE BE WORN TO PROTECT AGAINST SKIN IRRITATION.
13. WRAP THE BEAM WITH THE SPECIFIED NUMBER OF WRAPS AS CALCULATED AND INDICATED ON THE DRAWINGS. SEQUENCE TO BE ADVISED ON DAILY WORK SHEET FOR BEAM. FOLLOW APPROVED DRAWINGS. APPLY SHEAR STRENGTHENING LAYERS ON TOP OF FLEXURAL STRENGTHENING LAYERS OR AS PER ENGINEERING DRAWINGS. THIS METHOD HELPS TO SECURE THE ENDS OF THE FLEXURAL STRENGTHENING. INSTALL FIBER ANCHORS AS PER SPECIFICATIONS IF REQUIRED. FABRIC SAMPLING PROCEDURE AS REQUIRED BY SPECIFICATIONS.
14. USING A ROLLER, PRIME THE AREA TO BE WRAPPED WITH ONE COAT OF SIKADUR HEX EPOXY. APPLY THE LAYERS OF FABRIC WRAP INDIVIDUALLY, WAITING AS PER SPEC'S BEFORE APPLYING AS PER SPECIFICATIONS BEFORE APPLYING FABRIC WRAP FOR VERTICAL AND OVERHEAD APPLICATIONS, SUBSEQUENT LAYERS. APPLY UNIFORM AND SMOOTH PRESSURE EITHER WITH A STIFF SPATULA OR ROLLER REMOVING AIR BUBBLES. APPLY FINAL COAT OF EPOXY TOP COAT.
15. APPLY FIRE RETARDANT PAINT OVER ALL FRP.

CFRP–CARBON FIBER REINFORCING POLYMER RODS (NSM–RODS)

1. ALL SUBSTRATES MUST BE CLEAN, SOUND, AND FREE OF SURFACE MOISTURE. REMOVE DUST, LAITANCE, GREASE, CURING COMPOUNDS, WAXES, IMPREGNATIONS, FOREIGN PARTICLES AND OTHER BOND INHIBITING MATERIALS.
2. LAYOUT LOCATIONS TO RECEIVE CFRP RODS. CUT A GROOVE INTO THE CONCRETE USING AN APPROPRIATE CONCRETE SAW OR DIAMOND BLADE. BLAST CLEAN, SHOTBLAST OR USE OTHER APPROVED MECHANICAL METHODS TO PROVIDE AN OPEN ROUGHENED TEXTURE. IN ADDITION, CLEAN THE GROOVE WITH COMPRESSED AIR. DURING THE CUTTING PROCESS, DO NOT CUT ANY EXISTING STEEL REINFORCING OR OTHER ITEMS WITHIN THE SUBSTRATE. LOCATE POSITION AND DEPTH OF EXISTING BARS USING GPR OR ANY OTHER METHOD PRIOR TO THE CUTTING OF THE NSM GROOVES.
3. STORE AND CONDITION THE SPECIFIED PRODUCTS AS RECOMMENDED BY THE MANUFACTURER.
4. PRECAUTIONS SHOULD BE TAKEN TO AVOID DAMAGE TO ANY SURFACE NEAR THE WORK ZONE DUE TO MIXING AND HANDLING OF THE CFRP ROD SYSTEM.
5. THE AMBIENT TEMPERATURE AND TEMPERATURE OF THE EPOXY COMPONENTS SHALL BE AS SPECIFIED AS PER THE MANUFACTURER AT THE TIME OF MIXING.
6. MIX ONLY THAT QUANTITY OF EPOXY WHICH CAN BE USED WITHIN ITS POT LIFE.
7. MIX THE EPOXY, SIKADUR 32 OR SIKADUR 30, PER THE MANUFACTURER'S REQUIREMENTS.
8. CLEAN THE CFRP RODS WITH AN APPROPRIATE CLEANER SUCH AS MEK. DRY THE CFRP RODS WITH A CLEAN RAG. RODS MUST BE CLEANED OUTSIDE OF THE BUILDING OR IN A VENTED AREA PRIOR TO PLACEMENT.
9. APPLY THE MIXED EPOXY INTO THE GROOVE UNTIL HALF FULL. PRESS THE ASLAN 200 RODS INTO THE EPOXY AND THEN APPLY ADDITIONAL EPOXY OVER THE RODS TO FILL THE GROOVES. STRIKE THE SURFACE WITH A TROWEL TO FORCE OUT ANY AIR AND PROVIDE A CLEAN SURFACE.
10. THE EPOXY AND REINFORCEMENT MUST NOT BE DISTURBED FOR A MINIMUM OF 24 HOURS. THE EPOXY WILL HAVE REACHED ITS DESIGN STRENGTH AFTER 7 DAYS.
11. CFRP BARS ARE TO BE ASLAN 200 FRP BARS BY HUGHES BROTHERS, INC.

PLAN NOTES

1. DROP PANELS NOTED ARE ON THE BOTTOM OF THE INDICATED SLAB LEVEL.
2. THE WALLS SHOWN INDICATE THE ROOMS LOCATED ON THE SLAB LEVEL. THE WALLS BELOW ARE NOT SHOWN.
3. DO NOT DAMAGE EXISTING PIPE, CONDUIT OR DUCTWORK DURING CONSTRUCTION.
4. RELOCATE EXISTING SPRINKLER PIPING TO ACCOMMODATE NEW DROP PANELS OR WHERE CFRP CAN NOT BE ADJUSTED TO PREVENT INTERFERENCE. SPRINKLER PIPING MAY BE TEMPORARILY RELOCATED.
5. SMOKE DETECTORS TO BE PROTECTED DURING CONSTRUCTION.
6. REPOSITION OR RELOCATE LIGHTS AS REQUIRED TO PLACE DROP PANELS.
7. DROP PANELS THAT INTERSECT CONC. BEAM OR STRUCTURAL WALL TO TERMINATE AT FACE OF CONCRETE.
8. CFRP RODS AND WRAP ARE TO BE SPACED SYMMETRICALLY ABOUT COLUMN SLAB PANEL CENTERLINES UNLESS OTHERWISE NOTED.
9. REMOVE AND REPLACE VEHICULAR WHEEL STOPS AS NECESSARY TO ACCOMMODATE CONSTRUCTION.
10. REMOVE AND REPLACE SIGNAGE AS NECESSARY. SIGNAGE MUST BE IN–PLACE DURING TRAFFIC CONDITIONS.
11. COORDINATE PLACEMENT OF TRAFFIC COATING WITH PROJECT SCHEDULE AND OWNER'S REQUIREMENTS.
12. FRP FABRIC AND BARS SHALL REMAIN UNDISTURBED (NO LOADING ALLOWED ON SLAB SURFACE AND ADJACENT SPANS) FOR A MINIMUM OF 72 HOURS OR AS DETERMINED THROUGH PULL–OFF TESTS. AT THE DISCRETION OF THE ENGINEER, PULL–OFF TESTS OF 200 PSI OR GREATER MAY ALLOW LOADING OF THE STRUCTURE EARLIER THAN 72 HOURS.
13. REPAIR ALL CRACKS ON SLAB LEVEL EXCEPT THOSE AS NOTED. CRACKS THAT ARE INJECTED ARE TO BE INJECTED W/ SIKADUR 35 FOLLOWING ACCEPTABLE INJECTION METHODS. SAMPLES OF EPOXY SHALL BE TAKEN & CORES TAKEN AT CRACKS TO ENSURE PROPER FILLING OF CRACKS.

THRESHOLD INSPECTION

1. THIS BUILDING IS CLASSIFIED AS A THRESHOLD BUILDING AND IS SUBJECT TO THE REQUIREMENTS OF THE FLORIDA STATUTES.
2. WORK TO BE OBSERVED CONSISTS OF ALL STRUCTURAL COMPONENTS. THESE ITEMS INCLUDE CONCRETE WORK, STRUCTURAL STEEL, FRP INSTALLATION AND MASONRY WORK.
3. THE SPECIAL INSPECTOR IS RESPONSIBLE TO THE ENFORCEMENT AGENCY HAVING JURISDICTION FOR THIS PROJECT. THE SPECIAL INSPECTOR SHALL NOT ASSUME THE DUTIES OF THE ENFORCEMENT AGENCY, THE CONTRACTOR, THE OWNER, NOR THE STRUCTURAL ENGINEER.
4. THE SPECIAL INSPECTOR SHALL MAKE INSPECTIONS OF ALL CONSTRUCTION INDICATED ON THE STRUCTURAL DRAWINGS AND SHALL IMMEDIATELY REPORT OBSERVED CONSTRUCTION VARIATIONS TO THE CONTRACTOR AND THE STRUCTURAL ENGINEER.
5. THE SPECIAL INSPECTOR SHALL PREPARE WRITTEN INSPECTION REPORTS RECORDING WORK PROGRESS, WORKING CONDITIONS, INSPECTION OBSERVATIONS, TESTING, VARIATIONS OF CONSTRUCTION FROM THE DRAWINGS, REQUIREMENT PERTAINING TO VARIATIONS, AND CORRECTIVE ACTIONS TAKEN BY THE CONTRACTOR.
6. A WRITTEN INSPECTION REPORT SHALL BE PREPARED FOR EVERY INSPECTION PERFORMED BY THE SPECIAL INSPECTOR, OR HIS AUTHORIZED REPRESENTATIVES, AND ALL INSPECTION REPORTS SHALL BE SIGNED, DATED AND BEAR THE INSPECTIONS PERFORMED DURING THE WORK PERIOD.
7. THE SPECIAL INSPECTOR SHALL MAINTAIN AN EXCEPTION FILE RECORDING.
8. SEE THE PROJECT SPECIFICATIONS FOR ADDITIONAL THRESHOLD REQUIREMENTS.
9. THE FOLLOWING ITEMS OF WORK ARE TO BE OBSERVED INCLUDING INFORMATION CONTAINED IN THE SPECIFICATION SECTION 02210.

CAST–IN–PLACE CONCRETE:

1. THE SPECIAL INSPECTOR SHALL INSPECT THE CAST–IN–PLACE CONCRETE FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS.

SHORING AND RE–SHORING PROCEDURES:

1. THE SPECIAL INSPECTOR SHALL INSPECT ALL SHORING AND RE–SHORING PROCEDURES OF CAST–IN–PLACE CONCRETE WORK FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS.

