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STEVENSON ELEMENTARY SCHOOL ANNEX

SECTION 01113

CONSTRUCTION OPERATIONS AND SITE UTILIZATION PLAN

PART 1 - GENERAL

1.1 SUMMARY

A. The Construction Operations Plan provides a coordinated construction environment to ensure an orderly, secure and safe operation within the existing school and the entire school property, consequently forming the basis for the Site Utilization Plan prepared by the General Contractor.
   1. The PBC Authorized Representative in direct coordination with CPS will administer the operations plan activities. All Construction Operating issues shall be channeled through and require approval by the PBC Authorized Representative in coordination with CPS and/or the Building Engineer and Principal.
   2. The Construction Operations Plan has been prepared based on the requirements of the project and in coordination with the existing school operations and program. The elements of this plan required for incorporation into the Site Utilization Plan are included in this section.

1.2 RELATED SECTIONS

A. Refer to the General Contractor's Service Agreement for information related to this section. Additional Specification Sections containing information that relate to this section include:
   1. Selective Demolition: Section 01732.

1.3 SUBMITTALS

A. Site Utilization Plan: submit five (5) copies of the site Utilization Plan required in Part 3.
   1. Submit proposed revisions as deemed necessary

1.4 CONSTRUCTION OPERATIONS PLAN

A. Area of Work

In order to minimize disruption to school operations during construction, the Work will be performed in accordance with the designated Areas of Work listed below, along with durations for each.

1. **Area of Work I - New 2 Story Annex**:
   - All Work associated with the construction of the New 2 Story Annex, site improvement, courtyard, and landscaping work shall commence upon issuance of the NTP and be completed by no later than November 14, 2012.
   - All Work associated with the furnishing and installation of utility services to the new addition shall commence upon issuance of the NTP and be completed by no later

than August 17, 2012. Utility shut-offs will only be permitted during off hours between the hours of Friday 6:00 pm through Monday 7:00 am. All utility shut-offs require written approval of the PBC Authorized.

- All Work associated with the furnishing and installation of main system tie-ins to existing services including but not limited to computer network, phone, water, sewer, BAS controls, security, fire alarm, and HVAC (coordinate with Area of Work II).

2. <u>Area of Work II - Existing Building Interior Renovations:</u>

- No Work shall take place in the Existing Building until environmental remediation has been completed in accordance with the contract documents. Environmental remediation will be permitted from April 2, 2012 through April 7, 2012 and June 18, 2012 through June 29, 2012.
- All Work located within the basement level associated with the interior renovations of the existing school building excluding rooms 004, and 008 shall commence once environmental remediation has been completed in accordance with the contract documents and be completed by no later than August 17, 2012.
- All Work located within first, second, attic, and roof levels associated with the interior renovations shall commence once environmental remediation has been completed in accordance with the contract documents from June 18, 2012 and be completed by no later than August 17, 2012.
- All Work associated with the furnishing and installation of main system tie-ins to existing services including but not limited to computer network, phone, water, sewer, BAS controls, security, fire alarm, and HVAC shall commence once environmental remediation has been completed in accordance with the contract documents from June 18, 2012 and be completed by no later than August 17, 2012. All utility shut-offs require written approval of the PBC Authorized Representative.

3. <u>Area of Work III - Fire Lane/Driveway:</u>

- All Work associated with the construction of the fire lane/driveway, site improvement, landscaping, and utility work shall commence on June 18, 2012 and be completed by no later than August 17, 2012.
- All Work associated with the furnishing and installation of utility services to the new addition within the limits of Area of Work III shall commence June 18, 2012 and be completed by no later than August 17, 2012. Utility shut-offs will only be permitted during off hours between the hours of Friday 6:00 pm through Monday 7:00 am. All utility shut-offs require written approval of the PBC Authorized Representative.

4. <u>Area of Work IV - Existing Building Interior Renovations of Rooms 004 and 008:</u>

- No Work shall take place in the Existing Building until environmental remediation has been completed in accordance with the contract documents. Environmental remediation will be permitted from December 22, 2012 through January 4, 2013.
- All Work associated with the construction of rooms 004, and 008 shall commence on January 4, 2013 and be completed by no later than February 28, 2013.

1.5 GENERAL REQUIREMENTS

A. General Contractor shall review and be familiar with the site conditions through site visits.

B. General Contractor to provide all temporary and permanent driveway apron and alley permits for the duration of the construction if required. The General Contractor is to pay all fees

required for processing permits and is to contact and comply with all authorities and jurisdiction required for permitting.

C. General Contractor shall provide snow removal and clear all debris within project limits, and adjacent Public Right of Way.

D. General Contractor is to provide all required permits for street access for truck delivery from the local and state jurisdiction.

E. General Contractor will be required to coordinate all phases of construction and complete the work within the milestone completion date(s) for the work. The General Contractor shall be also held responsible for meeting all related provisions as described within this section.

F. Upon issuance of the Notice to Proceed (NTP) the General Contractor shall survey the site and photograph the area of construction operations and surrounding/adjacent areas. Upon completion of the work the Contractor is to restore the area to the documented condition prior to the start of work or as otherwise indicated in the Contract Documents.

G. General Contractor is to replace all removed trees, bushes, ground covers and grass on the Chicago Public Schools' property used as part of the construction operations. Also concrete pavement walks and asphalt surfaces shall be replace to condition prior to construction.

H. General Contractor shall coordinate work with School during Mandatory State Testing periods. Test dates should be verified with the School. No work will be permitted in the existing facility or on the construction site during testing except as specifically approved by the PBC Authorized Representative. If the General Contractor secures written approval for specific work to be executed in designated areas during testing periods, the General Contractor must minimize noise in these areas during these time periods, and if requested by the School, stop work causing the noise until testing is completed. General Contractor shall account for in his bid and bear all costs for any loss of time or production related to Mandatory State Testing. The State Testing Dates for the 2012 academic years as follows: 2012 March 6 through March 16, 2012.

I. General Contractor shall coordinate and maintain all exit egress during construction as required by the City of Chicago code, other entities with jurisdiction, and as directed by PBC Authorized Representative. The General Contractor shall provide and maintain all materials and labor including barricades, construction fence, doors, partitions, and fire rated walls as required for safe egress. All costs for this work shall be included in the Contract Base Bid regardless of whether it is indicated in the Contract Documents or not.

J. No construction deliveries will be permitted to either the existing facility or the new addition between the hours of 8:30 to 9:30 AM and 2:30 to 4:30 PM.

K. The Contractor is to set up and stage the entire project within the boundaries of the contract limits. The General Contractor is responsible for maintaining and modifying the fence as necessary and as approved in the Site Utilization Plan for the life of the project. Removal and disposal of the fence at the conclusion of the project is the responsibility of the General Contractor.

L. The PBC in conjunction with CPS, the Building Engineer and/or other approved CPS staff as approved by CPS is required to be present at all times work is in progress in the existing Building. If advance arrangements are not made, the General Contractor shall be responsible

for all overtime costs for the CPS staff member for work outside of normal working hours. Overtime arrangements for CPS staff includes weekends, holidays, and generally hours beyond that listed in Site Restrictions above. IUOE Local 143 Holidays are as follows (Saturday holidays are observed on Friday, Sunday holidays are observed on Monday):

1. New Year's Day
2. Martin Luther King Jr.'s Birthday
3. Lincoln's Birthday
4. Presidents Day
5. Pulaski Day
6. Memorial Day
7. Independence Day
8. Labor Day
9. Columbus Day
10. Veterans Day
11. Thanksgiving
12. Friday after Thanksgiving
13. Christmas Day

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SITE UTILIZATION PLAN

A. After a Notice of Award and prior to Notice to Proceed the General Contractor is to prepare and submit to the PBC Authorized Representative for approval a Preliminary Site Utilization Plan based on the Construction Operations requirements outlined in this section. Mobilization on-site is not to occur until approval of the Site Utilization Plan is obtained. If requested by the Contractor, a preliminary meeting to review site elements and Construction Operations with the PBC Authorized Representative prior to submission of the Site Utilization Plan shall be held.

B. The Site Utilization Plan shall be submitted within 15 calendar days of issuance of the NTP and shall be provided in a full-size graphic drawing format (36" x 48"). The final Site Utilization Plan must be approved before any direct construction activities take place on the site. Provide a separate plan for the site and for each floor of the existing building where work is being performed. The Contractor is required to prepare and secure approvals of a separate Site Utilization Plan for each phase of the work. Modifications to the format and sheet size will be permitted if pre-approved by the PBC Authorized Representative and if proposed modifications will facilitate preparation, presentation and review of the Site Utilization Plan. Electronic copies of the Contract Document drawings as appropriate will be provided for this purpose upon request. The Site Utilization Plan shall at a minimum include the following elements:

1. Title block information including School Name, Contract Number, General Contractor, Building floor/level information, and current plan date.
2. All denotations shall be illustrated in a legend on each Site Utilization Plan.
3. Denotation of construction limits by area of work with commencement and completion dates for each.
4. Building footprint of both new and existing buildings, trees, landscaping, paving, drainage structures, existing and ornamental fencing and other important site features.

5. Areas of staging for students and staff, student drop-off points, existing school entrances and exits, staff parking areas, and traffic patterns for both construction and non-construction vehicles.
6. Denotation of the limits of construction and required construction fencing including any existing fencing to remain.
7. Denotation of required covered construction barricade walkways
8. Denotation of areas allowed for staging purposes: construction personnel parking, material storage, and construction trailer(s). Such activities are to only take place in areas designated and approved by the PBC Authorized Representative.
9. Denotation of any specific site conditions required to be observed such as keeping alleys clear next to adjacent properties, and any other issues listed on the Construction Operations Site Plan.
10. Denotation of areas allowed for site access and equipment including but not limited to gates, cranes, scaffold, trailers, dumpster, wheel washers, storage and existing utility poles.
11. Denotation of all required temporary utilities, including but not limited to AT&T, Peoples Gas, and ComEd.
12. Denotation of areas of work within the existing building for the period of time covered by the Site Utilization Plan, coordinated with the Project Schedule. Each area should indicate planned beginning and end dates for work in that area. Areas where all work is completed are to be noted.
13. Construction worker ingress/egress, material staging areas in the existing building.
14. Proposed locations of temporary protection, barricades, and temporary walls within the existing building.
15. Denotation of all temporary exits and path of travel by pedestrians and vehicular traffic.
16. Denotation of commencement and completion of the work for systems tie-ins to existing services including but not limited to water, sewer, power, controls, security, and HVAC.

3.2 SITE UTILIZATION PLAN UPDATES

A. The General Contractor is required to submit for approval updated Site Utilization Plans whenever conditions in the current approved plan have changed. Approval is required prior to proceeding on any changed conditions not previously approved. Requirements for updating include the following:
   1. In coordination with the project schedule provide detailed information regarding work in the existing building including phasing, vacation of existing in-use areas, and any other information requested by the PBC Authorized Representative and CPS.
   2. Revision to the site plan to reflect changing conditions regarding construction fencing, ingress and egress, student and staff staging, construction deliveries, areas of stored materials, parking, and any other construction facility revisions.

END OF SECTION

SECTION 01331

Cx [COMMISSIONING] SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

C. Commissioning Submittals: Copy of selected submittals provided to the commissioning authority for review against the Owner’s Project Requirements (OPR) during the normal submittal process.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Architect by request for Contractor's use in preparing submittals. Contractor bears all responsibility for information contained in submittals whether or not provided in electronic format to the Contractor.

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. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect reserves the right to return without action submittals requiring coordination with other submittals.

C. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.

1. Initial Review: Allow ten (10) working days for initial review of each submittal. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Resubmittal Review: Allow ten (10) working days for review of each resubmittal.

3. If intermediate submittal is necessary, process it in same manner as initial submittal.

4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.

2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect and Boards Authorized Representative.

3. Include the following information on label for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name and address of Architect
   d. Name and address of Contractor.
   e. Name and address of subcontractor.
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Unique identifier, including revision number.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.
   k. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will, without review, return submittals received from sources other than Contractor.

1. Transmittal Form: Contractor’s standard form which is to include the following information:
   a. Project name.
   b. Date.
   c. Destination (To:).
   d. Source (From:).
   e. Names of subcontractor, manufacturer, and supplier.
   f. Category and type of submittal.
   g. Submittal number.

h. Submittal purpose and description.
i. Submittal and transmittal distribution record.
j. Remarks.
k. Signature of transmitter.

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

H. 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 **"Reviewed- No Exception Taken"**

4. Commissioning Authority (CxA) shall review only one re-submittal per submittal provided by Contractor. If additional re-submittals are required due to Contractor negligence in resolution of issues provided by CxA or A/E, then Contractor shall be back charged by Owner for each subsequent re-submittal review by A/E and CxA.

I. 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.

J. Use for Construction: Use only final submittals with mark indicating **"Reviewed- No Exception Taken"**

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

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

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 printed 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 written recommendations.
b. Manufacturer's product specifications.
c. Manufacturer's installation instructions. (Must be included in all commissioning submittals)
d. Standard color charts.
e. Manufacturer's catalog cuts.
f. Wiring diagrams showing factory-installed wiring.

c. When required, submit one additional blue or black-line print and one (1) copy electronically to Owner provided document management system during the Initial Submittal process for review by the commissioning authority.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed. Mount, display, or package Samples in manner specified to facilitate review of qualities indicated.

1. Prepare Samples to match Architect's sample where so indicated. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side that includes the following:
   a. Generic description of Sample.
   b. Product name or name of manufacturer.
   c. Sample source.
   d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples for Initial Selection: Submit one (1) full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples for Verification: Submit a minimum of three (3) sets of Samples. Architect will retain one, one is to be maintained in the field, and one is to be returned to the Subcontractor.
      1) If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of the variations.
      2) Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit three (3) copies of each submittal and one (1) copy electronically to Owner provided document management system, unless otherwise indicated.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

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

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp or which, in the Architect’s opinion, are incomplete, contain numerous errors, have not been checked or have only been checked superficially and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken:

1. Reviewed- No Exception Taken
2. Rejected
3. Furnish as Corrected
4. Submitted for Record – No Action Taken
5. Revise and Resubmit
6. Submit Specified Item
7. Revise and Resubmit for Record Only

C. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

SECTION 01783

Cx [COMMISSIONING] PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents (As-Builts).

1.2 SUBMITTALS

A. Record Drawings: Submit copies of Record Drawings as follows:

1. Initial Submittal: Submit to the AOR one (1) set of plots from corrected CAD Drawings and one copy of the original marked-up Record Prints. Architect will provide comment as to whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return plots and prints to the Contractor for use in organizing the final submittal.

2. Final Submittal: Submit one set of original marked-up Record Prints, two sets of reproductions of the marked up Record Prints, one set of CD-ROM(s) containing Record CAD Drawing files, and one set of Record CAD Drawing plots. Plot and print each Drawing, whether or not changes and additional information were recorded.

    a. Submit all copies to the Boards Authorized Representative with a transmittal indicating compliance with requirements for Project Record Documents. Boards Authorized Representative will be responsible for distribution to the appropriate parties, including the end user.

B. Record Specifications: Submit one (1) copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one (1) copy of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as Record Product Data.

1.3 DEFINITIONS

A. Record Documents: Documents submitted by a contractor or subcontractor to show the construction of a particular structure or work as actually completed. Record documents are also referred to as “as-builts”.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an understandable drawing technique.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

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

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

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the 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 Prints: Immediately before inspection for Preliminary Acceptance, review marked-up Record Prints with Architect and Boards Authorized Representative. When authorized, prepare a full set of corrected prints of the Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
2. Refer instances of uncertainty to Architect through Construction Manager for resolution.
3. The Board will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
4. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Architect will make the Contract Drawings available to Contractor's print shop.

C. Record CAD Drawings: Immediately before inspection for Preliminary Acceptance, review marked-up Record Prints with Architect and Construction Manager. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:

1. Format: Same CAD 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 Architect through Construction Manager for resolution.
4. Architect will furnish Contractor one electronic set of CAD Drawings of the Contract Drawings for use in recording information.

    a. Architect makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.

5. Drawings shall include all referenced files, (font files, menus, shape files, x-refs, etc.) and strictly adhere to the current published CPS guidelines for layering standards.
6. In addition to editable drawing files (dwg, dxf) Provide a complete set of plotfiles (PLT-FILES) in Hewlett Packard Graphics Language [HPGL] format.

D. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult with Architect and Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

E. 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. Record CAD Drawings: Organize CAD 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 CAD file.
3. Identification: As follows:

    a. Project name.

b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect and Construction Manager.
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 the 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 Drawings, [and] [Product Data] where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Drawings, [and] [Product Data] where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project

Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION

SECTION 01784

Cx [COMMISSIONING] OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals.

1.2 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.

1.3 SUBMITTALS

A. Initial Submittal: Submit to the AOR three (3) copies of each manual in final form, including labeled 3-ring binders, indexes etc. no later than 6 weeks prior to commencement of owner's training. Include a complete operation and maintenance directory. Architect will return all copies and note whether scope, content, and format of manual are acceptable.

1. AOR will provide one (1) copy of manuals applicable to commissioned systems to the Commissioning Authority for review and comment.

2. General Contractor will make any corrections required and resubmit all copies until Architect finds them acceptable.

B. Final Submittal: Submit three (3) copies of each manual in final form evidencing acceptance by the Architect and Commissioning Authority. Operation and Maintenance manuals must be delivered to the Owner (end user) a minimum of one week prior to commencement of any owner's training on all systems or equipment.

1. Submit all copies to the Boards Authorized Representative with a transmittal indicating compliance with requirements for submittal of Operation and Maintenance Data. Boards Authorized Representative will be responsible for distribution to the appropriate parties, including the end user.

1.4 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

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

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of the Board.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

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.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch, 20-lb/sq. ft. white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

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. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of the Board'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.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

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

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.

2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in the manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

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

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components. (exploded parts breakdown)
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

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 the Board'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 the Board'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 Division 1 Section "Project Record Documents."

G. Comply with Division 1 Section "Closeout Procedures" for the schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01810

COMMISSIONING PROCESS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes specifications for the implementation, tracking and verification of the commissioning process.

1.2 DEFINITIONS

A. A/E Architect / Engineer

B. Cx: Commissioning

C. CxA: Commissioning Authority

D. P/T: Pressure / Temperature

E. OPR: Owner's Project Requirements

F. BAS: Building Automation System

G. PFC: Pre-functional Checklist

H. FPT: Functional Performance Tests

I. TAB: Test, Adjusting, Balancing

1.3 SUBMITTALS

A. The following table contains deliverables and/or submittals required under this section, the party(s) responsible for each, the frequency and or timeline these items shall be provided, the format and quantity to be provided, and the party(s) to be provided to.

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
Commissioning plan	CxA	45 days after commence-ment of work	Electronic	Cx Team
Commissioning plan up-dates	CxA	Monthly	Electronic	Cx Team
Draft construction sched-ule	Contractor	7 days prior to commence-ment of work	Electronic	CxA
Commissioning mile-stones for construction schedule	CxA	Within 7 days of receipt of schedule	Electronic	Contractor
Updated construction schedule	Contractor	Weekly	Electronic	CxA
Submittal register	Contractor	7 days prior to commence-ment of work	Electronic	CxA
Submittal log	Contractor	Weekly	Electronic	CxA
Submittals (Commissioned Systems)	Contractor	Concurrent with submis-sions to A/E	Electronic	CxA
Submittal review com-ments	CxA	Within 7 days of receipt of submittal	Electronic	A/E
A/E submittal review comments/approval	A/E	Within 14 days of receipt of submittal	Electronic	CxA Copies to Con-tractor per con-tract.
Notification of equipment and/or system start-up	Contractor	Within 7 days prior to sched-uled start-up	Electronic	CxA and A/E
Equipment and/or system start-up reports	Contractor	Within 7 days of start-up	Electronic	CxA and A/E
Notification of specified testing for commissioned systems and procedures (FPT excluded)	Contractor	Within 7 days prior to sched-uled test	Electronic	CxA and A/E
Specified testing reports for commissioned sys-tems	Contractor	Within 7 days of testing	Electronic	CxA and A/E
Draft as-builts	Contractor	Within 14 days prior to scheduled training	Paper (2 copies)	A/E and Owner

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
Final as-builts	A/E	Within 60 days of substantial completion	As specified in Division-01	Owner
Notification of commissioning site visit	CxA	7 days prior to site visit	Electronic	Contractor
Site visit report	CxA	Within 7 days of site visit	Electronic	Contractor, A/E and Owner
Resolution report for site visit issues	Contractor	Within 7 days of receipt of site visit report	Electronic	A/E, CxA and Owner
Notification of commissioning meeting and agenda	CxA	7 days prior to meeting	Electronic	Contractor
Commissioning meeting minutes	CxA	Within 7 days of meeting	Electronic	Contractor, A/E and Owner
TAB plan	Contractor	90 days prior to scheduled start date	Electronic	CxA and A/E
TAB plan review comments	CxA	Within 7 days of receipt of plan	Electronic	A/E
A/E TAB plan review comments/approval	A/E	Within 14 days of receipt of plan	Electronic	CxA and Contractor
TAB report	Contractor	Within 7 days of TAB completion	Electronic	CxA and A/E
TAB report review comments	CxA	Within 7 days of receipt of report	Electronic	A/E
A/E TAB report review comments/approval	A/E	Within 14 days of receipt of report	Electronic	CxA and Contractor
TAB verification report	CxA	Within 14 days of TAB verification	Electronic	Contractor, A/E and Owner
Operation and maintenance data draft submittal	Contractor	60 days proceeding submittal approval	As specified under Division-01	CxA, A/E and Owner
O&M data review comments	CxA	Within 7 days of receipt of submittal	Electronic	A/E
A/E O&M data review comments/approval	A/E	Within 14 days of receipt of submittal	Electronic	CxA and Contractor

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
Operation and maintenance data final submittal	Contractor	60 days prior to scheduled training	As specified under Division-01	CxA, A/E and Owner
Draft training program	Contractor	120 days prior to substantial completion	Electronic	CxA, A/E, and Owner
Draft training program review comments	CxA	Within 7 days of receipt of program	Electronic	A/E
A/E draft training program review comments/approval	A/E	Within 14 days of receipt of program	Electronic	CxA and Contractor
Training materials	Contractor	60 days prior to scheduled training	Electronic	CxA and A/E
Training materials review comments	CxA	Within 7 days of receipt of program	Electronic	A/E
A/E training materials review comments/approval	A/E	Within 14 days of receipt of program	Electronic	CxA and Contractor
Training session notifications	Contractor	7 days prior to scheduled session	Electronic	CxA and Owner
Completed training sessions record and evaluation forms	Contractor	Within 7 days of sessions	Electronic	CxA and A/E
Training session review comments and recommended action	CxA	Within 7 days of sessions	Electronic	CxA
A/E training session review comments/approval	A/E	Within 14 days of session	Electronic	CxA and Contractor
Complete Training Manual including training plan, training materials, sign in sheet, evaluations etc as required	Contractor	Within 30 days of completion of training	As specified under Division-01	
Training session videos	Contractor	Within 30 days of completion of training	Electronic	CxA, A/E and Owner
Warranty coverage and requirements per equipment and/or system	Contractor	Within 60 days of scheduled training	Electronic	CxA, A/E and Owner
Warranty review report	CxA	Within 14 days of site visit	Electronic	Contractor, A/E and Owner

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
Warranty review A/E action statement	A/E	Within 14 days of receipt of report	Electronic	Contractor
Warranty resolution report	Contractor	Within 7 days of completion of work	Electronic	CxA, A/E and Owner
Draft commissioning record	CxA	Within 14 days of completion of FPT	Electronic	Owner
Final commissioning record	CxA	Within 28 days of final acceptance	Electronic	Owner
Commissioning issues report	CxA	Monthly	Electronic	Contractor, A/E and Owner
Resolution report for commissioning issues	Contractor	Within 7 days of receipt of issues report	Electronic	CxA

1.4 COMMUNICATION

A. Communication resulting from or in relation to commissioning activities will be relayed directly to the responsible party whenever possible, with copies to the Owner, A/E and Contractor.

1.5 COMMISSIONED SYSTEMS

A. Commissioned systems are defined as the equipment and/or systems pertaining to the systems or equipment listed below:

1. Hot Water Systems: Boilers, Pumps, Expansion Tanks, Air Separators, Tanks, Pressure Fill Systems, Filters, VFDs, Meters
2. Air Distribution Systems: Rooftop Units, Terminal Units, Sound Attenuators, Fire Dampers, Split AC Units, Condensing Units, Fans, Cabinet Heaters, Electric Wall Heaters
3. Fuel Systems: Meters
4. Domestic Cold Water Systems: Pumps, Backflow Preventers, Fixtures
5. Domestic Hot Water Systems: Water Heaters, Pumps, Expansion Tanks, Temperature Mixing Valves
6. Energy Management & Control Systems (BAS)
7. Indoor Lighting and Control Systems
8. Outdoor Lighting and Control Systems
9. Energy Metering

1.6 RESPONSIBILITIES

A. The responsibilities of various parties in the commissioning process are provided in this section. The responsibilities listed for Contractor apply to all contractors related scope as well as any sub-contractors, consultants and/or personnel under the employment of the Contractor.

B. All Parties

1. Follow the Commissioning Plan
2. Attend commissioning pre-construction meeting and additional meetings, as necessary.

C. A/E

1. Review and approve submittals, O&M data, training program and as-builts in accordance with contracted services
2. Provide design narrative documentation as requested by the CxA. This includes clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
3. Attend the commissioning pre-construction meeting and selected additional commissioning meetings.
4. Review TAB plan and report
5. Coordinate resolution of system deficiencies and discrepancies identified during commissioning, according to the contract documents.
6. Prepare and submit final as-built basis of design and Owner project requirements documentation for inclusion in the O&M data
7. Prepare and submit final as-built one line system diagrams and narratives for inclusion in the O&M data.
8. Coordinate resolution of design non-conformance and deficiencies identified during warranty-period commissioning

D. CxA

1. The primary role of the CxA is to develop and coordinate the execution of a testing plan, observe and document performance—that systems are functioning in accordance with the documented intention of design and in accordance with the Contract Documents. Contractor shall provide all tools or the use of tools to start, check-out and functionally test equipment and systems, except for specified testing with portable data-loggers, which, if determined by the CxA to be required, shall be supplied and installed by the CxA.

2. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
3. Prepare and maintain commissioning plan.
4. Prepare and update commissioning milestones and schedule.
5. Coordinate the commissioning work and, with Contractor, verify that commissioned activities are being scheduled into the master schedule
6. Coordinate and facilitate pre-construction commissioning meeting and commissioning meetings as required.
7. Request and review additional information required to perform commissioning tasks, including O&M data, contractor start-up and checkout procedures.
8. Review normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.
9. Plan and conduct a commissioning pre-construction meeting and other commissioning meetings
10. Develop construction checklists and provide Contractor with final checklists in approved format with accompanying tracking system.
11. Provide equipment identification tags specified under this section.
12. Provide Contractor with training in relation to use of checklists and tracking system.
13. Provide Contractor with itemized list detailing checklist items requiring action.

14. Before startup, review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
15. Perform site visits, as contracted, to observe equipment and system installations. Attend selected planning and job-site meetings to obtain information on construction progress
16. Witness part of the additional testing specified for the commissioned systems, in sufficient detail to be confident that proper procedures were followed. Review the reports prepared by the Contractors to document the testing procedures. Notify A/E and Owner of any deficiencies in results or procedures.
17. Review construction checklist completion by reviewing construction checklist completion reports and by selected site observation and spot checking. Advise Contractor of status of construction checklist completion and discrepancies identified
18. Review and witness a sampling of equipment start-up and reports, in sufficient detail to be confident of results and procedures followed
19. Review a sampling of as-built drawings, in sufficient detail to be confident of validity and accuracy of the documentation.
20. Review TAB plan and report.
21. Verify air and water systems balancing by spot testing, by reviewing completed reports and by selected site observation.
22. Prepare and provide contractor readiness criteria to Contractor.
23. Analyze any functional performance trend logs and monitoring data to verify performance.
24. Witness and document manual functional and seasonal tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.
25. Maintain a master deficiency and resolution log and a separate testing record. Provide Contractor with written progress reports and test results with recommended actions
26. Review equipment warranties to verify that the Owner's responsibilities are clearly defined.
27. Review the training of the Owner's operating personnel per contract.
28. Compile and maintain a commissioning record.
29. Review the preparation of the O&M data.
30. Coordinate and facilitate warranty review with Owner staff and provide formal report of findings to A/E and Contractor.
31. Develop and maintain commissioning record.

E. Contractor

1. Facilitate the coordination of the commissioning work by the CxA, and with other contractors.
2. Include the cost of commissioning in the total contract price.
3. Verify that commissioning activities are being scheduled into the master schedule.
4. Attend a commissioning pre-construction meeting and other commissioning meetings as requested.
5. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CxA.
6. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks and training.
7. Ensure that all sub-contractors and personnel execute their commissioning responsibilities according to the Contract Documents and schedule.
8. Review construction verification checklists provided in specifications, prior to commencement of work.
9. Complete checklists for sections responsible for, according to procedures specified under section 01811.

10. Maintain hard copy of the commissioning pre-functional checklists on-site for review by the CxA.
11. Distribute required checklist tracking reports to parties and at durations specified under this section
12. Distribute required checklist tracking reports to parties and at durations specified under this section
13. Resolve and provide resolution reports for all checklist discrepancies noted by CxA.
14. Review and approve the functional performance test procedures submitted by CxA.
15. Provide CxA functional and seasonal testing plan in accordance with procedures supplied under section 01812.
16. Provide CxA with contractor readiness notification.
17. Facilitate and assist CxA as necessary in the functional and seasonal testing of selected equipment and systems.
18. Ensure sub-contractors and personnel facilitate and assist CxA as necessary in the functional and seasonal testing of selected equipment and systems.
19. Review commissioning progress and deficiency reports.
20. Coordinate and facilitate the resolution of non-compliance, deficiencies and discrepancies identified in all phases of commissioning.
21. Ensure sub-contractors and personnel coordinate and facilitate the resolution of non-compliance, deficiencies and discrepancies identified in all phases of commissioning.
22. Coordinate and facilitate the training of Owner personnel.
23. Prepare O&M data, according to the Contract Documents, including clarifying and updating Contract Documents to as-built conditions.

F. Equipment and Material Suppliers

1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing per agreements with Contractor.
3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone datalogging equipment that may be used by CxA.
4. Through the Contractor they supply products to, analyze specified products and verify that the designer has specified the newest most updated equipment reasonable for this project’s scope and budget.
5. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
6. Review and approve test procedures for equipment installed by factory representatives.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout, additional testing and required functional performance testing shall be provided by Contractor for the equipment being tested.

B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site, except for stand-alone datalogging equipment that may be used by the CxA.

C. Datalogging equipment and software required to test equipment, if used, will be provided by the CxA, but shall not become the property of the Owner.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply:

1. Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5ºF and a resolution of + or – 0.1ºF.
2. Pressure sensors shall have an accuracy of + or – 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.
3. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 PURPOSE

A. Commissioning is a systematic process of assess whether all commissioned systems perform interactively according to the Owner's project requirements and the intention of the design, and to track the process by which any deviations from this performance are addressed. This is achieved by beginning in the design phase and documenting design intent and continuing through construction, acceptance and the warranty period with actual verification of performance.

B. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning facility.

3.2 COMMISSIONING PLAN

A. CxA shall develop a complete commissioning plan detailing the following information at a minimum:

1. Contact information for key members of commissioning team.
2. Description of procedures to be utilized for each commissioning task.
3. List of commissioned systems and associated equipment.
4. Sampling approach to be utilized for each equipment and system type by commissioning task.
5. List of responsibilities for each party involved in the commissioning process.
6. Commissioning milestones and schedule.
7. Record of results for commissioning tasks to date.

B. CxA shall provide the commissioning plan to Contractor as defined under SUBMITTALS for this section, and shall provide updates to this plan at the intervals and format defined under SUBMITTALS for this section.

3.3 SCHEDULING

A. Contractor to provide CxA with a draft construction schedule as defined under SUBMITTALS for this section.

B. Contractor to provide CxA with updates to construction schedule based upon activities to date in regular intervals, where regular interval is as defined under SUBMITTALS for this section.

C. CxA shall provide Contractor detailed list of commissioning milestones and task schedule as defined under SUBMITTALS for this section.

D. Contractor to provide a minimum notice to CxA as defined under SUBMITTALS for this section, with regards to the following activities unless specifically stated otherwise within another section of the specifications:

1. Equipment or system start-up
2. Specified testing other than FPT
3. Cancellation of activity requiring CxA attendance

3.4 PRE-CONSTRUCTION COMMISSIONING MEETING

A. Contractor and affiliated sub-contractors and personnel associated with work with the commissioned systems of this project shall attend pre-construction commissioning meeting facilitated by CxA. Meeting shall occur within 14 days of selection of Contractor.

3.5 SUBMITTAL REVIEWS

A. Contractor shall supply one complete copy of the submittal register in electronic format to CxA as defined under SUBMITTALS for this section. Register shall include at a minimum the following:

1. Specification section number
2. List of equipment, system, materials, certifications and/or reports requiring submittals for each specification section
3. Number of submittals anticipated for each specification section

B. Contractor to supply one copy, in electronic format of each submittal required for the system or equipment of this section to CxA concurrently with A/E submission. This shall include but is not limited to:

1. Equipment and system shop drawings
2. Coordination drawings
3. RFI’s
4. CO’s
5. RFC’s

C. All submittals supplied by Contractor shall comply with Division 01 specifications and those listed within the technical specifications sections, but not less than the following:

1. Submittals shall show evidence of review and approval by Contractor to ensure compliance to contract documents.
2. Submittals shall be marked to show exact items, sizes, components, characteristics, quantities and details required for project.
3. Submittals shall be properly annotated to match drawing schedules.
4. Catalog information provided shall be clearly marked to indicate intended item and options.
5. Submittals shall contain a complete and edited copy of the manufacturer’s installation and O&M manuals for the proposed equipment and/or system, including wiring diagrams, troubleshooting procedures, parts list and preventative maintenance instructions.

6. Submittals shall include manufacturer's typical start-up checklist, report, and/or procedures for the proposed equipment and/or system.

D. Upon receipt CxA shall review submittal in parallel with A/E review and provide comments to the A/E for inclusion in their final comments to Contractor as defined under SUBMITTALS for this section.

E. A/E shall provide Contractor and CxA with single collated comments and action for submittal as defined under SUBMITTALS for this section.

F. CxA shall review only one re-submittal per submittal provided by Contractor. If additional re-submittals are required due to Contractor negligence in resolution of issues provided by CxA or A/E, then Contractor shall be back charged by Owner for each subsequent re-submittal review by A/E and CxA.

3.6 CONSTRUCTION VERIFICATION

A. See section titled Cx Pre-Functional Checklists

3.7 START-UP VERIFICATION

A. Contractor shall notify CxA and A/E as defined under SUBMITTALS for this section for equipment or system start-up for a commissioned system.

B. CxA and A/E shall witness equipment or system start-up as deemed necessary.

C. Contractor to supply one copy of the start-up report to CxA and A/E as defined under SUBMITTALS for this section.

3.8 TESTING VERIFICATION

A. For all commissioned systems, Contractor shall notify CxA and A/E as defined under SUBMITTALS for this section for any testing specified under technical section for a given equipment or system within the commissioned system. Notification shall include a copy of the proposed procedures to be utilized in electronic format.

B. CxA and A/E shall witness additional testing as deemed necessary.

C. Contractor to supply one copy of the test report to CxA and A/E as defined under SUBMITTALS for this section.

3.9 AS-BUILT VERIFICATION

A. Contractor shall maintain on site and up to date one copy of project as-builts per the requirements of Division 01.

B. As-built drawings shall be of sufficient detail to clearly indicate any and all deviations from design, including items modified per RFC, RFI or CO.

C. As-built drawings maintained by Contractor will be periodically reviewed and verified during construction by CxA. Discrepancies in the drawings will be documented in site visit reports and

the Contractor shall be responsible to verify and correct the as-built drawings against the installed system for specified and all similar problems noted.

D. Contractor shall supply draft copy of complete as-builts to A/E and Owner as defined under SUBMITTALS for this section.

3.10 SITE VISITS

A. As defined under SUBMITTALS for this section the CxA shall provide Contractor with site visit log detailing the number, dates and scope of commissioning site visits anticipated for the duration of the project. This log shall be maintained by .CxA and shall be updated and provided to Contractor at each construction schedule update.

B. CxA shall notify Contractor as defined under SUBMITTALS for this section prior to a scheduled site visit for confirmation of schedule and scope of site visit. Notification shall include the following items at a minimum:

1. Date of site visit
2. Activities to be performed for site visit
3. Areas and system to reviewed during site visit
4. CxA personnel to be in attendance

C. Site visits by CxA shall consist of at least one of the following activities, with the actual scope of activities to be clearly defined within the site visit log and notification of site visit to Contractor:

1. Pre-Functional Checklists
2. Start-up verification
3. Testing verification
4. As-built verification
5. General review of progress and quality
6. Meeting attendance
7. Commissioning meeting
8. Attendance of Owner training session
9. TAB verification
10. Witness of functional performance testing

D. Contractor shall ensure that personnel related to activities, areas and systems scheduled for a given site visit by CxA are readily available for questions and/or assistance to CxA.

E. As defined under SUBMITTALS for this section the CxA shall provide Contractor and Owner with a clear record of the activities performed for the site visit and any deficiencies, discrepancies or issues identified. Report shall clearly detail the scope and location of the issues identified, including provision of photographs as possible.

F. As defined under SUBMITTALS for this section, the Contractor shall supply CxA with a detailed resolution report detailing the following information for issues identified in the site visit report:

1. Issue number and description
2. Method of resolution
3. Date of resolution
4. Party(s) responsible for resolution
5. List of similar installations and areas reviewed and resolved

3.11 COMMISSIONING MEETINGS

A. Periodically CxA shall call a meeting of Contractor, A/E and Owner to review progress of the project, review issues, and discuss scheduling for future commissioning tasks.

B. To the fullest extent possible CxA shall schedule meetings to occur at times that coincide with existing meetings scheduled for Contractor to minimize downtime of Contractor, sub-contractors and personnel.

C. CxA shall provide notification to all parties requested to attend a specific meeting as defined under SUBMITTALS for this section. Notification shall include a formal agenda of the meeting, including the anticipated duration and attendees required.

D. Contractor, A/E and Owner shall be responsible to have personnel requested in attendance at meeting for duration specified by CxA. If people requested are not available then Contractor, A/E or Owner shall provide notice to CxA and provide a substitute

E. CxA shall supply all attending parties with a formal copy of the minutes for the meeting, as defined under SUBMITTALS for this section.

F. Attending parties shall have 5 business days from receipt of minutes to formally comment to CxA on changes to minutes.

3.12 TESTING ADJUSTING AND BALANCING (TAB) VERIFICATION

A. TAB Plan

1. Contractor is to provide A/E and CxA with a complete copy of the TAB plan for the project, as defined under SUBMITTALS for this section. TAB plan shall include at a minimum the following information:
    a. Review contract documentation, submittals and installations for each system requiring TAB. Provide comments on any conditions of design and installation that will preclude proper TAB of facility.
    b. Copy of qualifications and certifications for technicians to be utilized for TAB work
    c. Step by step procedures detailing the methods to be utilized for balancing of each system and equipment type present. Procedures shall be of sufficient detail to ensure repeatable measurement, as well as include procedures to be utilized for examination and preparation prior to TAB.
    d. Pre-populated TAB report in format specified under Div 15 section titled Testing Adjusting and Balancing. TAB report shall include design and submitted performance data for facility equipment and systems.
2. CxA shall provide comments to A/E for review and incorporation into the A/E response to the submittal, as defined under SUBMITTALS for this section.
3. A/E shall provide Contractor with formal response and action for TAB plan, as defined under SUBMITTALS for this section.
4. Contractor shall utilize approved TAB plan as basis for all TAB work to be performed on site. CxA shall in turn utilize the TAB plan as the basis for establishment of the TAB verification plan and the body of record for reviewing the procedures utilized by Contractor in the verification of TAB.

B. TAB Report

1. Contractor shall supply A/E and CxA with a complete copy of the TAB report for the facility, as defined under SUBMITTALS for this section. Report is to meet the requirements stated under Div 15 section titled Testing Adjusting and Balancing and shall be provided in electronic format.
2. CxA shall provide comments to A/E for review and incorporation into the A/E response to the submittal, as defined under SUBMITTALS for this section.
3. A/E shall provide Contractor with formal response and action for TAB report, as defined under SUBMITTALS for this section.
4. If any deficiencies are noted in TAB report comments from the A/E that are related to the methods utilized or results of TAB, Contractor shall remedy said issues and inform A/E and CxA of completion

C. TAB Verification

1. A minimum verification sample of 10% of total the points defined under the work of TAB shall be included for TAB verification. CxA shall define the overall sampling approach and rate to be utilized for TAB verification.
2. Contractor shall supply all personnel and equipment necessary to fully implement TAB verification as requested by CxA. Allow a total of 8 hours over a single day for TAB verification.
3. CxA shall provide A/E, Owner and Contractor with formal TAB verification report, as defined under SUBMITTALS for this section. Report shall include at a minimum the following:
   a. Names of personnel in attendance
   b. Date and duration of verification
   c. Lists of areas and equipment sampled
   d. TAB report and verification values for each point sampled
   e. List of deficiencies and discrepancies noted during verification with recommendations for resolution

3.13 FUNCTIONAL PERFORMANCE AND SEASONAL TESTING

A. See Section sections titled Cx Functional Performance Testing

3.14 OPERATION AND MAINTENANCE DATA

A. Submittal

1. Contractor shall supply one copy of O&M data in format defined to the CxA as defined under SUBMITTALS for this section.
2. CxA shall provide A/E with comments or review and incorporation into A/E comments and action for submittal, as defined under SUBMITTALS for this section.
3. Contractor shall make revisions noted in A/E formal response and provide one copy of the final O&M data to the CxA as defined under SUBMITTALS for this section.
4. Any revisions or changes to the systems and/or equipment post delivery of the final O&M data submittal must be submitted to CxA as an addendum item. Any such submittal must adhere to specifications and be delivered within 30 days of the revision or change.

3.15 TRAINING AND DEMONSTRATION

A. Contractor shall be responsible to submit a formal training program per Division 01 specifications to be utilized for each respective system under their responsibility to CxA, as defined under SUBMITTALS for this section.

B. CxA shall supply A/E with comments or review and incorporation into A/E comments and action for submittal, as defined under SUBMITTALS for this section.

C. Contractor shall submit training materials per section titled Cx Demonstration and Training to be utilized for all sessions under their responsibility to CxA, as defined under SUBMITTALS for this section.

D. CxA shall supply A/E with comments or review and incorporation into A/E comments and action for submittal, as defined under SUBMITTALS for this section.

E. Contractor shall notify CxA of confirmation for training session, as defined under SUBMITTALS for this section.

F. CxA shall attend and review portions of the training sessions to verify that the training program was followed. CxA shall provide comments and recommendation for action for each session attended to A/E as defined under SUBMITTALS for this section. Any sessions deemed as unacceptable or rejected shall be re-done and taped at the convenience of the Owner and CxA. Contractor shall be back charged in these instances for the cost of attendance by CxA.

G. Training videos shall be supplied to the Owner and CxA as defined under SUBMITTALS for this section.

3.16 WARRANTY REVIEW

A. Contractor shall supply a complete copy of all warranties applicable to the facility, the terms of maintenance for each warranty, and the inception and expiration dates for each within the O&M data as defined under SUBMITTALS for this section.

B. Within 10 months of substantial completion CxA shall conduct a review of the operations and condition of the facility with respect to warranty related issues. CxA shall supply Contractor, A/E and Owner with a detailed report listing the issues identified, as defined under SUBMITTALS for this section. This report shall include at a minimum the following:

1. Description of issue identified, including photographs as applicable
2. Recommended course of action
3. Supplementary information relative to previous maintenance or repairs attempted for resolution of issue

C. A/E shall issue a formal course of action to Contractor for resolution of issues identified, as defined under SUBMITTALS for this section.

D. Contractor shall employ services and materials necessary for compliance to action statement from A/E as defined under SUBMITTALS for this section.. All repairs and actions taken by Contractor shall be coordinated with Owner, with a formal log of work completed provided to Owner, A/E and CxA as defined under SUBMITTALS for this section.

3.17 COMMISSIONING ISSUES

A. Throughout the course of the project and commissioning process the CxA shall identify various issues relative to deficiencies or discrepancies with the installations, submissions, or instructions provided by Contractor. These issues shall be clearly identified to Contractor, A/E and other parties of interest in multiple forms depending upon the commissioning task the issue was

identified during. However, CxA shall provide a formalized Cx issues report detailing all issues identified to date and the current status of each issue to Contractor, A/E and Owner as defined under SUBMITTALS for this section.

B. Contractor and A/E are ultimately responsible for resolution of all issues identified during course of project and the commissioning process. Contractor shall supply CxA a formal resolution report for outstanding issues listed in the Cx issues report as defined under SUBMITTALS for this section.

END OF SECTION

SECTION 01811

Cx PRE-FUNCTIONAL CHECKLISTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes specifications for the implementation, tracking and verification of the commissioning process during construction.

1.2 DEFINITIONS

A. A/E: Architect / Engineer

B. Cx: Commissioning

C. CxA: Commissioning Authority

D. BAS: Building Automation System

E. TAB: Testing, Adjusting, and Balancing

F. RFC: Request for Clarification

1.3 SUBMITTALS

A. The following table contains deliverables and/or submittals required under this section, the party(s) responsible for each, the frequency and or timeline these items should be provided, the format and quantity to be provided, and the party(s) to be provided to.

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
Completion of draft checklists	CxA	120 days following contract award and approved equipment submittals	Electronic	Contractor, Owner and A/E
Review comments on checklists provided	Contractor	7 days proceeding receipt of checklists	Electronic	CxA
Final Checklists	CxA	14 days proceeding receipt of comments	Electronic	Contractor

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
Instructions for completion and utilization of checklists and tracking system	CxA	14 days proceeding receipt of checklist comments	Electronic	Contractor
Equipment identification tags	CxA	14 days proceeding receipt of checklist comments	Laminated Paper (1 copy per unit)	Contractor
Checklist Tracking System	CxA	14 days proceeding receipt of checklist comments	Electronic	Contractor
PC and related software defined under the HARDWARE/SOFTWARE REQUIREMENTS for Checklist Tracking System	CxA	14 days proceeding receipt of checklist comments	N/A	Contractor
Completion and deficiency reports as defined by CxA	Contractor	Weekly	Electronic	A/E, CxA and Owner
List of deficiencies requiring action	CxA	Weekly, within 3 business days of receipt of deficiency report	Electronic	Contractor
Resolution report for deficiencies	Contractor	Weekly	Electronic	A/E, CxA and Owner
Construction Checklist Completion Summary and Construction Checklist Deficiency Reports	CxA	Monthly	Electronic	Contractor, A/E and Owner
Completed and finalized checklists	Contractor	7 days prior to functional testing	Electronic	CxA
Discrepancy report for periodic checklist verification	CxA	Within 7 days of checklist verification	Electronic	Contractor
Resolution report for discrepancies	Contractor	Weekly	Electronic	A/E, CxA and Owner
Construction Checklist Verification Completion Summary and Construction Checklist Verification Discrepancy Reports	CxA	Monthly	Electronic	Contractor, A/E and Owner

PART 2 - PRODUCTS N/A

PART 3 - EXECUTION

3.1 PURPOSE

A. The intent of the pre-functional checklists is to provide a formalized means to provide individual workers the key criteria for a successful installation and to easily track construction progress.

3.2 DEVELOPMENT PROCEDURE

A. Pre-functional checklists shall be developed for each system or equipment to be commissioned.

B. CxA shall be responsible to provide Contractor with draft copies of each checklist to be utilized for this project for each equipment/system type as defined under SUBMITTALS for this section for commissioned equipment. An example for checklists is provided in Annex A showing the format to be used.

C. Checklists shall be provided in the following formats:

1. EQUIPMENT: Checklists related to a specific piece of equipment or portion of an overall system that is completed in a linear progression similar to the standard installation practices of the equipment.
2. SYSTEM: Checklists related to the overall distribution system or repetitive equipment found universally throughout a given system (i.e. valves, diffusers, outlets, etc.).

D. Contractor is responsible to review the checklists provided by the CxA and provide any comments or issues related to the specified checklist as defined under SUBMITTALS for this section. Failure to provide comments on the checklists shall constitute full acceptance as written.

E. Contractor and A/E are responsible to provide notice to CxA for any project modifications related to the addition or deletion of equipment and/or systems to be commissioned.

F. CxA shall incorporate any comments from the Contractor for the final checklists that are not deemed in contradiction to the scope of the project, applicable codes and standards, and the OPR of the project.

G. CxA shall provide contractor with the following items to the Contractor upon incorporation of all applicable comments:

1. Instructions for completion and utilization of checklists and tracking system.
2. Checklists for all equipment and systems in the following format:
    a. SHORT FORM: Paper checklists divided into individual groups as noted within the PRE-FUNCTIONAL CHECKLISTS provided under this section. Checklist shall be divided by trade and step of installation with each trade Contractor responsible for the completion of each checklist group. Each group to be provided and tracked as an individual checklist. Checklists to include tracking ID that uniquely identifies the singular piece of equipment or area of the system, and the checklist group the given checklist relates to. Checklist shall include area to mark checklist as complete, as well as an area to note the initials of the individual responsible for completion and the

date of completion. Checklists to include space for notation of any deficiencies identified during verification of installation.

3. Unique identification tags for each piece of equipment related to the systems. Identifier for tags shall be directly tied to checklists regardless of format utilized.

H. CxA shall provide contractor with the training on the utilization of the checklists and tracking system prior to delivery or commencement of any work related to the checklists.

3.3 HARDWARE/SOFTWARE REQUIREMENTS

A. The CxP will provide netbook PCs and other equipment necessary for a fully functioning electronic-based checklist verification system. The Contractor will be required to comply with and sign a cost-free lease agreement between the CxP and General Contractor regarding the electronic equipment. This lease agreement shall require the Contractor to agree to manage and insure the provided equipment on site from excessive damage and loss or compensate the CxP for the full replacement of the equipment (estimated value of $2500).

B. The Contractor must provide a dedicated area in the site trailer for storage and maintenance of equipment mentioned in (A). This equipment and related software shall be allowed full access to on-site internet capabilities. Full access shall also be provided to CxP, Owner and Contractors for field use during typical hours of operation on site.

3.4 COMPLETION PROCEDURE

A. The following is the permitted method the Contractor is to utilize for completion of all construction verification checklists related to project. Any deviations from this procedure must be authorized by the CxA.

B. EQUIPMENT CHECKLSITS

1. The electronic equipment, provided on-site for completion of checklists shall be checked out by completing a log sheet. Equipment shall be checked back in at the end of each day.
2. The checklist shall be completed by the individual completing the work who is responsible for the given delivery or installation step of the equipment.
3. Checklists shall be completed fully with all information or responses noted in the spaces provided for each item. Any items that cannot be answered due to lack of information with equipment or not being applicable to a given installation shall be noted negatively, with an explanation provided in the deficiency section.
4. Any negative responses on the checklist shall be explained and documented at the end of the checklist. Explanation shall be detailed to a degree to define the reasoning for non-compliance without further observation.
5. Once all items on a checklist have been completed, individual shall mark that group/checklist as complete.
6. At end of dayall electronic equipment that was checked out shall be returned to the site trailer, synched with the main system, and signed back in using the log sheet..
7. CxP shall periodically review deficiency reports provided by checklist system and provide a list of deficiencies requiring action by Contractor.
8. Contractor to record method and date of resolution within 7 days of receipt of report from CxP.
9. If any deficiencies or non-compliance are noted Contractor shall remedy said issues and inform A/E and CxP of completion.

10. The completion of the checklists does not eliminate the Contractor's responsibility for meeting other requirements in the specifications and drawings.

C. SYSTEM CHECKLISTS

1. The checklist shall be completed by the individual completing the work who is responsible for the given installation of the system.
2. Individual to periodically record the work completed throughout the week for the given system by recording the percentage of completion, the description of work performed, and response to the items identified. Periodicity of this record shall be defined as follows:
   a. For checklists pertaining to areas of systems with an overall installation timeframe <3 weeks, checklist to be completed on a daily basis.
   b. For checklists pertaining to areas of systems with an overall installation timeframe <8 weeks, but >3 weeks, checklist to be completed twice per week.
   c. For checklists pertaining to areas of systems with an overall installation timeframe >8 weeks, checklist to be completed on a weekly basis.
3. Checklists shall be completed fully with all information or responses noted in the spaces provided for each item. Any items that cannot be answered due to lack of information with equipment or not being applicable to a given installation shall be noted negatively, with an explanation provided in the deficiency section.
4. Any negative responses on the checklist shall be explained and documented at the end of the checklist. Explanation shall be detailed to a degree to define the reasoning for non-compliance without further observation.
5. Once the percentage of completion for a given system checklists is noted as 100%, individual shall mark that group/checklist as complete.
6. CxP shall periodically review deficiency reports provided by checklist system and provide a list of deficiencies requiring action by Contractor.
7. Contractor to record method and date of resolution within 7 days of receipt of report from CxP.
8. If any deficiencies or non-compliance are noted Contractor shall remedy said issues and inform A/E and CxP of completion
9. The completion of the checklists does not eliminate the Contractor's responsibility for meeting other requirements in the specifications and drawings.

3.5 VERIFICATION PROCEDURE

A. At the commencement of work related to the checklists the CxP will periodically verify the accuracy, completeness and tracking of the checklists. This verification shall consist of reviewing the as installed conditions of the equipment and/or system versus the statements recorded on the checklists and the progress of the checklists in general.

B. CxP shall record any discrepancies noted between the as installed conditions and/or progress of installation versus the checklists in a formal report to the Contractor as defined under SUBMITTALS for this section.

C. Contractor shall provide CxP method and date of resolution as defined under SUBMITTALS for this section.

D. Any discrepancies noted for action that are disputed by Contractor and cannot be resolved between the Contractor and the CxP, shall be presented to Owner and A/E for resolution in the form of a RFC.

E. If during verification the CxP identifies more than a 10% discrepancy rate for items identified on an individual checklist, or for the overall item count for the checklists for a given equipment or system, the Contractor shall re-validate 100% of the checklists, equipment and/or system.

F. If during verification the CxP identifies more than a 10% discrepancy rate between the current installation completion percentage for a given equipment or system and that reflected in the current checklists, the Contractor will be issued a written warning regarding this issue and shall be responsible to bring the checklist completion in line with the installation progress by a date defined by the CxP. The Contractor will have 7 days to respond to the issue as described in the warning letter. The Owner shall be notified of condition and the status of the resolution. If this issue is again not resolved by the date specified and/or occurs again during the course of the project, the Owner may choose to withhold payments based on the percentage of checklists completed or the Contractor will be back charged by the Owner to have the CxP review 100% of all un-completed checklists required to bring the checklist completion in line with the installation progress.

ANNEX A – SAMPLE CONSTRUCTION VERIFICATION CHECKLIST

The following checklist is provided as an example only. The content and format does not necessarily reflect the final scope, format or system to be utilized for this project.

Equipment Type: Modular Boilers
Tag #:
Location:
Spec #: 15600
System:
Checklist Tracking ID:

Instructions:

1. Checklists are organized in groups by installation phase. Each phase is assigned a given responsible contractor which is solely responsible for the construction verification items defined within that group.
2. Checklists are to be completed in accordance with the stage of delivery, installation or start-up by the individuals responsible for installation.
3. Circle Yes or No, or provide the requested information for each checklist item.
4. If the information requested for a checklist item is not listed or the item does not apply to the given unit or system, list it as "N/A" and provide the reasoning under the negative responses section.
5. Explain all discrepancies or negative responses in the negative responses section of the checklist. All discrepancies, negative and "N/A" responses must be defined.
6. At the completion of each checklist group the party responsible for completion of the checklist group is to mark that group as complete in the provided checkbox, and initial and date in the spaces provided. *Note completion of the checklist group is defined as the complete response to each checklist item within the group including negative responses and the completion of all delivery, installation or start-up tasks related to the equipment for that group.*
7. Provide checklist to lead contractor at completion of each work day.

Group/Item	Group/Task Description	Submitted	Delivered
A	*MODEL VERIFICATION*		
1	Manufacturer		
2	Model		
3	Serial Number		
4	Total Input / Output Capacity (MBH)	/	/
5	Gas inlet pressure (psi)		
6	Burner motor HP		
7	Voltage / Phase / Frequency (V / - / Hz)	/ /	/ /
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____

Group/Item	Group/Task Description	Response	
B	*PHYSICAL CHECKS*		
1	Unit is free from physical damage.	YES	NO
2	The water and gas openings are sealed with plastic plugs.	YES	NO
3	All components present.	YES	NO
4	Installation and startup manual provided.	YES	NO
5	Unit tags affixed.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
C	*INSTALLATION*		
1	Unit located indoors and protected from freezing temperatures.	YES	NO
2	Unit not located near an air-moving device.	YES	NO

Group/Item	Group/Task Description	Response	
3	Proper clearances from combustible surfaces maintained per manufacturer's instructions and applicable codes.	YES	NO
4	Installation area free of corrosive elements and flammable materials.	YES	NO
5	Unit is set on concrete housekeeping pad and is level.	YES	NO
6	Unit secured as required by manufacturer and specifications.	YES	NO
7	Equipment location coordinated with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances.	YES	NO
8	Adequate clearance around unit for service.	YES	NO
9	All components accessible for maintenance.	YES	NO
10	Unit labeled and is easy to see.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
D	*VENTILATION AND COMBUSTION AIR SUPPLY*		
1	Fresh air not taken from areas that contain negative pressure producing devices.	YES	NO
2	Fresh air supply free of corrosive elements and flammable vapors.	YES	NO
3	Fresh air openings located correctly with consideration given to the blocking effect of louvers and grilles.	YES	NO
4	Overall ductwork length and restrictions comply with manufacturer requirements.	YES	NO
5	Ductwork is the same cross-sectional area as openings.	YES	NO
6	All ductwork is properly sealed and sloped per manufacturer specifications.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
E	*VENT PIPE SYSTEM*		
1	Draft hood for atmospheric burners properly installed.	YES	NO
2	Vent connectors securely fastened with screws and supported properly to maintain 6-inch clearance.	YES	NO
3	Vent connector made of approved material and sloped correctly.	YES	NO
4	Vent pipe system in accordance with "National Fuel Gas Code", NFPA 54, ANSI Z223.1-Latest Edition or prevailing provisions of local codes.	YES	NO
5	Overall ductwork length and restrictions comply with manufacturer requirements.	YES	NO
6	Flue baffle engaged in slots provided in the flue tube.	YES	NO
7	Flue way, draft hood or vent pipe system not obstructed in any way.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
F	*WATER PIPING*		
1	All piping components have been installed (in the correct order) as required by contract document or manufacturer.	YES	NO
2	Piping arranged for ease of unit removal.	YES	NO
3	Piping supported as required by specifications.	YES	NO
4	Piping is clean.	YES	NO
5	Unit connected to water supply, return, and drain piping using unions or flanges and isolation valves.	YES	NO
6	Dielectric fittings installed to isolate dis-similar pipe materials.	YES	NO
7	Piping and valves properly checked and free of leaks.	YES	NO
8	Thermometers and pressure gauges supplied on supply and return lines.	YES	NO
9	Balancing valve supplied for each boiler branch (multiple boiler arrangements ONLY).	YES	NO
10	Piping insulation is complete and installed as per specifications.	YES	NO

Group/Item	Group/Task Description	Response	
11	All valves and test ports are easily accessible.	YES	NO
12	Valve tags attached.	YES	NO
13	Pressure and temperature relief valve(s) for correct pressure and temperature installed.	YES	NO
14	Pressure and temperature relief valve(s) piped with sufficient pipe diameter to drain designed for boiling water.	YES	NO
15	Drain valve provided.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
G	*STEAM PIPING (IF APPLICABLE)*		
1	All piping components have been installed (in the correct order) as required by contract document or manufacturer.	YES	NO
2	Strainer and isolation valve installed.	YES	NO
3	Proper condensate trap installed.	YES	NO
4	Pressure relief valve installed prior to heat exchanger for steam supply pressures above maximum recommended pressure ratings for unit.	YES	NO
5	Safety and pressure relief devices installed in manner to minimize personnel and property damage.	YES	NO
6	Piping pitched for proper condensate flow.	YES	NO
7	Piping arranged for ease of unit removal.	YES	NO
8	Piping supported as required by specifications.	YES	NO
9	Piping is clean.	YES	NO
10	Piping and valves properly checked and free of leaks.	YES	NO
11	Pressure gauges supplied on supply lines.	YES	NO
12	Piping insulation is complete and installed as per specifications.	YES	NO
13	All valves and test ports are easily accessible.	YES	NO
14	Valve tags attached.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
H	*GAS PIPING*		
1	Gas supply is the same type as listed on the unit data plate.	YES	NO
2	Pressure reducing valves provide correct pressure to unit.	YES	NO
3	Gas cock / valve and union provided on gas supply.	YES	NO
4	Drip / dirt leg and cap provided on gas supply.	YES	NO
5	Pressure relief valves are piped to outdoors.	YES	NO
6	Piping and valves properly checked and free of leaks.	YES	NO
7	Proper gas train provided (FM/IRI arrangements).	YES	NO
8	Gas utility company inspected installation (if required).	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
I	*ELECTRICAL*		
1	Local disconnect installed in accessible and visible location.	YES	NO
2	All electrical connections are tight.	YES	NO
3	All electrical components are grounded.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
J	*CONTROLS INSTALLATION*		
1	Control panel accessible and labeled properly.	YES	NO
2	Remote start and stop wiring installed and communication verified.	YES	NO
3	Remote status wiring installed and communication verified.	YES	NO
4	Remote alarm wiring installed and communication verified.	YES	NO
5	Hot water temperature reset signal verified and programmed.	YES	NO
6	Actuators installed and calibration verified.	YES	NO
7	Low water cutoff switch installed and operational.	YES	NO

Group/Item	Group/Task Description	Response	
8	High temperature limit sensor installed and programmed per contract documents.	YES	NO
9	High pressure limit sensor installed and programmed per contract documents (steam boilers ONLY).	YES	NO
10	Hot water supply and return temperature sensors installed and communication verified.	YES	NO
11	Steam supply pressure sensor installed and communication verified (steam boilers ONLY).	YES	NO
12	Circulation pump wired and operational (if applicable).	YES	NO
13	Test ports installed near all control sensors.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
K	*MECHANICAL STARTUP*		
1	System flushed, filled, and air purged.	YES	NO
2	Burner adjusted to proper settings and CO_2, CO, and combustion efficiencies are acceptable.	YES	NO
3	System starts and runs without any unusual noise or vibration.	YES	NO
4	Pressure and temperature relief valve(s) set to proper pressure and temperature and manually checked for functionality.	YES	NO
5	Manufacturer's startup checklist completed and attached.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
L	*CONTROLS STARTUP*		
1	Low water cut off sequence verified and acceptable.	YES	NO
2	High temperature limit sequence verified and acceptable.	YES	NO
3	High pressure limit sequence verified and acceptable (steam boilers ONLY).	YES	NO
4	Flame safety sequences verified and acceptable.	YES	NO
5	Heating sequence verified and acceptable.	YES	NO
6	Temperature reset schedule verified and acceptable.	YES	NO
7	Lead/lag sequence verified and acceptable.	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____
M	*TAB*		
1	Minimum flow conditions for boiler verified and acceptable (primary pumping systems ONLY).	YES	NO
❑ **CHECKLIST GROUP COMPLETE**	**INITIALS:** _____	**DATE:**	_____

Negative Responses

Group/ Item	Date Found	Found By	Reason for Negative Response	Resolved	Date Resolved	Resolution
				YES / NO		
				YES / NO		
				YES / NO		
				YES / NO		
				YES / NO		

END OF SECTION

SECTION 01812

Cx FUNCTIONAL PERFORMANCE TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes specifications for the implementation, tracking and verification of the commissioning process.

1.2 DEFINITIONS

A. A/E: Architect / Engineer

B. Cx: Commissioning

C. CxA: Commissioning Authority

D. BAS: Building Automation System

E. TAB: Testing, Adjusting, and Balancing

F. RFC: Request for Clarification

G. FPT: Functional Performance Test

1.3 SUBMITTALS

A. Contractor to supply formal review and comment to CxA on procedures supplied by CxA for application to project, adherence to warranty requirements and general safety.

B. CxA shall provide contractor with list of criteria required for contractor readiness notification. Whereas contractor readiness notification is deemed as the formal notification by Contractor for initiation of functional testing. These criteria shall be provided for each commissioned system to be tested and shall consist of the following items at a minimum:

1. Completed copies of all construction verification checklists for equipment and systems pertaining to commissioned system.
2. Written and approved notification of the resolution of all deficiencies, discrepancies and issues noted for equipment and systems pertaining to commissioned system.
3. Completed and approved copies of all start-up, testing and balancing reports specified for equipment and systems pertaining to commissioned system.

C. Contractor to supply construction schedule providing a minimum of 21 days prior to substantial completion for the functional and seasonal testing of all commissioned systems. Schedule is to comply with general scheduling requirements specified under 01810 and shall provide sufficient time prior to specified testing period to meet contractor readiness notification requirements.

D. Prior to commencement of testing period Contractor to provide CxA with a proposed plan to implement the tests specified by CxA for approval. Plan to include the following on an hour/day schedule.

1. Personnel to be in attendance
2. Tools to be provided
3. Duration provided for each test
4. Arrangement of tests to maximize personnel utilization and minimize down time required for test preparation.

E. The following table contains deliverables and/or submittals required under this section, the party(s) responsible for each, the frequency and or timeline these items should be provided, the format and quantity to be provided, and the party(s) to be provided to.

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
FPT procedures	CxA	120 days following contract award	Electronic	Contractor, Owner and A/E
Review comments on FPT procedures	Contractor	7 days proceeding receipt of checklists	Electronic	A/E and CxA
Final FPT procedures	CxA	14 days after receipt of comments	Electronic	Contractor
Construction schedule with FPT provisions	Contractor	7 days prior to commencement of work	Electronic	A/E, Owner and CxA
FPT plan	Contractor	28 days prior to commencement of testing	Electronic	A/E, Owner and CxA
Contractor readiness notification	Contractor	14 days prior to commencement of testing	Electronic	A/E, Owner and CxA
FPT readiness conformation	Contractor	7 days prior to commencement of testing	Electronic	CxA
Preliminary FPT report and list of deficiencies requiring action	CxA	Within 14 days of completion of testing	Electronic	Contractor
Resolution report for FPT deficiencies	Contractor	Within 7 days of receipt of report	Electronic	A/E, Owner and CxA
FPT re-test plan (if applicable)	Contractor	14 days prior to commencement of testing	Electronic	A/E, Owner and CxA
Final FPT report	CxA	Within 7 days of completion of testing	Electronic	Contractor and Owner
Seasonal testing plan	CxA	Within 7 days of completion of substantial completion	Electronic	Contractor and Owner

Submittal	Party(s) Responsible	Frequency or Timeline	Format & Quantity	Party(s) Provided To
Seasonal testing readiness conformation	Contractor	7 days prior to commencement of testing	Electronic	CxA
Preliminary seasonal testing report and list of deficiencies requiring action	CxA	Within 14 days of completion of testing	Electronic	Contractor
Resolution report for seasonal test deficiencies	Contractor	Within 7 days of receipt of report	Electronic	A/E, Owner and CxA
Final seasonal testing report	CxA	Within 7 days of receipt of resolution report	Electronic	Contractor and Owner

1.4 TEST METHODS

A. FPT is achieved in accordance with the procedures outlined by the CxA with the example provided under Annex A. For the purpose of clarity CxA may require Contractor to employ one of the following methods below:

1. Simulated Conditions. Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
2. Overwritten Values. Overwriting sensor values to simulate a condition, such as overwriting shall be allowed, but shall be used with caution and avoided when possible.
3. Simulated Signals. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
4. Altering Setpoints. Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable.
5. Indirect Indicators. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses.

B. Sampling. Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy as defined by CxA. Provided a minimum sampling rate of 20% of the similar units is provided and that units with significant application differences and significant sequence of operation differences are not included in the overall sample.

PART 2 - PRODUCTS

2.1 All standard testing equipment required to perform startup, initial checkout, additional testing and required functional performance testing shall be provided by Contractor for the equipment being tested.

2.2 Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site, except for stand-alone datalogging equipment that may be used by the CxP.

2.3 Datalogging equipment and software required to test equipment, if used, will be provided by the CxP, but shall not become the property of the Owner.

2.4 All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply:

A. Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5ºF and a resolution of + or – 0.1ºF.

B. Pressure sensors shall have an accuracy of + or – 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

C. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 PURPOSE

A. The intent of the functional performance tests is to provide a formalized means to verify the completion and functional preparedness of the commissioned systems for operation and occupancy.

3.2 DEVELOPMENT PROCEDURE

A. FPT shall be developed for each system and equipment to be commissioned. For the purpose of clarity it can assumed the following tests with minimum durations will be required:

1. Hot Water – 2 hours
2. Air Distribution – 8 hours
3. Domestic Cold Water – 1 hour
4. Domestic Hot Water Systems – 1 hour
5. Energy Management & Control Systems (BAS) – 4 hours
6. Indoor Lighting and Control Systems – 2 hours
7. Outdoor Lighting and Control Systems – 1 hour

B. CxA shall be responsible to provide Contractor with copies of each FPT to be utilized for this project for each commissioned system as defined under SUBMITTALS for this section. An example showing the rigor and detail that is to be utilized for FPT procedures is provided in Annex A.

C. Contractor is responsible to review the FPT provided under by CxA and provide any comments or issues related to the specified FPT as defined under SUBMITTALS for this section. Failure to provide comments on the FPT shall constitute full acceptance as written and obligation of Contractor to full warrant the application, safety and warranty terms of the equipment and system under the conditions presented by the tests specified.

D. Contractor and A/E are responsible to provide notice to CxA for any project modifications related to the addition or deletion of equipment and/or systems to be commissioned.

E. CxA shall incorporate any comments from the Contractor that are not deemed in contradiction to the scope of the project, applicable codes and standards, and the OPR of the project.

3.3 CONTRACTOR READINESS

A. The following conditions shall constitute the definition of contractor readiness. The Contractor shall be responsible to formally provide written confirmation of compliance with all criteria as defined under SUBMITTALS for this section.
   1. Completed copies of all construction pre-functional checklists for equipment and systems pertaining to commissioned system.
   2. Written and approved notification of the resolution of all deficiencies, discrepancies and issues noted for equipment and systems pertaining to commissioned system.
   3. Completed and approved copies of all start-up, testing and balancing reports specified for equipment and systems pertaining to commissioned system.
   4. Documentation of preliminary functional testing results as performed by Contractor.

B. Contractor failure to provide any portion of the above criteria within the specified timeframe shall cancel and put a stop to all scheduled functional testing, without extension to Contractor for testing, substantial completion, and/or Contract period.

3.4 PRE-IMPLEMENTATION PROCEDURE

A. The following is the permitted method the Contractor is to utilize prior to implementation of all FPT related to project. Any deviations from this procedure must be authorized by the A/E and CxA.

   1. Contractor supplies CxA with FPT plan as defined under SUBMITTALS for this section.
   2. CxA reviews FPT plan and provide comments to Contractor.
   3. Contractor provides contractor readiness notification for commissioned systems as defined under SUBMITTALS for this section.
   4. CxA with confirmation of FPT readiness as defined under SUBMITTALS for this section.

3.5 IMPLEMENTATION PROCEDURE

A. CxA is NOT responsible for the operation of equipment/systems and/or conducting the testing on the equipment/systems. CxA is only responsible for witnessing, reporting and approving the tests conducted by the Contractor. Contractor is fully responsible for operation of equipment/systems and conducting the testing on the equipment/system specified under the FPT procedures to the satisfaction of CxA.

B. The following is the permitted method the Contractor is to utilize for implementation of all FPT related to project. Any deviations from this procedure must be authorized by the CxA prior to testing.

1. On day of scheduled test Contractor shall have personnel and tools present to accomplish test. If required personnel and/or tools are not present Contractor shall be responsible for re-testing in accordance with the requirements specified under RE-TESTING PROCEDURE.
2. Contractor shall ensure BAS and/or data logging equipment is set-up for trending specified for each test prior to initiation of test.
3. Contractor shall implement testing according to approved FPT plan unless directed by CxA.
4. If minor issues are identified during the test CxA and Contractor shall review issue and formulate resolution to continue test. Contractor shall repair or remedy issues identified and test shall be continued once completed. CxA shall clearly identify the issue and method of resolution in the FPT report.
5. If major issues are identified during the test Contractor shall terminate test immediately and work with A/E and CxA to determine the method of resolution. CxA shall clearly identify the issue in the FPT report. Upon resolution of these issues Contractor shall supply CxA with report detailing method of resolution and proposed schedule for re-testing according to the requirements specified under RE-TESTING PROCEDURE.
6. If at any point, frequent failures are occurring and testing is requiring excessive troubleshooting, CxA may stop the testing and require the responsible Contractor to perform and document a checkout of the remaining units and systems, prior to continuing with functional testing. Failures of this nature shall constitute a re-test and handled in accordance with the guidelines specified for re-testing under this section.

C. CxA is solely responsible for defining what constitutes a minor or major issue during a test. Minor issues are defined as issues related to deficiencies in the installation of equipment or system that can be resolved without interpretation by the A/E and/or not requiring significant time for resolution that would cause delay to the completion of the test. Major issues are defined as issues related to deficiencies in the installation of equipment or system that cannot be resolved without interpretation by the A/E and/or requiring significant time for resolution that would cause significant delay to the completion of the test.

D. At the completion and approval of all tests CxA shall provide A/E, Owner and Contractor with final copy of FPT report.