FRP PLACEMENT:

1. THE SPECIAL INSPECTOR SHALL INSPECT THE FRP PLACEMENT FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS.
10. THE SPECIAL INSPECTOR SHALL, UPON COMPLETION OF THE BUILDING AND PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY, FILE A SIGNED AND SEALED STATEMENT WITH THE ENFORCEMENT AGENCY.

STRUCTURAL STEEL – SECTION 05120

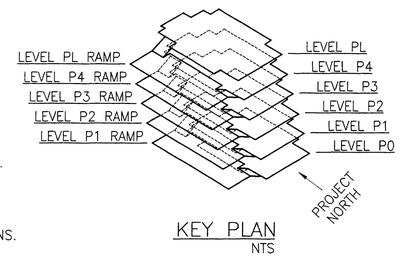
1. STRUCTURAL STEEL DESIGN, FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS," NINTH EDITION.
2. HIGH STRENGTH BOLTING SHALL BE IN ACCORDANCE WITH AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS" (LATEST EDITION). CONNECTION TYPE MAY BE BEARING – TYPE CONNECTION WITH THREADS INCLUDED IN THE SHEAR PLANE.
3. WELDING SHALL BE IN ACCORDANCE WITH AMERICAN WELDING SOCIETY SPECIFICATION AWS D1.1 LATEST EDITION. WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS.
4. ALL STRUCTURAL STEEL SHALL HAVE THE FOLLOWING MINIMUM YIELD STRENGTHS, UNLESS OTHERWISE NOTED ON THE DRAWINGS.

STRUCTURAL TUBING	Fy = 46KSI
ALL OTHER	Fy = 50KSI

5. HIGH STRENGTH BOLTS, NUTS AND HARDENED WASHERS SHALL CONFORM TO ASTM A325; MACHINE BOLTS AND NUTS SHALL CONFORM TO ASTM A307.
6. WELDING ELECTRODES USED FOR SHOP OR FIELD CONNECTIONS SHALL HAVE A MINIMUM ELECTRODE TENSILE STRENGTH OF 70 KSI. UNLESS NOTED OTHERWISE ON THE DRAWINGS, ELECTRODES SHALL CONFORM TO AWS A5.
7. ALL STRUCTURAL STEEL SHALL BE UNPRIMED WHERE FIREPROOFING IS TO BE APPLIED.
8. PROVIDE SPRAY ON FIREPROOFING ON STEEL MEMBERS.

FABRICATION AND ERECTION

1. ERECTION BOLTS USED IN HIGH STRENGTH BOLTED CONNECTIONS SHALL BE REMOVED AND REPLACED WITH HIGH STRENGTH BOLTS.
2. WHEN CONNECTIONS REQUIRE FIELD PREPARATION OF BOLT HOLES, THE HOLES SHALL BE DRILLED AND THE DIAMETER OF THE BOLT HOLES SHALL BE 1/16 INCH GREATER THAN THE NOMINAL BOLT DIAMETER.
3. FIELD CORRECTING OF FABRICATED STEEL BY GAS CUTTING SHALL NOT BE PERMITTED ON STRUCTURAL FRAMING MEMBERS WITHOUT PRIOR APPROVAL OF THE ENGINEER.



KEY PLAN
NTS

AS–BUILT DRAWINGS

SHEET INDEX

SDFE structural diagnostics & forensic engineering
1221 W. Tharpe Street
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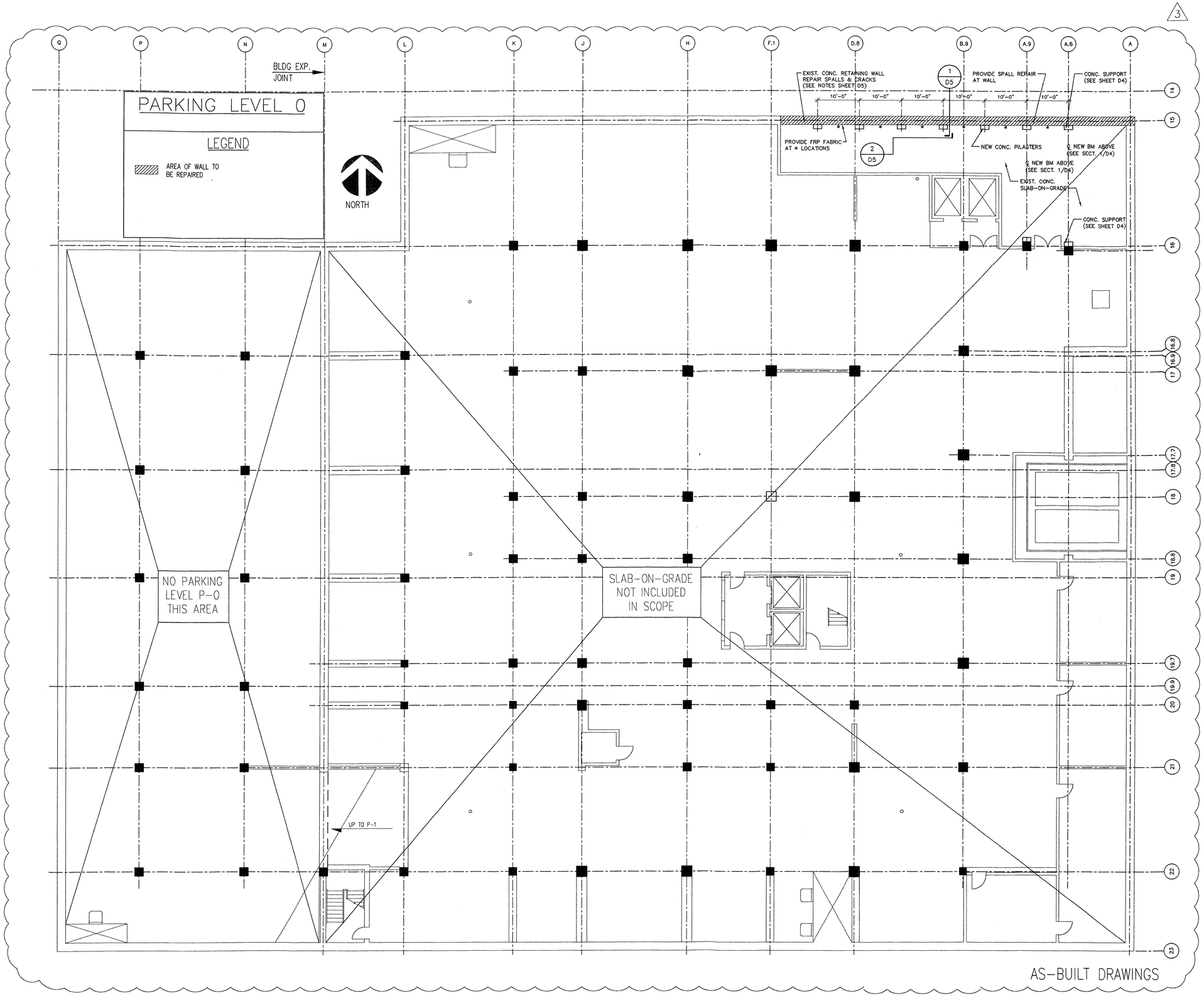
Cert. of Authorization# 08549
Primus V. Mtenga PE# 46667

PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
TALLAHASSEE, FLORIDA

CONSTRUCTION DOCUMENTS
Date: NOV 12, 2004
Project No.: 002–04
Drawn By: AJV
Checked By: PVM
Rev.# Date Description

3 ADDITIONAL WORK 5/27/05

S1
OF



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PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
TALLAHASSEE, FLORIDA

CONSTRUCTION DOCUMENTS
MAY 27, 2005
Project No.: 002-04
Drawn By: AJV
Checked By: PVM

Rev.# Date Description
3 ADDITIONAL WORK 5/27/05

P0
OF

PARKING LEVEL 1
SCALE 3/32"=1'-0"

LEGEND

- DROP PANEL
- FRP BAR
- FRP FABRIC
- CRACKS/COLD JOINTS TO BE ROUTED AND SEALED (NO EPOXY INJECTED)

NORTH

FILL CRACKS ON THIS LEVEL

FILL CRACKS ON THIS LEVEL

RAMP SLAB ON GRADE

TO P0

IF PANEL DIMENSIONS ARE NOT PROVIDED, PANEL IS TO BE CENTERED ON COLUMN GRID LINES. SEE SHEET D1 FOR PANEL DIMENSIONS.
DROP PANELS NOTED ARE ON THE BOTTOM OF THE SLAB LEVEL.
AT LOCATIONS WHERE FRP FABRIC IS PLACED BETWEEN DROP PANEL, FABRIC IS TO BE CENTERED BETWEEN DROP PANELS.
IF FABRIC/ROD POSITION NOT SHOWN, PLACE FABRIC/ROD SYMMETRICALLY TO COLUMN OR SLAB PANEL.
VERIFY CONDITION OF EXISTING WALL. IF NECESSARY, PROVIDE REPAIR TO STRENGTHEN WALL. REPAIR WILL BE BASED ON FIELD CONDITIONS.

1 AS-BUILT DRAWINGS

SDFE ltd. structural diagnostics & forensic engineering

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PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
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CONSTRUCTION DOCUMENTS
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Rev.# Date Description

1 COT COMMENTS 12/20/04
2 OWNER'S ENGINEER COMMENTS 1/7/05
3 ADDITIONAL WORK 5/27/05
4 MOD. TO ACCOMODATE ADD. MECH. LOAD 6/16/05

P1
OF

PARKING LEVEL 2

SCALE 3/32"=1'-0"

LEGEND

- DROP PANEL
- FRP BAR
- FRP FABRIC
- CRACKS/COLD JOINTS TO BE ROUTED AND SEALED (NO EPOXY INJECTED)

NORTH

NOTE:
1. IF PANEL DIMENSIONS ARE NOT PROVIDED, PANEL IS TO BE CENTERED ON COLUMN GRID LINES. SEE SHEET D1 FOR PANEL DIMENSIONS.
2. DROP PANELS NOTED ARE ON THE BOTTOM OF THE SLAB LEVEL.
3. AT LOCATIONS WHERE FRP FABRIC IS PLACED BETWEEN DROP PANEL, FABRIC IS TO BE CENTERED BETWEEN DROP PANELS.
4. IF FABRIC/ROD POSITION NOT SHOWN, PLACE FABRIC/ROD SYMMETRICALLY TO COLUMN OR SLAB PANEL.