E. The completion of the FPT does not eliminate the Contractor's responsibility for meeting other testing requirements in the specifications and drawings.

3.6 SEASONAL TESTING PROCEDURE

A. Portions of or tests in whole are required to be run under near peak load conditions. For these instances the Contractor will be required to attend and implement seasonal tests under the direction of CxA.

B. Contractor and CxA shall develop and agree upon a seasonal testing plan as defined under SUBMITTALS for this section, which shall have the same format and detail required for the FPT plan defined in this section.

C. Contractor to provide CxA with confirmation of seasonal testing readiness as defined under SUBMITTALS for this section.

D. Contractor and CxA shall follow identical procedure defined for FPT under this section for all seasonal tests, including methods for issue resolution and re-testing.

E. At the completion and approval of all tests CxA shall provide A/E, Owner and Contractor with final copy of seasonal test report.

F. The completion of the seasonal tests does not eliminate the Contractor's responsibility for meeting other testing requirements in the specifications and drawings.

3.7 NON-CONFORMANCE AND APPROVAL OF TESTING

A. Non-Conformance

1) If any deficiencies or non-conformance are noted the Contractor shall remedy said issues until satisfactory performance is achieved in accordance with re-testing guidelines provided under this section and inform A/E and CxA of completion for reinspection.

B. Failure Due to Manufacturer Defect

1. If 10%, or three, whichever is greater, of identical pieces of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the A/E or Owner. In such case, the Contractor shall provide the Owner with the following:
   a. Within 7 days of notification from the A/E, Owner and CxA, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the A/E within two weeks of the original notice.
   b. Within 14 days of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
   c. A/E, Owner and CxA will determine whether a replacement of all identical units or a repair is acceptable.
   d. Two examples of the proposed solution will be installed by the Contractor and the A/E, Owner and CxA will be allowed to test the installations for up to one week, upon which the A/E and Owner will decide whether to accept the solution. Cost of this re-testing for A/E, Owner and CxA shall fall under the guidelines for re-testing presented in this section.
   e. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

C. Approval.

1. CxA shall have the sole responsibility of determining the satisfactory completion and approval of any and all functional and seasonal tests. CxA shall provide A/E, Contractor and Owner with formal approval of each functional and seasonal test as part of the final FPT report.

3.8 RE-TESTING PROCEDURE

A. CxA is responsible for attendance at one attempt per test, where an attempt is defined as the participation and attendance at a test at the time approved under the FPT readiness conformation.

B. Any requirement for a re-test for a given test shall constitute the back charge to the responsible Contractor by the Owner for the attendance of CxA. CxA shall be solely responsible for determining the responsible party, and a re-test shall be defined in this context as any time where a test defined under this section for the project cannot be fully executed due to any of the following conditions:

1. Date and time of test changed without a minimum of seven (7) days notice to CxA.
2. Improper or insufficient personnel and/or tools on site at time of test.
3. Deficiencies or discrepancies present at time of test that have been previously noted by CxA and remain unresolved.
4. Any issues that require a re-test or stoppage of tests in progress.
5. Failure of test for reason under responsibility of Contractor and/or Contractor responsible for sub or feed system (i.e. controls, electrical, etc.).
6. Failure due to manufacturer defect.

C. The Contractor is responsible for all costs associated with re-testing.

D. Re-testing by Contractor shall not be considered a reason for a claim of delay or for a time extension by the Contractor.

3.9 PROJECT FUNCTIONAL PERFORMANCE TEST PROCEDURES

A. Refer to Annex A following this section for copies of the FPT to be utilized for this project.

END OF SECTION

ANNEX A –SAMPLE FUNCTIONAL PERFORMANCE TEST PROCEDURE

The following FPT is provided as an example only. The content and format does not necessarily reflect the final scope, format or systems to be utilized for this project.

Boiler Functional Performance Test

Date: _____ Start Time: _____ End Time _____

Estimated Duration: _____
Cx Provider(s): _____
_____
_____

Applicable Equipment: _____

A Objectives

This test is performed to investigate the ability of the boiler to provide heating water or steam for the facility.

B Instrumentation

Instrument	Accuracy	Measurement
N/A	N/A	N/A

C Stated Sequence

TBD

D Procedure

1. Hot Water Temperature Reset
    a. Verify boilers are in occupied mode. If not override system into occupied mode.
    b. Record outside air temperature and hot water supply temperature.
    c. Override outside air temperature to be 10º above current outside air temperature.
    d. Verify hot water temperature decreases with override proportionally.
    e. Override outside air temperature to be 10º below current outside air temperature.
    f. Verify hot water temperature increases with override proportionally.
    g. Return outside air temperature to normal operation.
2. Staging Up
    a. Override hot water temperature set point to be 15º above current reading.
    b. Verify lead boiler circulation pump energizes and lead boiler fires at low fire.
    c. Record the hot water supply and return temperatures, as well as the time lead boiler started.
    d. Lower the delay time between all stages to a maximum of 3 minutes.
    e. Verify lead boiler modulates to high fire after three minutes at low fire setting.
    f. Record the hot water supply and return temperatures.
    g. Verify lag boiler circulation pump energizes and lag boiler fires at low fire after lead boiler has been under operation at high fire for 3 minutes.
    h. Record the hot water supply and return temperatures.
    i. Verify lag boiler modulates to high fire after three minutes at low fire setting.
    j. Record the hot water supply and return temperatures.
    k. Repeat steps g to j for each additional lag boiler present.
    l. Verify lead and lag boilers continue to operate until hot water temperature set point is achieved and record time.
3. Staging Down
    a. With all boilers firing, lower hot water temperature set point to be 15º below current reading.
    b. Record the hot water supply and return temperatures, as well as the time test started.
    c. Verify lag boiler(s) modulates to low fire after 3 minutes at new setpoint.
    d. Record the hot water supply and return temperatures.
    e. Verify lag boiler(s) shuts down after operation at low fire for 3 minutes.
    f. Verify lag boiler(s) circulation pump de-energizes thirty seconds after lag boiler(s) has shut down.

g. Record the hot water supply and return temperatures.
h. Verify lead boiler modulates to low fire after 3 minutes has passed since last lag boiler(s) shut down.
i. Record the hot water supply and return temperatures.
j. Verify lead boiler shuts down after operation at low fire for 3 minutes.
k. Verify lead boiler circulation pump de-energizes thirty seconds after lead boiler has shut down.
l. Record time of lead boiler shut down.
m. Return system and settings to normal mode and original set points.

4. Minimum Boiler Flow (primary pumping systems ONLY)
   a. Override hot water temperature set point to be 5º above current reading.
   b. Verify one boiler pump energizes and boiler fires at low fire.
   c. Override all control valves to close in hot water system. For 3-way valves ensure valves are set to bypass coil.
   d. Verify boiler has minimum flow per manufacturer requirements.
   e. Override all 3-way valves to coil.
   f. Verify boiler has minimum flow per manufacturer requirements.
   g. Override all control valves to close in hot water system. For 3-way valves ensure valves are set to bypass coil.
   h. Shut down ON boiler via local disconnect.
   i. Verify lag boiler pump energizes and lag boiler fires at low fire.
   j. Verify boiler has minimum flow per manufacturer requirements.
   k. Override all 3-way valves to coil.
   l. Verify boiler has minimum flow per manufacturer requirements.
   m. Override all control valves to close in hot water system. For 3-way valves ensure valves are set to bypass coil.
   n. Shut down ON boiler via local disconnect.
   o. Repeat steps ix through xiv for each lag boiler.
   p. Return system to normal operation and conditions.
5. Unoccupied Mode
   a. Change the current time to be in unoccupied mode.
   b. Verify all connected loads to hot water system are also in unoccupied mode and not operational.
   c. Override boilers and pump to normal.
   d. Verify boilers and pumps do not come ON.
   e. Manually start one load served by the hot water system.
   f. Verify boilers and pumps are energized.
   g. Manually shut down the energized air handling unit from step e.
   h. Verify boilers and pumps shut down in accordance with proper cool down and minimum run times for boilers.
   i. Return system to and equipment to normal operations and occupied mode.
6. Alarms and Safeties
   a. With lead boiler ON in occupied mode (adjust hot water temperature set point if necessary), manually shut OFF boiler via disconnect.
   b. Verify lag boiler energizes and alarm is generated at local control panel and/or BAS head end.
   c. Repeat steps a and b for each lag boiler.
   d. Return all boilers to normal operating conditions.
   e. With lead boiler ON in occupied mode (adjust hot water temperature set point if necessary), shut down circulation pump for boiler via disconnect.
   f. Verify low flow alarm is initiated at local control panel and/or BAS head end and boiler shuts down.
   g. Repeat steps e and f for each lag boiler.
   h. Return all boilers to normal operating conditions.
   i. With lead boiler ON in occupied mode (adjust hot water temperature set point if necessary), lower high temperature limit set point to be below current hot water temperature reading.
   j. Verify boiler shuts down and alarm is initiated at local control panel and/or BAS head end and boiler shuts down.
   k. Repeat steps i and j for each lag boiler.
   l. Return all boilers to normal operating conditions.
   m. With lead boiler ON in occupied mode (adjust hot water temperature set point if necessary), jump or remove wires or close gas valve, as appropriate, to simulate an unsafe gas condition.
   n. Verify boiler shuts down and alarm is initiated at local control panel and/or BAS head end and boiler shuts down.

o. Repeat steps m and n for each lag boiler.
p. Return all boilers to normal operating conditions.
q. With lead boiler ON in occupied mode (adjust hot water temperature set point if necessary), locate and trip EPO (Emergency Power Off) switch.
r. Verify boiler goes into emergency shutdown operations, an audible alarm is sounded in room, and an alarm is initiated at local control panel and/or BAS head end.
s. Return all boilers to normal operating conditions.

7. STEAM

a. Repeat all procedures listed for hot water boiler applications. Modify tests to accommodate regulation and monitoring of steam pressure in lieu of hot water temperature and ensure a high pressure limit alarm sequence is included within the Alarms and Safeties tests.

8. FULLY MODULATING BURNERS

a. Repeat all procedures listed for hot water boiler applications. Modify tests to accommodate fully modulating burners by adapting stage steps to coincide with boiler management system capacity percentages provided by manufacturer.

E Results

Hot Water Temperature Reset:

Outside Air Temperature #1: _____
Heating Water Setpoint #1: _____
Outside Air Temperature #2: _____
Heating Water Setpoint #2: _____

Hot water temperature setpoint adjusts proportionally with increases/decreases with outside air temperature?

YES NO

Staging Up:

Starting HWS Temperature: _____
Starting HWR Temperature: _____

Boiler Tag						
Time Boiler Started:						
HWR Temperature at Low Fire Start:						
HWS Temperature at High Fire Start:						

Time Setpoint Reached: _____

Staging Down:

Starting HWS Temperature: _____
Starting HWR Temperature: _____

Boiler Tag:						
HWR Temperature at Low Fire Start:						
HWS Temperature at Boiler Shut Down:						
Time Boiler Shut Down:						

Time All Boilers Shut Down: _____

Boiler circulation pumps do not de-energize until 30 seconds after associated boiler has shut down?

YES NO

Minimum Boiler Flow (primary pumping systems ONLY):

Boiler Tag:						
Boiler maintains minimum flow with all loads bypassed or isolated?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Boiler maintains minimum flow with all 2-way valved loads isolated and all 3-way valved loads open to load?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

Unoccupied Mode:

Boilers do not fire when placed into unoccupied mode? YES NO

Boilers fire when load is sensed on hot water system during unoccupied mode? YES NO

Alarms and Safeties:

Boiler Tag:						
Lead/lag operation for boiler is operational and acceptable?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Low flow alarm sequence is operational and acceptable?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
High temperature limit sequence is operational and acceptable?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Flame failure sequence is operational and acceptable?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
EPO switch sequence is operational and acceptable?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

F Conclusion

Acceptable Criteria: Hot water temperature reset schedule adjusts hot water temperature setpoint in proportion to outside air temperature per contract documents. Boiler staging and firing corresponds to designated heating sequence for facility with minimal hunting. Whereas minimal hunting corresponds to hot water temperature readings differ from hot water temperature set point by no more than ±2º. All alarm and safeties operate per specified sequence and initiate appropriate alarm conditions at local control panel and/or BAS head end.

Comments:

Observations:

Final Status: ❑ Accepted ❑ Not Accepted

G Relevant Trend Data

Boiler status, HWS temperature, HWR temperature, HWS setpoint, pump status, outside air temperature.

H Witnesses

Name	**Signature**

SECTION 01821

COMMISSIONING DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

1. This Section includes administrative and procedural requirements for instructing the Board's personnel in the operation and maintenance of systems, subsystems, and equipment.

1.2 SUBMITTALS

A. Training Session Matrix: One month prior to Preliminary Acceptance submit to the AOR, Owner and CxA a training session matrix that indicates all required training sessions and proposed dates and blocks of time for each. This matrix will be used to confirm scheduling of all required training sessions with the end user.

B. Sign-off sheets: Submit copies of proposed sign-off sheets for each training session a minimum of 10 days prior to the scheduled training. Sign-off sheets are to include the following information:

1. Name of training session
2. Date of training
3. Beginning/Ending time
4. Detailed, itemized summary listing all areas of training for that session.
5. Listing of hand-out materials distributed at the session.
6. Signature lines for Trainer, Contractor, and CPS personnel being trained.
    a. Signature by CPS personnel evidences training received only to the extent listed on the sign-off sheet summary.

C. Demonstration and Training Videotape: Submit three (3) copies at end of each training module.

1.3 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.4 COORDINATION

A. Coordinate instruction schedule with the Board's operations and schedule through the Boards Authorized Representative. Adjust schedule as required to minimize disrupting the Board's operations and to ensure attendance by designated CPS representatives.

B. Coordinate content of training modules with content of emergency, operation, and maintenance manuals. Provide copies of this coordinated material at each training session.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

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

1. Refrigeration systems, including chillers, pumps and distribution piping.
2. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices.
3. HVAC instrumentation and controls.
4. Lighting equipment and controls.

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:

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.
h. Performance curves.

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 combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct the Board's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. The Boards Authorized Representative. will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed on times as approved in the training schedule matrix. For equipment that requires seasonal operation, provide similar instruction at start of each season.

   1. The training schedule will be coordinated through the Boards Authorized Representative.

C. Signoff Sheets: At the conclusion of each training module obtain sign-offs using the approved sign-off sheets. Executed sign-off sheets are to be submitted as part of the closeout documentation evidencing compliance with training requirements.

D. Demonstration and Training Videotape: 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.

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

END OF SECTION

SECTION 03361

INTEGRALLY COLORED CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work of this Section.

B. Section Includes:
   1. Integrally colored concrete
   2. Curing of integrally colored concrete.

C. Related Sections:
   1. Division 3 Section "Cast-In-Place Concrete" for general applications of concrete and coordination of sample submittal and color selection.

1.2 REFERENCES

A. American Concrete Institute (ACI):
   1. ACI 301 "Specification for Structural Concrete for Buildings."
   2. ACI 302 IR "Recommended Practice for Concrete Floor and Slab Construction."
   3. ACI 303.1 "Standard Specification for Cast-In-Place Architectural Concrete."
   4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete."
   5. ACI 305R "Recommended Practice for Hot Weather Concreting."
   6. ACI 306R "Recommended Practice for Cold Weather Concreting."

B. American Society for Testing and Materials (ASTM):
   1. ASTM C309 "Liquid Membrane-Forming Compounds for Curing Concrete."
   2. ASTM C494 "Standard Specification for Chemical Admixtures for Concrete."
   3. ASTM C979 "Standard Specification for Pigments for Integrally Colored Concrete."

C. American Association of State Highway and Transportation Officials (AASHTO):
   1. AASHTO M194 "Chemical Admixtures."

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s complete technical data sheets for the following:
   1. Colored admixture.
   2. Curing compound.

B. Design Mixes: For each type of integrally colored concrete.

C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available.

D. Qualification Data: For firms indicated in "Quality Assurance" Article, including list of completed projects.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with 10-years experience in the production of specified products.

B. Installer Qualifications: An installer with 5- years experience with work of similar scope and quality.

C. Comply with the requirements of ACI 301.

D. Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.

E. Notification of manufacturer's authorized representative shall be given at least 1-week before start of Work.

F. Integrally Colored Concrete Field Samples:
1. Provide under provisions of Division 1 Section "Quality Control."
2. At location on Project selected by Architect.
3. For accurate color, the quantity of concrete mixed to produce the sample should not be less than 3 cubic yards (or not less than 1/3 the capacity of the mixing drum on the ready-mix truck) and should always be in full cubic yard increments. Excess material shall be discarded according to local regulations.
4. Construct sample panel using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and expansion joints in sample panels. Field sample shall be produced by the individual workers who will perform the work for the Project.
5. Retain samples of cements, sands, aggregates and color additives used in mockup for comparison with materials used in remaining work.
6. Accepted field sample provides visual standard for work of Section.
7. Field sample shall remain through completion of work for use as a quality standard for finished work.
8. Remove field sample when directed.

1.5 DELIVERY, STORAGE AND HANDLING

A. Colored Admixture: Comply with manufacturer's instructions. Deliver colored admixtures in original, unopened packaging. Store in dry conditions.

1.6 PROJECT CONDITIONS

A. Integrally Colored Concrete Environmental Requirements:
   1. Schedule placement to minimize exposure to wind and hot sun before curing materials are applied.
   2. Avoid placing concrete if rain, snow, or frost is forecast within 24-hours. Protect fresh concrete from moisture and freezing.
   3. Comply with professional practices described in ACI 305R and ACI 306R.

B. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer's written recommendations.

1.7 PRE-INSTALLATION CONFERENCE

A. One week prior to placement of integrally colored concrete a meeting will be held to discuss the Project and application materials.

B. It is suggested that the Architect, General Contractor, Construction Manager, Subcontractor, Ready-Mix Concrete Representative, and a Manufacturer's Representative be present.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER (BASIS OF DESIGN):

A. L.M. SCOFIELD COMPANY, Douglasville, Georgia and Los Angeles, California (800) 800-9900 or the appropriate local contact: Eastern Division – 201-672-9050; Western Division – 714-568-1870; Central Division Office – 630-377-5959.

2.2 MATERIALS

A. Colored Admixture for Integrally Colored Concrete: CHROMIX P® Admixture and CHROMIX ML®; L.M. SCOFIELD COMPANY.
   1. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are limeproof and ultra-violet resistant.
   2. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494 and ASSHTO M194.

B. Curing and Sealing Compound: Cureseal-W™ Semi-gloss and Cureseal-S™ Gloss; L.M. SCOFIELD COMPANY. Curing and sealing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.

2.3 COLORS

A. Concrete Color[s]:
   1. Cement: Color shall be gray.
   2. Sand: Color shall be locally available natural sand.

3. Aggregate: Concrete producer's standard aggregate complying with specifications.
4. Colored Admixture: As selected by Architect

B. Curing Compound: Color to match integrally colored concrete.

2.4 CONCRETE MIX DESIGN

A. Minimum Cement Content: 5 sacks per cubic yard of concrete.

B. Slump of concrete shall be consistent throughout Project at 4-inches or less. At no time shall slump exceed 5-inches.

C. Do not add calcium chloride to mix as it causes mottling and surface discoloration.

D. Supplemental admixtures shall not be used unless approved by manufacturer.

E. Do not add water to the mix in the field.

F. Add colored admixture to concrete mix according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install concrete according to requirements of Division 3 Section "Cast-In-Place Concrete."

B. Do not add water to concrete mix in the field.

C. Surfaces shall be finished uniformly with the following finish:
1. Broomed: Pull broom across freshly floated concrete to produce fine texture in straight lines perpendicular to main line of traffic. Do not dampen brooms.

3.2 CURING

A. Integrally Colored Concrete: Apply curing and sealing compound for integrally colored concrete according to manufacturer's instructions using manufacturer’s recommended application techniques. Apply curing and sealing compound at consistent time for each pour to maintain close color consistency.

B. Curing compound shall be same color as the colored concrete and supplied by same manufacturer of the colored admixture.

C. Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 *Plastic Shrinkage Cracking* published by the National Ready Mixed Concrete Association.

D. Do not cover concrete with plastic sheeting.

3.3 TOLERANCES

A. Minor variations in appearance of integrally colored concrete, which are similar to natural variations in color and appearance of uncolored concrete, are acceptable.

END OF SECTION

SECTION 08570

ACCESSIBLE AWNING WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install accessible awning windows complete with push out hardware, glazing, weather stripping, insect screens, simulated divided lites, jamb extensions, specified anchors, trim, attachments and related components as shown on Drawings and specified in this Section.

B. Related Work:
   1. Section 01352: LEED Requirements
   2. Section 08661: Exterior Metal Window Guards
   3. Section 08910: Aluminum Window Wall

C. The materials in this section are part of the overall USGBC "Leadership in Energy and Environmental Design" (LEED) prerequisites and credits needed for the Project to obtain LEED Silver certification based on *LEED 2009 for Schools* requirements. See Section 01352 "LEED Requirements" and this section for more information.

D. Coordination of integration and installation of accessible awning windows into aluminum window wall system.
   1. Accessible awning window units must be fully integrated into window wall framing system(s). Stacked (independent) installations of awning window units and window wall systems are prohibited.

E. Coordination of integration and installation of exterior metal window guards to accessible awning windows where shown in Drawings.
   1. Exterior metal window guards must be fully integrated with accessible awning window units. Window guards must not interfere with proper accessible operation of awning window units, including all operating clearances and forces required by applicable accessibility codes.

1.2 REFERENCES

A. AAMA - American Architectural Manufacturers Association – *www.aamanet.org*
   1. AAMA/WDMA/CSA 101/I.S.2/A440-05 “Standard/Specification for Windows, Doors, and Unit Skylights”
   2. AAMA 502-08 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products"
   3. AAMA 611-98 "Voluntary Specification for Anodized Architectural Aluminum"
   4. AAMA 701/702-04 "Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals”
   5. AAMA 800-07 "Voluntary Specifications and Test Methods for Sealants"
   6. AAMA 904-01 “Voluntary Specification for Multi-Bar Hinges in Window Applications”
   7. AAMA 910-93 “Voluntary ‘Life Cycle’ Specifications and Test Methods for Architectural Grade Windows and Sliding Glass Doors”

8. AAMA 1503-98 "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections"
9. AAMA 2603-02 "Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels"
10. AAMA 2604-05 "Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels"
11. AAMA 2605-05 "Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels"
12. AAMA CW-10-04 "Care and Handling of Architectural Aluminum from Shop to Site"

B. ANSI – American National Standards Institute – *www.ansi.org*
1. ANSI A117.1-03 " Accessible and Usable Buildings and Facilities Standards"
2. ANSI Z97.1-04 "American National Standard for Safety Glazing Materials used in Buildings – Safety Performance Specifications and Methods of Test"

C. ASTM - American Society for Testing and Materials – *www.astm.org*
1. ASTM E 90-04 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
2. ASTM E 283-04 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen"
3. ASTM E 330-02 "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference"
4. ASTM E 331-00 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference"
5. ASTM E 413-04 Classification for Rating Sound Insulation
6. ASTM E 547-00 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference"
7. ASTM E 2190-02 "Standard Specification for Insulating Glass Unit Performance and Evaluation"

D. CCMC – City of Chicago Municipal Code - *www.amlegal.com/library/il/chicago.shtml*
1. CCMC – Chapter 18-11-1109.13.1 - Operable windows.
2. CCMC – Chapter 18-13 Energy Conservation Code

E. CPSC - Product Safety Commission - *www.cpsc.gov*
1. CPSC 16 CFR 1201 "Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials – codified at Title 16, Part 1201 of the Code of Federal Regulations"

F. GANA – Glass Association of North America – *www.glasswebsite.com*
1. GANA - "Glazing Manual" 2008

G. IGCC – Insulating Glass Certification Council – *www.igcc.org*

H. NAAMM - National Association of Architectural Metal Manufacturers - *www.naamm.org*
1. AMP-500-06 "Metal Finishes Manual"

I. NFRC - National Fenestration Rating Council - *www.nfrc.org*
   1. NFRC -100-04 "Procedures for Determining Fenestration Product U-factors"
   2. NFRC- 300- 04 "Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems

J. PEI – Porcelain Enamel Institute - *www.porcelainenamel.com*
   1. PEI - "Porcelain Enamel for Architects, Designers & Construction Specifiers," 2008

K. SGCC – Safety Glazing Certification Council – *www.sgcc.org*

L. WDMA – Window and Door Manufacturer's Association - *www.wdma.com*
   1. WDMA I.S.4-07A "Water-Repellent Preservative Non-Pressure Treatment for Millwork"

1.3 SYSTEM DESCRIPTION

A. AAMA product designation: AW-PG65-AP

B. Windows: manufacturer's standard awning windows with a minimum frame depth of 2-¼ inches with operable sash installed by the manufacturer into frame; equal leg frame; interior and exterior finishes applied by the window manufacturer; frames and vents assembled by the window manufacturer.

C. Configuration: Match size, shape, proportions and patterns of adjacent windows.
   a. Project out/awning; overlap vent sash in window configurations indicated on drawings.
   b. In projects where adjacent windows configuration consists of single hung or double hung sashes: provide a single vent in lower lite and fixed lite in upper frame. Meeting rail dimensions between upper and lower sections to match adjacent window dimensions.
   c. In projects where adjacent window configuration consists of individual fixed and operable projecting vents: provide single project out awning vent with dimensions matching adjacent operable vents.

D. Vent glazing: exterior aluminum glazing bead; with thermal glazing bead on interior and exterior perimeter; 1" insulating glass; glazed by the window manufacturer.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide accessible awning windows units that meet or exceed performance requirements specified as confirmed by testing manufacturer's windows that are representative of those specified, and that are of tested to size indicated below.

B. Performance Class & Grade: All window units installed in project are to conform to AW-PG65-AP specifications of AAMA/WDMA/CSA 101/I.S.2/A440 when tests are performed on a 60" x 36" minimum frame size with the test results as specified below.

1. In cases where window units required exceed test size stated above, test largest sized unit required for project for compliance with specified performance requirements below.

C. Design Requirements: Provide windows that comply with AAMA 910 life cycle test requirements and meet AAMA/WDMA/CSA 101/I.S.2/A440 standards when tests are performed on a window size matching or exceeding size specified above. Window tests are to be by a recognized Independent Testing Laboratory or Agency, in accordance with ASTM E 283 for air infiltration, and with ASTM E 331 and ASTM E 547 for water penetration
   1. Air Infiltration: of maximum .1 cfm/square foot at a static air pressure difference of 6.24 psf.
   2. Water Penetration: no water penetration shall be permitted at a static air pressure difference of 10 psf.

D. Structural Performance: Provide windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA/CSA 101/I.S.2/A440 requirements for Uniform Load Structural Test:
   1. Design Wind Loads: Provide windows identical to windows that have been successfully tested to resist design pressure, but not less than the following:
      a. Pressure: 30 psf in any direction.
   2. Uniform Deflection: no more than L/175 when tested per ASTM E 330 at a static air pressure difference of 65 psf.
   3. Uniform Structural: Unit is to be tested at 1.5 x design wind pressure, both positive and negative at 97.5 psf in accordance with ASTM E 330. There shall be no glass breakage, permanent damage to fasteners, hardware parts or any other damage to make the window inoperable. There shall be no permanent deformation of any main frame or vent member in excess of 2% of its span.

E. Installation Performance Requirements:
   1. Design the attachment of the windows at jambs, head, and sill and reinforce mullions to resist 30 psf load applied in any direction.

F. Thermal Movement: Provide windows, including anchorage, that allow for thermal movement resulting from the following maximum range in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change Range: 120 deg F, ambient; 180 deg F material surfaces.

G. Thermal Performance: Provide windows that comply with energy conservation requirements of CCMC as demonstrated by testing per AAMA 1503.
   1. U-Factor: Provide window units having maximum U-factor of 0.45 or better for fixed units and 0.50 or better for operable units as determined in accordance with NFRC 100 by a laboratory accredited by a nationally recognized accreditation organization such as the NRFC and labeled and certified by the manufacturer
   2. Condensation Resistance Factor (CRF): Minimum CRF to be 50 or better for frame and 60 or better for glass.
   3. Solar Heat Gain Coefficient: Provide window units assembly maximum solar heat gain coefficient (SHGC) for overall glazed area of 0.49 or better for north orientation and 0.39 or better for all other orientations as determined in accordance with NFRC 200 by a laboratory accredited by a nationally recognized accreditation organization such as the

National Fenestration Rating Council and shall be labeled and certified by the manufacturer.

a. Shading coefficient of the center of glass multiplied by 0.86 shall be an acceptable alternate for determining compliance with the SHGC required for the overall glazed area. Shading coefficient shall be determined using special data file determined in accordance wit NFRC 300. Shading coefficient shall be verified and certified by the glass unit manufacturer.

H. Sound Transmission Class (STC): Provide glazed windows rated for not less than 35 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.

I. Accessible Windows: Where accessible glazed openings in accessible rooms or spaces are shown on the Drawings for operation by occupants, provide windows that comply with CCMC accessibilty requirements for operable windows .

1. Window Hardware: Comply with ANSI A117.1 section 309.4 Operation, that need to be pushed, pulled, or lifted to open, provide hardware that requires that no more than 5 lbf of force be used to open or close the operable vent.
2. Operation. Provide controls and operating mechanisms for Accessible Windows, in compliance with ANSI A117.1-2003 section 309.4 Operation, that are operable with one hand with a force of no more than 5 lbf and do not require tight grasping, pinching, or twisting of the wrist.
3. Confirm compliance with specfied operating force requirements by having operable vent of accessible window tested by a recognized Independent Testing Laboratory or Agency and so labeled and certified by the manufacturer.

1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, product performance test certifications, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of accessible awning window indicated.

B. LEED Submittals

1. LEED Credit MR 4.1 and Credit MR 4.2: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
   a. Include statement indicating costs for each product having recycled content.
2. LEED Credit MR 5.1 and Credit MR 5.2: Submit product data for products that have been extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.
   a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

C. Shop Drawings: Shop drawings shall be the responsibility of the window manufacturer and prepared by the manufacturer's authorized agent bearing the manufacturer's name. Drawings prepared by others are not acceptable. Include building plans and elevations drawn at a minimum 1/8" scale; window unit elevations at minimum 3/8" scale; details of all components, including required reinforcement, to be drawn full size. Include floor plans, elevations, sections, details,

hardware, attachments to other work, operational clearances, installation details, and the following:

1. Mullion details, including reinforcement and stiffeners.
2. Joinery details.
3. Expansion provisions.
4. Flashing and drainage details.
5. Weather-stripping details.
6. Thermal-break details.
7. Glazing details.
8. Exterior window guard attachment details.
9. Window cleaning provisions.

D. Samples for Verification: For the windows and components required, submit samples of size indicated below:

1. Main Framing Member: 12-inch- long, full-size sections of extrusions with factory applied color finish.
2. Window Corner Fabrication: 12-by-12-inch- long, full-size window corner including full-size sections of extrusions with factory-applied color finish, weather stripping, and glazing.
3. Operable Window: Full-size unit with factory-applied finish.
4. Hardware: Full-size units with factory-applied finishes.
5. Weather Stripping: 12-inch- long sections.

E. Product Schedule: For new windows using same designations indicated on Drawings.

F. Qualification Data: For Installer, manufacturer, and testing agency.

G. Field quality-control test reports.

H. Product Test Reports: Based on AAMA criteria, submit for evaluation of most recent comprehensive tests performed, but in no case older than four years from date of submittal, by a qualified testing agency for each type, class, grade, and size of window. Test results based on use of downsized test units will not be accepted.

I. Maintenance Data: For operable window sash, operating hardware, weather stripping and finishes to include in maintenance manuals.

J. Thermal Performance Certifications: Submit certifications as required under “Performance Requirements” of this section.

K. Operating Force: provide test results and compliance certification.

L. Warranty: Special warranty as specified in this Section.

1.6 QUALITY ASSURANCE

A. The Drawings and Specifications herein indicate types, sizes, profiles, connections, dimensional and operational requirements for accessible awning windows of the specific manufacturer’s products as specified.

B. Accessible awning windows having equal performance characteristics by other manufacturers may be considered, provided that deviations do not change the design concept or intended performance as determined by the Architect.

C. Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of required windows. Aesthetic effects, such as simulated divided lites, are shown on Drawings by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to each another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

D. Manufacturer Qualifications: A manufacturer capable of fabricating windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, calculations and verifiable history of manufacturing specified windows for a minimum of ten (10) years.

E. Installer Qualifications: Installer to be certified by window manufacturer for installation of window units required.
   1. Engineering Responsibility: Preparation of data for windows, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project by a state of Illinois liscensed engineer.
   2. Provide skilled craftspeople who have demonstrated a verifiable successful history of installing specified windows for a minimum of five (5) years.

F. In addition to above comply with the following:
   1. The Manufacturer shall visit the site before fabrication and examine existing window openings and frames into which the new replacement windows are to be installed. If any discrepancies, or conditions, are discovered that are detrimental to the proper and timely completion of the work, the Manufacturer is to notify the Architect in writing.
   2. Check actual window openings by accurate field measurement before fabrication. The replacement window tolerance of 1/2” less than the actual window opening dimensions will apply for all manufactured units. Units supplied plus or minus 1/4” in excess of the tolerance standards will be deemed out of compliance and will be replaced by the Manufacturer. Show recorded measurements on final shop drawings.

G. Source Limitations: Obtain windows through one source from a single manufacturer.

H. Mockups: Build mockups as directed by the Board to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup for type of window indicated.
   2. Mock up a minimum of three (3) accessible awning windows of each type, or three (3%) percent of each type of accessible awning window product; whichever is greater.

I. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to windows including, but not limited to, the following:
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review and discuss the finishes of windows that are required to be coordinated with the finishing of other adjacent work for color and finish matching.

3. Review, discuss, and coordinate the interrelationship of windows with other exterior wall components. Include provisions for structural anchorage, glazing, flashing, weeping, sealants, and protection of finishes.
4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
5. Inspect and discuss the condition of aluminum window wall and other preparatory work performed by other trades.

J. Fenestration Standard: For minimum standards of performance,definitions, materials, components, accessories, and fabrication requirements conform to AAMA/WDMA/CSA 101/I.S.2/A440. In case of conflicts, comply with more stringent requirements.

K. Furnish a valid AAMA “Authorization for Product Certification” indicating that the windows for the project conform to AAMA/WDMA/CSA 101/I.S.2/A440.

L. Furnish visible, permanent IGCC certification labels indicating conformance to ASTM E 2190 on insulating glass units.

M. Furnish visible, permanent SGCC certification labels indicating conformance to ANSI Z97.1 and/or 16 CFR 1201 on tempered glass lites, if included on the project, and laminated glass lites, if included on the project.

N. Glazing Stanadard: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated on Drawings.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 DELIVERY, STORAGE AND HANDLING

A. Protect windows from damage during handling and construction operations before, during and after installation.

B. Store windows under cover, setting upright.

C. Do not stack windows flat.

D. Do not lay building materials and/or equipment on windows

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace windows that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to meet performance requirements.
      b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
      c. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
      d. Faulty operation of operable vents and hardware.
      e. Failure of insulating glass.
   2. Warranty Period:
      a. Windows: Ten (10) years from date of Substantial Completion of the Project, as applicable**.**
      b. Metal Finish: Ten (10) years from date of Substantial Completion of window installation.
      c. Hardware: Ten (10) years from date of Substantial Completion of window installation.
      d. Glazing: Ten (10) years from date of Substantial Completion of window installation.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Description: Subject to compliance with the requirements, provide factory assembled accessible awning windows from:
   1. Graham
   2. Traco

B. Accessible awning windows having equal performance characteristics by other manufacturers may be considered, provided that deviations do not change the design concept or intended performance as determined by the Architect. The burden of proof for equality of other awning windows is on the proposer.

2.2 MATERIALS

A. Aluminum Extrusions: extruded by the window manufacturer from commercial quality 6063-T5 alloy; free from defects impairing strength and durability.

B. Weather-stripping: Provide full-perimeter weather stripping for each operable ventilator. Installed weather stripping to be UV stable, flexible in low temperatures, and resistant to compression set; conforming to AAMA 701/702.

C. Hardware: Provide ANSI A117.1 compliant operator and hinge hardware in manufacturer’s standard finish complete with stainless steel limit stop for 6” opening restriction and release key for custodial access to clean and maintain operable vent.

D. Screens General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches.
   1. Insect Screens: Fabricate insect screens to fully integrate with window frame. Locate screens on inside of window and provide for each operable ventilator where shown on Drawings.
      a. Provide insect screens on operating sash and ventilators in offices, food preparation areas, and lunchrooms and where indicated on Drawings.
      b. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints, concealed fasteners and removable PVC spline/anchor concealing edge of frame.
         1) Extruded-Aluminum or Aluminum Tubular Framing Sections and Cross Braces: Not less than 0.040-inch wall thickness.
         2) Finish: Match aluminum window members.
      c. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch- diameter, coated aluminum wire.
         1) Wire-Fabric Finish: Charcoal gray.

E. Exterior Metal Window Guards: Design windows and hardware to accommodate gurads in a tight-fitting, fully operable arragement, with a minimum of exposed fasteners and latches.
   1. Perforated Metal Panel: Screen infill shall be minimum 18 gauge stainless steel perforated metal panel with 5/32" diameter holes on 3/16" centers, staggered pattern; and with an open area of 63% of total panel area. Paint perforated panels after punching process is complete.
   2. Frames and hardware: Comply with all requirements as specified in Section 08661 "Exterior Metal Window Guards".

2.3 FABRICATION

A. Window Unit Fabrication:
   1. Aluminum Fabrication:
      a. Vent and Frame: all members to be tubular; 45 degree reinforced mitered corners; crimped to extruded aluminum corner keys.
      b. Frame and vent joints: factory sealed by window manufacturer with sealant conforming to AAMA 800.
   2. Water control: pressure equalization compression gasket on vent interior to resist wind driven rain.
   3. Weep holes: Provide exterior weep slots/holes in each sill of sufficient size to allow water drainage to exterior by gravity, but prevent ingress by insects
   4. Emboss universal symbol of accessibility (1” diameter) on all operable window frames that comply with ADAAG with a contrasting color.
   5. Provide 1-1/2” x 1-1/2” universal symbol of accessibility interior sign on bottom rail of operable window frames that comply with ADAAG. See section 10433 “Interior Signage”.

B. Insulating Glass Units:
   1. Preglaze window units at the factory using glazing method tested with unit as required and in conformance to ASTM E 2190; with visible, permanent IGCC certification label for window grade and performance requirements specified.
   2. Provide 1" insulating glass units composed of two (2) sheets of minimum 3/16” thick glass (ASTM C 1048, Type I, Quality 3) permanently and hermetically sealed together at

edges with with manufacturer's spacer system and sealant to provide a dehydrated air space with -80 degree □F dew point, passing IGCC Test CBA.

a. Provide tempered glass both sides.
b. Provide soft coat low E coating on #2 surface of exterior lite of units meeting "performance requirements" of this Specification and Drawing notes.
c. Airspace fill: Argon gas.
d. Glazing Spacer color: black

C. Finish on Aluminum Extrusions:
1. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes. Apply on clean extrusions free from serious surface blemishes; on exposed surfaces visible when installed product's operating vents are closed.
2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering or shrink wrapping before shipping.
3. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
4. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
a. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent Polyvinylidene fluoride resin by weight; complying with AAMA 2605.
b. Dry film thickness: minimum 1.2 mils on exposed surfaces, except inside corners and channels.
c. Color: chosen from manufacturer's standards.

D. Miscellaneous Metal Finishes:
1. Concealed Steel Items: Galvanized in accordance with ANSI/ASTM A386 to 2.0 oz/sq. ft. or primed with iron oxide paint.
2. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

E. Installation Accessories
1. Material: extruded aluminum; nominal .078" wall for panning and .062" wall for trim; with exposed surfaces finished to match window color and finish performance; install with concealed fasteners and required weatherseals. Detail installation for unrestricted expansion and contraction.
2. Interior: continous clip two-piece snap trim.
3. Mullions: with thermal break; integral: mounted between frame members

PART 3 – EXECUTION

3.1 PREPARATION – GENERAL

A. Comply with all applicable laws, rules and regulations.

B. Inspect openings before beginning installation work. Verify that rough or masonry opening is correct and the sill is level.

C. Assure that each window opening conforms to dimensions and tolerances taken at the time of site visit.

D. Perform operations as necessary to prepare openings for proper installation and operation of new construction units. Verify openings are in accordance with shop drawings and Architects Drawings. Prepared openings to be in tolerance, plumb, level, and provided with secure anchoring. Window installation shall not begin until all conditions are satisfactory. Failure to do so does not relieve the Contractor from the need to furnish any and all materials, which may be required, in accordance with the specifications, without any additional costs to the Board.

3.2 PREPARATION- NEW CONSTRUCTION

A. Perform operations as necessary to prepare openings for proper installation and operation of new construction units. Verify openings are in accordance with shop drawings and Architects Drawings. Prepared openings to be in tolerance, plumb, level, and provided with secure anchoring.

B. New Construction: Verify wall openings and adjoining air and vapor seal materials are clean, dry and ready to receive work of this Section. Verify that rough opening and masonry openings are correct and the sill plate is level.

C. Provide and apply sealant compound, meeting AAMA 808.3, at all joints and intersections and at all other opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth. Coordinate installation with wall flashings and other components of the work.

3.3 INSTALLATION – NEW CONSTRUCTION

A. Remove new windows and accessories from crating and packaging material. Verify that all parts and accessories are included.

B. Install in accordance with manufacturer's approved shop drawings, specifications and recommendations for installation of window units, hardware, operators and other components of work.

C. Provide required support and securely fasten and set windows plumb, square, and level without twist or bow of frames or sash. Maintain dimensional tolerances, aligning with adjacent work. Anchor securely in place. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action. In no case shall attachment to structure or to components of the window system be through or affect the thermal barriers of the window units.

D. Coordinate attachment and seal of air and vapor barrier materials. Install under sill and sill brake metal flashing.

E. Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier. Wedge fiberglass insulation between frames of new windows and construction to remain, or between frames and new receptor as applicable. Compress fiberglass to no less than 50 percent of original thickness.

F. Set sill members and other members in bed of compound, joint fillers, or gaskets per manufacturer recommendations to provide weatertight construction. Seal units per sealant manufacturer's recommendations at all other opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.

G. Anchor windows on all four sides with anchor clips
   1. Do not allow anchor clips to bridge thermal breaks
   2. Use separate clips for each side of thermal breaks.
   3. Make connections to allow for thermal and other movements.
   4. Do not allow building load to bear on windows.
   5. Use manufacturer's standard clips at all corners and at intermediate points not over 16" on center.
   6. Anchor clips are to be fully covered by panning or trim.

H. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with the requirements specified in the window reference standard. Where incompatible metals join together, coat the abutting surfaces with asphaltic paint and use epoxy coated connectors.

I. Pre-fit, pre-punch, etc., all materials so that the unit when assembled shall fit the openings and will not require any cutting, ripping or fitting on the job site other than trimming of the exterior panning to fit into the masonry opening and cutting interior trim to length by the installing crews.

J. All voids between new window frames and adjoining construction shall be packed solid with fiberglass batt insulation before installation of interior trim or panning.

K. Interior and exterior surfaces shall have proper contact for caulking back up. The caulking shall be in full contact with window members and exterior and interior walls providing a continuous air and water tight bead around perimeter of windows as shown on Drawings.

L. It shall be the responsibility of the installation Contractor to repair any exterior and interior surfaces to the satisfaction of the Board approved representative damaged as a result of the installation procedures involved with the materials and products of this section.

3.4 FIELD TESTING

A. Field Tests: Contractor shall perform and pay for onsite tests of selected newly installed windows or window system components. Test newly installed accessible awning window products as directed by the Board's Authorized Representative for air leakage and water penetration resistance.
   1. All new accessible awning window products shall be field tested in accordance with AAMA 502 by an AAMA accredited laboratory as selected by the Board's Authorized Representative and engaged by the responsible Contractor. Independent testing laboratory engaged to perform tests will meet all requirements of AAMA 204.

2. Costs for all tests, both original and retests shall be paid for by the responsible Contractor. All unsuccessful tests, both original and retest, shall be paid for by the responsible Contractor.
3. All testing work in accordance to AAMA 502 of newly installed accessible awning window products shall commence at initial window installation and shall be completed prior to issuance of a certificate of Substantial Completion for accessible awning window work; and in no case more than six months after the date of Substantial Completion of the installation. Any field testing required six months beyond the date of Final Acceptance of the accessible awning window installation, will be done in accordance with AAMA 511.
4. Testing Quantity: Erect test chambers for each window product type identified on plans. Test three (3) accessible awning window products of each type, or three (3%) percent of each type of accessible awning window products installations; whichever is greater, for air infiltration and water penetration as specified in accordance to AAMA 502 after the accessible awning window products have been completely installed.
5. Test Parameters:
   a. Air infiltration field tests shall be conducted at the same uniform static test pressure as the laboratory test unit. The Maximum allowable rate of air leakage shall not exceed 1.5 times the laboratory test unit for hardware and glazing types consistent with the laboratory test unit. The field test air leakage rate shall not exceed 1.5 times the maximum allowable laboratory performance specified in the testing criteria listed in Section 1.4.D & E above for any configuration.
   b. Water penetration field tests shall be conducted at a static test pressure of 4/5 of the laboratory test performance values for hardware and glazing types consistent with the laboratory test unit. The field test water test pressure shall not be less than 4/5 of the minimum allowable laboratory performance specified in the testing criteria listed in Section 1.4.F above for any configuration.
6. All work on accessible window products that fail the field tests shall be re-executed until the installation passes the field testing. Modify methods of installation of subsequent work to incorporate required corrections identified by the testing process.

3.5 ADJUSTING AND CLEANING

A. Adjust operating vent and hardware to provide tight fit at contact points and at weatherstripping, for smooth operation and weathertight closure.

B. Clean aluminum surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and moving parts.

C. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances.

D. Remove from site all removed materials, debris, packaging, banding and all other surplus materials and equipment. All materials removed from site become property of the Contractor who shall promptly remove same and legally dispose of at no additional cost to the Board.

3.6 PROTECTION

A. Initiate all protection and other precautions required to ensure that window units will be without damage or deterioration (other than normal weathering) at time of acceptance.

B. Submit to Architect written recommendations for maintenance and protection of windows following Substantial Completion of window installation work.

END OF SECTION

SECTION 08661

EXTERIOR METAL WINDOW GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Window guards on windows where noted and shown on the drawings that comply with performance requirements specified as determined by testing manufacturer's standard assemblies representing those indicated for this Project.

B. Related Work:
   1. Section 01352: LEED Requirements
   2. Section 08570: Accessible Awning Windows
   3. Section 08910: Aluminum Window Walls

1.2 SYSTEM DESCRIPTIONS AND OPERATION

A. Metal window guards shall be designed to furnish physical deterrence against forcible entry through windows and to allow emergency egress for building occupants.

B. Window guard assemblies shall consist of but not limited to a main frame permanently fixed to the adjacent construction and operable sub-frame with perforated sheet metal guard panel, concealment plates, scribes, hardware, and anchors.

C. Metal window guards shall be equipped with quick-release latch to allow emergency egress requiring no special tools or knowledge. Latch operation shall activate a spring-loaded mechanism, which shall assist in releasing barrier for occupant egress. Guards shall be operable on the lower part of the window sash (for windows 48” and greater in height) - the upper portion concealing the upper sash shall operate separately from the lower unit.

D. Window guard assemblies shall be accessible and easily operated for maintenance purposes, including window cleaning, repainting and general maintenance.

E. Window guards over 5’ wide or 8’ high shall be fabricated in two sections.

F. Window guards shall be designed to be attached to the frames of operable (moving) lites of aluminum windows.

G. Coordination of integration and installation of exterior metal window guards to accessible awning windows where shown in Drawings.
   1. Exterior metal window guards must be fully integrated with accessible awning window units. Window guards must not interfere with proper accessible operation of awning window units, including all operating clearances and forces required by applicable accessibility codes.

1.3 QUALITY ASSURANCE

A. Acceptable Manufacturers:
   1. Items provided in the section shall be manufactured and fabricated by firms with 3 years experience in type of work specified.
   2. Field Support: The manufacturer shall furnish site support including installation support for installation crews.

B. AAMA Certification: Units shall comply with AAMA CFR-200.935, "Security Screen-Heavy" and SMA 6001-2002 for impact, forced entry resistance and sag.

C. Qualifications of Installers: Use skilled workers, experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work.

D. Single Source Responsibility: Furnish metal window guards produced by a single manufacturer.

1.4 SUBMITTALS

A. Product Data: Within 14 calendar days after award of the Contract, submit:
   1. Materials list of all parts and components of metal window guard.
   2. Construction details and fabrication methods.
   3. Profiles and dimensions of individual components.
   4. Data on hardware, accessories, and finishes.
   5. Recommendations for maintaining and cleaning exterior surfaces.
   6. Manufacturer's recommended installation procedures, specifications and other data required to demonstrate compliance with the specified requirements.

B. The manufacturer’s submitted installation procedures approved by the Architect will be used for the actual installation procedures used on the work.

C. Window guard submittals shall be coordinated and submitted with the aluminum window submittals so that they can be reviewed together. Refer to other sections for requirements for window submittals.

D. Shop Drawings: Submit complete shop drawings for metal window guards. Include information not fully detailed in manufacturer's standard product data, including details of surrounding construction locations, masonry set backs, sills, and the following:
   1. Fabrication and installation of metal window guards.
   2. Layout and installation details, including anchors.
   3. Elevations at 1/4 inch = 1 foot scale.
   4. Typical unit elevations at 3/4 inch = 1 foot scale.
   5. Full-size section details of typical members, including reinforcement and stiffeners.

E. Samples
   1. Samples for Initial Color Selection: Submit samples of each specified finish on 10-inch long sections of members. Where finishes involve normal color variations, include sample sets showing the full range of variations; include sample sets showing the full range of variations expected.
   2. Perforated Metal Panel Sample: 8” x 8”, of perforated metal guard panel, finished as specified.

F. Manufacturer Certifications
   1. AAMA Certification: Submit certification stating that units comply with AAMA CFR-200.935, "Security Screen-Heavy" and SMA 6001-2002 for impact, forced entry resistance and sag test reports from a qualified testing agency.
      a. Test Requirements: Comply with test criteria of SMA 6001-2002.
         1) Impact Test: An impact of 100 ft. lbs of force causing a deflection of not more than 3" as specified for heaving rating.
         2) Sag Test: 90 lbs of weight applied for 5 minutes with permanent sag of not more than 0.063" as specified for heaving rating.
         3) Force Entry Test: Three loads of force: A: 150 lbs, B: 300 lbs, C: 50 lbs applied to the screen as specified for heaving rating.
   2. Testing: Submit copy of test report(s) signed by an Independent Laboratory. Test reports more than four years old will not be accepted.

G. LEED
   1. LEED Credit MR 4.1 and Credit MR 4.2: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.
   2. LEED Credit MR 5.1 and Credit MR 5.2: Submit product data for products that have been extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.
      a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

1.5 PRODUCT HANDLING

A. Protection: Use all means necessary to protect materials of this Section before, during, and after installation and to protect installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to approval of the Architect and at no additional cost to the Owner.

C. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturers recommendations.

1.6 EXISTING CONDITIONS

A. Measurements: Check actual window openings by accurate field measurement before fabrication. Coordinate fabrication schedule with construction progress to avoid delay of the work.

B. Coordinate and obtain from the field all dimensions needed for fabrication and installation of new window guards. Include field dimensions on shop drawings. Obtain dimensions and details for the operation of the new windows, blocking of the windows, brick set backs, anchors, and all information needed to install the window guards.

C. Notify the Architect in writing of any discrepancies or conditions, which are detrimental to proper and timely completion of the work. Proceeding with the erection of the work means acceptance of the existing conditions.

1.7 WARRANTY

A. Special Warranty: Submit a written warranty signed by window guard manufacturer agreeing to repair or replace window guard components that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection.
   2. Faulty operation of window guard and hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

B. Warranty Period for The Window Guard Unit: 5 years after date of Preliminary Acceptance.

C. Warranty Period for Metal Finishes: 5 years after date of Preliminary Acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, furnish metal window guards manufactured by one of the following:
   1. Accurate Screening Media, Inc.
   2. Avant-Guards
   3. Exeter Architectural Products
   4. Kane Manufacturing Corporation.
   5. Air Tec
   6. Harmony Products Inc.

2.2 MATERIALS

A. Extruded Aluminum: ASTM B-221, 6063-T6 alloy and temper having a minimum ultimate tensile strength of not less than 35,000-psi and a yield strength of not less than 31,000 psi.

B. Steel Sheet, Galvannealed: ASTM A-653 (commercial quality), Coating Designation G 90, mill phosphatized, stretcher leveled.

C. Steel Sheet, Aluminum-Zinc Coated: Commercial-quality, cold-rolled, stretcher-leveled, carbon-steel sheet, complying with the following requirements:
   1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792, Class AZ-50 coating, Grade 40.

D. Stainless-Steel Sheet: ASTM A-167, Type 304, stretcher leveled with the following mill finish suitable for application of specified paint finish:
   1. Polished requiring no polishing after fabrication to produce the SSINA No. 4 polished finish.

E. Fasteners and Anchors: Fasteners and anchors and all other materials, required for a complete and operable installation, shall be non-magnetic 300 series stainless steel.

1. Furnish concealed fasteners except where exposed fasteners are unavoidable.
2. Where exposed in finished surfaces, use Torx tamper resistant fasteners.

F. Steel Scribing Angle: shall be formed from 0.062 thick 1-1/4" by 1" galvannealed steel angles and shall be at head and jambs.

G. Concealment Plates: shall be formed from 0.090" thick galvannealed steel plate of sufficient size and fastened to mainframe to conceal fasteners anchoring perforated metal panel to subframe and to conceal locking bolts.

H. Horizontal Stiffener: The horizontal stiffener shall be located and centered at each window-meeting rail.

I. Screen infill shall be perforated metal panel; minimum 18 gauge stainless steel with 5/32" diameter holes on 3/16" centers, staggered pattern and with an open area of 63% of total panel area. Paint perforated panels after punching process is complete.

J. Locking Mechanism: Provide key operated maintenance multi-point mechanism that activates a cast metal bolt at the sill and a two directional metal lock and keeper.

K. Locks and Release: Each window guard shall have a locking system, which shall activate the operation of an emergency release mechanism. A single handle located at the sill of the screen shall be provided for emergency egress. This release, when activated, shall simultaneously release all latching mechanisms and open the window guard in the direction of egress for instant access for exiting. The emergency egress release shall meet the requirements of NFPA 101, section 5-2.1.7.1, whereby a push in the direction of egress unlocks and opens the window guard in one motion. Any further lifting or sliding of the window guard or its locking mechanisms shall be unacceptable. The window guard shall latch and lock with one pulling motion when closing.
   1. Lock bar shall be a solid bar with minimum cross sectional area of 0.295 square inches and not less than 0.375 inches in diameter.

L. Hardware: Each screen shall be furnished with two or more concealed 13 gauge, minimum steel hinges with minimum 1/4" inch diameter hardened, loose stainless steel pins and integral compression guards or stainless steel pivots with minimum 1/4" diameter hardened stainless steel pins. Each screen shall have all necessary installation hardware, including fastening screws. Each screen shall come fully assembled and tested from the factory.

M. Custodial Locks: At fixed windows and transoms, furnish a custodial-keyed locking device to allow the window to be cleaned from the exterior. For openings having a vertical dimension less than 3 feet, furnish one locking device at the mid point of the screen frame jamb. In vertical openings exceeding 3 feet furnish one lock for every 3 feet of vertical height. Locate locks on the frame jambs at quarter points.

N. Limit Device: An adjustable arm made of galvanized steel shall be provided and located at the head, to limit the screen from swinging open past 100 degrees. Field adjustment shall be possible to accommodate existing conditions.

O. Security Tags: Each unit shall be supplied with "red" tamper proof tags designed to indicate if emergency release has been operated. An additional 200 tags shall be provided to the Owner.

P. Furnish all other materials, not specifically described but required for a complete and operable installation of the window guards.

2.3 FABRICATION

A. Fabricate and assemble window guards at the manufacturer's shop to the fullest extent possible and before applying finishes, including, but not limited to, welding, cutting, drilling, and fitting of joints. Furnish mortising, drilling, tapping, and reinforcement required for hardware at fabrication plant prior to application of finishes.

B. Welding: Use electrodes and methods recommended by manufacturer of material being welded, and in accordance with applicable AWS standards. Use only methods, which prevent distortion and discoloration of exposed faces. Grind weld areas smooth. Restore finish of component parts after welding and grinding.

C. Dissimilar Materials: Separate dissimilar materials with a heavy coating of epoxy paint or other suitable permanent separation as required to prevent galvanic action.

D. Window guards shall be side hinged or pivoted. Window guards shall be fabricated so hinges shall not carry the weight of the operable guard panel when the panel is in the closed position. Panels shall be supported on frame with plastic supports to support panel and facilitate smooth opening of the operable panel.

E. Removal of hinge pins shall not allow access from the exterior.

F. All hinge and latch mechanisms and fasteners shall be concealed and inaccessible from the exterior.

G. Fasten perforated metal window guard panel to subframe using screws, spaced 4” on center maximum and concealed with a continuous angle fastened with Torx tamper resistant screws.

H. Anchoring mechanisms shall be adjustable to accommodate variations in window openings. Adjustability range shall be 3” vertically and 3” horizontally.

I. Vertical juncture of a pair of adjoining window guards shall occur at the centerline of the window mullions behind and shall be capped and sealed continuously at head.

J. Weeps: Furnish weeps to drain water entering the window guards to the exterior.

K. Fasteners used to anchor metal window guards to adjacent construction shall be installed in the plane of the wall so that during forcible entry attempts, the fasteners are stressed in shear.

2.4 FINISH

A. Steel Finish Preparation: Prepare steel surfaces for painting as recommended by coating manufacture.

B. Aluminum Preparation: Prepare aluminum in accordance with coating manufacturer’s recommendations.

C. Stainless Steel Preparation: Prepare stainless in accordance with coating manufacturer's recommendations.

D. Furnish shop applied paint system after assembly consisting of Tnemec Series 161 Epoxy - Polyamide primer and Tnemec Series 74 high-build acrylic polyurethane enamel finish applied in accordance with paint system manufacturer's recommendations, minimum 3.5 mil dry.
   1. At the option of the manufacturer, Furnish shop electrostatically applied polyester powder coated finish. Powder coating finish shall meet or exceed AAMA 603.8.

E. Colors: Furnish custom colors to match aluminum window framing at each window on the concealment angles and frame assembly. Balance of assembly and perforated stainless steel panel shall be matte black.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that openings fit allowable tolerances are plumb, level, provide a solid anchoring surface and comply with approved shop drawings.

B. Plumb and align faces in a single plane and erect doors square and true adequately anchored. After completion of installation, screens shall be in proper working condition.

3.2 INSTALLATION

A. Exterior guards shall cover those portions of windows indicated on the drawings. Guards shall be secured to jambs, heads and sills, with anchors equally spaced and 1' - 6" on center maximum.

B. Exterior guards shall not be secured to window frame, panning or mullions or any portion of the window that will void the aluminum window manufacturer's warranty.

C. Shim and allow for movement resulting from changes in thermal conditions. Furnish separators and isolators to prevent freeze-up of moving joints.

D. Install in accordance with approved shop drawings, manufacturer's instructions, and specifications. Plumb and align faces in a single plane and erect screens square and true, adequately anchored. After completion of installation, screens shall be adjusted to insure proper operation.

3.3 Demonstration

A. After installation and final inspection, test and demonstrate emergency egress operation. Operate the latch release and close and lock the window guard from the inside.

3.4 CLEANING

A. Clean work of this section upon completion. Remove debris resulting from work of this section.

END OF SECTION

SECTION 08910

ALUMINUM WINDOW WALL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Aluminum window wall as indicated and as specified

B. Related Work:
1. Section 01352: LEED Requirements
2. Section 08570: Accessible Awning Windows

1.2 SUBMITTALS

A. Product Data: Submit copies of manufacturer's data, recommendations and standard details, including fabrication, finishing, hardware, accessories and other components of the Work.

B. Provide Structural Calculations signed and sealed by a Structural Engineer licensed in the State of Illinois will submittals.

C. Shop Drawings: Submit Shop Drawings for the fabrication and installation and associated components of the Work signed and sealed by a licensed State of Illinois Structural Engineer. Attesting that the system conforms to "Quality Assurance" requirements of the specification. Include wall elevations at 1/2" scale, and half-size detail sections of every typical composite member. Show anchors, joint system, expansion provisions and other components not included in manufacturer's standard data. Include glazing details.

D. Samples: Submit a set of two (2) samples of required aluminum finish, showing extremes of color and appearance, on minimum 4" long extrusions of the alloys to be used for the Work.
1. The right is reserved to require samples of typical fabricated sections, showing joints, exposed fastenings (if any), quality of workmanship, hardware and accessory items, before fabrication of the Work proceeds.

E. Certification: Submit written certifications, signed by window wall manufacturer, attesting that system conforms to each of the "Quality Assurance" requirements of this Specification where the manufacturer's standard system has been tested in accordance with specified tests and meets performance requirements specified. Where such testing has not been accomplished, perform required tests through a recognized testing laboratory or agency and provide certified test results.

F. LEED Submittal:
1. LEED Credit EQ 4: Submit manufacturers' product data proving that adhesives and sealants used inside the weatherproofing system meets the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various sources Using Small Scale Environmental Chambers,* including 2004 addenda

1.3 QUALITY ASSURANCE

A. Standards: Comply with the requirements and recommendations in applicable specifications and standards by NAAMM, AAMA and AA, including the terminology definitions, and specifically

including the "Entrance Manual" by NAAMM, except to the extent more stringent requirements are indicated. Conform to 16 CFR 1201.

B. Manufacturer: Provide systems by manufacturers regularly engaged in providing systems of the type required for a minimum of three (3) years and conforming to profiles and dimensions shown and this specification.

C. Installer: Regularly engaged in installation of the types of Work required and acceptable to the system manufacturer.

D. Wind Loading: Fabricate exterior units to withstand the wind pressure loading of 30 lbs. per sq. ft. on the gross area of the system, acting inward and also acting outward except 40 lbs. per sq. ft. at corners when tested in accordance with ASTM E 330.

E. Deflections and Thermal Movements: Design work and internally reinforce component members to withstand wind pressures, building deflections, construction shrinkage, thermal movements and erection tolerances, within the following deflection limitations and temperature variations without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance or other detrimental effects. Fabricate, assemble and erect the work to maintain these limitations.
   1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches (4.1 m), and to 1/240 of clear span plus 1/4 inch (6.35 mm), for spans greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.
   2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch (3.2 mm).
   3. Cantilever Deflection: Where framing members overhang an anchor point, limited to 2 times the length of cantilevered member, divided by 175.
   4. Thermal expansion and contraction movement capability, resulting from not less than an ambient temperature range of 120^{o}F, which may cause a window wall material temperature range of 180^{o}F.
   5. Building deflection of L/360.

F. Story Drift: Provide glazed aluminum curtain-wall systems that accommodate design displacement of adjacent stories indicated.
   1. Design Displacement: H/400.

G. Structural steel elements supporting window wall component have been designed in accordance with AAMA TIR-A11 “maximum allowable deflection of framing systems for building cladding components at design wind load.”

H. Water and Air Leakage: Design, fabricate, assemble and erect work and system of sealed joints with other work, to be permanently free of significant leakage of both water and air. Significant leakage is defined as follows, based on a differential test pressure amounting to 20% of specified strength performance pressure required, testing a complete module of window wall work.
   1. Air Infiltration (Windows): More than 0.1 cu. ft. per minute per sq. ft. (projected area of module), determined by ASTM E 283 at an inward test pressure of 6.24 PSF
   2. Air Infiltration (Framing): More than 0.06 cu. ft. per minute per sq. ft. (projected area of module), determined by ASTM E 283 at an inward test pressure of 6.24 PSF.

3. Air Infiltration (Doors): Provide doors with an air infiltration rate of not more than 0.50 CFM for single doors and 1.0 for pairs of doors when tested in accordance with ASTM E 283 at an inward test pressure differential of 1.567 PSF.
4. Water Penetration: Provide framing systems with no water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E 331 at an inward test pressure differential of 8psf. Field testing at 4/5 to be 6.24 lbf. per sq. ft.

I. Condensation Requirements: Provide thermal-break construction which provides a condensation resistance factor (CRF) of at least 55 per the requirements of AAMA 1503.

J. Glass Statistical Factor (Safety Factor): Glass thicknesses when shown on the Drawings are for convenience of detailing only and are to be confirmed by the Contractor and/or glass manufacturer. All glass for the size openings shown will be provided in thicknesses such that the probability of breakage at the "Design Wind Pressure" will not exceed 8 lights per 1000 lights (S.F. 2.5

K. Thermal Performance: Provide window wall system and doors having maximum U-factor of 0.45 for fixed units and 0.50 for operable units as determined in accordance with NFRC 100 by a laboratory accredited by a nationally recognized accreditation organization such as the National Fenestration Rating Council and labeled and certified by the manufacturer; and assembly maximum solar heat gain coefficient (SHGC) of 0.49 for north orientation and 0.39 for all other orientations for overall glazed area as determined in accordance with NFRC 200 by a laboratory accredited by a nationally recognized accreditation organization such as the National Fenestration Rating Council and shall be labeled and certified by the manufacturer. Shading coefficient of the center of glass multiplied by 0.86 shall be an acceptable alternate for determining compliance with the SHGC required for the overall glazed area. Shading coefficient shall be determined using special data file determined in accordance wit NFRC 300. Shading coefficient shall be verified and certified by the glass unit manufacturer.
U-Factors from 8.1 of ASHRAE IESHA Standard 90.1-1999 shall be an acceptable alternate for determining compliance with the U-factor criteria. Where credit is being taken for a low-emissivity coating, the emissivity of the coating shall be determined in accordance with NFRC 301. Emissivity shall be verified and certified by the window wall manufacturer.

L. Job Mock-Up: Prior to their installation of the work, contribute to the project mock-up shown in the Construction Drawings and as specified in Section 01410 "Preconstruction Project Mock-Up". Build mockups to verify selections mad under sample submittals and to demonstrate aesthetic effects, attachment and performance and set quality standards for fabrication and installation.

M. Perimeter Fire-resistive Joint System: For joints between edges of fire -resistive rated floor assemblies and window wall system, provide a system of type and rating below as determined by NFPA 285 and UL 2079.
1. UL-listed Perimeter Fire Containment system: Integrity rating equal or exceeding the fire-resistive rating of the floor or floor/ceiling assembly forming one side of the joint having the required joint width and movement classification and an L number rating.

1.4 WARRANTY

A. Description: Subject to compliance with the requirements, provide factory assembled accessible awning windows from:
1. Graham
2. Trace

3. Other manufacturer's products will be considered subject to compliance with project requirements.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace window wall that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to meet performance requirements.
      b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
      c. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
      d. Faulty operation of operable vents and hardware.
      e. Failure of insulating glass.
   2. Warranty Period:
      a. Window Wall: Ten (10) years from date of Substantial Completion of the Project, as applicable**.**
      b. Metal Finish: Ten (10) years from date of Substantial Completion of window wall installation.
      c. Hardware: Ten (10) years from date of Substantial Completion of window wall installation.
      d. Glazing: Ten (10) years from date of Substantial Completion of window wall installation.

PART 2 - PRODUCTS

2.1 MATERIALS AND ACCESSORIES

A. Aluminum Extrusions: Provide alloy and temper as recommended by manufacturer for strength, corrosion resistance, application of required finish and control of color, but not less than 22,000 psi ultimate tensile strength. Provide main extrusions of not less than 0.125" wall thickness.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other non-corrosive metal fasteners guaranteed by the manufacturer to be compatible with the doors, frames, stops, hardware, anchors and other items being fastened. For exposed fasteners (if any), provide Phillips flat-head screws with finish matching the item fastened.
   1. Do not use exposed fasteners except where unavoidable for the assembly of units, and unavoidable for the application of hardware. Provide only concealed screws in glazing stops.

C. Steel Reinforcement and Brackets: Manufacturer's standard formed or fabricated steel units, of shapes, plates or bars; with 2.0 oz. hot-dip zinc coating complying with ASTM A 123, applied after fabrication to brackets and rust inhibitive paint applied to reinforcing elements.

D. Concealed Flashing: Dead soft stainless steel, minimum 26 gauge.

E. Inserts: For required anchorage into concrete or masonry work, furnish inserts of cast iron, malleable iron or 12 gauge steel hot-dip galvanized after fabrication.

F. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.

G. Bituminous Coatings: Cold-applied asphalt mastic complying with SSPC-PAINT 12, compounded for 30-mil thickness per coat.

H. Sealants and Gaskets: Provide sealants and gaskets in the fabrication, assembly and installation of the Work, which are recommended by the manufacturer to remain permanently elastic, non-shrinking, non-migrating and weatherproof for the life of the building.

I. LEED Requirement: Provide adhesives and sealants used inside the weatherproofing system meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing of Volatile Organic emissions from Various Sources Using Small Scale Environmental Chambers.* Including 2004 addenda.

J. Glazing Gaskets: For glazing glass, and for gaskets which are factory-installed in a "captive" assembly of glazing stops, provide manufacturer's standard stripping of molded neoprene.

K. Glazing:
1. Include a minimum 15% pre-consumer recycled glass in the prime glass (before coating). Tempered Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1. (clear), quality q3 (glazing select), kind FT (fully tempered); free of visible tong marks.
2. Spandrel Glass: ASTM C 1048, Condition B (spandrel glass, one surface ceramic coated), Type I (transparent glass, flat), Class 1. (clear), quality q3 (glazing select), with ceramic coating applied to second surface free of pin holes, kind HS (heat strengthened) or kind FT (fully tempered).
3. Insulating Glass Units: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space complying with ASTM E 774, Performance Classification "A", manufacturer's ten (10) year warranty against failure of hermetic seal of air space.
4. Refer to drawings for composition of various glazing applications and minimum performance requirements.
5. For operable windows within window wall, see Section 08570.

2.2 HARDWARE

A. Except as indicated otherwise herein, refer to Section "Door Hardware" of these Specifications for the furnishing of hardware items. Hardware templates will be furnished to the manufacturer for the fabrication of door and frames to receive hardware. Receive the hardware and coordinate with the hardware requirements of this Section. Report discrepancies (in writing) to the Contractor.

B. Cut, reinforce, drill and tap frames and doors as required to receive hardware, except do not drill and tap for surface-mounted items until the time of installation at the Project Site. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

C. Install all hardware, except surface-mounted hardware, at the fabrication plant. Remove only as required for final finishing operations, and for delivery and installation of the Work at the Project Site

2.3 FABRICATION

A. Coordination of Fabrication: Wherever possible, check the actual openings in the construction work by accurate field measurement before fabrication, and show recorded measurements on final Shop Drawings.

B. Prefabrication: Provide each door as a "packaged entrance" unit. Complete the fabrication, assembly, finishing, application of hardware and all other Work, before shipment to the Project Site, to the greatest extent possible. Disassemble only to the extent necessary for shipment and installation.

C. Basic Fabrication:
   1. Complete the cutting, fitting, forming, drilling and grinding of all metal at the shop to the extent possible. Remove arrises from cut edges and ease edges and corners to a radius of approximately 1/64".
   2. Conceal fasteners, wherever possible, except as otherwise shown.
   3. Maintain continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.
   4. Internally reinforce the Work as necessary for performance requirements, and for support to the structure. Separate dissimilar metals with bituminous paint or preformed separators which will prevent corrosion. Separate metal surfaces at moving joints with nonmetallic separators to prevent "freeze-up" of joints.

D. Weather Stripping: Where exterior door stiles or head rails do not close against fixed stops equipped with compression weather stripping, provide sliding weather stripping, retained in an adjustable strip in a mortise centered in the edge of the door. Provide heavy-duty, hollow, compression weather stripping in the bottom-rail, adjustable for contact with the threshold.

E. Stile-and-Rail Type Aluminum Doors:
   1. Provide tubular frame members, fabricated with mechanical joints of heavy inserted reinforcing plates and concealed tie-rods or j-bolts, in accordance with manufacturer's standard fabrication methods; or fabricate with structurally welded joints, at manufacturer's option.
   2. Except as otherwise shown or scheduled, provide door units 1-3/4" thick.
      a. Provide wide stile doors.

F. Aluminum Framing:
   1. Fabricate tubular and channel frame assemblies with either welded or mechanical joints using shear blocks with concealed fasteners wherever possible.
   2. Provide non-removable door stops extruded integrally with frame to extent possible.
      a. Provide compression weather stripping on the door-contact face of door stop for exterior door frames, and on other frames where indicated.
      b. Where weather stripping is not provided, install neoprene silencers on door stops to prevent metal-to-metal contact between doors and stops.
   3. Provide glazing system for frames to receive lights. Design system for replacement of glass, but for non-removal of glass from the exterior.
   4. Fabricate frame assemblies for exterior walls with flashing and weeps to drain penetrating moisture to exterior. Provide anchorage and alignment brackets for concealed support of assembly from the building structure. Allow for thermal expansion of exterior units.
   5. Provide all elements with thermal breaks to positively eliminate outside to inside metal contact. Provide thermal break materials certified to comply with Performance Requirements of the unit in each case (window or window wall).
      a. Interior framing need not be thermal break construction.

G. Fabrication of Supporting Steel Elements:
   1. Fabricate in accordance with AISC - Manual of Standard Practice.
   2. Certify welders in accordance with requirements of AWS.
   3. Fabricate and assemble in the shop to the greatest extent possible. Shear, slame cut and chip accurately and carefully.
   4. Degrease, hand tool clean and apply one coat of rust-inhibitive metal primer to all elements after fabrication.