AS-BUILT DRAWINGS

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PARKING GARAGE REMEDIATION

LEON COUNTY COURTHOUSE

TALLAHASSEE, FLORIDA

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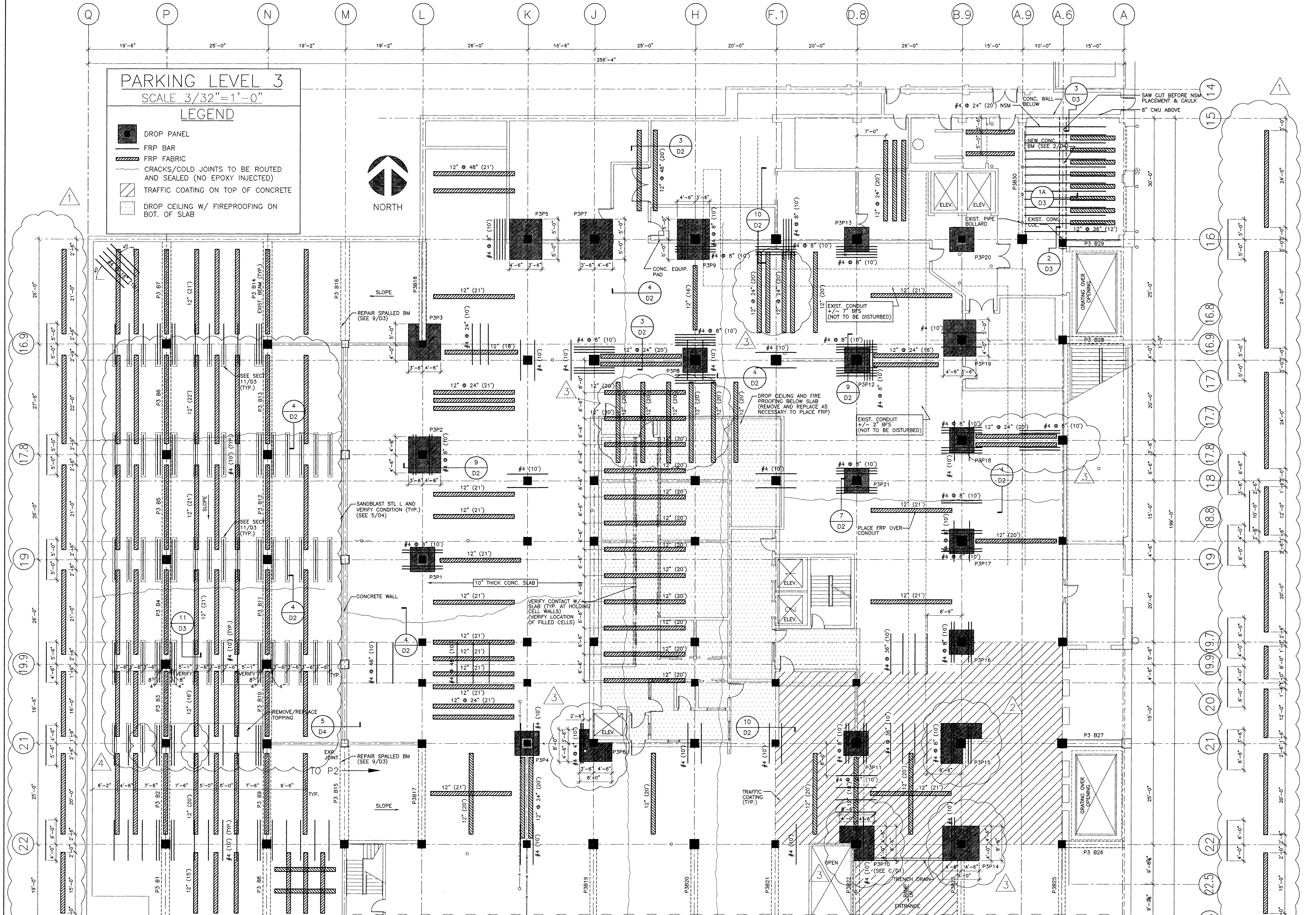
1. COT COMMENTS 12/20/04
2. OWNER'S ENGINEER COMMENTS 1/7/05
3. ADDITIONAL WORK 6/30/05

P2

OF



NOTE:
1. IF PANEL DIMENSIONS ARE NOT PROVIDED, PANEL IS TO BE CENTERED ON COLUMN GRID LINES. SEE SHEET D1 FOR PANEL DIMENSIONS.
2. DROP PANELS NOTED ARE ON THE BOTTOM OF THE SLAB LEVEL.
3. AT LOCATIONS WHERE FRP FABRIC IS PLACED BETWEEN DROP PANEL, FABRIC IS TO BE CENTERED BETWEEN DROP PANELS.
4. IF FABRIC/ROD POSITION NOT SHOWN, PLACE FABRIC/ROD SYMMETRICALLY TO COLUMN OR SLAB PANEL.

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2 OWNER'S ENGINEER COMMENTS 1/7/05
3 ADDITIONAL WORK 5/27/05
4 ADDITIONAL WORK 6/30/05

P3
OF

PARKING LEVEL 4
SCALE 3/32"=1'-0"

LEGEND

- DROP PANEL
- FRP BAR
- FRP FABRIC
- CRACKS/COLD JOINTS TO BE ROUTED AND SEALED (NO EPOXY INJECTED)
- TRAFFIC COATING ON TOP OF CONCRETE
- EXISTING TRAFFIC COATING ON TOP OF CONCRETE

NORTH

CONCRETE WALL (TYP.)
REPAIR SPALLED BM (SEE 9/D3)
SLOPE
BEAM
SANDBLAST STL L AND VERIFY CONDITION (TYP.) (SEE 5/D4)
CONCRETE WALL
10" THICK CONC. SLAB
VERIFY CONTACT BETWEEN BEAM AND SLAB IN HOLDING CELLS
REINFORCED CONC. BEAM
MASONRY WALL
TRAFFIC COATING (TYP.)
CONC. COL. (TYP.)
ENTRANCE
TO P3
REMOVE PORTION OF ABANDONED DUCT WORK
RELOCATE EXIST. DUCTWORK AROUND NEW DROP PANEL
C15x33.9 (SEE BM. ELEV. 3/D4)
ELEV.
P4P1
P4P2
P4P3
P4P4
P4P5
P4P6
P4P7
P4P8
P4P9
P4P10
P4P11
P4P12
P4P13
P4P14
P4P15

NOTE:
1. IF PANEL DIMENSIONS ARE NOT PROVIDED, PANEL IS TO BE CENTERED ON COLUMN GRID LINES. SEE SHEET D1 FOR PANEL DIMENSIONS.
2. DROP PANELS NOTED ARE ON THE BOTTOM OF THE SLAB LEVEL.
3. AT LOCATIONS WHERE FRP FABRIC IS PLACED BETWEEN DROP PANEL, FABRIC IS TO BE CENTERED BETWEEN DROP PANELS.
4. IF FABRIC/ROD POSITION NOT SHOWN, PLACE FABRIC/ROD SYMMETRICALLY TO COLUMN OR SLAB PANEL.

AS-BUILT DRAWINGS

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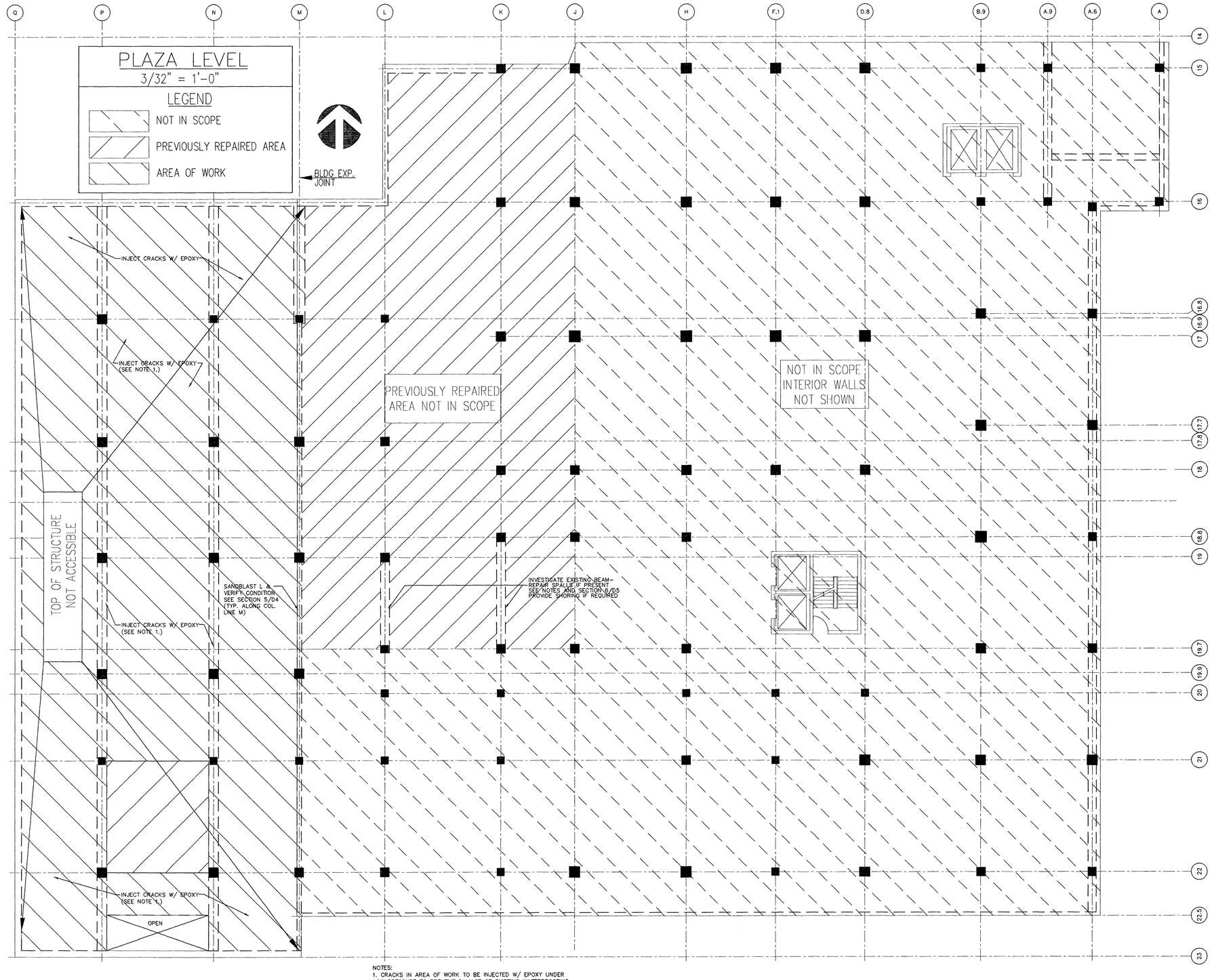

NOTES:
1. CRACKS IN AREA OF WORK TO BE INJECTED W/ EPOXY UNDER LOW PRESSURE TO PREVENT DAMAGE OF EXISTING WATERPROOFING.