2.4 ALUMINUM FINISHES

A. Prepare the surfaces for finishing in accordance with recommendations of the aluminum producer and the finisher or processor.

B. Finish all components of each assembly simultaneously so as to attain complete uniformity of color. Adjust and control the direction of mechanical finishes (as specified) to achieve the best overall visual effect in the Work, as determined in consultation with the Architect.

C. Sequence the finishing and processing of materials in a predetermined bay-bay-bay plan, which will minimize color and texture differences between adjacent components.

D. Color and Texture Tolerance:
   1. The right is reserved to reject the Work because of color or texture variations, which are visually objectionable, but only where the variation exceeds the range of variations established by the manufacturer prior to the Work, by means of range samples which have been accepted by the Architect.
   2. Prepare range samples on extrusions of profiles and shapes of the actual members of the Work. Establish range samples to maintain a total range of 2 degrees on the green reflectance scale.

E. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

F. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

G. Class I, Clear Anodic AA-M12C22A41 Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install component parts which are observed to be defective in any way, including warped, bowed, dented, abraided and broken members, including glass and edge damage. Remove and replace members which have been damaged during installation.\

B. Deliver base plates for mullion anchorage in time to allow for installation. Provide setting drawings.

3.2 ERECTION TOLERANCES

A. Limit variations from plumb, and level to the following:
   1. 1/8" maximum deviation.

B. Limit variations from location (theoretical calculated positions in plan or elevation based on established floor lines and column lines), including variations from plumb and level, to the following:
   1. 3/8" total maximum deviation for any member at any location.
   2. 1/8" maximum change in deviation for any member at any 10' run, any direction.

C. Limit offsets in the end-to-end and edge-to-edge alignments of adjoining and consecutive members, which form planes, continuous runs and profiles to the following:
   1. 1/16" maximum offset in any flush alignment, including any which are to be ½" or less out-of-flush, and including any which are separated 2" or less by a reveal or protrusion in the plane of the wall.
   2. 1/8" maximum offset in alignments which are to be out-of-flush by more than ½", or separated by a reveal or protrusion of more than 2" width.

D. Provide sliding connections at top of mullions to accommodate deflections of L/360 of the floor above.

3.3 ERECTION

A. Erect steel elements in accordance with AISC - Manual of Standard Practice.

B. Certify welders in accordance with requirements of AWS.

C. Do not cut, trim, weld or braze components during erection in any manner which would damage the finish, decrease the strength, or result in a visual imperfection or a failure in performance of the window wall. Return component parts which require alteration to the shop for refabrication, if possible, or for replacement by new parts, if not possible.

D. Install components level, plumb, true to line and with uniform joints and reveals. Use erection equipment which will not mark or stain finished surfaces, and will not damage the component parts in any way.

E. Anchor component parts securely in place by bolting, welding or other permanent mechanical attachment system, which will comply with performance requirements and permit movements which are intended or necessary. Install slip-joints wherever necessary to ensure movement as intended or necessary.

F. Apply bituminous paint of approximately 30-mil dry film thickness, or other suitable permanent separator, on concealed contact surfaces of dissimilar materials, before assembly or installation.

G. Wire brush and touch-up prime welded and unshop primed steel.

H. Provide close fitting sleeves at joints to insure alignment and no open joints.

I. Provide all closures, panels, sill and stool covers and all other accessory items required for a complete installation. Form accessories of minimum .063" aluminum.

J. Install fire stopping in accordance with requirements to obtain fire rating.

3.4 GLAZING

A. Protect glass units from edge damage at all times during handling and installation.

B. Inspect for edge or surface damage and do not install defective units. The glazer is responsible for correct glass size for each opening, within the tolerances and necessary dimensions established.

C. The glazer must examine the framing or glazing channel surfaces, backing, removable stop design, and the conditions under which the glazing is to be performed, and notify the Construction Manager in writing of any conditions detrimental to the proper and timely completion of the Work. Start of Work will evidence acceptance of conditions.

D. Do not install glazing sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

E. Comply with combined recommendations of glass manufacturer and manufacturer of glazing sealants and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturers' technical representatives direct otherwise.

F. Comply with "Glazing Manual" and "Glazing Sealing Systems Manual" by Flat Glass Marketing Association, except as shown and specified otherwise, and except as specifically recommended otherwise by the manufacturers of the glass and glazing materials.

G. Before glazing begins, the Contractor shall conduct a meeting with the glass manufacturer, glazing materials manufacturer, glazer, and Construction Manager to review details of installation.

H. Glazing Methods:
   1. Glaze in exact accordance with requirements necessary to obtain "quality assurance" specified hereinbefore.
   2. Immediately upon installation, protect glass from breakage by attachment of crossed streamers to framing held away from glass. Do not apply markers of any type to surface of glass.
   3. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in any other way during the installation period.
   4. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other surfaces.

3.5 PERIMETER FIRE CONTAINMENT SYSTEM

A. Perimeter fire resistive joint by system: Install perimeter fire stopping system in exact accordance with manufacturer requirements.
   1. Owner will engage qualified independent inspecting agency to inspect fire-resistive joint systems and prepare inspection reports.
   2. Inspecting of completed installation of fire-resistive joint systems shall take place in successive stages as installation of fire-resistive joint system proceeds. Do not proceed with installation of joint systems for the next area until inspecting agency determines completed work shows compliance with requirements.
      a. Inspecting agency shall state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.
   3. Remove and replace fire-resistive joint systems where inspections indicate that they do not comply with specified requirements.

4. Additional inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
5. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and fire-resistive joint systems comply with requirements.

3.6 PROTECTION AND CLEANING

A. Protect exposed aluminum work from damage by construction and. Use lacquer coating only if totally removed without damage to finish. Use strippable covering only if totally removed without damage to finish. Remove protection and clean surfaces and glass immediately before acceptance of building.

END OF SECTION

SECTION 11400

FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. The plans and specifications as written are inclusive of known quantities, and quality standards that meet the minimum performance standards of the school lunch program for the city of Chicago public schools, the architectural limitations of the new building and the enrollment capacity of the new school.

B. All equipment shall be provided in strict accordance with the plans and specifications. All contractors, subcontractors, and sub-tier subcontractors shall be bound to the specifications as well as the general contract conditions, supplemental conditions and section one of the contract documents.

C. The naming of manufacturers in the specifications or on the drawings shall not be construed as an intention to eliminate the products of other manufacturers having equivalent products that meet or exceed the performance and quality standards of the named manufacturer.

D. Other manufacturer's products will be considered subject to meeting the performance criteria specified herein.

E. Any necessary modifications of the equipment, building, piping, ductwork, electrical or any other work including architectural costs resulting from the use of substituted equipment or material shall be at the sole costs of the contractor and specifically not the building owner.

F. The approval of substituted material or equipment by owner or the architect will not relieve the contractor from sole responsibility for the proper installation and original performance requirements nor will the approval and or review by the owner or architect be considered as a basis for any additional monies or an extension of time in the performance of the contract work.

1.2 DESCRIPTION

A. Furnish and install all food service equipment indicated on the drawings and as specified herein. The work includes but is not necessarily limited to the following;

1. Custom fabricated equipment.
2. Prefabricated equipment.

    a. Where more than one manufacturers name is listed you may select one of the named manufacturers as long as all options and accessories are included to meet the performance criteria.

3. Necessary appurtenances and accessories.

B. It is the intention of these specifications to designate an inclusive job, complete, ready for use, except plumbing rough-in, electrical rough-in, (all ductwork and fans up stream from the hood collars) and final connections which will be made by other contractors as noted equipment shall be set in place, leveled, ready for use except for the final connections by the respective building trades.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. The following sections contain requirements that relate to this section.

1. Division 15

   a. Waste, water and vent piping rough in for and make all final connections to all equipment.
   b. Pressure reducing valves, "P" traps, floor drains and grease traps.
   c. All indirect connected waste lines and condensate drainlines.

2. Division 16

   a. All wiring, conduit and fittings shown on the electrical drawings and final connection to the equipment.
   b. Receptacles for all equipment furnished with cords and plugs.
   c. Any miscellaneous disconnects, transformers, switches and other related equipment, which are required for a complete operating assembly.

1.4 QUALITY ASSURANCE

A. General Provisions

1. The Food Service Equipment Contractor will be referred to in the specifications and on the drawings as the "K.E.C." or the Kitchen Equipment Contractor, or the Food Service Equipment Contractor.
2. Kitchen Equipment Contractor shall carefully read all the Contract Documents and furnish the equipment to conform to the construction limitations of the building as set forth in all of the Contract Documents.

B. Uniformity of Construction

1. All custom-fabricated equipment shall be made by one manufacturer and shall be uniform throughout as to method and type of construction used. All equipment shall carry a nameplate identifying the manufacturer.

C. Contractor Qualifications

1. The Food Service Equipment Contractor shall have been regularly engaged in this work for the past five years, and use only skilled craftsmen completely familiar with the methods and materials called for herein.
2. The Contractor, upon demand, shall submit to Architect written evidence of having executed contracts of a comparable size and evidence of sufficient financial resources, which will enable him to perform the work in an expeditious manner, without delay to the project or to other trades.
3. Fabrication of items other than standard catalog items shall be fabricated by a food service equipment fabricator, which has the plant, personnel, and engineering facilities to properly design, detail, and fabricate high quality equipment. The fabricator shall be acceptable to the Architect and the Owner. Furthermore, all work in above category shall be standard unit assembly manufactured by one manufacturer and of uniform design, material, and finish equal to the specification as written.

D. Deviations of Specifications and Substitutions

1. The Contractor shall furnish equipment in strict accordance with the Specifications.
2. Any and all substitutes shall be in strict accordance with the conditions and procedures of the section one contract documents. Any requests not meeting the qualification and procedures as written will be cause for rejection by the Owner and or the Architect.

E. Standard Manufactured Equipment

1. All standard catalog items shall be furnished as specified in regard to brand name, item type, accessories, scheduled options and quantities.
2. All equipment shall be new and of the latest current model.
3. All equipment shall be delivered to the job site in the manufacturer's original shipping container or packaging, sealed and unopened.
4. All equipment shall be N.S.F. labeled.

F. Codes, Regulations and Standards

1. All equipment shall be constructed in strict conformance with the standards of the National Sanitation Foundation as outlined in its bulletin on food service equipment entitled "Standard No. 2" dated July and October, 1952 with its most current revision. Each piece of equipment shall have a "seal of approval" label of the National Sanitation Foundation.
2. Installation of all food service equipment shall comply fully with Illinois State Department of Public Health Regulations and with other current applicable City, County, State and Federal regulations and code requirements.
3. The Contractor shall submit all notices required by law to authorities having jurisdiction and shall obtain and pay for all required permits or certificates of inspection. Submit to the Owner permits and certificates of inspection prior to the request for final payment.
4. All refrigeration shall meet the requirements of the City of Chicago Refrigeration Department and meet or exceed the requirements of the 1995 Montreal Convention.

G. Field Dimensions

1. The K.E.C. shall take all field dimensions as required to fit its equipment to the building conditions and shall coordinate with the other building trades in locating the utility service connections.
2. Trim will not be acceptable to fit the equipment to the building where the K.E.C. has failed to verify all field dimensions.

1.5 SUBMITTALS

A. Shop Drawings

1. Submit shop drawings in compliance with section one documents.

B. Equipment Data

1. Submit catalog sheets of standard manufactured equipment in compliance with section one documents.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All materials and equipment shall be delivered and handled on the job site in a manner to prevent damage or loss, and stored in a place protected from damage, moisture and exposure to elements.

B. In the event of damage, immediately make all repairs and replacements necessary to meet the approval of the Architect and at no additional cost to the owner.

C. No equipment shall be delivered to the job site until the site is ready to receive the equipment.

1.7 JOB CONDITIONS

A. Coordinate work with the work of other contractors to insure proper roughing-in and final connections to equipment and that adequate openings and bases for equipment are provided.

B. Establish the exact size of openings to be left for all built-in work, and verify all measurements at the job site and be responsible for same.

C. Kitchen Equipment Contractor shall provide a representative at the job site during the installation of his equipment, who shall supervise the installation of the equipment and coordinate the connection of the equipment.

D. Protect all surfaces and structure in the area of installation from damage during the execution of work.

E. Schedule delivery of food service equipment so that areas to receive it are ready for installation.

F. Final tests of all equipment and demonstration of use shall be made in compliance with section one documents.

1.8 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Furnish complete portfolios in compliance with section one documents.

1.9 GUARANTEE

A. The contractor is required to place all equipment in perfect operating order inclusive of each particular system or parts thereof, which are part of his work, ready for continuous use and satisfactory operation, in a manner acceptable to the Architect and Owner.

B. The contractor shall guarantee all furnished work and materials and equipment are in compliance with section one documents.

C. This guarantee shall not be constitute to abrogate other specified guarantees or usual guarantees against work that has been defective when supplied or that has been improperly cared for or protected during the construction period.

D. In addition to the normal testing and repair, which are required for the completion of his work during the guarantee period, the Contractor shall visit the building at the Owner's request to clarify any questions for the operating personnel concerning the proper operation and maintenance of the equipment.

E. All compressors furnished as part of the food service equipment shall have a five (5) year warranty commencing from date as stipulated above. This warranty shall be as provided by the manufacturer of the compressor.

F. Provide extended warranties where specified.

PART 2 - PRODUCTS

2.1 QUALITY AND CONDITION OF MATERIALS

A. All materials shall be new, first quality, and without flaws. Equipment shall be delivered upon completion in an undamaged condition. The K.E.C. shall protect from damage, clean, and put into operating condition before acceptance by Owner.

2.2 MATERIALS AND GAUGES

A. Unless otherwise specified or shown on drawings, all surfaces shall be fabricated of stainless steel, including exposed underbracing below tops of dish tables and open base tables and sinks. The gauges used shall be as follows:

1. 12 ga. (Special construction where specified) Wide tops, sinks, underbracing, drip pans and floor troughs.
2. 14 ga. (Standard construction unless otherwise noted) Table tops, sinks, underbracing and special overshelves.
3. 16 ga. (Standard construction, unless otherwise noted) Undershelves, interior shelves, overshelves, wall shelves, body panels for base cabinets and counters.
4. 18 ga. (Standard construction, unless otherwise noted) Body panels for wall cabinets, partitions, back wall panels, drawer and door fronts and canopies.
5. 20 ga. (Standard construction, unless otherwise noted) Liners for refrigerators, interior panels for drawers and doors.

2.3 MATERIALS

A. Non-Corrodible Alloy

1. Non-corrodible alloy, or stainless steel, specified hereinafter shall be Type 304 stainless steel, having a standard analysis of 18% chromium and 8% nickel. Sheets shall be stretcher leveled, free of buckles, warps and surface imperfections.
2. All gauges, where specified United States Standard gauges. All exposed surfaces shall be given a finish equal to #4 or 180 grit. Where manufacturing process and welding disturb the original finish, it shall be carefully reground, polished and restored to match balance of surface.

B. Galvanized Iron: Where galvanized iron is specified, furnish hot-dip galvanized, copper bearing steel. Use in largest possible sheets with as few joints as necessary. All sheets shall be commercial quality, stretcher leveled, and re-rolled to insure a smooth surface.

C. Faucets, Valves, Fittings: Sinks fitted with faucets as called for under each or as a separate item listed as faucets. All basin type faucets, Chicago #51, T&S #B202, or Fisher #3110. All splash mount faucets, Chicago #445, T&S #B237, or Fisher #3210. All special faucets for kettles, pre-wash, etc., shall be listed under Item Specifications.

D. Motors: Up to and including 1/2 HP shall be wired for 120 volts, single phase. Motors over 1/2 HP shall be wired for 208 volts, coordinate with electrical contractor.

E. Switches and Controls: The equipment contractor shall supply each motor-driven appliance or electrically heated unit a suitable control switch or starter of proper type in accordance with Underwriter's Laboratories and code requirements. Controls that are mounted on vertical surfaces of fabricated fixtures shall be set into recessed die stamped stainless steel cups or otherwise indented to prevent damage.

F. Electrical Elements:

1. Fabricated items requiring dry heat, such as plate warmers, urn stands shall be fitted with strip or ring heaters of sufficient wattage to provide specified heat. Unless otherwise specified, these heaters shall be installed directly below bottom shelf. Mount in suitable channels and interconnect with hard copper wire in accordance with Electrical Code. Provide each fixture with one or more thermostatic controls, each with pilot light indicator(s).
2. Properly protect all wiring in metal enclosures in accordance with the National Electrical Code, the Chicago Electrical Code and UL Standards.

2.4 FABRICATION

A. Open Type Bases

1. Pipe standards and frames: All pipe stands for open base tables or dish tables shall be constructed of 1-5/8 OD stainless steel tubing, with stringers and cross braces of the same material. All joints between legs and cross braces shall be welded and ground smooth. Legs shall not be spaced more than 5'6" on center.
2. Feet: Fit all pipe legs with sanitary, die-stamped stainless steel bullet shaped feet, fully enclosed, with a slightly rounded bottom to protect the floor. Fit top of these feet with a male threaded stem to fit into the end of the pipe legs specified and provide a total adjustment of 1". Stem shall be extra long so threads are not exposed. Finish off bottom on pipe leg smoothly and overlap stem to provide sanitary fitting and prevent accumulation of grease or other debris at this joint.
3. Undershelves: Unless otherwise specified in item Specifications, undershelves shall be constructed of 16 gauge stainless, turned down front, sides and back 1-1/2" with edges deburred. Shelf shall have rounded corners and be provided with die-stamped raised ferrules to receive legs. Reinforce shelf with 14 gauge stainless steel closed inverted hat type channels. Dish table shelves shall be removable.

B. Enclosed and Semi-Enclosed Bases:

1. Body: Body shall be constructed of fronts, and ends and backs of 18 gauge stainless steel formed and reinforced to create a rigid, welded structure.
2. Tops: When metal tops are specified, reinforced with 14 gauge stainless steel closed inverted hat-type channel bracing.
3. Shelves: intermediate shelves shall be welded in place, unless otherwise specified. Bottom shelves shall be made removable is sections. Both types of shelves shall be constructed of 16 gauge stainless steel turned down fronts, sides and back 1-1/2" with deburred edges. Shelves shall be braced with 12 gauge stainless steel closed inverted hat-type channels. Provide pipe chase openings for utility lines when required. Intermediate shelves shall be turned up 1-1/2" in back and sides and feathered along wall surfaces of base.
4. Legs: Unless otherwise specified, or detailed, bases shall be mounted on 6" high, 1-5/8" OD stainless steel seamless tubular legs, each fitted with a stainless steel closed bottom, vermin-proof, adjustable bullet shaped foot. Legs shall be welded to 14 gauge stainless steel closed inverted hat-type channel welded to body under lower shelf.
5. Drawers: Drawers, unless otherwise specified, shall be 20" x 20" x 5" deep. Drawer front shall be pan-type, fabricated of 14 gauge stainless steel, fitted with a S.S. recessed pull and shall be flush with enclosure. Drawer insert shall be fabricated of 28 gauge stainless steel with all interior coved 1/2" radius. Insert shall be removable and shall be at least three-quarter exposed when drawer is opened fully. Drawer shall operate on heavy-duty stainless steel extension slides with stainless steel ball-bearing rollers. Drawer shall be enclosed fully and shall be self-closing except when fully extended. Provide stainless steel hasp fully welded to all drawers.

C. Table Tops (Metal):

1. Metal table tops of 14 gauge stainless steel with all horizontal and vertical corners coved on 5/8" radius. Shop seams and corners welded, ground smooth and polished. Working tops enclosed base fixtures reinforced on the underside with a framework of 1-1/2" x 4" x 1-1/2" inverted closed hat channel. Cross angle members placed at each pair of legs. Additional cross angle members between legs on not less than 48" centers. One angle runner, running lengthwise, provided on top so here will not be any noticeable deflection. Studweld reinforcements to underside of top. Do not use rivets or bolts through top.
2. Provide field joints in top where necessary and locate for practical construction, consistent with sizes convenient for shipping and accessibility into building. See paragraph entitled "Field Joints" for description of these joints.

3. Turn metal tops down 1-3/4" in a bullnose roll except where adjacent to walls or other pieces of equipment. Turn wall side up and back 2" unless otherwise specified in schedule.

D. Dish Table Tops:

1. Construct tops of dish tables of 14 gauge stainless steel with all free edges turned up 3" and finished with die-formed sanitary rolled rim. Flange sides adjacent to walls or higher fixtures up 6" and back 2" at up 45 degrees then down 3/4". All interior horizontal and vertical corners shall be coved on 5/8" radius. Outside radius of rolled rim corners shall be concentric with side cove.
2. Mount dish table tops on stainless steel tubing legs and connecting rails same as specified for open base tables.
3. Ends of splash shall be closed. Free corners of tops shall be spherical.

E. Sinks, Drainboards and Sink Insets:

1. Unless otherwise specified in Item Specifications shall be fabricated of 14 gauge stainless steel with 1-1/2" rim of front and sides and shall be of one-piece welded construction. All interior corners shall be coved a minimum of 3/4" radius, horizontally and vertically, with all intersections meeting in a spherical section. Solder filling shall not be acceptable. All exposed corners shall be bullnosed. Unless otherwise specified, backsplash shall be turned up 8", back on a 45 degree angle and down 3/4" with exposed ends closed. Bottom shall be pitched and fitted with 1-1/2" waste outlet with stainless steel removable strainer plate, lever handle valve and connected overflow. The use of die drawn bowls will not be accepted.
2. Multiple Compartments: All sinks having two or more compartments adjacent shall be of double thickness continuously welded to form a continuous front. Each compartment shall be pitched and fitted with a 1-1/2" I.P.S. waste outlet with stainless steel removable strainer plate, lever handle valve and connected overflow.
3. Drainboards: Where drainboards with sink compartments are specified they shall be fabricated of the same material as sink and shall be welded integrally with sink to form one-piece welded construction. Drainboards shall be pitched 1/8" per foot minimum. However, drainboards rim shall be kept level with sink. The front end shall be turned up 3" and finished with a 1-1/2" channel rim, with edges deburred. All exposed corners shall be rounded. Unless otherwise specified, backsplash shall be turned up 8", back on a 45 degree angle and down 3/4" with all exposed ends closed. Drainboards shall be reinforced with a 14 gauge stainless steel closed inverted hat-type channel bracing. Undersides of sinks and drainboards shall be coated with 1/8" thick hard-drying, sound-deadening mastic material and sprayed with aluminum paint.
4. Sink Insets: Sinks built into tops of fixtures, unless otherwise specified in Item Specifications, shall be fabricated of 14 gauge stainless steel. All interior corners shall be coved a minimum of 3/4" radius, horizontally and vertically with all intersections meeting in a spherical section. Sinks shall be welded integral to table tops. Riveted, spot-welded, and soldered joints between sink and top of table or in sink proper shall not be acceptable. Bottom shall be pitched and fitted with 1-1/2" I.P.S. waste outlet with stainless steel crumb strainer waste outlet. All sizes of sinks specified are inside dimensions.

F. Field Joints:

1. All field joints shall be welded.
2. All welded parts shall be non-porous and free of imperfections, free of pits, cracks, or discoloration. All welds of galvanized metal on dish tables and sinks shall be ground smooth, sandblasted, and sprayed with molten zinc at 1,200 degrees F to a minimum thickness of .004". Tinning of welds shall not be acceptable. All welds of stainless steel shall be ground and polished to original finish.

G. Sound Deadening:

1. Underside of all tops at contact of body and bracing shall be sound deadened with high quality asphalt mastic: Philip Cary "Hush Mush", Daubert Chemical "Quiet Tape", or approved equal.
2. Underside of drawers and shall be sound deadened.
3. Double walled sliding and swing doors shall be fitted with sound deadening insulation between the walls.

PART 3 - EXECUTION

3.1 GENERAL

A. Furnish to the architect a purchase order log with the following information.

1. Line item equipment number
2. Quantity of each line item
3. Manufacturer name
4. Model number of line item
5. Date ordered
6. Scheduled delivery date
7. Purchase order number

B. Furnish the general contractor with the following items.

1. A delivery schedule compatible with their construction schedule.
2. All items of equipment that would require early installation dates, i.e. hoods, floor troughs, etc.
3. Copies of all delivery receipts and bill of ladings for all items delivered to the job site. Copy shall bare the written name and signature of receiving person.
4. All loose, small component items shall be clearly taped with the corresponding item number.
5. The general contractor shall distribute all components that are scheduled for installation by others to each respective trade.

C. Trash and crating

1. Remove all debris generated by k.e.c. to job site dumpsters on a daily basis.
2. Do not allow any debris to accumulate in any work area that would impede the work of others or would in any way create a hazard.

3.2 SITE INSPECTIONS

A. Report to the general contractor in writing verification of all rough locations that are not located per the drawing or the requirements of the specified equipment.

B. Field verify actual as built dimensions of all walls, rough-ins, structurals, etc. That effect your work.

C. Field verify that all areas are ready to receive equipment prior to delivery to site.

3.3 INSTALLATION

A. Deliver all equipment in strict accordance with the specifications.

B. Deliver, uncrate, assemble, set in place, and level all equipment to be ready for final m.e.p. connections.

C. Cover all equipment work surfaces with, a thickness equal to the original packaging material, a cover to protect the equipment until the job site is ready for final clean up. All covers shall be securely fastened to the equipment.

D. Silicone seal all equipment to walls where equipment abuts walls. Seal shall be neat, clean and coved so

as to create an easily cleanable surface.

E. Securely fasten with concealed fastener all scheduled trim after all final connections are completed.

F. Field verify that all exposed edges of all equipment is free of all burrs, sharp edges and all exposed surfaces are free of any and all fabrication irregularities. Where necessary repair, grind and polish irregularities to a quality finish consistent with the specification standards.

G. Remove all protective covering from all equipment and clean all equipment ready for final sanitizing when the job site is ready for final inspection by the architect.

3.4 TESTING

A. Verify that all equipment is connected as per the manufacturer requirements.

B. Lubricate, start-up, test and adjust all equipment prior to the architect's and owner's inspection.

C. Notify the architect in writing that all equipment is ready for inspection and demonstration.

3.5 CONTRACT CLOSE OUT

A. Deliver to the architect all required copies of owner's manuals, operating instructions and warranty documents prior to scheduling architect acceptance review.

B. Demonstrate all items of equipment to architect and owner.

C. Deliver all keys clearly tagged, miscellaneous loose accessories to the owner via schedules bill of lading and secure signature for same.

PART 4 - LINE ITEM SPECIFICATION

KEC contractor shall install all equipment level and plumb. All necessary field modifications to equipment to achieve a level and plumb installation shall comply with all applicable codes and (NSF) sanitation requirements.

ITEM 1 STOREROOM SHELVING

Quantity and size as shown on the drawings.

CAMBRO MFG. CO.	INTERMETRO INDUSTRIES CORP.	AMCO INDUSTRIES
7601 CLAY AVE.	NORTH WASHINGTON ST.	901 N. KILPATRICK AVE
HUNTINGTON BEACH,	WILKES-BARRE,	CHICAGO, IL 60651
CALIFORNIA 92648-2219	PENNSYLVANIA 18705	800-621-4023
800-854-7631	717-825-2741	FAX 312-379-5183
FAX 714-842-3430	FAX 717-825-2852	MODEL: PLASTIC PLUS
MODEL: CAMSHELVING	MODEL: METROMAX	

Steel core posts and traverse supports polypropylene coated. Open grid, removable shelf mats capable of being washed in a commercial dishwasher. A 48” shelf section shall support 800 lbs. Each unit to be sized per plan and adjusted per field conditions and to be approximately 84” – 87” high and to have three (3) tiers equally spaced. Each section to be fitted with 5” high premium swivel casters with brakes suitable for corrosion resistant applications.

NOTE: ALL SHELVING FOR ITEMS 1 - 3 SHALL BE BY THE SAME MANUFACTURER

ITEM 2 KOLD LOCKER (F)

Quantity and size as shown on drawings.

KOLPAK/McCALL	LEER MANUFACTURING	NOR-LAKE
641 N. McCORKLE PARK	206 LEER STREET	727 SECOND ST.
PARSONS, TN 38363	NEW LISBON, WI 53950	HUDSON, WI 54016
901-847-5306	888-766-5337	800-955-5253
901-847-9013 (FAX)	608-562-3166 (FAX)	715-386-6149 (FAX)
Model #P6-066-FT	Model #G5-6X6	MODEL #KL-66

Cooler shall be exterior sized per the drawing for nominal 6'-0" x 6'-0" width and length, and shall be 6'-6" high. Failure of the Kitchen Equipment Contractor to provide the correct size, as specified that results in changes to the building architectural and mechanical electrical and plumbing system shall pay all costs to alter same.

Walls panels, interior and exterior shall be a minimum 26 gauge, pebble pattern finish aluminum, with 4" thick closed-cell foamed-in-place polyurethane construction, standard cam-lock connection system, to insure a sealed enclosure when erected. Ceilings to be white baked enamel. Provide stucco aluminum trim angles at all wall intersections with the building wall. Flame spread rating to be 25 or less.

Stainless steel insulated floor set in building slab depression.

Doors and door panel sections shall be positioned as shown on the drawings. Each door shall fit flush with box exterior; shall be equipped with a minimum of 2 cam-lift, self-closing hinges securely fastened to door frame; magnetic sealing door gasket, recessed light switch with pilot light, door frame heater, 14 gauge stainless steel threshold plate, 2" dial thermometer, cam-action locking handle with interior safety release, heated pressure relief port and audio alarm. Door to be a nominal 26" wide and stainless steel finished.

Interior lighting shall include one (1) standard 100 watt shielded vaporproof light fixture provided at the door opening, installation and for inter-connection to door light switch. Refrigeration system shall consist of self-contained, top mounted air-cooled unit; refer to drawings for operation voltage and amperage.

Refrigeration systems shall be provided by same manufacturer as the walk-in cooler. Furnish a letter of certification that the compressor and coil system is sized correctly to operate and hold product at 0 degrees F. with a maximum run time of 80% and as a working cooler. Assume that product load will be room ambient; door open thermal loss of 10% for 4 hours per day, five out of seven days.

Refrigeration system shall consist of furnishing and installing complete refrigeration system. Furnish complete with permits, hook-ups, valves, building coves, controls, disconnects, start-up, and 1 year service after Final Acceptance. All work shall be performed in accordance with the City of Chicago Refrigeration Code and meet the minimum standards as set by the 1995 Montreal Convention.

1. Coils shall be flush, ceiling mounted.

2. Provide unit with sight glass, drier and liquid line assembly, and pressure relief valve. Pressure relief valve and all piping shall meet the Chicago Mechanical Code.

3. Condensate evaporator.

4. Electric defrost heater on drain line from the freezer coil.

5. Hi/low temperature alarm system.

Submit complete shop drawings and details for review prior to fabrication and installation.

NOTE: ITEMS 2 AND 3 SHALL BE THE SAME MANUFACTURER

ITEM 3 KOLD LOCKER (R)

Quantity and size as shown on drawings.

KOLPAK/McCALL	LEER MAUFACTURING	NOR-LAKE
641 N. McCORKLE PARK	206 LEER STREET	727 SECOND ST.
PARSONS, TN 38363	NEW LISBON, WI 53950	HUDSON, WI 54016
901-847-5306	888-766-5337	800-955-5253
901-847-9013 (FAX)	608-562-3166 (FAX)	715-386-6149 (FAX)
MODEL #P6-066-FT	MODEL #G5-6X6	MODEL #KL-66

Same as specified for Item #2 except provide refrigeration to maintain +38 degrees Fahrenheit.

ITEM 4 HAND SINK

Quantity as shown on the drawings.

EAGLE GROUP	ADVANCE TABCO	UNVERSAL STAINLESS
100 INDUSTRIAL BLVD.	200 HEARTLAND BLVD. SUITE T	2801 HUTCHINSON-MCDONALD
CLAYTON, DE 19930	EDGEWOOD, NY 11747	CHARLOTTE, NC 28269
800-441-8440	1-800-645-3166	1-800-925-1909
FAX 302-653-2065	FAX 1-516-242-6900	FAX 1-704-599-1909
MODEL HSA-10-F	MODEL 7-PS-60	MODEL CHS-1

Handsink shall be complete with faucet/strainer and wall mounting bracket. Handsink bowl shall measure nominal 12" x 10" x 5-1/2" overall with marine edge, made of 20 gauge, type 300 series stainless steel. Corner shall be minimum 1-3/4" coved; ends shall be turned back for safe, no-cut edges. Backsplash shall be 8" high with 2-3/4" turnback at 45 degree angle, with all welded end caps. Welded areas shall be blended to match adjacent surfaces, then polished to No. 4 finish. Hand sink shall include splash-mounted, chrome-plated Chicago, T&S or Fisher faucet with wrist handles and swivel gooseneck spout with .5 GPM aerator.

ITEM 5 ROLL-THRU REFRIGERATOR

Quantity as shown on the drawings.

TRAULSEN	VICTORY	TRUE MFG
11-402 15TH AVE.	110 WOODCREST RD.	PO BOX 970
COLLEGE POINT, NY	CHERRY HILL, N.J. 08003	O'FALLON, MO 63366
1-800-825-8220	856-428-4200	800-325-6152
FAX 1-718-961-1390	FAX 856-428-7299	FAX 314-272-2408
MODEL ARI (1)32-LPUTFHS	MODEL RISA-1D-S7	MODEL #TA1-RRT-1S1S

- Provide stainless steel trim and enclosure panels as shown on detail 12.
- Item #5 and #8 to be the same manufacturer.

ITEM 6 OVEN CARTS

Mfg: Blodgett or approved equal
Quantity as shown on drawings.

- Two (2) #CTRE-2 transport carts for each oven (four total).
- Four (4) #DBR-1L roll-in basket dollies for each oven (eight total).
- Porcelain finish for oven interiors.

BASKET REQUIREMENTS, each basket dolly shall be provided with fourteen (14) #136-12 wire baskets as manufactured by Marlin Steel Wire Products (#410-644-7456). Baskets shall be constructed of nickel chrome plated cold rolled steel wire. Basket top and bottom frame to be ¼" diameter cold rolled steel. Crosswires of #11 gauge cold rolled steel shall be welded for form a 2" grid pattern and corner Vs for extra strength. The entire basket assembly is then to be nickel chrome plated. Basket shall measure 13-3/8" x 25-7/8" x 2-5/8". Total quantity baskets required is one hundred twelve (112).

ITEM 7 UTILITY CARTS

Quantity and size as shown on drawings.

LAKESIDE	WILDER MFG CO.	PIPER PRODUCTS
1977 S. ALLIS ST.	41 MECHANIC ST.	300 S. 84TH AVENUE
MILWAUKEE, WI 53207	P.O. BOX 1112	WAUSAU, WI
1-414-481-3900	PORT JERVIS, N.Y. 12771	800-544-3057
FAX 1-414-481-9313	1-914-856-5188	FAX 715-842-3125
MODEL #543	FAX 1-914-856-1950	MODEL #6-UCM-2
	MODEL #C2133S-2-NF	

- Corner bumpers

ITEM 8 ROLL-THRU FOOD WARMER

Quantity as shown on the drawings.

TRAULSEN	VICTORY	TRUE MFG.
11-402 15TH AVE.	110 WOODCREST RD.	P.O. BOX 970
COLLEGE POINT, NY	CHERRY HILL, N.J. 08003	O'FALLON, MO 63366
1-800-825-8220	856-428-4200	800-325-6152
FAX 1-718-961-1390	FAX 856-428-7299	FAX 314-272-2408
MODEL #AIH-132-LPFHS	MODEL #HISA-1D-S7	MODEL #TA1HRT-1S1S

- Provide stainless steel trim and enclosure panels as shown on detail 12.
- Items 5 & 8 to be the same manufacturer.

ITEM 9 MOBILE WORKTABLE

Quantity and size as shown on the drawings.
Custom Fabricated, NSF, general construction per standard details

TOP, 14 gauge stainless steel, type 304 (18/8) with edge per detail 5d.
UNDERSTRUCTURE, 14 gauge galvanized channeling rigidly braced to top with studs and dome caps.
UNDERSHELF, 16 gauge stainless steel, type 304 (18/8) with edge to match top welded to legs.
LEGS, 1-5/8" diameter S/S, type 304 (18/8) (8) legs required.
GUSSETS, stainless steel conical type with inner sleeve and set screw.
CASTERS, 5" diameter polyurethane tires, all swivel, two (2) w/brakes.
DRAWERS, 20" x 20" x 5" deep, stainless steel drawer and housing.

ITEM 10 THREE COMPARTMENT SINK

Quantity and size as shown on drawings.

Custom fabricated, NSF, general construction per standard details.

SINK, 14 gauge stainless steel, type 304 (18/8) with 3/4" radius corners. Backsplash per details 3b and 4a against walls. Rim per detail 5b on free sides. Include lever wastes.
PARTITIONS, 14 gauge S/S, 5/8" thick double wall construction totally flush welded to sink body.
DRAINBOARDS, 14 gauge S/S integrally welded and of same construction as sink, sized per plan to have built in pitch to sink compartments.
UNDERSTRUCTURE, 14 gauge S/S triangular channeling welded to bottom.
LEGS, 1-5/8" diameter S/S, type 304 (18/8).
GUSSETS, stainless steel conical type with inner sleeve and set screw.
FEET, stainless steel adjustable bullet type.