SDFE structural diagnostics & forensic engineering inc.

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CONSTRUCTION DOCUMENTS
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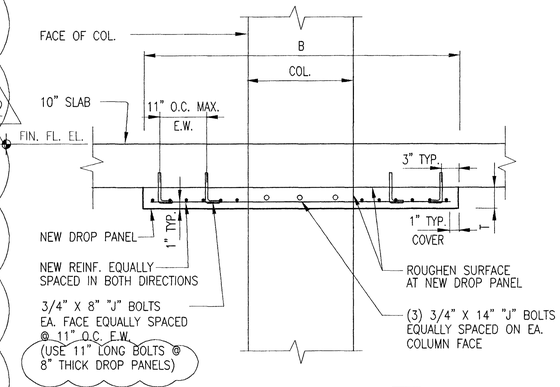
Rev.# Date Description
1 COT COMMENTS 12/20/04
2 OWNER'S ENGINEER COMMENTS 1/7/05

PL
OF

ID	N–S GRID	E–W GRID	T	B_{N-S}	B_{E-W}	A_{NS1}	A_{NS2}	A_{EW1}	A_{EW2}
P1P1	L	19	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P2	L	17.8	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P3	L	16.9	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P4	K	21	5"	7'–0"	7'–6"	3'–6"	3'–6"	4'–6"	3'–0"
P1P5	K	18	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P6	K	17	5"	10'–0"	7'–6"	5'–0"	5'–0"	4'–6"	3'–0"
P1P7	K	16	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P8	J	17	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P9	J	16	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P10	H	17	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P1P11	H	16	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P1P12	F1	17	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P1P13	D8	22	5"	8'–0"	10'–0"	4'–0"	4'–0"	4'–0"	6'–0"
P1P14	D8	21	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P1P15	D8	18	5"	10'–0"	10'–0"	6'–0"	4'–0"	4'–0"	6'–0"
P1P16	D8	17	5"	10'–0"	10'–0"	5'–0"	5'–0"	4'–0"	6'–0"
P1P17	D8	16	5"	10'–0"	10'–0"	5'–0"	5'–0"	4'–0"	6'–0"
P1P18	B9	22	5"	8'–0"	8'–0"	4'–0"	4'–0"	4'–0"	4'–0"
P1P19	B9	21	5"	8'–0"	8'–0"	4'–0"	4'–0"	4'–0"	4'–0"
P1P20	B9	19.7	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P1P21	B9	18.8	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P1P22	B9	17.7	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P1P23	B9	16.8	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P1P24	B9	16	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P1P25	A6	18.8	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P1P26	A6	19.7	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P1	L	19	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P2P2	L	17.8	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P2P3	L	16.9	6"	10'–0"	8'–0"	5'–0"	5'–0"	3'–6"	4'–6"
P2P4	K	22	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P2P5	K	17	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P6	K	16	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P2P7	J	17	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P2P8	J	16	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P2P9	H	22	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P2P10	H	17	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P11	H	16	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P12	F1	17	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P2P13	D8	22	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P2P14	D8	21	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P15	D8	17	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P16	D8	16	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P17	D8	18.8	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P2P18	D8	17.7	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P2P19	D8	16.9	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P2P20	D8	16	6"	10'–0"	7'–0"	5'–0"	5'–0"	4'–6"	2'–6"
P2P21	A6	17.7	5"	5'–0"	5'–0"	2'–6"	2'–6"	4'–6"	1'–0"
P2P22	J	22	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P3P1	L	19	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P3P2	L	17.8	5"	9'–0"	8'–0"	4'–6"	4'–6"	3'–6"	4'–6"
P3P3	L	16.9	5"	9'–0"	8'–0"	5'–0"	4'–0"	3'–6"	4'–6"
P3P4	K	21	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P3P5	K	16	8"	10'–0"	8'–0"	5'–0"	5'–0"	4'–6"	3'–6"
P3P6	J	21	5"	8'–0"	8'–0"	3'–6"	4'–6"	3'–6"	4'–6"
P3P7	J	16	8"	10'–0"	8'–0"	5'–0"	5'–0"	3'–6"	4'–6"
P3P8	H	17	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P3P9	H	16	5"	10'–0"	8'–0"	5'–0"	5'–0"	4'–6"	3'–6"
P3P10	D8	22	5"	8'–6"	8'–6"	4'–6"	4'–0"	4'–0"	4'–6"

ID	N–S GRID	E–W GRID	T	B_{N-S}	B_{E-W}	A_{NS1}	A_{NS2}	A_{EW1}	A_{EW2}
P3P11	D8	21	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P3P12	D8	17	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P3P13	D8	16	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P3P14	B9	22	5"	8'–6"	9'–0"	4'–6"	4'–0"	4'–6"	4'–6"
P3P15	B9	21	8"	10'–0"	10'–0"	5'–0"	5'–0"	5'–0"	5'–0"
P3P16	B9	19.7	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P3P17	B9	18.8	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P3P18	B9	17.7	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P3P19	B9	16.8	6"	9'–0"	8'–0"	5'–0"	4'–0"	4'–6"	3'–6"
P3P20	B9	16	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P3P21	D8	18	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P4P1	L	21	8"	7'–6"	8'–0"	3'–0"	4'–6"	3'–6"	4'–6"
P4P2	L	19	5"	9'–0"	8'–0"	4'–6"	4'–6"	3'–6"	4'–6"
P4P3	L	17.8	5"	9'–0"	8'–0"	4'–6"	4'–6"	3'–6"	4'–6"
P4P4	L	16.9	5"	10'–0"	8'–0"	5'–0"	5'–0"	3'–6"	4'–6"
P4P5	K	22	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P4P6	H	17	5"	5'–0"	5'–0"	2'–6"	2'–6"	2'–6"	2'–6"
P4P7	D8	21	5"	9'–0"	9'–0"	4'–6"	4'–6"	4'–6"	4'–6"
P4P8	D8	17	5"	9'–0"	9'–0"	4'–6"	4'–6"	4'–6"	4'–6"
P4P9	B9	22	5"	9'–6"	9'–0"	5'–0"	4'–6"	4'–6"	4'–6"
P4P10	B9	21	6"	10'–0"	9'–0"	5'–0"	5'–0"	4'–6"	4'–6"
P4P11	B9	19.7	5"	9'–0"	9'–0"	4'–6"	4'–6"	4'–6"	4'–6"
P4P12	B9	18.8	5"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P4P13	B9	17.7	6"	9'–6"	9'–0"	5'–0"	4'–6"	4'–6"	4'–6"
P4P14	B9	16.8	6"	10'–0"	9'–0"	5'–0"	5'–0"	4'–6"	4'–6"
P4P15	B9	16	5"	4'–0"	4'–0"	2'–0"	2'–0"	2'–0"	2'–0"
P1P27	A6	16.8	6"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P1P28	A6	16	6"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"
P1P29	A9	16	6"	6'–0"	6'–0"	3'–0"	3'–0"	3'–0"	3'–0"

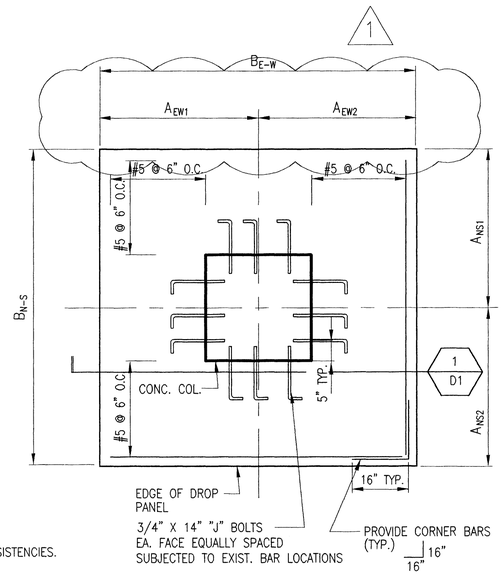
ALL QUANTITIES TO BE VERIFIED BY CONTRACTOR.
REINFORCING TO BE EQUALLY SPACED.