FAUCETS - Two (2) required

- Chicago or T&S 15" minimum double jointed nozzle with 2.2 GPM aerator.

ITEM 11 ROLL-IN CONVECTION OVEN

BLODGETT OVEN CO. (OR APPROVED EQUAL)
50 LAKESIDE AVE.
P.O. BOX 586
BURLINGTON, VT 05402
802-860-3700
802-864-0183 (FAX)
MODEL #ZEPHAIRE, DOUBLE (ELECTRIC)

STANDARD EXTERIOR FINISH, shall consist of #430 stainless steel front, #3 finish and a dull heat resistant black enamel finish on the top, sides and back of oven.
CONTROL PANEL, shall be of stainless steel with independent controls. Control panel shall be completely removable for servicing.
STANDARD BAKING COMPARTMENT INTERIOR, including baffle to be of steel. Dimensions 29" wide x 20" high x 28-1/4" deep to front of baffle.
INSULATION, top, back and sides to be insulated with 1" thick, high temperature mineral fiber sheet.
DOORS AND HANDLES, a single handle mounted on each door to operate each door individually.
TRACKS, shall consist of stainless steel-formed guides mounted on the liner bottom.

DOCKING AND LOCKING ASSEMBLY, to be mounted on oven base to facilitate alignment for docking and locking of transport cart.
VENTING, oven baking chamber is continuously vented to oven exterior.
THERMOSTATS, each section shall be equipped with an electric, direct acting thermostat, which shall have a snap action mechanism and integral off-on switch. Range shall be 200 degrees F to 500 degrees F.
TIMER, 60-miute mechanical timer with bell.
LISTING, ovens are listed Underwriters Laboratories and National Sanitation Foundation. Each Convection Oven shall be provided with the following optional features:

- 6" stainless steel legs, solid doors in lieu of doors with windows.
- Safety restraining cable.

ITEM 12 EXHAUST HOOD(S)

Quantity and size as shown on drawing.

AVTEC INDUSTRIES	CAPTIVE-AIRE	CADDY
120 KENDALL POINT DR.	245 W. ROOSEVELT RD.	509 SHARPSTOWN RD.
OSWEGO, IL 60543	W. CHICAGO, IL 60185	BRIDGEPORT, NJ
708-851-4800	630-231-3380	609-467-4222
FAX 708-851-5777	FAX 630-231-8721	FAX 609-467-5511
MODEL #VDW – TYPE II	MODEL #VHB-6 – TYPE II	MODEL CHW – TYPE II

The exhaust hood[s] construction and specifications shall meet or exceed the minimum standards as set forth by the following agents and authorities:

1. The City of Chicago Building Code
2. Underwriter's Laboratories
3. The National Sanitation Foundation
4. The National Fire Protection Agency
5. Illinois Department of Public Health

The exhaust hood[s] shall be sized as per the Food Service and architectural drawings and the mechanical drawings; both of which allow for a minimum overhang of 6" in rear for the mechanical connection of the equipment under the hood, 12" in front of equipment, and the length by 6" at each side beyond the equipment as it is spaced under the exhaust canopy, except against a building wall.

The exhaust air shall be sized as per the mechanical drawings.

Where the mechanical requirements of the exhaust hood[s] provided by the Food Service Equipment Contractor do not meet the values as set forth by the Contract Documents, all costs for altering the duct and fan system, altering the H.V.A.C. system of the room, general construction modification, including any required architectural and/or engineering review shall be borne by the Kitchen Equipment Contractor.

The entire hood shall be constructed of a minimum of number 18 gauge, Type 304 stainless steel, No. 4 finish on all exposed areas. Single wall vent hood for non-grease applications for the removal of heat, vapor, etc. Hood shall have a full perimeter gutter with a ½" OD Bolt thread drain connection.

1. Exhaust duct collar to be 4" high with 1" flanges. Duct sizes, CFM and static pressure requirements shall be as shown on the drawings. Hood shall be recognized by NSF.
2. Incandescent light fixtures, quantity as follows. Light fixtures shall be interconnected to a single point connection within hood sections.
   a. Hood under 8'-0" long to include (1) fixture.
   b. Hood between 8'-0" and 10'-0" long to include (2) fixtures.

c. Hood between 10'-0" and 16'-0" long to include (3) fixtures.
3. 20 gauge, Type 304 stainless steel enclosure panel to enclose area above the canopy from the top of the canopy to the building ceiling.
4. Provide 18 gauge, Type 304 stainless steel wall flashing with a No. 4 finish to wall or walls under exhaust canopy. Wall flashing shall extend from the cove base to the underside of hood. Provide clean, tight knockouts for all utility rough-ins.
5. Provide light and fan switches on the face of the hood.

ITEM 13 MILK CASE COOLERS

Quantity and size as shown on the drawings.

MOD-U-SERVE	BEVERAGE-AIR	NOR-LAKE
2320 PEYTON	P.O. BOX 5932	727 SECOND ST.
HOUSTON, TX 77032	SPARTANBURG, SC 29304	HUDSON, WI 54016
888-955-5463	800-845-9800	800-955-5253
FAX 281-442-3351	FAX 864-582-5083	FAX 715-386-6149
MODEL #MCT-DM2	MODEL #ST49N	MODEL #AR-124

- Stainless steel interior and exterior.

ITEM 14 FROST TOP SERVING COUNTER

Quantity as shown on the drawings.

All serving line counters to be by the same manufacturer. 32" working counter top height all units.

DELFIELD	DUKE MFG. CO.	MOD-U-SERVE
P.O. BOX 470	2305 N. BROADWAY	2320 PEYTON
MT. PLEASANT, IL	ST. LOUIS, MO 63102	HOUSTON, TX 77032
1-800-733-8821	800-735-3853	888-955-5463
FAX 1-800-669-0619	FAX 314-231-5074	FAX 281-442-3351
MODEL #SE-F5	MODEL #TFT-74-SS	MODEL #MCT-FR5

TOP, fabricated of 16 ga., type 302 polished stainless steel, turned down 2" on edges, with all corners welded and perimeter marine edge. Frost top to be approximately 2” below the counter top.
APRON, full length x 10" high stainless steel apron.
CASTERS, mount on four (4) 5" diameter, heavy-duty, double ball bearing swivel casters with non-marking rubber tires. Two casters fitted with brakes adjust height to accommodate 32" work top.

LOCKING DEVICE, Cam-action latches with trigger releases to join multiple units together at the top to form a unitized serving line.

Include the following accessories:

1. Full length x 12" wide, solid, stainless steel, ribbed type tray slide set on stainless steel folding brackets.
2. Full length minimum 6" wide stainless steel work shelf on stainless steel folding brackets.
3. Full front panel and end enclosure panels with laminate or fiberglass finish.
4. Full length x full width stainless steel undershelf.

5. Full length double-deck display stand with plexiglas sneeze guards and end panels and stainless steel shelves. Each shelf to be fitted with a fluorescent light interwired with compressor cordset
6. Full length stainless steel kickplate across the front.

ITEM 15 HOT FOOD SERVING COUNTER

Quantity as shown on the drawings**.** (Flat Top Serving Counter)

DELFIELD	DUKE MFG. CO.	MOD-U-SERVE
P.O. BOX 470	2305 N. BROADWAY	2320 PEYTON
MT. PLEASANT, IL	ST. LOUIS, MO 63102	HOUSTON, TX 77032
1-800-733-8821	800-735-3853	888-955-5463
FAX 1-800-669-0619	FAX 314-231-5074	FAX 281-442-3351
MODEL #SC-74	MODEL #TST-74-SS	MODEL #MCT-FT6

Same general materials, accessories, specifications and details to match Item #14, except delete the display stand specified under point 5. No display stand or sneeze guard is required.

ITEM 16 CHECKER STAND

Quantity as shown on the drawings.

DELFIELD	DUKE MFG. CO.	MOD-U-SERVE
P.O. BOX 470	2305 N. BROADWAY	2320 PEYTON
MT. PLEASANT, IL	ST. LOUIS, MO 63102	HOUSTON, TX 77032
1-800-733-8821	800-735-3853	888-955-5463
FAX 1-800-669-0619	FAX 314-231-5074	FAX 281-442-3351
MODEL #SCS-30	MODEL #TCS-30-SS	MODEL #MCT-CRSG

Same general materials, specifications and details to match Item #14.

1. Full length x 12" wide, solid, stainless steel, ribbed type tray slide set on stainless steel folding brackets.

ITEM 17 TRAY DRYING RACK

Quantity and size as shown on the drawings.

INTERMETRO INDUSTRIES CORP.	AMCO INDUSTRIES
NORTH WASHINGTON ST.	901 N. KILPATRICK AVE
WILKES-BARRE,	CHICAGO, IL 60651
PENNSYLVANIA 18705	800-621-4023
717-825-2741	FAX 312-379-5183
FAX 717-825-2852	MODEL: PP4824
MODEL: PR48VX	

Four (4) tiers high, all shelves equipped with removable shelf mats, tray drying inserts, and 5” diameter polyurethane tired casters, two (2) swivel with brakes. Include donut bumpers.

ITEM 18 ANGLE RACKS

Quantity as shown on the drawings.

NEW AGE	CRES-COR	CHANNEL
P.O. BOX 384	5925 HEISLEY ROAD	55 CHANNEL DRIVE
NORTON, KS 67654	MENTOR, OH 44060	PORT WASHINGTON, NY 11050
800-255-0104	877-273-7267	866-712-7283
FAX 913-817-2616	FAX 440-350-7267	FAX 516-944-6271
MODEL #1337	MODEL #207-1811C	MODEL #417-A-SL

Frame and cross supports shall be of 1" square tubing, extruded aluminum alloy, all welded construction with corner bumpers. Bottom shall be of solid aluminum alloy with aluminum hat channels welded underneath for recessing of casters. Tray slides shall be of extruded aluminum angles 5"± O.C. welded to the frame. Units shall be furnished with 5" diameter heavy duty, plate type casters two supplied with brakes and to be sized to fit into Items #5 and #8.

ITEM 19 SPARE NUMBER

ITEM 20 TRAY CARTS

Quantity as shown on the drawings.

DELFIELD	CADDY
P.O. BOX 470	711 CADDY DRIVE
MT. PLEASANT, IL	PITMAN, NJ 08071
1-800-733-8821	609-589-1550
FAX 1-800-669-0619	FAX 609-589-0220
MODEL DT-3SS	MODEL T-145

FRAME, constructed of 1" O.D. 16 ga. stainless steel tubing, with 3/4" O.D. integrally welded cross rails.
CABINET, constructed of all-welded 18 ga. stainless steel, with edges flanged. Include a canted shelf with enclosed ends and full height back at an angle to support trays, with all interior corners coved to a 1/2" radius. Shelf to be set 14" above the floor and provide a 1/2" diameter hole to permit drainage.
CASTERS, mounted on four (4) 4" diameter heavy-duty, double ball bearing swivel casters, two [2] with brakes.
Unit may be custom fabricated per the specifications.

ITEM 21 FLOOR TROUGHS

Quantity as shown on the drawing.

ADVANCE TABCO	IMC TEDDY
200 HEARTLAND BLVD	PO BOX 206
EDGEWOOD, NY 11747	COPIAGUE, NY 11726
800-645-3166	631-789-8881
FAX 516-242-6900	FAX 631-789-3633
MODEL #FFTG-1236	MODEL #FT-1236

Stainless steel subway style grate.
Unit may be custom fabricated to comply with the specifications of the above.

ITEM 22 RECYCLING COUNTER

Custom fabricated, size and quantity per plan x 34" O.A. high.

- General construction per details 1, 2, 6, and 7
- Backsplash per details 3e and 4a against building walls.
- Rim per detail 5f
- Integral sink approximately 40" x 20" x 12" deep fitted with T&S or Chicago deck mounted faucet with 12" nozzle with loose keyed stops and 2.2 GPM aerator spout, and crumb cup basket drain. Provide hinged double pan door per detail 7. Omit bottom shelf in the cabinet base.
- Support top with Walsh-Simmons seating #BAS 30WL cantilevered table brackets spaced to accommodate the recycling bins, Item #23.
- Provide cutout in top with 1" turndown at rear and ends and 1" turn-up at front with radiused corners. Cutouts to be centered over recycling bins between top supports.

ITEM 23 RECYCLING BINS

Quantity and size as shown on the drawings.

RUBBERMAID COMMERCIAL PRODUCTS
3124 VALLEY AVENUE
WINCHESTER, VA 22601
540-667-8700
FAX 540-542-8821
MODEL #FG395873

ITEM 24 DUNNAGE RACKS

Quantity and size as shown on drawings.

INTERMETRO INDUSTRIES CORP.
NORTH WASHINGTON ST.
WILKES-BARRE,
PENNSYLVANIA 18705
717-825-2741
FAX 717-825-2852
MODEL: A1460NK3/13PK3

AMCO INDUSTRIES
901 N. KILPATRICK AVE
CHICAGO, IL 60651
800-621-4023
FAX 312-379-5183
MODEL: A1260/P08 Polygard

Steel core posts and traverse supports polypropylene coated. Open grid, removable shelf mats capable of being washed in a commercial dishwasher. Each unit to be sized per plan and adjusted per field conditions and to be 8" – 12" high.

ITEM 25 FREEZER SHELVING

Quantity and size as shown on drawings.

CAMBRO MFG. CO.
7601 CLAY AVE.
HUNTINGTON BEACH,
CALIFORNIA 92648-2219
800-854-7631
FAX 714-842-3430
MODEL: CAMSHELVING

INTERMETRO INDUSTRIES CORP.
NORTH WASHINGTON ST.
WILKES-BARRE,
PENNSYLVANIA 18705
717-825-2741
FAX 717-825-2852
MODEL: METROMAX

AMCO INDUSTRIES
901 N. KILPATRICK AVE
CHICAGO, IL 60651
800-621-4023
FAX 312-379-5183
MODEL: PLASTIC PLUS

Provide shelving sections same as specified for Item #1. Sections to be sized per plan x approximately 64" high, with three (3) tiers. Delete casters.

ITEM 26 REFRIGERATOR SHELVING

Quantity and size as shown on drawings.

CAMBRO MFG. CO.
7601 CLAY AVE.
HUNTINGTON BEACH,
CALIFORNIA 92648-2219
800-854-7631
FAX 714-842-3430
MODEL: CAMSHELVING

INTERMETRO INDUSTRIES CORP.
NORTH WASHINGTON ST.
WILKES-BARRE,
PENNSYLVANIA 18705
717-825-2741
FAX 717-825-2852
MODEL: METROMAX

AMCO INDUSTRIES
901 N. KILPATRICK AVE
CHICAGO, IL 60651
800-621-4023
FAX 312-379-5183
MODEL: PLASTIC PLUS

Provide shelving sections same as specified for Item #1. Sections to be sized per plan x approximately 64" high, with three (3) tiers. Delete casters.

ITEM 27 TRASH CONTAINERS

Quantity and size as shown on the drawings.

RUBBERMAID COMMERCIAL PRODUCTS
3124 VALLEY AVENUE
WINCHESTER, VA 22601
540-667-8700
FAX 540-542-8821
MODEL #2655/2654

ITEM 28 SPARE NUMBER

ITEM 29 DISH WASHER

Quantity as shown on the drawings.

CHAMPION INDUSTRIES	CMA	HOBART
P.O. BOX 4149	12700 KNOTT AVE.	701 S. RIDGE
WINSTON-SALEM, NC 27115	GARDEN GROVE, CA 92841	TROY, OHIO 45374
336-661-1556	800-854-6417	888-4HOBART
FAX 336-661-1979	FAX 714-895-2141	FAX
MODEL #UH-170B	MODEL #180U.C	MODEL: LXi

- Detergent and rinse aid pumps
- Hot water sanitizing

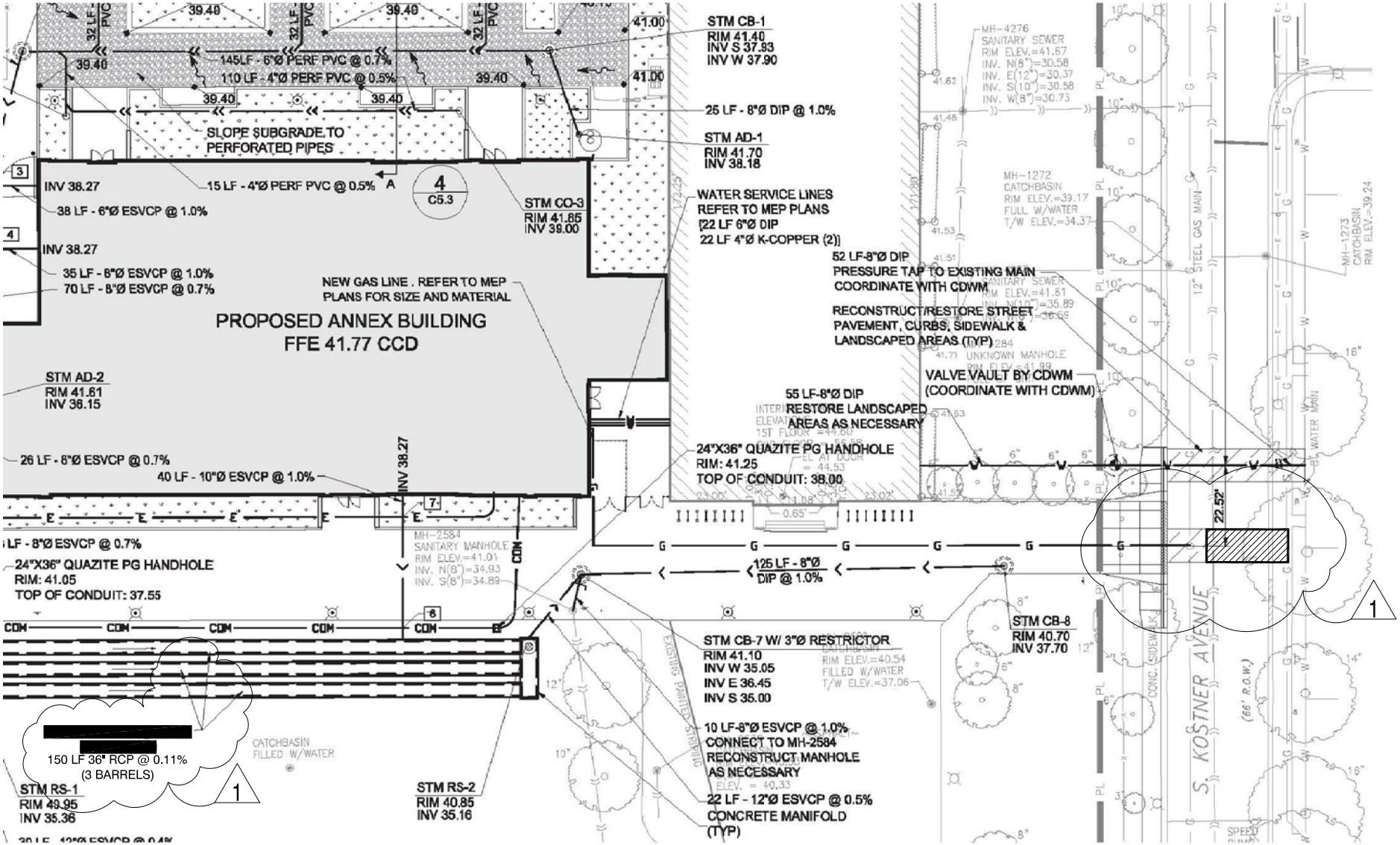
ITEM 30 DISH TABLE

Quantity as shown on the drawings.

ADVANCE TABCO	EAGLE	SELECT STAINLESS
200 HEARTLAND BLVD.	100 INDUSTRIAL BLVD.	11145 MONROE ROAD
EDGEWOOD, NY 11719	CLAYTON, DE 19938	MATTHEWS, NC 28105
800-498-6634	800-441-8440	888-843-2345
FAX 631-586-2933	FAX 302-653-2065	FAX 704-841-1590
MODEL #DTU-U60-48L	MODEL #UDT-4R-16/3	MODEL #52UD-L STANDARD

- 16 gauge, #304 stainless steel construction
- T&S, Chicago Faucet or Fisher backsplash mounted pre-rinse spray.

END OF SECTION



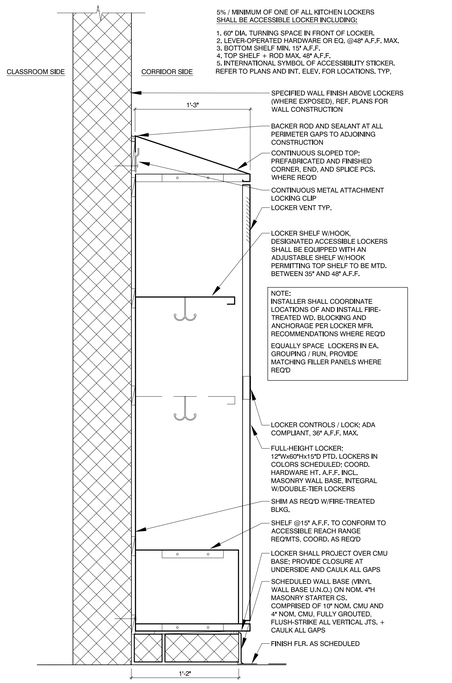
STEVENSON ANNEX ADDENDUM #1

REFERENCE: SHEET C4.0

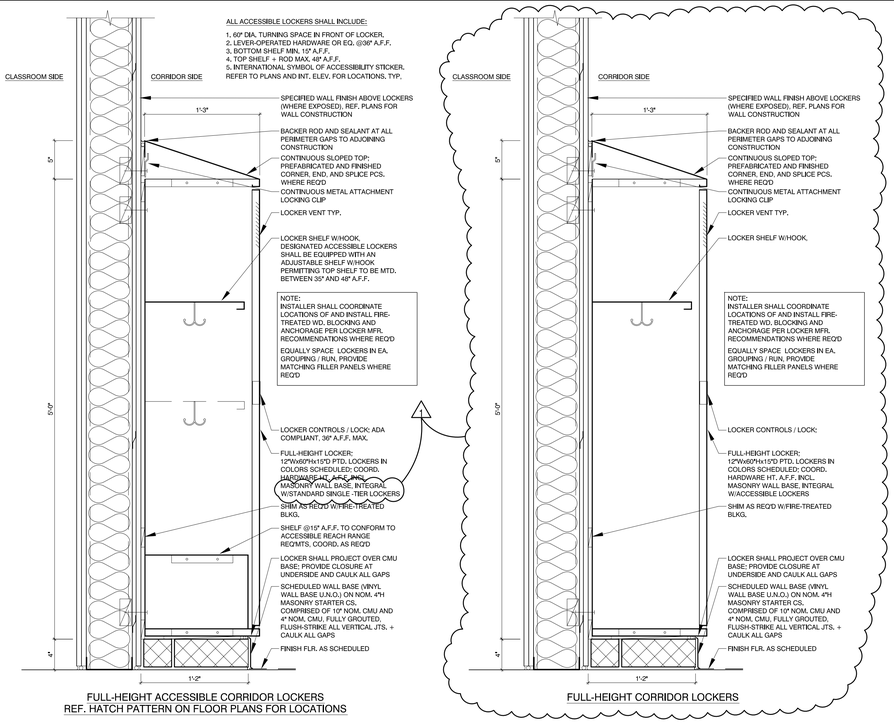
SCALE: NTS

CSK-1

12/29/2011



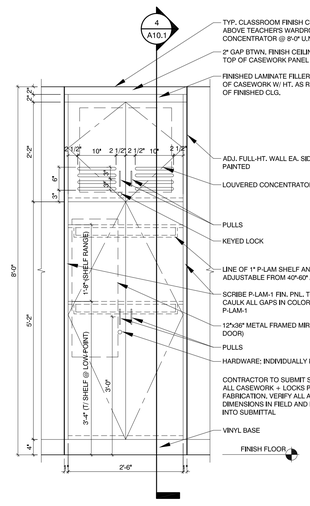
FULL-HEIGHT KITCHEN LOCKERS;
INCL. MIN. 1 ACCESSIBLE

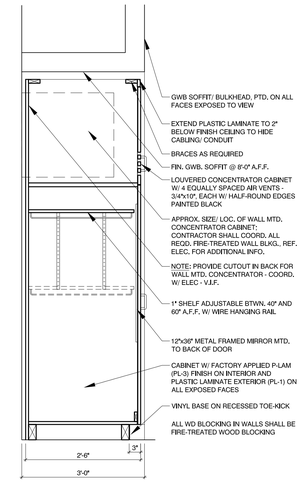


FULL-HEIGHT ACCESSIBLE CORRIDOR LOCKERS
REF. HATCH PATTERN ON FLOOR PLANS FOR LOCATIONS

FULL-HEIGHT CORRIDOR LOCKERS

ACCESSIBLE MOUNTING HEIGHTS	
A. ACCESSIBLE HEIGHT FOR LOW REACH ELEMENTARY: 19" A.F.F. (RECOMMENDED) 18" A.F.F. MIN. HIGH SCHOOL: 16" A.F.F. (RECOMMENDED) 15" A.F.F. MIN.	D. ACCESSIBLE HEIGHT FOR STORAGE CUBBIES PRE-K ONLY: 35" A.F.F. (RECOMMENDED)
B. ACCESSIBLE HEIGHT FOR HIGH REACH ELEMENTARY: 39" A.F.F. (RECOMMENDED) 40" A.F.F. MAX. HIGH SCHOOL: 47" A.F.F (RECOMMENDED) 48" A.F.F. MAX	E. ACCESSIBLE HEIGHT FOR MARKER BOARDS PRE-K: 24" A.F.F. MAX. TO THE BOTTOM OF THE WRITING SURFACE ELEMENTARY: 28" A.F.F. MAX. TO THE BOTTOM OF THE WRITING SURFACE HIGH SCHOOL: 36" A.F.F. MAX. TO THE BOTTOM OF THE WRITING SURFACE
C. ACCESSIBLE HEIGHT FOR COAT HOOKS PRE-K: 24" A.F.F. (RECOMMENDED) 25" A.F.F. MAX. ELEMENTARY 39" A.F.F. (RECOMMENDED) 40" A.F.F. MAX	F. SURFACE MOUNTED FIRE EXTINGUISHERS 27" A.F.F. MAX. TO THE BOTTOM OF THE FIRE EXTINGUISHER 27" A.F.F. MAX TO THE BOTTOM OF THE FIRE EXTINGUISHER CABINET



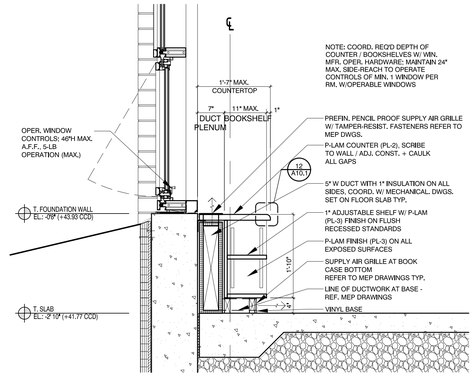


01 TYPICAL LOCKER DETAIL AT KITCHEN
SCALE: 1 1/2" = 1'-0"

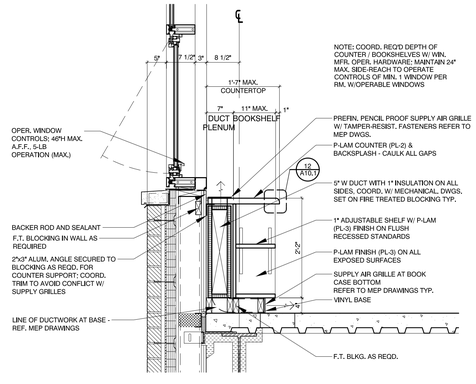
02 TYPICAL LOCKER SECTION DETAIL
SCALE: 1 1/2" = 1'-0"

03 TEACHERS WARDROBE - ELEVATION
SCALE: 3/4" = 1'-0"

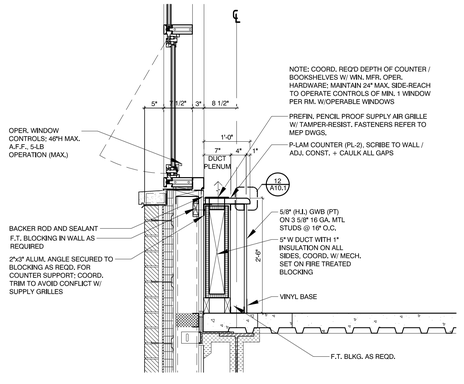
04 TEACHERS WARDROBE - SECTION
SCALE: 3/4" = 1'-0"



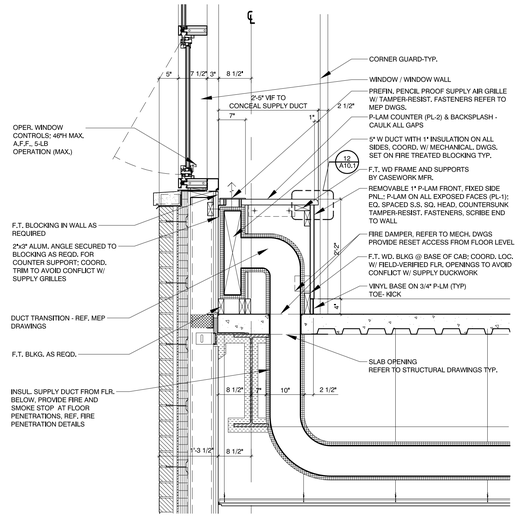
05 BOOKCASE @ ROOMS 133 AND 134
SCALE: 3/4" = 1'-0"



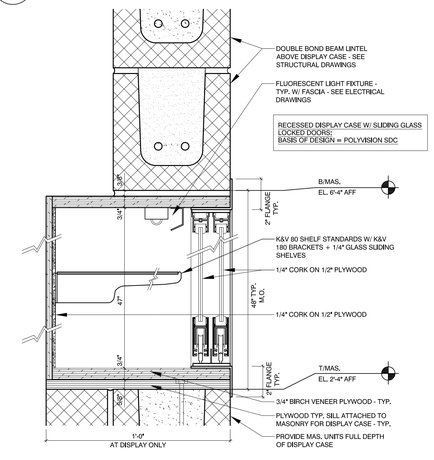
06 BOOKCASE AT WINDOW TYP.
SCALE: 3/4" = 1'-0"



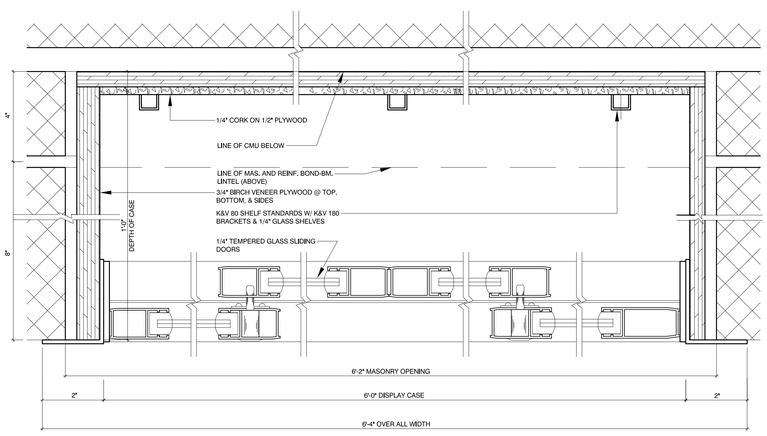
07 KNEEWALL SECTION
SCALE: 3/4" = 1'-0"



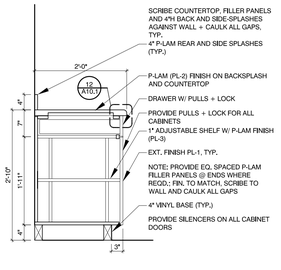
08 BOOKCASE AT DUCT CHASE
SCALE: 3/4" = 1'-0"



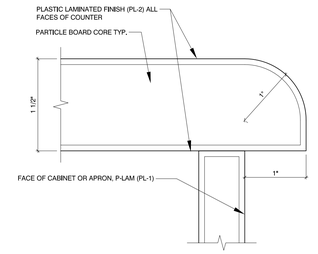
09 DISPLAY CASE SECTION
SCALE: 3" = 1'-0"



10 DISPLAY CASE PLAN
SCALE: 6" = 1'-0"



11 BASE CABINET SECTION
SCALE: 3/4" = 1'-0"



12 STANDARD POST FORM EDGE DETAIL
SCALE: 1" = 1'-0"

STEVENSON ANNEX
8010 S. KOSTNER AVE
CHICAGO, IL 60652
CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

WARNING:
LEAD-BASED PAINT MAY BE PRESENT WITHIN THE BUILDING. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO TAKE APPROPRIATE SAFETY MEASURES IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL RULES AND REGULATIONS INCLUDING OSHA (1926.62) COMPLIANCE. WASTE CHARACTERIZATION AND WASTE DISPOSAL. ALL WORK WITH SURFACES CONTAINING LEAD-BASED PAINT SHALL BE DONE IN ACCORDANCE WITH SECTION 02133.

THESE DRAWINGS HAVE BEEN PREPARED AT AND / OR UNDER MY SUPERVISION AND TO THE BEST OF MY KNOWLEDGE AND BELIEF CONFORM AND COMPLY WITH THE REQUIREMENTS OF THE CHICAGO DEPARTMENT OF BUILDING.

ILLINOIS
AGUSTIN GOMEZ-LEAL
REGISTERED ARCHITECT
001.014498
EXPIRATION DATE: NOVEMBER 30, 2012

Wallin ▪ Gomez
ARCHITECTS LTD
711 South Dearborn Street, Suite 606
Chicago, Illinois 60605-1827
P: 312-427-4702 ▪ F: 312-427-6611
E: admin@wgaltd.com

TERRA ENGINEERING, LTD.
Chicago, Illinois
Civil Engineer/Landscape Architect

MATRIX ENGINEERING CORP.
Chicago, Illinois
Structural Engineer

HMS ENGINEERING
Lombard, Illinois
MEP/FP Engineer

PRIMERA ENGINEERING
Chicago, Illinois
LEED Consultant

SHINER + ASSOCIATES, INC.
Chicago, Illinois
Acoustic Consultant

ISSUANCE

MARK	DESCRIPTION	DATE
1	DESIGN DEVELOPMENT	08.23.11
2	60% CONSTRUCTION	09.28.11
3	90% CONSTURCTION	11.02.11
4	100% CONSTRUCTION	11.18.11
5	100% REVIEW	11.23.11
6	ISSUE FOR BID	12.06.11
7	ADDENDUM 1 (1)	12.29.11
8		-

SCALE: AS NOTED
PLOT DATE.: 1/11/2012
PBC PROJECT NAME: STEVENSON ANNEX
PBC CONTRACT NO.: 05560
WGA PROJECT NO.: 11043

WARNING:
ASBESTOS-CONTAINING BUILDING MATERIALS ARE OR MAY BE PRESENT IN THIS BUILDING. AN ASBESTOS MANAGEMENT PLAN IS AVAILABLE IN THE SCHOOL FOR REVIEW UPON REQUEST. NO PERSON MAY DISTURB ASBESTOS CONTAINING MATERIALS UNLESS SUCH PERSON IS TRAINED AS AN ASBESTOS WORKER OR CONDUCTS SUCH WORK IN ACCORDANCE WITH SPECIFICATION(S) CONTAINED IN THE PROJECT DOCUMENTS AND IN COMPLIANCE WITH ILLINOIS DEPARTMENT OF HEALTH RULES AND REGULATIONS.

TITLE:
INTERIOR DETAILS

SHEET
A10.1

FIRST FLOOR SIGNAGE SCHEDULE

TAG	ROOM #	TYPE (SEE A14.4 & A14.5)	SIGN TEXT (NUMBER/NAME)	REMARKS
1-001	VESTIBULE #9	WHITE REFLECTIVE CUTOUT	5	EXTERIOR EMERGENCY SIGNAGE
1-002	STAIR #6	EX-2	STAIR 6 LEVEL 1	---
1-003	136	INT-U	136/(SEE SIGN TYPE)	---
1-004	136	EX-1	(SEE SIGN TYPE)	---
1-005	136	EX-1	(SEE SIGN TYPE)	---
1-006	136B-1	INT-X	RECYCLING	---
1-007	136B-2	TR-7	(SEE SIGN TYPE)	---
1-008	136B-3	TR-8	(SEE SIGN TYPE)	---
1-009	136B	SEE 02/A14.4	6	EXTERIOR EMERGENCY SIGNAGE
1-010	136B	EX-1	(SEE SIGN TYPE)	---
1-011	136B-4	INT-V	(SEE SIGN TYPE)	---
1-012	136A	INT-U	136A/KITCHEN	---
1-013	136A-2	INT-D	136A-2/(SEE SIGN TYPE)	---
1-014	136A-1	INT-X	STORAGE	---
1-015	136A	INT-U	136A/KITCHEN	---
1-016	136	INT-U	136/(SEE SIGN TYPE)	---
1-017	VESTIBULE #8	SEE 02/A14.4	4	EXTERIOR EMERGENCY SIGNAGE
1-018	VESTIBULE #8	EX-1	(SEE SIGN TYPE)	---
1-019	135A	TR-4	(SEE SIGN TYPE)	---
1-020	135B	TR-3	(SEE SIGN TYPE)	---
1-021	134	INT-C	134/CLASSROOM	---
1-022	133	INT-C	133/CLASSROOM	---
1-023	VESTIBULE #7	EX-1	(SEE SIGN TYPE)	---
1-024	VESTIBULE #7	SEE 02/A14.4	7	EXTERIOR EMERGENCY SIGNAGE
1-025	132B	INT-V	132B/PUMP ROOM	---
1-026	STAIR #5	EX-2	STAIR 5 LEVEL 1	---
1-027	CA1	SEE 02/A14.4	3	EXTERIOR EMERGENCY SIGNAGE
1-028	---	EX-1	(SEE SIGN TYPE)	---
1-029	131B	INT-V	131B/MECHANICAL	---
1-030	CL1	INT-C	CL1/CORRIDOR TO MAIN BUILDING	---
1-031	CL1	INT-C	CL1/CORRIDOR TO ANNEX	---
1-032	129	INT-C	129/CLASSROOM	---
1-033	VESTIBULE #1	EX-1	(SEE SIGN TYPE)	---
1-034	VESTIBULE #1	SEE 02/A14.4	2	EXTERIOR EMERGENCY SIGNAGE
1-035	STAIR #1	EX-2	STAIR 1 LEVEL 1	---
1-036	130	INT-C	130/CLASSROOM	---
1-037	130A	INT-X	STORAGE	---
1-038	130B	UN-1	(SEE SIGN TYPE)	---
1-039	127B	INT-X	(SEE SIGN TYPE)	---
1-040	128	INT-C	128/CLASSROOM	---
1-041	127A	TR-4	(SEE SIGN TYPE)	---
1-042	126	INT-C	126/CLASSROOM	---
1-043	125	INT-C	125/CLASSROOM	---
1-044	124	INT-C	124/CLASSROOM	---
1-045	123	INT-C	123/CLASSROOM	---
1-046	122	INT-D	122/ASSISTANT PRINCIPLE'S OFFICE	---
1-047	121	INT-C	121/CLASSROOM	---
1-048	119	TR-3	(SEE SIGN TYPE)	---
1-049	120	INT-D	120/PRINCIPLE'S OFFICE	---
1-050	120B	INT-X	(SEE SIGN TYPE)	---
1-051	118A	INT-D	(SEE SIGN TYPE)	---
1-052	120A	INT-X	VAULT	---
1-053	STAIR #2	EX-2	STAIR 2 LEVEL 1	---
1-054	VESTIBULE #6	WHITE REFLECTIVE CUTOUT	8	EXTERIOR EMERGENCY SIGNAGE
1-055	VESTIBULE #6	EX-1	(SEE SIGN TYPE)	---
1-056	118	INT-D	118/MAIN OFFICE	---
1-057	CS-1	EL-2	(SEE SIGN TYPE)	---
1-058	118	INT-D	118/MAIN OFFICE	---
1-059	VESTIBULE #2	INT-A	(SEE SIGN TYPE)	---
1-060	VESTIBULE #2	EL-2	(SEE SIGN TYPE)	---
1-061	VESTIBULE #2	UN-4	(SEE SIGN TYPE)	---
1-062	VESTIBULE #2	EX-1	(SEE SIGN TYPE)	---
1-063	VESTIBULE #2	WHITE REFLECTIVE CUTOUT	1	EXTERIOR EMERGENCY SIGNAGE
1-064	116D	INT-X	(SEE SIGN TYPE)	---
1-065	116	INT-N	(SEE SIGN TYPE)	---
1-066	116	LI-2	(SEE SIGN TYPE)	---
1-067	116	EX-1	(SEE SIGN TYPE)	---
1-068	116C	INT-X	STORAGE	---
1-069	116	LI-1	(SEE SIGN TYPE)	---
1-070	116	EX-1	(SEE SIGN TYPE)	---
1-071	109B	INT-X	JANITOR'S CLOSET	---
1-072	114	TR-6	114/WOMEN'S FACULTY	---
1-073	116	AR-2	(SEE SIGN TYPE)	---
1-074	ELEVATOR	EL-3	(SEE SIGN TYPE)	---
1-075	ELEVATOR	EL-1	(SEE SIGN TYPE)	---
1-076	112	INT-X	STORAGE	---
1-077	109A	UN-2	(SEE SIGN TYPE)	---
1-078	CC1	WHITE REFLECTIVE CUTOUT	9	EXTERIOR EMERGENCY SIGNAGE
1-079	VESTIBULE #4	SEE 02/A14.4	11	EXTERIOR EMERGENCY SIGNAGE
1-080	STAIR #3	EX-2	STAIR 3 LEVEL 1	---
1-081	110	INT-C	110/CLASSROOM	---
1-082	107	INT-C	107/CLASSROOM	---
1-083	108	INT-C	108/CLASSROOM	---
1-084	108A	INT-X	STORAGE	---
1-085	108B	UN-1	(SEE SIGN TYPE)	---
1-086	107	INT-C	107/CLASSROOM	---
1-087	107A	INT-X	STORAGE	---
1-088	107B	UN-1	(SEE SIGN TYPE)	---
1-089	105	INT-C	105/CLASSROOM	---
1-090	105A	INT-X	STORAGE	---
1-091	105B	UN-2	(SEE SIGN TYPE)	---
1-092	106	INT-R	106/(SEE SIGN TYPE)	---
1-093	106A	UN-1	(SEE SIGN TYPE)	---
1-094	104	INT-C	104/CLASSROOM	---
1-095	105	INT-C	105/CLASSROOM	---
1-096	102	INT-C	102/CLASSROOM	---
1-097	103C	TR-4	(SEE SIGN TYPE)	---
1-098	103B	INT-X	(SEE SIGN TYPE)	---
1-099	103A	TR-3	(SEE SIGN TYPE)	---
1-100	101	INT-C	101/CLASSROOM	---
1-101	100	INT-C	100/CLASSROOM	---
1-102	VESTIBULE #5	EX-1	(SEE SIGN TYPE)	---
1-103	STAIR #4	EX-2	STAIR 4 LEVEL 1	---
1-104	VESTIBULE #5	SEE 02/A14.4	10	EXTERIOR EMERGENCY SIGNAGE
1-105	VESTIBULE #9	EXT-D	(SEE SIGN TYPE)	EXTERIOR SIGN
1-106	VESTIBULE #8	EXT-D	(SEE SIGN TYPE)	EXTERIOR SIGN
1-107	CA1	EXT-D	(SEE SIGN TYPE)	EXTERIOR SIGN
1-108	VESTIBULE #1	EXT-D	(SEE SIGN TYPE)	EXTERIOR SIGN
1-109	VESTIBULE #2	EXT-A	(SEE SIGN TYPE)	EXTERIOR SIGN
1-110	VESTIBULE #4	EXT-C	(SEE SIGN TYPE)	EXTERIOR SIGN
1-111	VESTIBULE #5	EXT-C	(SEE SIGN TYPE)	EXTERIOR SIGN
1-112	NOT USED	NOT USED	NOT USED	NOT USED
1-113	VESTIBULE #6	EXT-C	(SEE SIGN TYPE)	EXTERIOR SIGN
1-114	VESTIBULE #7	EXT-D	(SEE SIGN TYPE)	EXTERIOR SIGN
1-115	136B	EXT-D	(SEE SIGN TYPE)	EXTERIOR SIGN

FIRST FLOOR SIGNAGE SCHEDULE

TAG	ROOM #	TYPE (SEE A14.4 & A14.5)	SIGN TEXT (NUMBER/NAME)	REMARKS
1-116	CC1	EX-1	(SEE SIGN TYPE)	---
1-117	VESTIBULE #4	EX-1	(SEE SIGN TYPE)	---
1-118	VESTIBULE #3	SEE 02/A14.4	12	EXTERIOR EMERGENCY SIGNAGE
1-119	131A	INT-X	JANITOR'S CLOSET	---
1-120	103A	UN-3	(SEE SIGN TYPE)	---
1-121	103C	UN-3	(SEE SIGN TYPE)	---
1-122	119	UN-4	(SEE SIGN TYPE)	---
1-123	127A	UN-4	(SEE SIGN TYPE)	---
1-124	116	GY-1	(SEE SIGN TYPE)	---
1-125	136	AR-2	(SEE SIGN TYPE)	---
1-126	136	LI-1	(SEE SIGN TYPE)	---
1-127	106A	UN-8	(SEE SIGN TYPE)	---
1-128	108B	UN-8	(SEE SIGN TYPE)	---
1-129	107B	UN-8	(SEE SIGN TYPE)	---
1-130	105B	UN-8	(SEE SIGN TYPE)	---
1-131	114	UN-8	(SEE SIGN TYPE)	---
1-132	120B	UN-8	(SEE SIGN TYPE)	---
1-133	130B	UN-8	(SEE SIGN TYPE)	---
1-134	132A	INT-W	132A / ELECTRICAL ROOM	---
1-135	135A	UN-9	(SEE SIGN TYPE)	---
1-136	135B	UN-9	(SEE SIGN TYPE)	---
1-137	136B-2	UN-9	(SEE SIGN TYPE)	---
1-138	136B-3	UN-9	(SEE SIGN TYPE)	---

SECOND FLOOR SIGNAGE SCHEDULE

TAG	ROOM #	TYPE (SEE A14.4 & A14.5)	SIGN TEXT (NUMBER/NAME)	REMARKS
2-001	STAIR #6	EX-2	STAIR 6 LEVEL 2	---
2-002	242	INT-C	242/(SEE SIGN TYPE)	---
2-003	240	INT-F	240/(SEE SIGN TYPE)	---
2-004	249	INT-D	249/(SEE SIGN TYPE)	---
2-005	247A	INT-X	JANITOR'S CLOSET	---
2-006	247B	UN-7	(SEE SIGN TYPE)	---
2-007	245	INT-C	245/(SEE SIGN TYPE)	---
2-008	243	INT-C	243/(SEE SIGN TYPE)	---
2-009	241B	TR-3	(SEE SIGN TYPE)	---
2-010	241A	TR-4	(SEE SIGN TYPE)	---
2-011	239	INT-C	239/(SEE SIGN TYPE)	---
2-012	237	INT-C	237/(SEE SIGN TYPE)	---
2-013	235B	INT-W	235B/(SEE SIGN TYPE)	---
2-014	238	INT-C	238/(SEE SIGN TYPE)	---
2-015	236	INT-C	236/(SEE SIGN TYPE)	---
2-016	234	INT-C	242/(SEE SIGN TYPE)	---
2-017	235A	UN-7	(SEE SIGN TYPE)	---
2-018	233	INT-C	233/(SEE SIGN TYPE)	---
2-019	231	INT-D	231/(SEE SIGN TYPE)	---
2-020	231A	INT-X	STORAGE	---
2-021	231B	INT-W	231B/ELECTRICAL CLOSET	---
2-022	STAIR #5	EX-2	STAIR 5 LEVEL 2	---
2-023	CL2	INT-C	CL2/CORRIDOR TO MAIN BUILDING	---
2-024	CL2	INT-C	CL2/CORRIDOR TO ANNEX	---
2-025	229	INT-C	229/(SEE SIGN TYPE)	---
2-026	STAIR #1	EX-2	STAIR 1 LEVEL 2	---
2-027	230	INT-C	230/(SEE SIGN TYPE)	---
2-028	228	INT-D	228/(SEE SIGN TYPE)	---
2-029	227B	INT-X	(SEE SIGN TYPE)	---
2-030	226	INT-C	226/(SEE SIGN TYPE)	---
2-031	227A	TR-4	(SEE SIGN TYPE)	---
2-032	224	INT-C	224/(SEE SIGN TYPE)	---
2-033	225	INT-C	225/(SEE SIGN TYPE)	---
2-034	222	INT-C	222/(SEE SIGN TYPE)	---
2-035	223	INT-C	223/(SEE SIGN TYPE)	---
2-036	220	INT-C	220/(SEE SIGN TYPE)	---
2-037	221	INT-C	221/(SEE SIGN TYPE)	---
2-038	219	TR-3	(SEE SIGN TYPE)	---
2-039	STAIR #2	EX-2	STAIR 2 LEVEL 2	---
2-040	218	INT-E	218/(SEE SIGN TYPE)	---
2-041	211B	INT-X	(SEE SIGN TYPE)	---
2-042	214	INT-E	214/(SEE SIGN TYPE)	---
2-043	212	INT-X	STORAGE	---
2-044	210	INT-V	210/FAN ROOM #3	---
2-045	ELEVATOR LOBBY	EL-1	(SEE SIGN TYPE)	---
2-046	ELEVATOR LOBBY	EL-3	(SEE SIGN TYPE)	---
2-047	NOT USED	NOT USED	NOT USED	NOT USED
2-048	211A	UN-3	(SEE SIGN TYPE)	---
2-049	STAIR #3	EX-2	STAIR 3 LEVEL 2	---
2-050	208	INT-C	208/(SEE SIGN TYPE)	---
2-051	209	INT-C	209/(SEE SIGN TYPE)	---
2-052	206	INT-C	206/(SEE SIGN TYPE)	---
2-053	207	INT-C	207/(SEE SIGN TYPE)	---
2-054	204	INT-C	204/(SEE SIGN TYPE)	---
2-055	205	INT-C	205/(SEE SIGN TYPE)	---
2-056	202	INT-C	202/(SEE SIGN TYPE)	---
2-057	203C	TR-4	(SEE SIGN TYPE)	---
2-058	203B	INT-X	(SEE SIGN TYPE)	---
2-059	203A	TR-3	(SEE SIGN TYPE)	---
2-060	200	INT-C	200/(SEE SIGN TYPE)	---
2-061	201	INT-C	201/(SEE SIGN TYPE)	---
2-062	STAIR #4	EX-2	STAIR 4 LEVEL 2	---
2-063	228A	INT-D	228A/(SEE SIGN TYPE)	---
2-064	203A	UN-3	(SEE SIGN TYPE)	---
2-065	203C	UN-3	(SEE SIGN TYPE)	---
2-066	219	UN-4	(SEE SIGN TYPE)	---
2-067	229A	UN-4	(SEE SIGN TYPE)	---
2-068	NOT USED	NOT USED	NOT USED	NOT USED
2-069	240	INT-F	240/(SEE SIGN TYPE)	---
2-070	228A	INT-W	228A/IDF ROOM	---
2-071	CS2	EL-2	240/(SEE SIGN TYPE)	---
2-072	241B	UN-3	240/(SEE SIGN TYPE)	---
2-073	241A	UN-4	240/(SEE SIGN TYPE)	---

BASEMENT SIGNAGE SCHEDULE

TAG	ROOM #/NAME	TYPE (SEE A14.4 & A14.5)	SIGN TEXT (NUMBER/NAME)	REMARKS
0-001	STAIR #1	EX-2	STAIR 1	---
0-002	011B	INT-V	011B/FAN ROOM 1B	---
0-003	004	EX-1	(SEE SIGN TYPE)	---
0-004	014	INT-V	014/WATER METER ROOM	---
0-005	013	INT-W	013/TRANSFORMER VAULT	---
0-006	006	UN-5	(SEE SIGN TYPE)	---
0-007	B13	INT-B	CORRIDOR	---
0-008	STAIR #2	EX-2	STAIR 2 BASEMENT	---
0-009	008	INT-U	TEACHER'S LUNCH ROOM	---
0-010	008	INT-U	TEACHER'S LUNCH ROOM	---
0-011	004A	INTX	STORAGE	---
0-012	004	EX-1	(SEE SIGN TYPE)	---
0-013	004	INT-C	004/MULTI-PURPOSE ROOM	---
0-014	006	TR-6	(SEE SIGN TYPE)	---
0-015	009	INT-X	STORAGE	---
0-016	ELEVATOR LOBBY	EL-3	(SEE SIGN TYPE)	---
0-017	ELEVATOR LOBBY	EL-1	(SEE SIGN TYPE)	---
0-018	ELEVATOR LOBBY	UN-5	(SEE SIGN TYPE)	---
0-019	B07C	INT-B	CORRIDOR	---
0-020	003	INT-X	STORAGE	---
0-021	005	INT-X	005/MACHINE ROOM	---
0-022	011A	INT-V	011A/FAN ROOM 1A	---
0-023	B12	INT-B	CORRIDOR	---
0-024	002	INT-V	002/BOILER ROOM	---
0-025	B11A	INT-D	ENGINEER'S OFFICE	---
0-026	B11B	TR-5	(SEE SIGN TYPE)	---
0-027	002	UN-5	(SEE SIGN TYPE)	---
0-028	NOT USED	NOT USED	NOT USED	NOT USED
0-029	001	INT-V	001/FAN ROOM 4	---
0-030	NOT USED	NOT USED	NOT USED	NOT USED
0-031	STAIR #4	EX-2	STAIR 4	---
0-032	010	INT-W	010/FAN ROOM 2	

CHICAGO BUILDING SCHOOLS ACROSS CHICAGO — CPS — CHICAGO PUBLIC SCHOOLS — PUBLIC BUILDING COMMISSION OF CHICAGO

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STEVENSON ANNEX

8010 S. KOSTNER AVE
CHICAGO, IL 60652

CHICAGO PUBLIC SCHOOLS

CITY OF CHICAGO, MAYOR RAHM EMANUEL

THESE DRAWINGS HAVE BEEN PREPARED AT AND / OR UNDER MY SUPERVISION AND TO THE BEST OF MY KNOWLEDGE AND BELIEF CONFORM AND COMPLY WITH THE REQUIREMENTS OF THE CHICAGO DEPARTMENT OF BUILDING.

ILLINOIS
AGUSTIN GOMEZ-LEAL
REGISTERED ARCHITECT
001.014496
EXPIRATION DATE: NOVEMBER 30, 2012

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MEP/FP Engineer

PRIMERA ENGINEERING
Chicago, Illinois
LEED Consultant

SHINER + ASSOCIATES, INC.
Chicago, Illinois
Acoustic Consultant

ISSUANCE

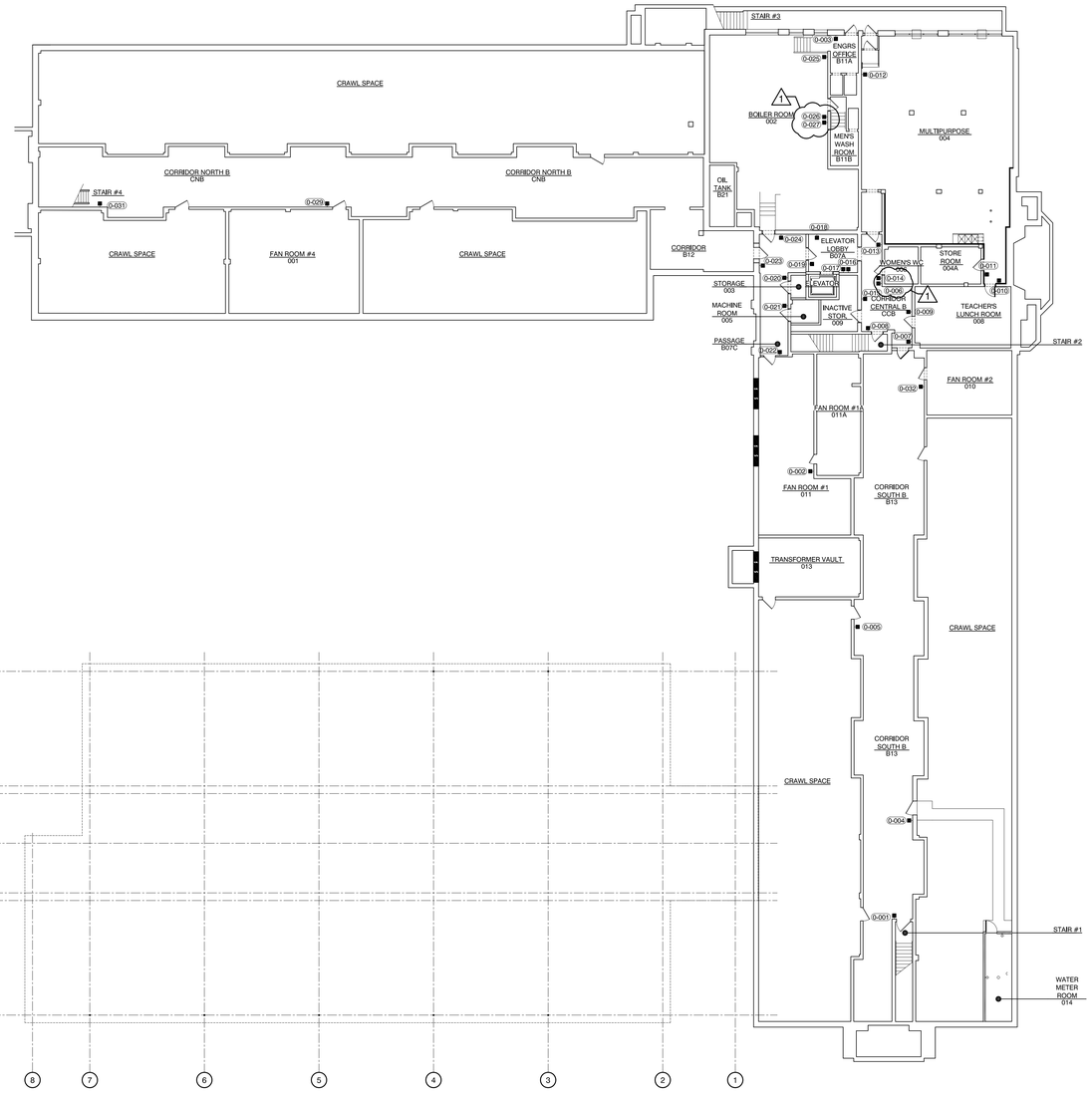
MARK	DESCRIPTION	DATE
1	DESIGN DEVELOPMENT	08.23.11
2	60% CONSTRUCTION	09.28.11
3	90% CONSTURCTION	11.02.11
4	100% CONSTRUCTION	11.18.11
5	100% REVIEW	11.23.11
6	ISSUE FOR BID	12.06.11
7	ADDENDUM 1	12.29.11
8	.	.

SCALE: AS NOTED
PLOT DATE.: 1/11/2012
PBC PROJECT NAME: STEVENSON ANNEX
PBC CONTRACT NO.: 05560
WGA PROJECT NO.: 11043

WARNING:
ASBESTOS-CONTAINING BUILDING MATERIALS ARE OR MAY BE PRESENT IN THIS BUILDING. AN ASBESTOS MANAGEMENT PLAN IS AVAILABLE IN THE SCHOOL FOR REVIEW UPON REQUEST. NO PERSON MAY DISTURB ASBESTOS CONTAINING MATERIALS UNLESS THAT PERSON IS A LICENSED ASBESTOS WORKER OR CONDUCTS SUCH WORK IN ACCORDANCE WITH SPECIFICATION(S) CONTAINED IN THE PROJECT DOCUMENTS AND IN COMPLIANCE WITH ILLINOIS DEPARTMENT OF HEALTH RULES AND REGULATIONS.

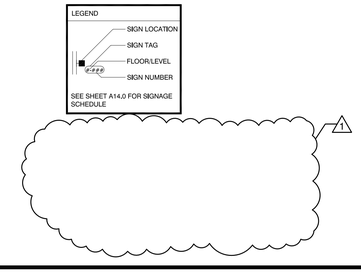
TITLE:
SIGNAGE SCHEDULE

SHEET
A14.0



01 BASEMENT SIGNAGE PLAN

SCALE: 1/16" = 1'-0"



PUBLIC BUILDING COMMISSION OF CHICAGO

BUILDING SCHOOLS ACROSS CHICAGO

CPS CHICAGO PUBLIC SCHOOLS

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STEVENSON ANNEX

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001.014496
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7	ADDENDUM 1	12.29.11
8	.	.

SCALE: AS NOTED

PLOT DATE.: 1/11/2012

PBC PROJECT NAME: STEVENSON ANNEX

PBC CONTRACT NO.: 05560

WGA PROJECT NO.: 11043

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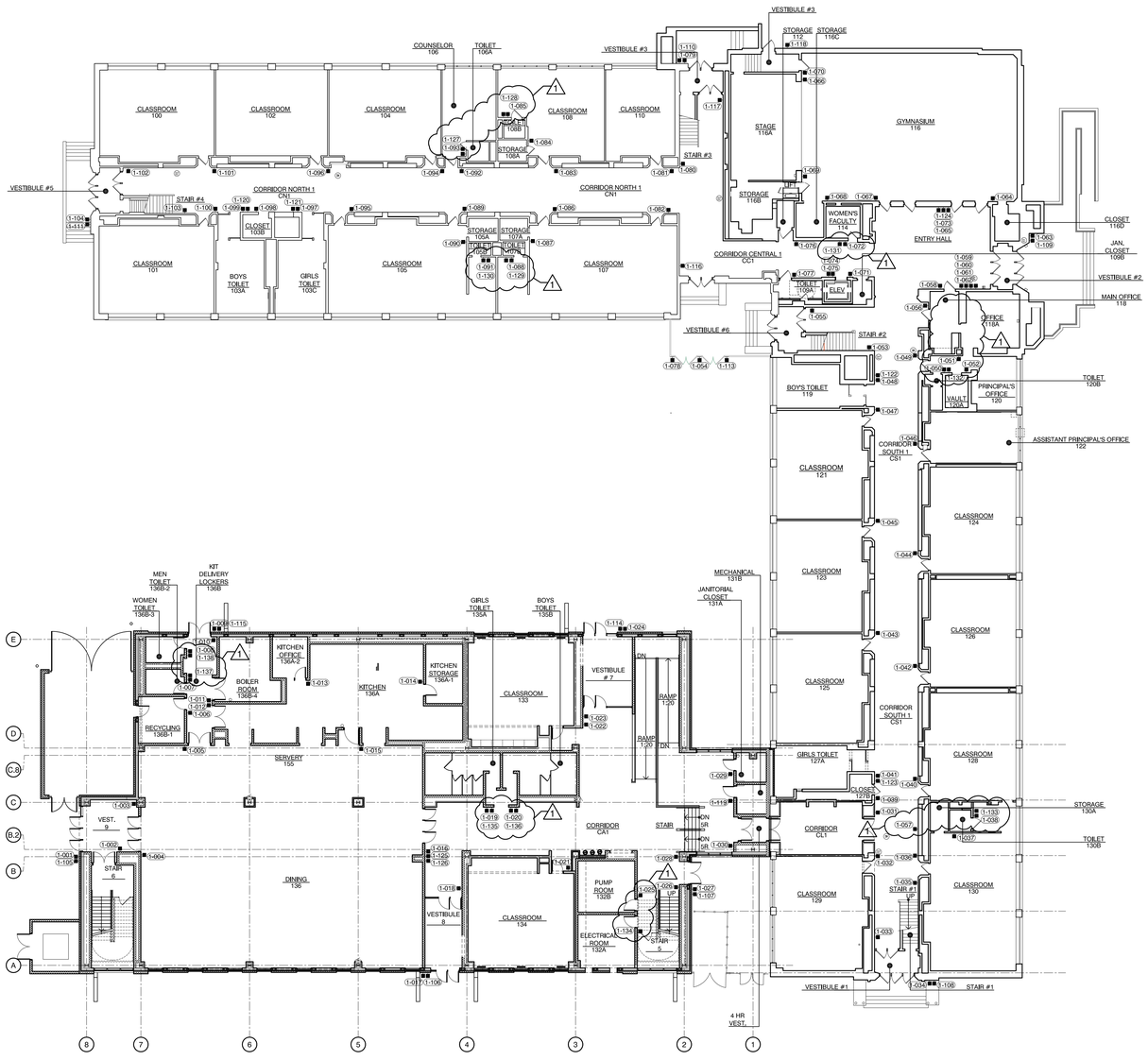
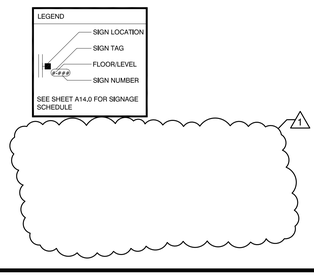
TITLE:

BASEMENT SIGNAGE PLAN

SHEET

A14.1





01 FIRST FLOOR SIGNAGE PLAN

SCALE: 1/16" = 1'-0"

PUBLIC BUILDING COMMISSION OF CHICAGO

BUILDING SCHOOLS ACROSS CHICAGO

CPS CHICAGO PUBLIC SCHOOLS

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7	ADDENDUM 1	12.29.11
8	.	.

SCALE: AS NOTED

PLOT DATE.: 1/11/2012

PBC PROJECT NAME: STEVENSON ANNEX

PBC CONTRACT NO.: 05560

WGA PROJECT NO.: 11043

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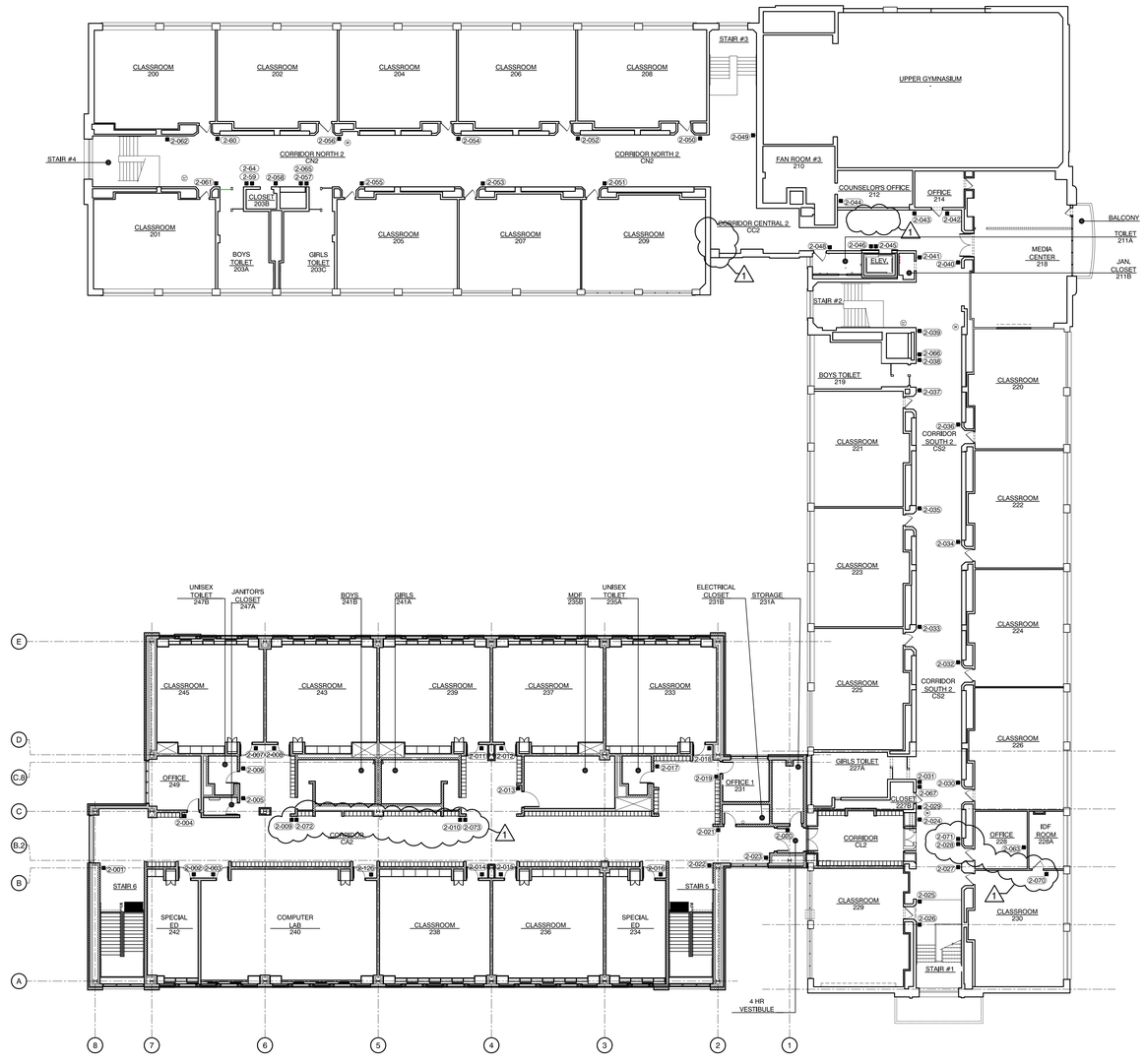
TITLE:

FIRST FLOOR SIGNAGE PLAN

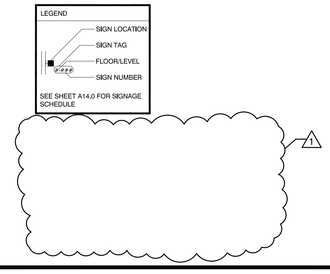
SHEET

A14.2



01 SECOND FLOOR SIGNAGE PLAN

SCALE: 1/16" = 1'-0"



PUBLIC BUILDING COMMISSION OF CHICAGO

BUILDING SCHOOLS ACROSS CHICAGO

CPS CHICAGO PUBLIC SCHOOLS

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CHICAGO PUBLIC SCHOOLS

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7	ADDENDUM 1	12.29.11
8	.	.