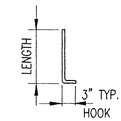
2 TYP. DROP PANEL SECTION 1/D1
SCALE: 3/4"=1'–0"

STRUCTURAL NOTES:

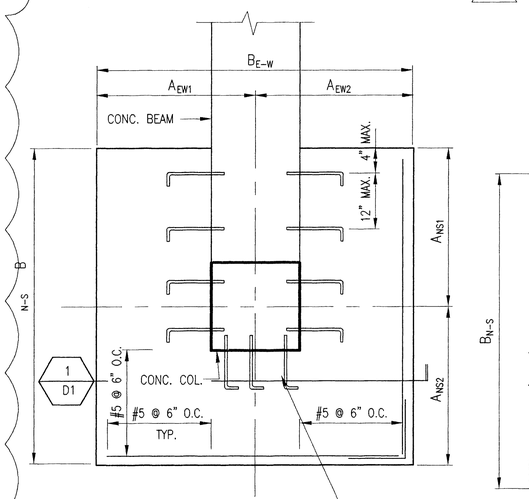
1. FIELD VERIFY EXISTING CONDITIONS. NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR INCONSISTENCIES.
2. PROTECT EXISTING FACILITIES, STRUCTURES AND UTILITIES FROM DAMAGE.
3. EXISTING SURFACES INTERSECTING DROP PANELS, SHALL BE ROUGHENED. APPLY SIKA ARMATEC 110 OR APPROVED EQUIVALENT AS A BONDING AGENT.
4. DROP PANELS TO BE POURED USING 5000 PSI CONCRETE PUMP MIX.
5. ANCHORS TO BE DRILLED, DOWELED AND EPOXIED INTO EXIST. CONCRETE USING SIKA ANCHOR FIX 4. MIN. EMBEDMENT TO BE 4".
6. FORMS MAY BE REMOVED AFTER DROP PANELS REACH A MIN. OF 80% OF THE DESIGN STRENGTH.
7. EXISTING STEEL REINF. TO BE LOCATED PRIOR TO DRILLING.
8. REINFORCING TO BE DEFORMED BARS CONFORMING TO A–615 GR 60 (Fy=60KSI).
9. "J" BOLTS AND STUDS SHALL BE A36 MATERIAL.
10. EXISTING MASONRY/PARTITIONS TO BE CUT AND REPLACED TO ACCOMMODATE NEW DROP PANELS.
11. THE DESIGN WAS BASED UPON THE CONCRETE COMPRESSIVE STRENGTH TESTING.
12. REPAIR CRACKS IN AREA OF DROP PANELS UTILIZING CRACK INJECTION/GRAVITY FEED METHODS. CRACKS SHALL BE EPOXIED INJECTED.
13. SEE SECTION 7/D3 WHERE DROP PANEL INTERSECTS NON–LOAD BEARING CMU WALL.



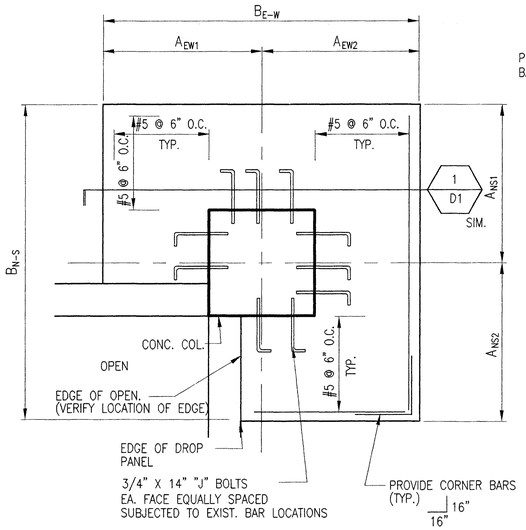
TYP. DROP PANEL
DETAIL A/D1
SCALE: 3/4"=1'–0"



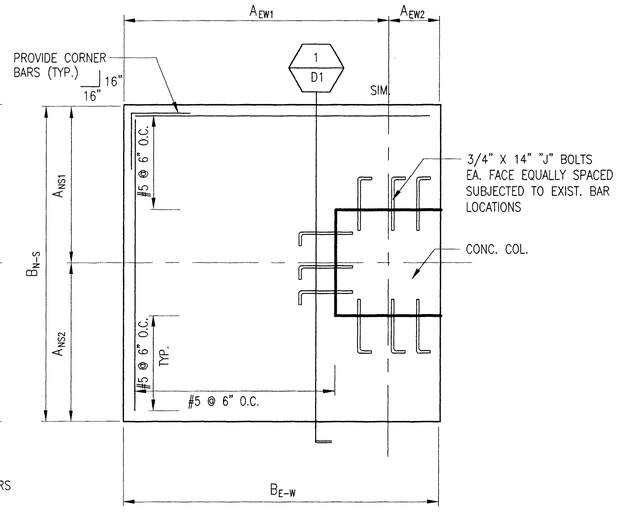
TYP. "J" BOLT



DROP PANEL @ BEAM INTERSECTION
DETAIL B/D1
SCALE: 3/4"=1'–0"



DETAIL C/D1
SCALE: 3/4"=1'–0"



DETAIL D/D1
SCALE: 3/4"=1'–0"

AS–BUILT DRAWINGS

SDFE Inc. structural diagnostics & forensic engineering
1221 W. Tharpe Street
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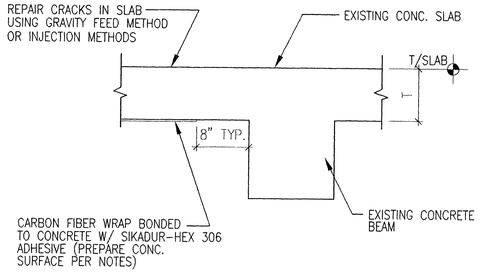
850–576–7333 F
Cert. of Authorization# 08549
Primus V. Mtenga PE# 46667

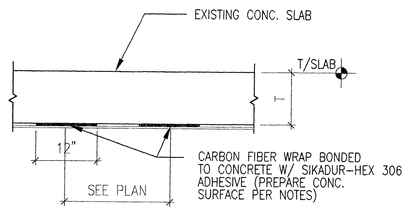
PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
TALLAHASSEE, FLORIDA

CONSTRUCTION DOCUMENTS
Date: NOV 12, 2004
Project No.: 002–04
Drawn By: AJV
Checked By: PVM

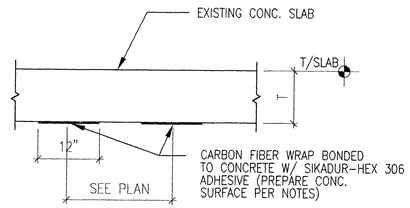
Rev.# Date Description
1 COT COMMENTS 12/20/04
2 OWNER'S ENGINEER COMMENTS 1/7/05
4 MOD. TO ACCOMODATE ADD. MECH. LOAD 6/16/05



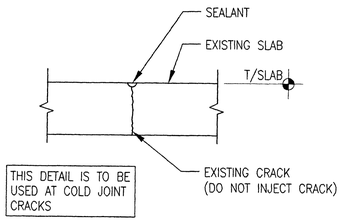
SECTION 1 D2
SCALE: 3/4"=1'-0"



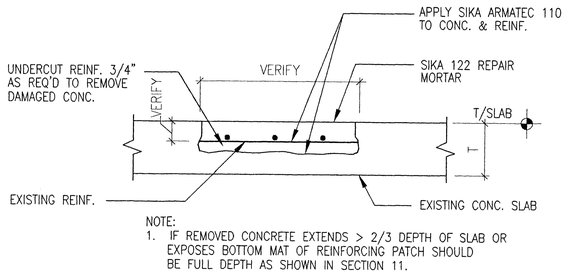
SECTION 2 D2
SCALE: 3/4"=1'-0"



SECTION 3 D2
SCALE: 3/4"=1'-0"

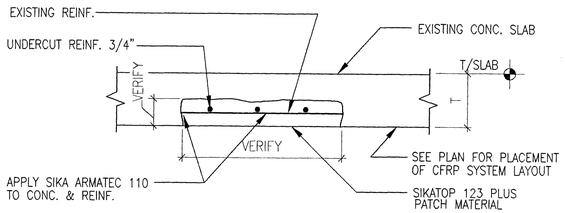


SECTION 4 D2
SCALE: 1 1/2"=1'-0"



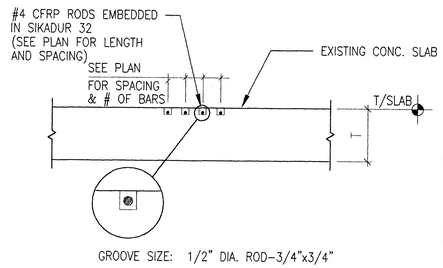
NOTE:
1. IF REMOVED CONCRETE EXTENDS > 2/3 DEPTH OF SLAB OR EXPOSES BOTTOM MAT OF REINFORCING PATCH SHOULD BE FULL DEPTH AS SHOWN IN SECTION 11.

SECTION 5 D2
SCALE: 3/4"=1'-0"



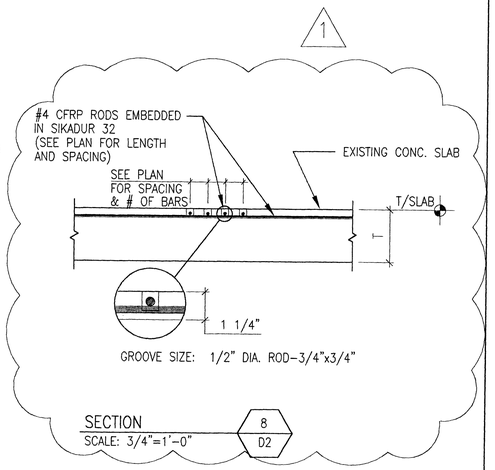
NOTE: AT BOTTOM PATCH AREAS TO RECEIVE CFRP, PATCH MUST BE LEVEL W/ BOTT. OF EXISTING SLAB.

SECTION 6 D2
SCALE: 3/4"=1'-0"



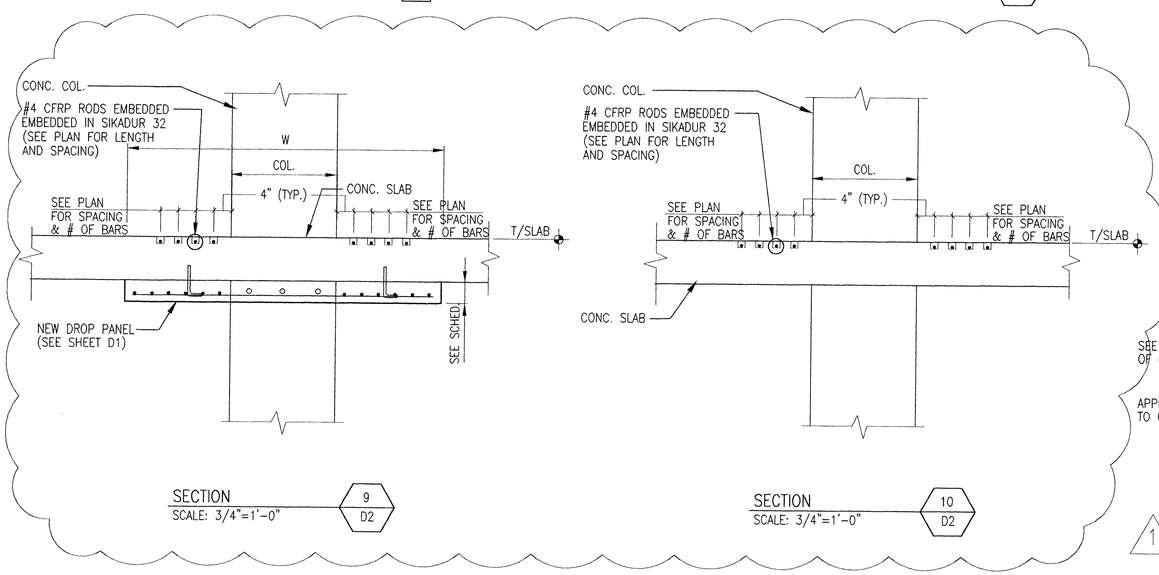
GROOVE SIZE: 1/2" DIA. ROD-3/4"x3/4"

SECTION 7 D2
SCALE: 3/4"=1'-0"



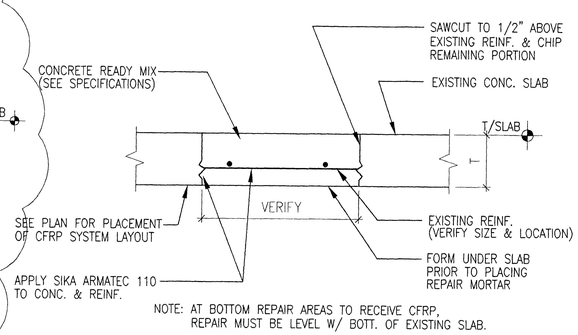
GROOVE SIZE: 1/2" DIA. ROD-3/4"x3/4"

SECTION 8 D2
SCALE: 3/4"=1'-0"



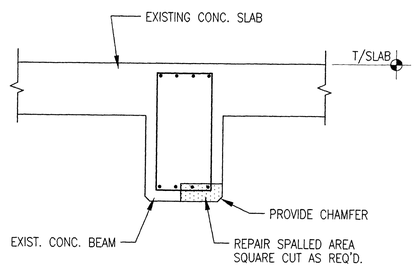
SECTION 9 D2
SCALE: 3/4"=1'-0"

SECTION 10 D2
SCALE: 3/4"=1'-0"



NOTE: AT BOTTOM REPAIR AREAS TO RECEIVE CFRP, REPAIR MUST BE LEVEL W/ BOTT. OF EXISTING SLAB.

FULL DEPTH REPAIR 11 D2
SCALE: 3/4"=1'-0"



SECTION 12 D2
SCALE: 3/4"=1'-0"

AS-BUILT DRAWINGS

SDFE structural diagnostics & forensic engineering, inc.
1221 W. Tharpe Street
Tallahassee, Florida 32303
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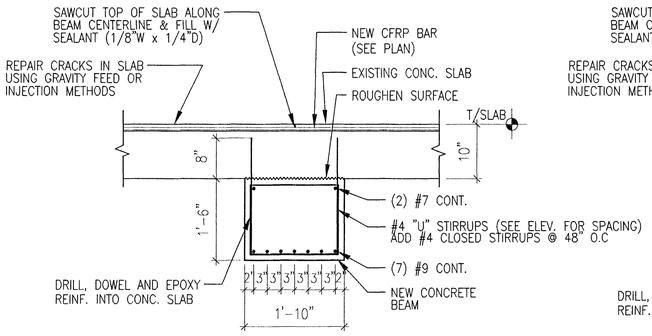
Cert. of Authorization# 08549
Primus V. Mtenga PE# 46667

PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
TALLAHASSEE, FLORIDA

CONSTRUCTION DOCUMENTS
Date: NOV 12, 2004
Project No.: 002-04
Drawn By: AJV
Checked By: PVM

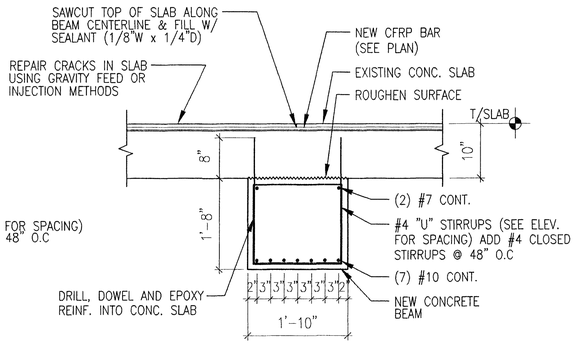
Rev.# Date Description
1 COT COMMENTS 12/20/04
2 OWNER'S ENGINEER COMMENTS 1/7/05

D2
OF



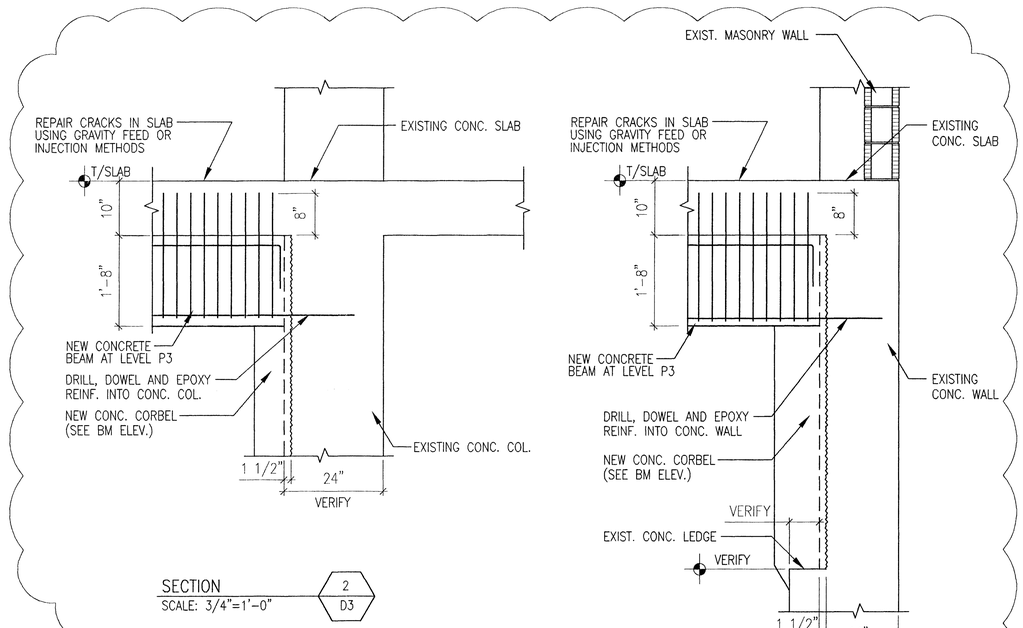
SEE BEAM ELEVATION 1, SHEET D4

SECTION 1 / SCALE: 3/4"=1'-0" / D3



SEE BEAM ELEVATION 2, SHEET D4

SECTION 1A / SCALE: 3/4"=1'-0" / D3



SECTION 2 / SCALE: 3/4"=1'-0" / D3

SECTION 3 / SCALE: 3/4"=1'-0" / D3

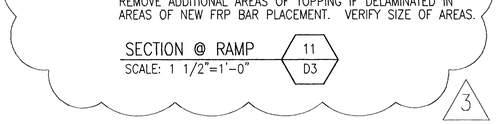
3

SEE BEAM ELEVATION FOR REINF. @ PIPE

SECTION 4 / SCALE: 3/4"=1'-0" / D3

SECTION 5 / SCALE: 3/4"=1'-0" / D3

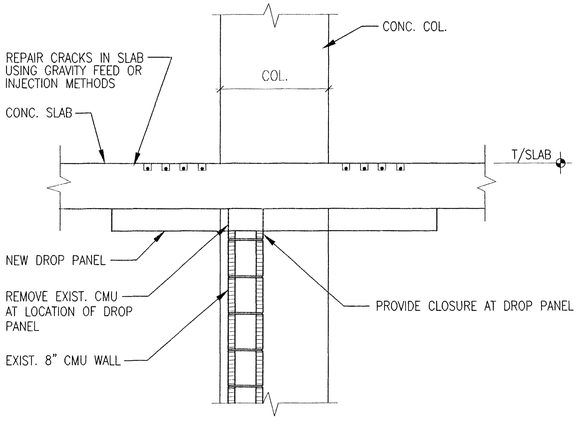
SECTION 6 / SCALE: 3/4"=1'-0" / D3



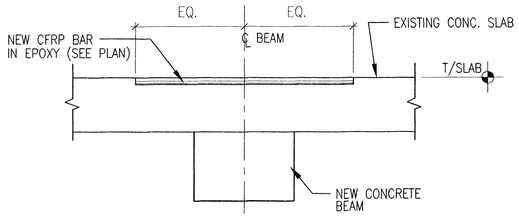
NOTE: CUT EXIST. TOPPING 6" BEYOND EACH END OF BAR
REMOVE ADDITIONAL AREAS OF TOPPING IF DELAMINATED IN AREAS OF NEW FRP BAR PLACEMENT. VERIFY SIZE OF AREAS.

SECTION @ RAMP 11 / SCALE: 1 1/2"=1'-0" / D3

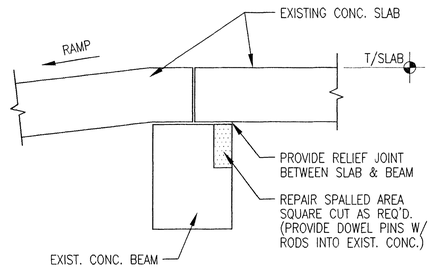
3



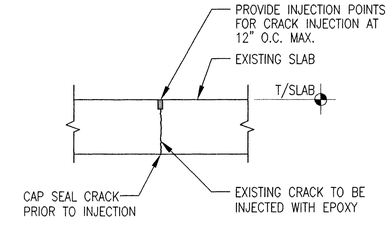
SECTION 7 / SCALE: 3/4"=1'-0" / D3



SECTION 8 / SCALE: 3/4"=1'-0" / D3



SECTION 9 / SCALE: 3/4"=1'-0" / D3



SECTION 10 / SCALE: 1 1/2"=1'-0" / D3

AS-BUILT DRAWINGS

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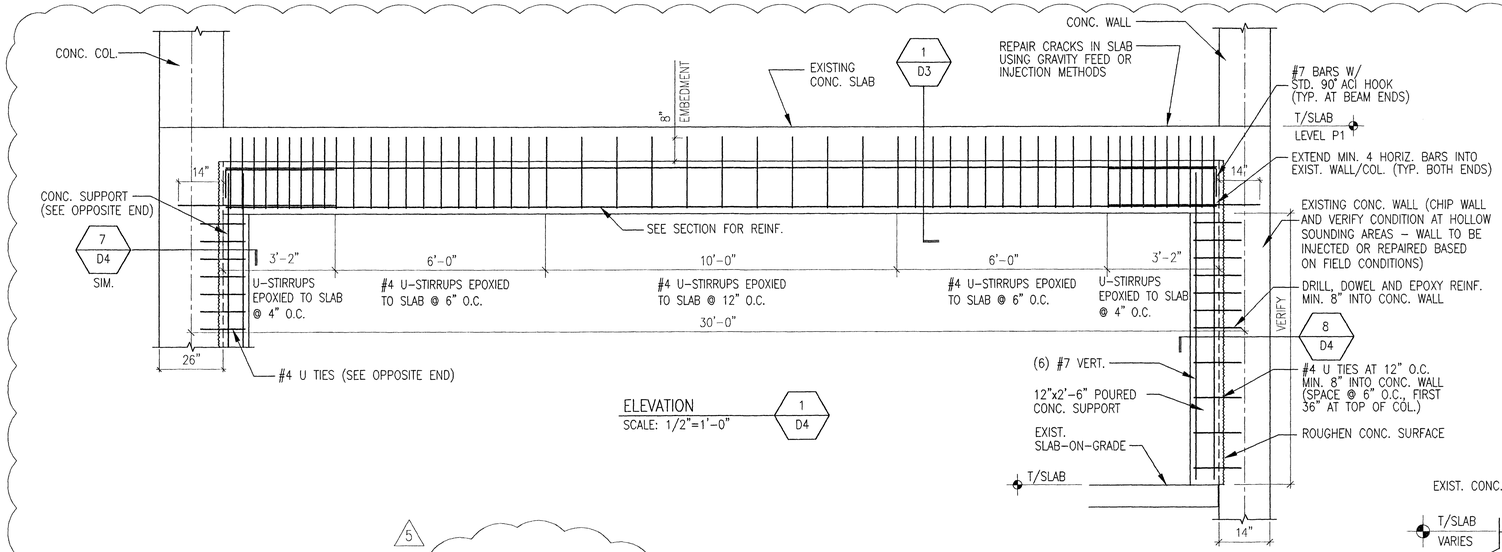
PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
TALLAHASSEE, FLORIDA

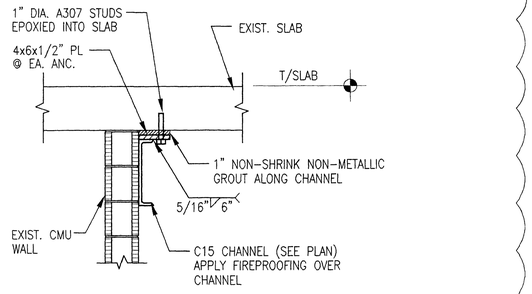
CONSTRUCTION DOCUMENTS
Date: NOV 12, 2004
Project No.: 002-04
Drawn By: AJV
Checked By: PVM

Rev.# Date Description
1 COT COMMENTS 12/20/04
2 OWNER'S ENGINEER COMMENTS 1/7/05
3 ADDITIONAL WORK 5/27/05

D3
OF

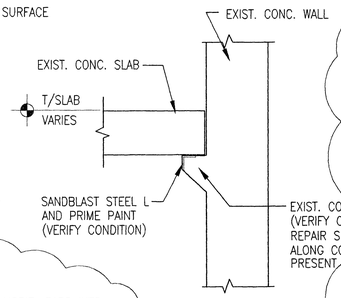


ELEVATION
SCALE: 1/2"=1'-0"
1 D4

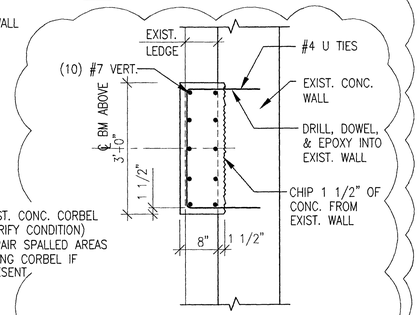


SECTION
SCALE: 3/4"=1'-0"
4 D4

SEE 9/D5 AT LOCATIONS WHERE ANCHORS INTERFERE WITH EXISTING SLAB REINFORCEMENT.

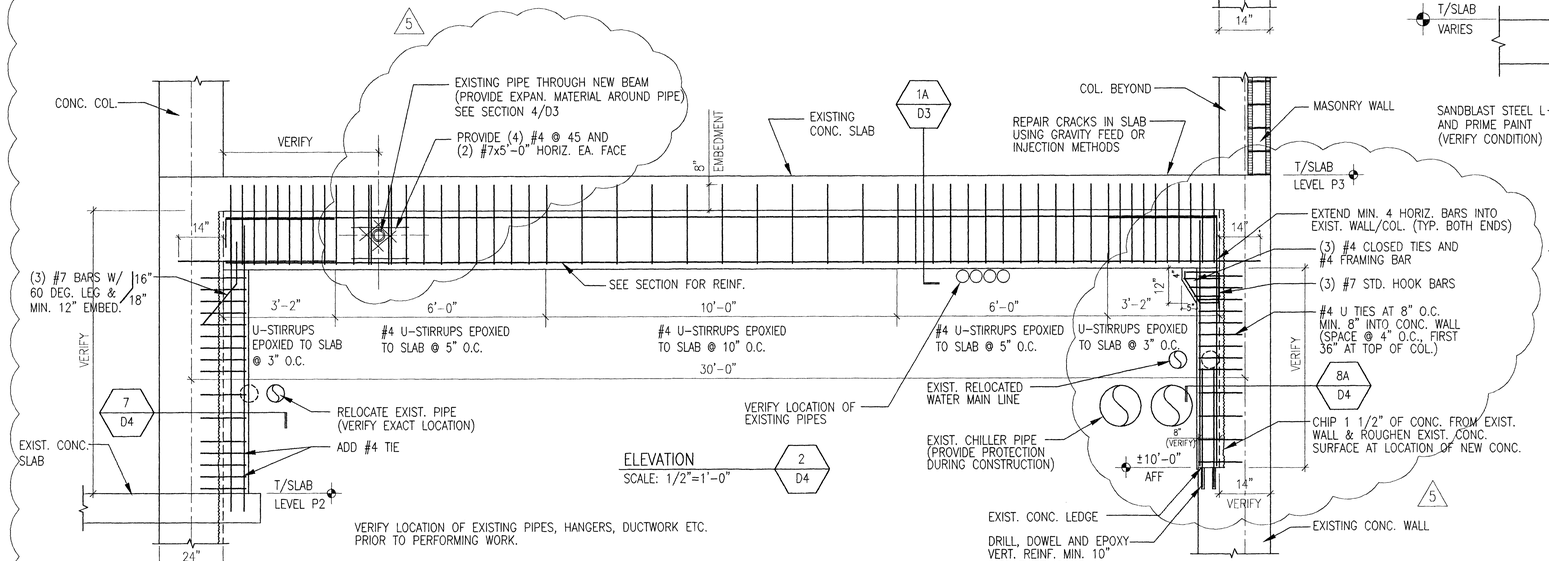


SECTION
SCALE: 3/4"=1'-0"
5 D4



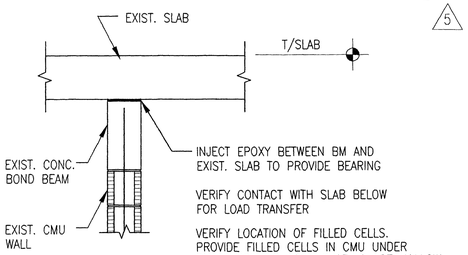
SECTION
SCALE: 3/4"=1'-0"
8A D4

5

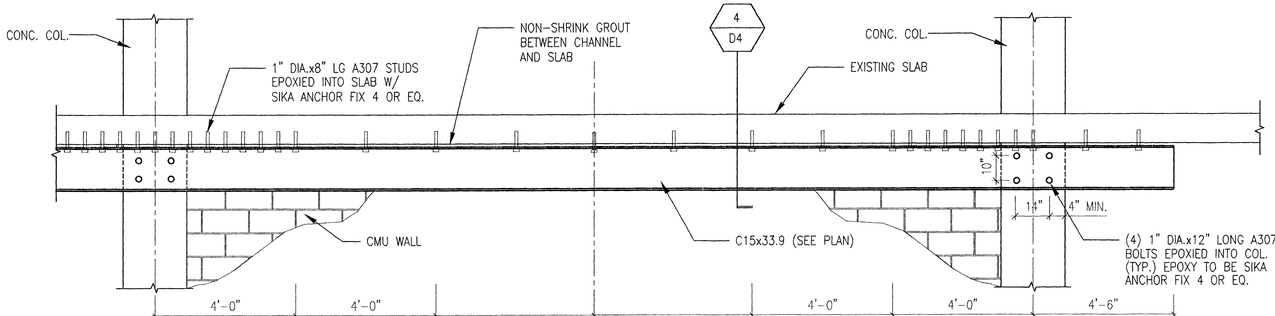


ELEVATION
SCALE: 1/2"=1'-0"
2 D4

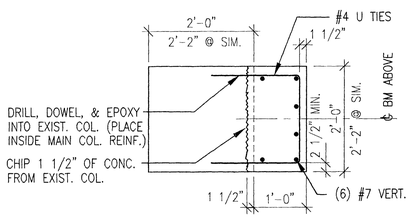
5



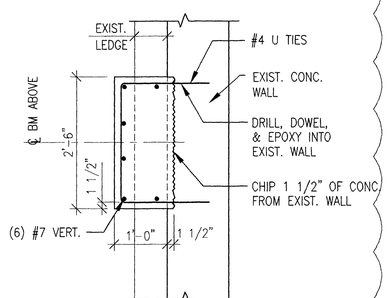
SECTION
SCALE: 3/4"=1'-0"
6 D4



ELEVATION
SCALE: 1/2"=1'-0"
3 D4



SECTION
SCALE: 3/4"=1'-0"
7 D4



SECTION
SCALE: 3/4"=1'-0"
8 D4

1

AS-BUILT DRAWINGS

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PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
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CONSTRUCTION DOCUMENTS
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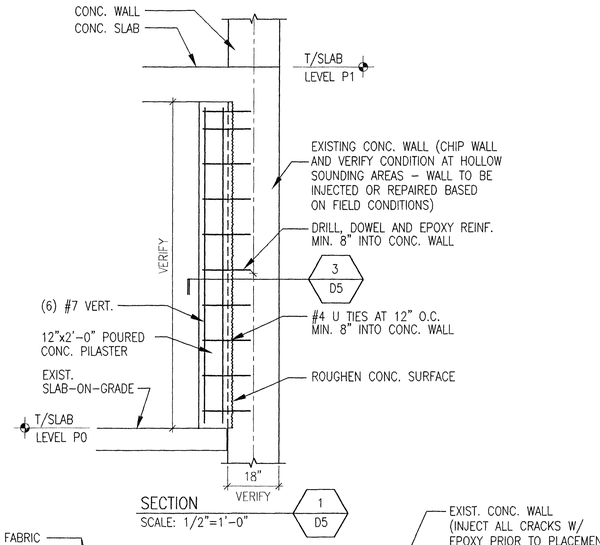
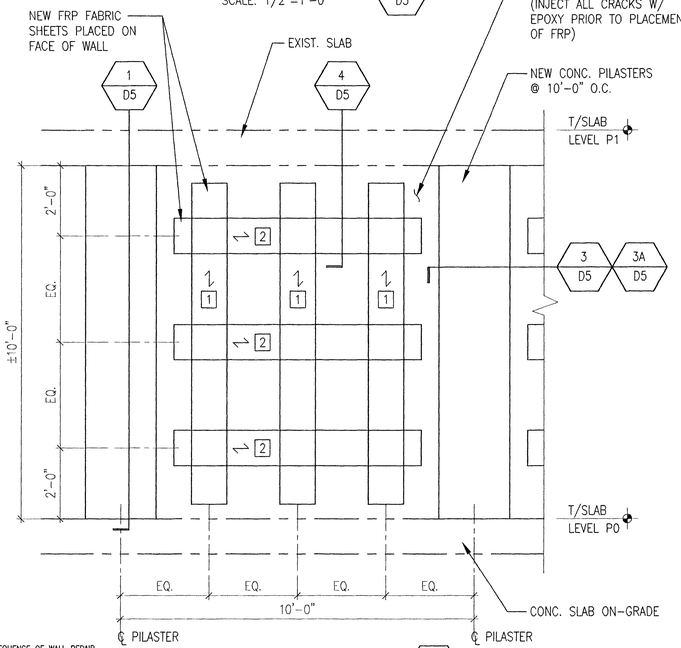
Rev.# Date Description
1 COT COMMENTS 12/20/04
2 OWNER'S ENGINEER COMMENTS 1/7/05
5 MOD. DUE TO PIPE 7/29/05

D4
OF

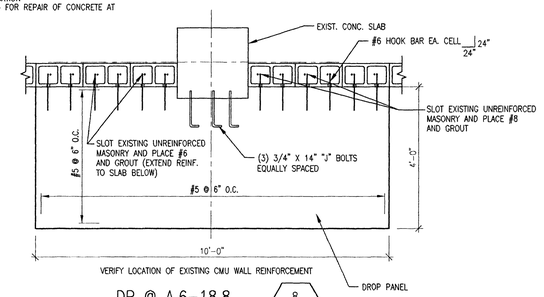


SECTION
SCALE: 1/2"=1'-0"
1
D5

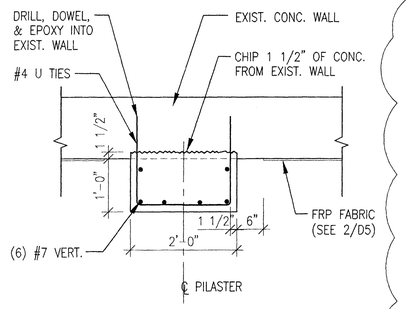


SEQUENCE OF WALL REPAIR
1. INJECT ALL CRACKS IN WALL W/ EPOXY.
2. REPAIR SPALLS AND HOLLOW SOUNDING AREAS.
3. INSTALL PILASTERS AT SPACING SHOWN.
4. INSTALL FRP FABRIC ON FACE OF WALL BETWEEN PILASTERS. SEE PLAN FOR LOCATION
5. SEE SECTION 5/D5 FOR REPAIR OF CONCRETE AT BASEMENT WALL.

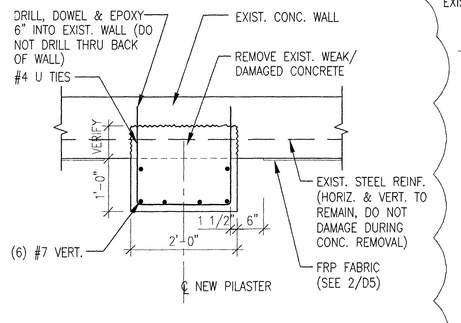
WALL ELEVATION
SCALE: 1/2"=1'-0"
2
D5



DP @ A.6-18.8
SCALE: 3/4"=1'-0"
8
D5

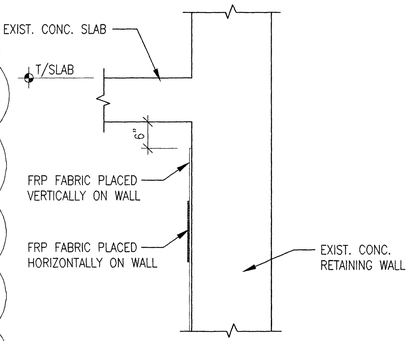


SECTION
SCALE: 3/4"=1'-0"
3
D5

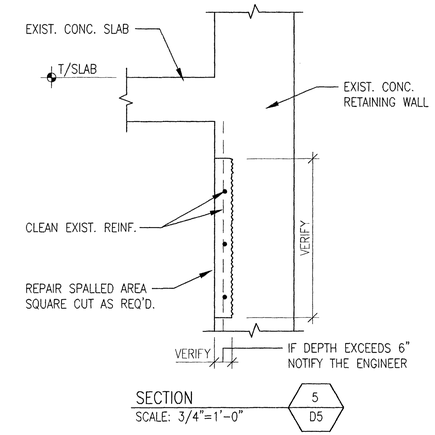


SECTION
SCALE: 3/4"=1'-0"
3A
D5

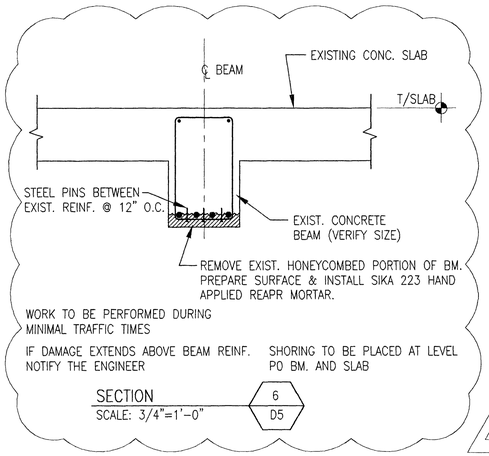
4



SECTION
SCALE: 3/4"=1'-0"
4
D5

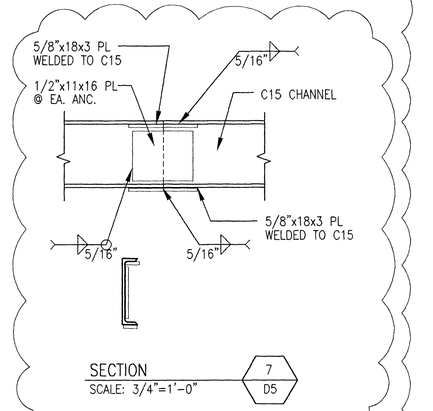


SECTION
SCALE: 3/4"=1'-0"
5
D5

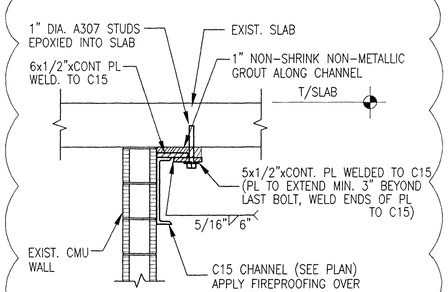


SECTION
SCALE: 3/4"=1'-0"
6
D5

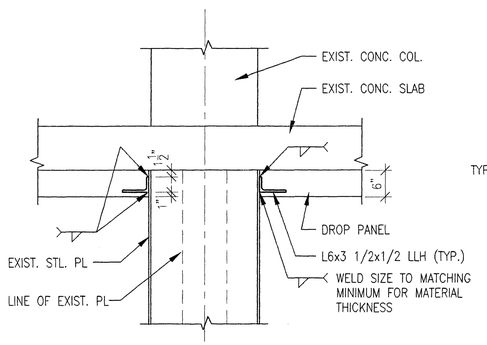
4



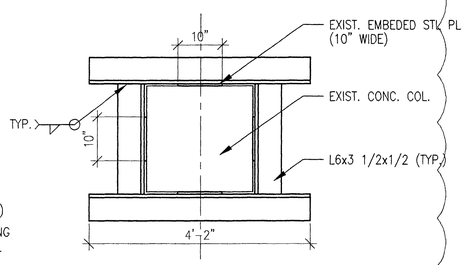
SECTION
SCALE: 3/4"=1'-0"
7
D5



SECTION
SCALE: 3/4"=1'-0"
9
D5



DP @ A.6-19.7
SCALE: 3/4"=1'-0"
10
D5



EXIST. ANCHORS AT EMBED. PL NOT SHOWN FOR CLARITY

AS-BUILT DRAWINGS

3

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Primus V. Mtengo PE# 46667

PARKING GARAGE REMEDIATION
LEON COUNTY COURTHOUSE
TALLAHASSEE, FLORIDA

CONSTRUCTION DOCUMENTS
MAY 27, 2005
Project No.: 002-04
Drawn By: AJV
Checked By: PVM
Rev.# Date Description

3 ADDITIONAL WORK 5/27/05
4 ADDITIONAL WORK 6/30/05

D5
OF