SCALE: AS NOTED

PLOT DATE.: 1/11/2012

PBC PROJECT NAME: STEVENSON ANNEX

PBC CONTRACT NO.: 05560

WGA PROJECT NO.: 11043

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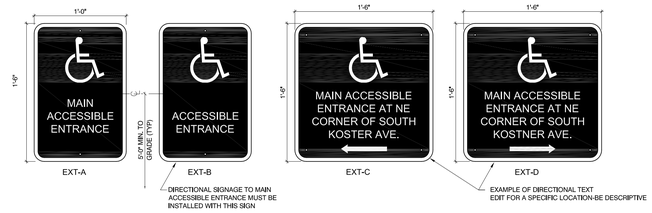
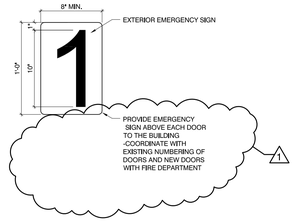
TITLE:
SECOND FLOOR SIGNAGE PLAN

SHEET
A14.3



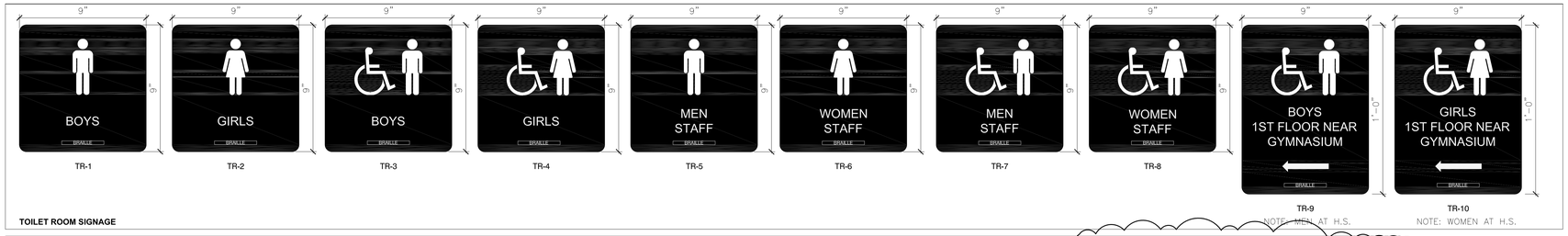
01 EXTERIOR SIGNAGE

SCALE: NTS



02 EXTERIOR EMERGENCY SIGNAGE

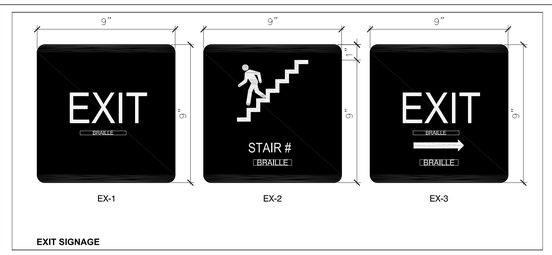
SCALE: NTS



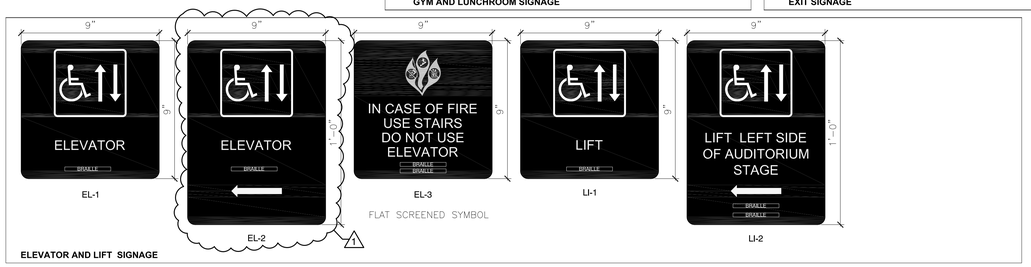
TOILET ROOM SIGNAGE

UNISEX SIGNAGE

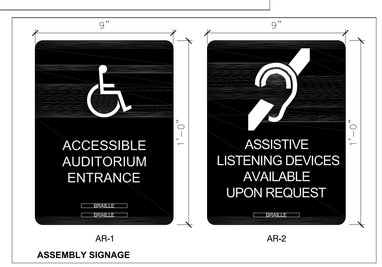
GYM AND LUNCHROOM SIGNAGE



EXIT SIGNAGE



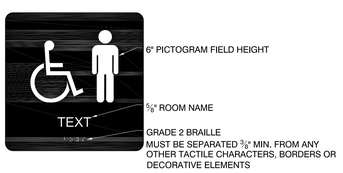
ELEVATOR AND LIFT SIGNAGE



ASSEMBLY SIGNAGE

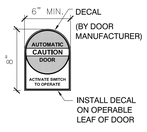
03 TYPICAL INTERIOR SIGNAGE

SCALE: NTS



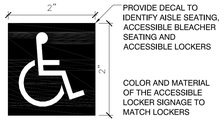
04 TYPICAL INTERIOR SIGNAGE DETAIL

SCALE: NTS



05 CAUTION AUTOMATIC DOOR DECAL DETAILS

SCALE: NTS



06 ACCESSIBLE SIGN DECAL DETAILS

SCALE: NTS

GENERAL NOTES

1. WHEN A DIMENSION ON A DRAWING IS GIVEN, THE CONSTRUCTION TOLERANCE ALLOWED BY CPS IS + ¼" TO – ¼" OF THE DIMENSION ON THE DRAWING.
2. WHEN A RANGE IS GIVEN FOR A DIMENSION ON A DRAWING, THERE IS NO CONSTRUCTION TOLERANCE ALLOWED BY CPS. THE ITEM MUST BE INSTALLED IN THE RANGE INDICATED.
3. ALLOW FOR ACCESSIBILITY SYMBOL AND MALE/FEMALE PICTOGRAM ON TOILET ROOM SIGNS.
4. THE EXACT LOCATION OF ALL SIGNAGE WILL BE DETERMINED BY ACTUAL FIELD CONDITIONS. IF CONFLICTS OCCUR WITH THE PLACEMENT OF SIGNAGE SHOWN ON DRAWINGS AND EXISTING STRUCTURES AND APPURTENANCES, THE CONTRACTOR WILL COORDINATE WITH THE ARCHITECT AND BUILDING ENGINEER BEFORE FINAL INSTALLATION. CONTRACTOR WILL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

PUBLIC BUILDING COMMISSION OF CHICAGO
BUILDING SCHOOLS ACROSS CHICAGO
CHICAGO PUBLIC SCHOOLS | CPS

STEVENSON ANNEX
8010 S. KOSTNER AVE
CHICAGO, IL 60652
CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ILLINOIS
AGUSTIN GOMEZ-LEAL
REGISTERED ARCHITECT
001.014496
EXPIRATION DATE: NOVEMBER 30, 2012

Wallin ▪ Gomez
ARCHITECTS LTD
711 South Dearborn Street, Suite 606
Chicago, Illinois 60605-1827
P: 312-427-4702 ▪ F: 312-427-6611
E: admin@wgaltd.com

ISSUANCE

MARK	DESCRIPTION	DATE
1	DESIGN DEVELOPMENT	08.23.11
2	60% CONSTRUCTION	09.28.11
3	90% CONSTURCTION	11.02.11
4	100% CONSTRUCTION	11.18.11
5	100% REVIEW	11.23.11
6	ISSUE FOR BID	12.06.11
7	ADDENDUM 1	12.29.11
8	-	-

SCALE: AS NOTED

PLOT DATE.: 1/11/2012

PBC PROJECT NAME: STEVENSON ANNEX

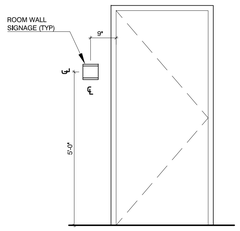
PBC CONTRACT NO.: 05560

WGA PROJECT NO.: 11043

WARNING:
ASBESTOS-CONTAINING BUILDING MATERIALS ARE OR MAY BE PRESENT IN THIS BUILDING. AN ASBESTOS MANAGEMENT PLAN IS AVAILABLE IN THE SCHOOL FOR REVIEW UPON REQUEST. NO PERSON MAY DISTURB ASBESTOS CONTAINING MATERIALS UNLESS THAT PERSON IS A LICENSED ASBESTOS WORKER OR CONDUCTS SUCH WORK IN ACCORDANCE WITH SPECIFICATION(S) CONTAINED IN THE PROJECT DOCUMENTS AND IN COMPLIANCE WITH ILLINOIS DEPARTMENT OF HEALTH RULES AND REGULATIONS.

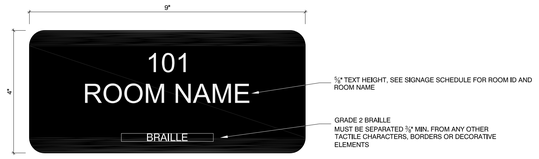
TITLE:
SIGNAGE DETAILS

SHEET
A14.4

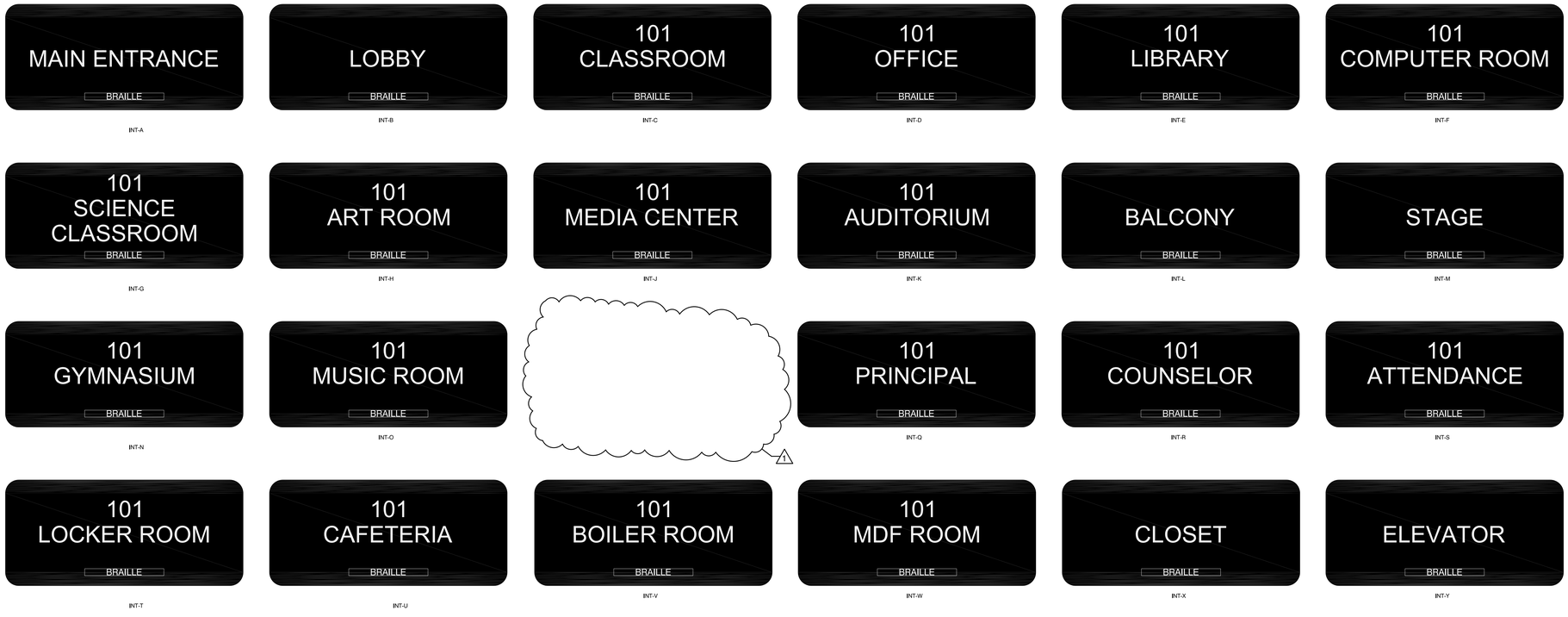


01 SIGNAGE LOCATION DETAIL

SCALE: 6" = 1'-0"



SIGNAGE TYPE DETAIL



NOTE: THIS SIGN SHALL BE POSTED WHEN THE ELEVATOR IS NOT IMMEDIATELY VISIBLE THE MAIN CORRIDOR

02 TYPICAL PERMANENT ROOM IDENTIFICATION SIGNAGE

SCALE: NTS

GENERAL NOTES

1. WHEN A DIMENSION ON A DRAWING IS GIVEN, THE CONSTRUCTION TOLERANCE ALLOWED BY CPS IS + ¼" TO – ¼" OF THE DIMENSION ON THE DRAWING.
2. WHEN A RANGE IS GIVEN FOR A DIMENSION ON A DRAWING, THERE IS NO CONSTRUCTION TOLERANCE ALLOWED BY CPS. THE ITEM MUST BE INSTALLED IN THE RANGE INDICATED.
3. ALLOW FOR 4–DIGIT ROOM NUMBER FOR EACH SIGN. ROOM NUMBERING SYSTEM TO BE DETERMINED BY THE SCHOOL PRINCIPAL AND BUILDING ENGINEER AND ISSUED AS A PART OF THE SHOP DRAWING REVIEW.
4. THE EXACT LOCATION OF ALL SIGNAGE WILL BE DETERMINED BY ACTUAL FIELD CONDITIONS. IF CONFLICTS OCCUR WITH THE PLACEMENT OF SIGNAGE SHOWN ON DRAWINGS AND EXISTING STRUCTURES AND APPURTENANCES, THE CONTRACTOR WILL COORDINATE WITH THE ARCHITECT AND BUILDING ENGINEER BEFORE FINAL INSTALLATION. CONTRACTOR WILL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

PUBLIC BUILDING COMMISSION OF CHICAGO
BUILDING SCHOOLS ACROSS CHICAGO
CHICAGO PUBLIC SCHOOLS | CPS

STEVENSON ANNEX
8010 S. KOSTNER AVE
CHICAGO, IL 60652
CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ILLINOIS
AGUSTIN GOMEZ-LEAL
REGISTERED ARCHITECT
001.014496
EXPIRATION DATE: NOVEMBER 30, 2012

Wallin ▪ Gomez
ARCHITECTS LTD
711 South Dearborn Street, Suite 606
Chicago, Illinois 60605-1827
P: 312-427-4702 ▪ F: 312-427-6611
E: admin@wgaltd.com

ISSUANCE

MARK	DESCRIPTION	DATE
1	DESIGN DEVELOPMENT	08.23.11
2	60% CONSTRUCTION	09.28.11
3	90% CONSTURCTION	11.02.11
4	100% CONSTRUCTION	11.18.11
5	100% REVIEW	11.23.11
6	ISSUE FOR BID	12.06.11
7	ADDENDUM 1	12.29.11
8		-

SCALE: AS NOTED

PLOT DATE.: 1/11/2012

PBC PROJECT NAME: STEVENSON ANNEX

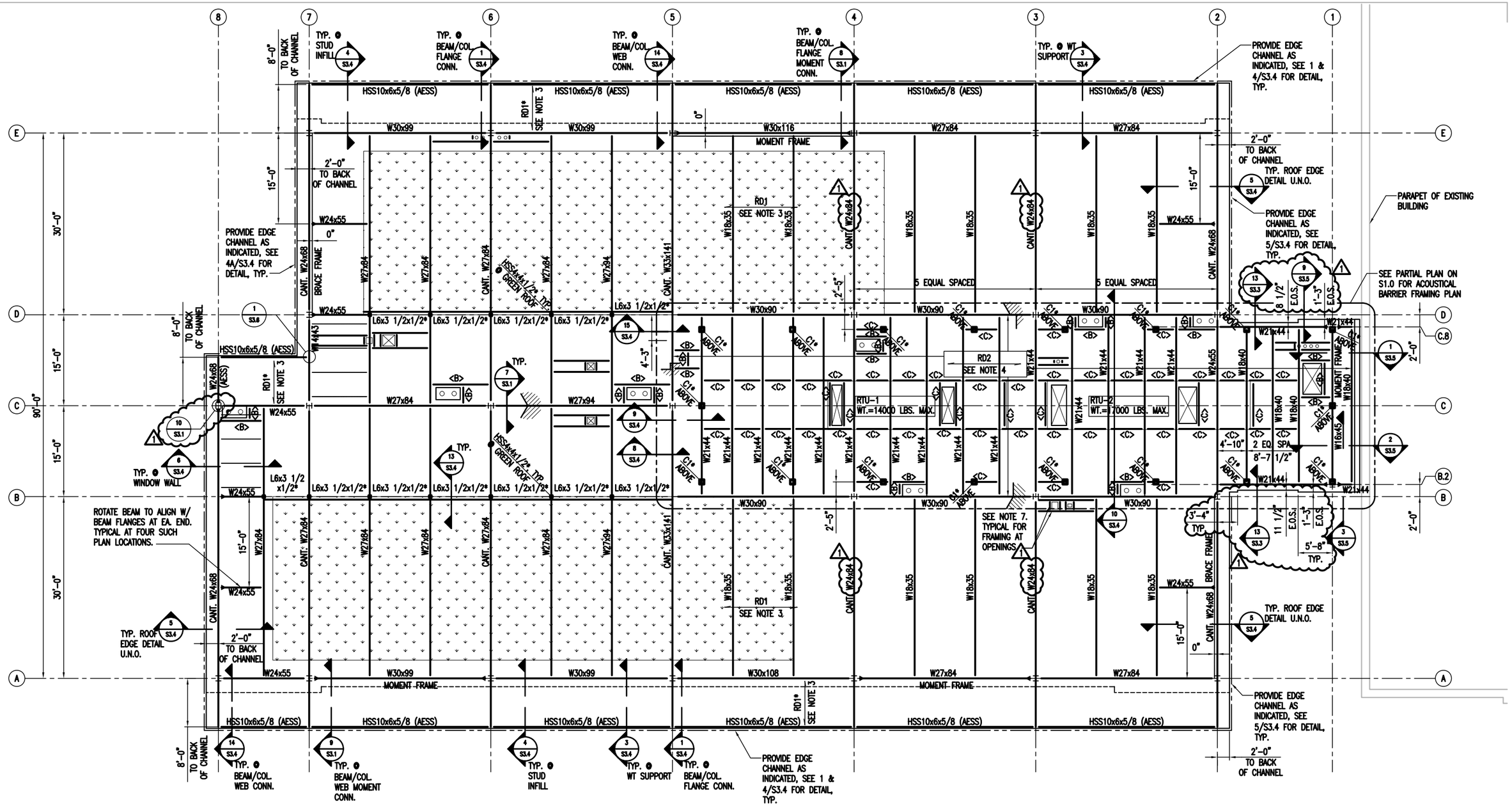
PBC CONTRACT NO.: 05560

WGA PROJECT NO.: 11043

WARNING:
ASBESTOS-CONTAINING BUILDING MATERIALS ARE OR MAY BE PRESENT IN THIS BUILDING. AN ASBESTOS MANAGEMENT PLAN IS AVAILABLE IN THE SCHOOL FOR REVIEW UPON REQUEST. NO PERSON MAY DISTURB ASBESTOS CONTAINING MATERIALS UNLESS SUCH PERSON IS AN ASBESTOS WORKER OR SUPERVISOR SUCH WORK IN ACCORDANCE WITH SPECIFICATION(S) CONTAINED IN THE PROJECT DOCUMENTS AND IN COMPLIANCE WITH ILLINOIS DEPARTMENT OF HEALTH RULES AND REGULATIONS.

TITLE:
SIGNAGE DETAILS

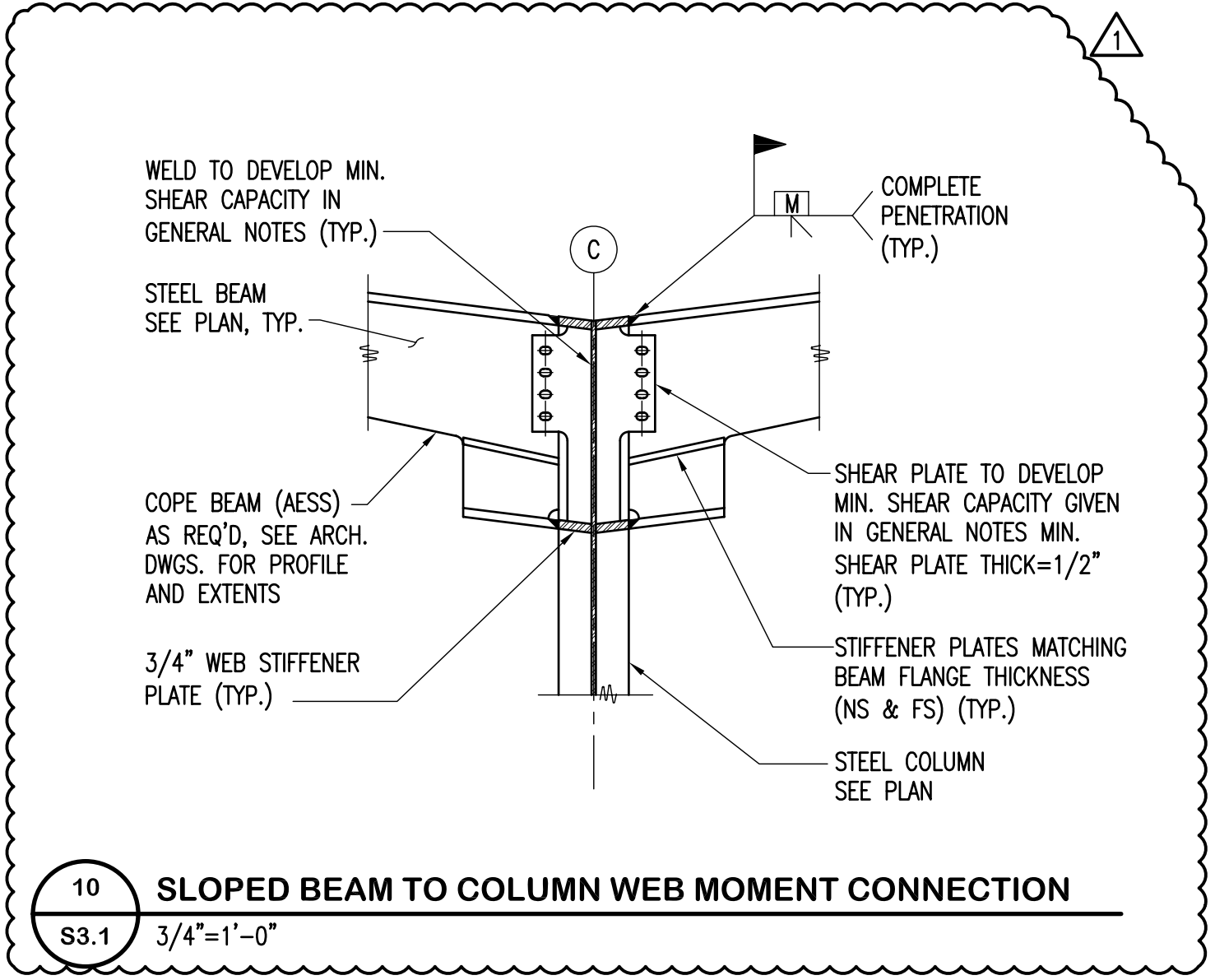
SHEET
A14.5



ROOF FRAMING PLAN
1/8"=1'-0"

MATRIX	PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
Matrix Engineering Corporation	MATRIX #: 11022
Structural Engineers	ISSUE: ADDENDUM 1
33 W. Jackson Blvd 4th floor	TITLE: ROOF FRAMING PLAN
Chicago Illinois 60604-3901	REFERENCE: S1.3
v 312 427 1200	COMMENTS: 1/16"=1'-0"
f 312 427 4220	DATE 12/29/11

SSK-01



10 / S3.1 **SLOPED BEAM TO COLUMN WEB MOMENT CONNECTION**

3/4"=1'-0"

AT
Matrix Engineering Corporation
Structural Engineers

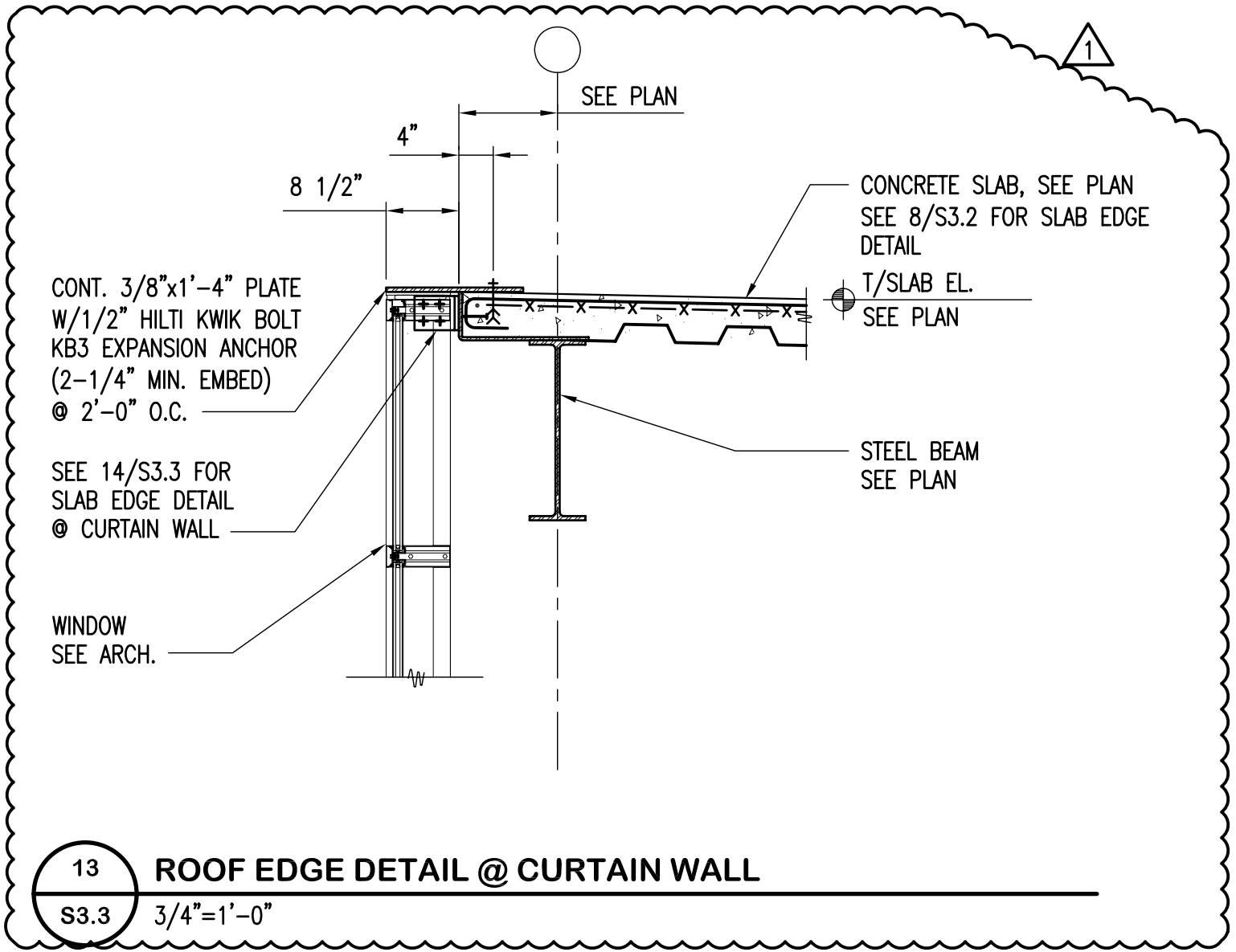
. TEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
11022

ADDENDUM 1
SLOPED BEAM TO COLUMN WEB MOMENT CONNECTION
AS NOTED

N.T.S.

DATE 12/29/11

SSK-02



13 / S3.3

ROOF EDGE DETAIL @ CURTAIN WALL

3/4"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

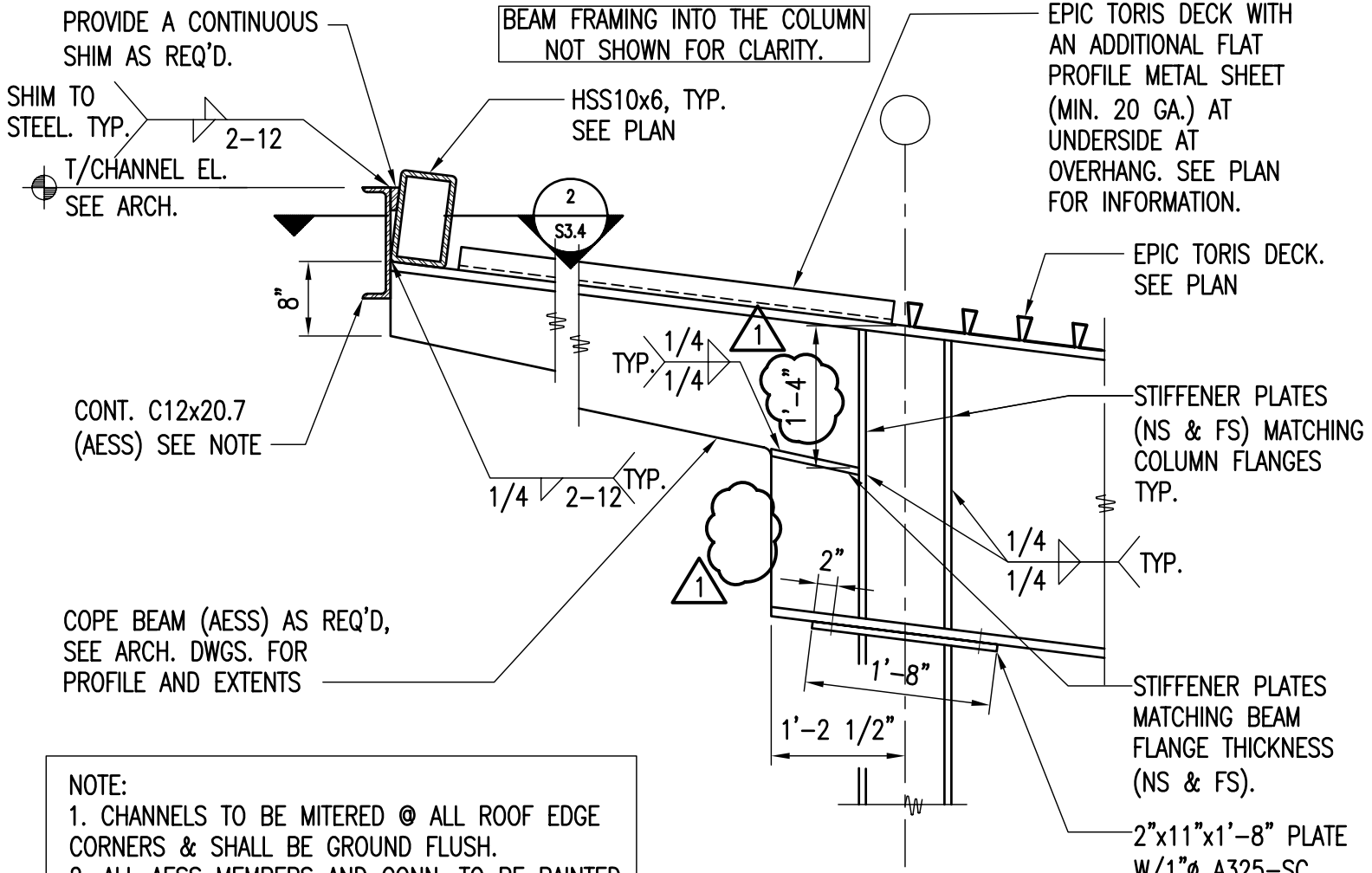
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: ROOF EDGE DETAIL @ CURTAIN WALL
REFERENCE: AS NOTED

COMMENTS: N.T.S.

DATE: 12/29/11

SSK-03



NOTE:
1. CHANNELS TO BE MITERED @ ALL ROOF EDGE CORNERS & SHALL BE GROUND FLUSH.
2. ALL AESS MEMBERS AND CONN. TO BE PAINTED W/RUST INHIBITIVE PAINT

1 / S3.4

TYPICAL SECTION @ CANT. ROOF BEAM AT COLUMN FLANGE

3/4"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

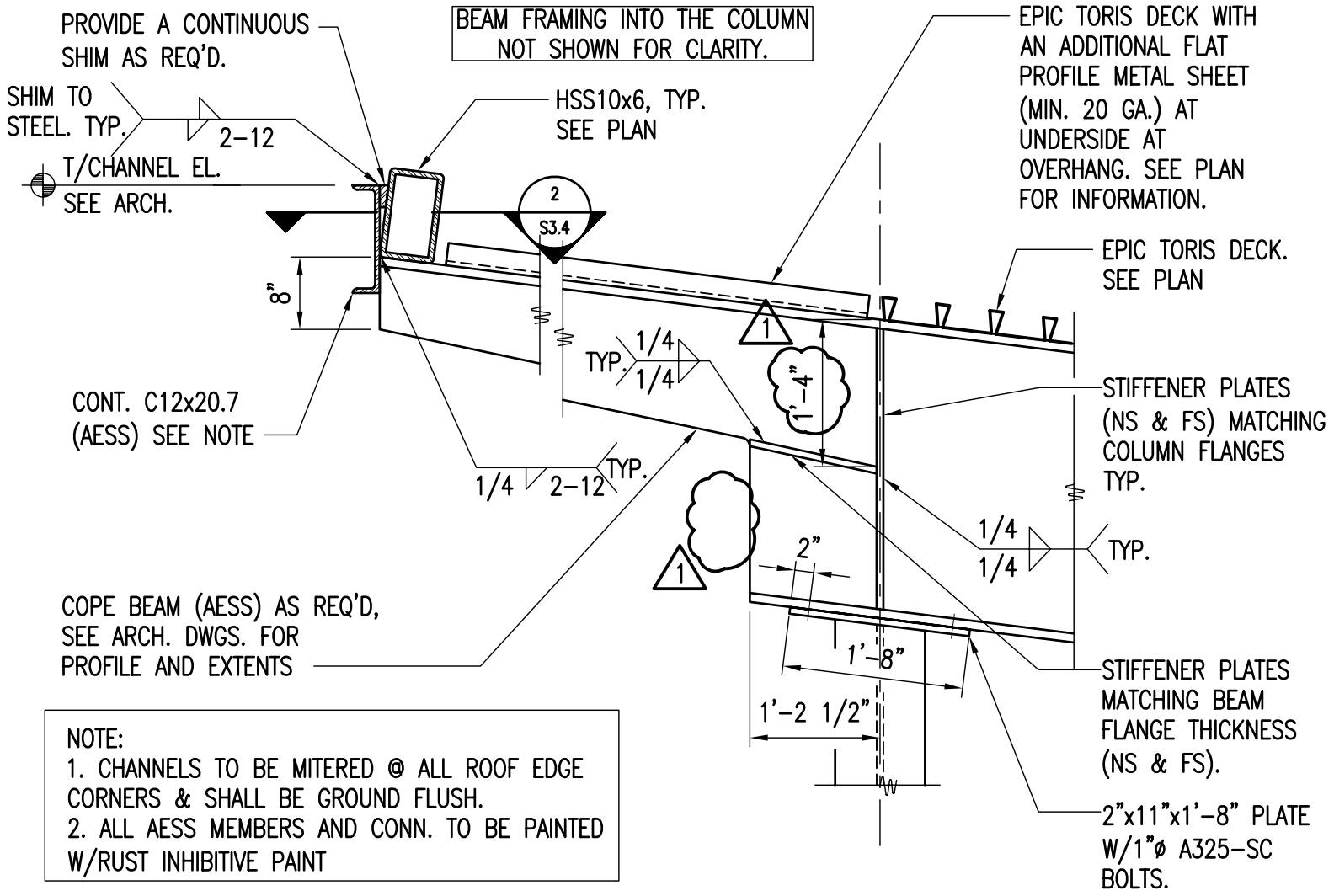
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: TYPICAL SECTION @ CANT. ROOF BEAM AT COLUMN FLANGE
REFERENCE: AS NOTED

COMMENTS: N.T.S.

DATE: 12/29/11

SSK-04



NOTE:
1. CHANNELS TO BE MITERED @ ALL ROOF EDGE CORNERS & SHALL BE GROUND FLUSH.
2. ALL AESS MEMBERS AND CONN. TO BE PAINTED W/RUST INHIBITIVE PAINT

14 / S3.4

TYPICAL SECTION @ CANT. ROOF BEAM AT COLUMN WEB

3/4"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

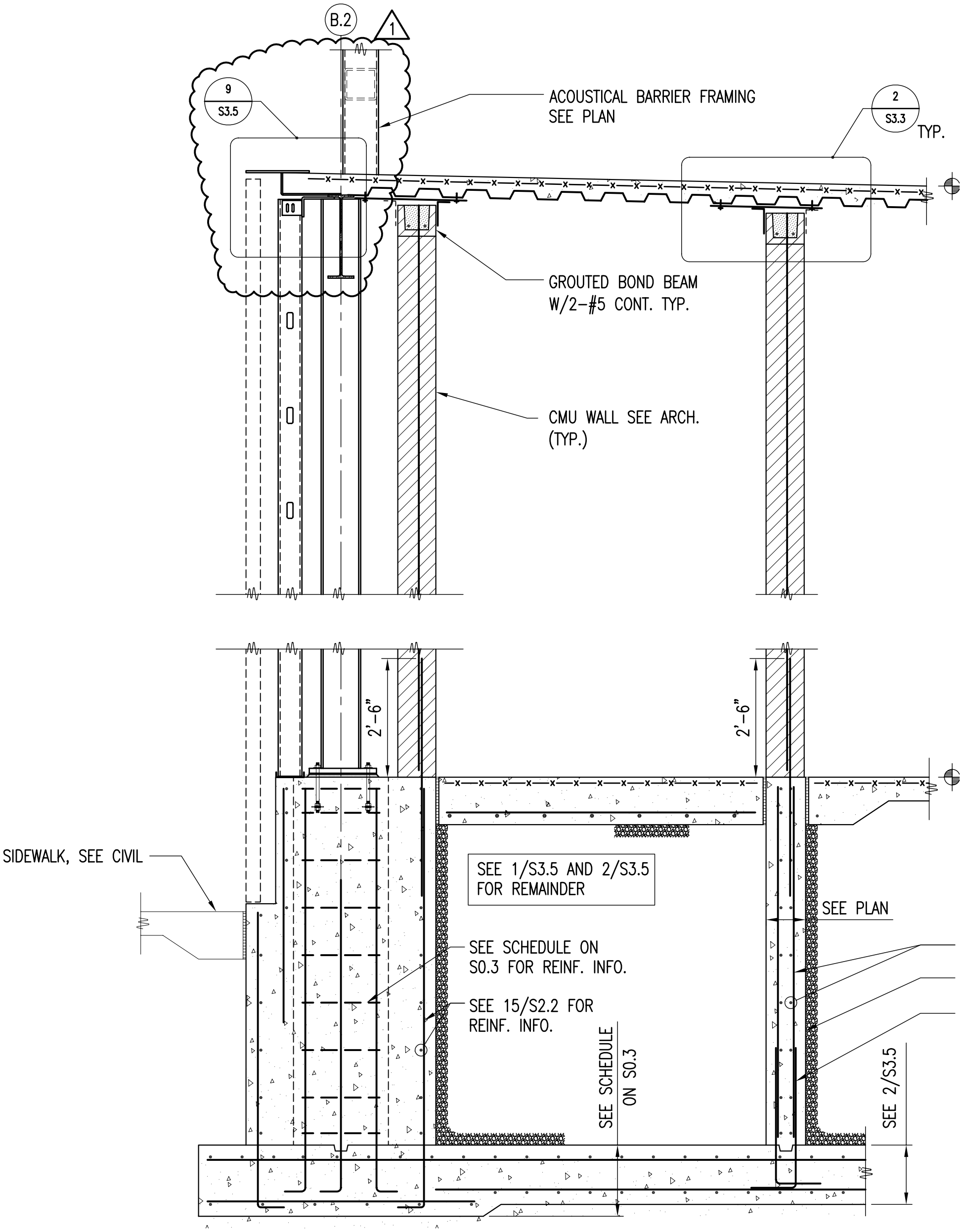
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: TYPICAL SECTION @ CANT. ROOF BEAM AT COLUMN WEB
REFERENCE: AS NOTED

COMMENTS: N.T.S.

DATE: 12/29/11

SSK-05



3 / S3.5 NORTH-SOUTH SECTION THRU 4-HR VESTIBULE

1/2"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

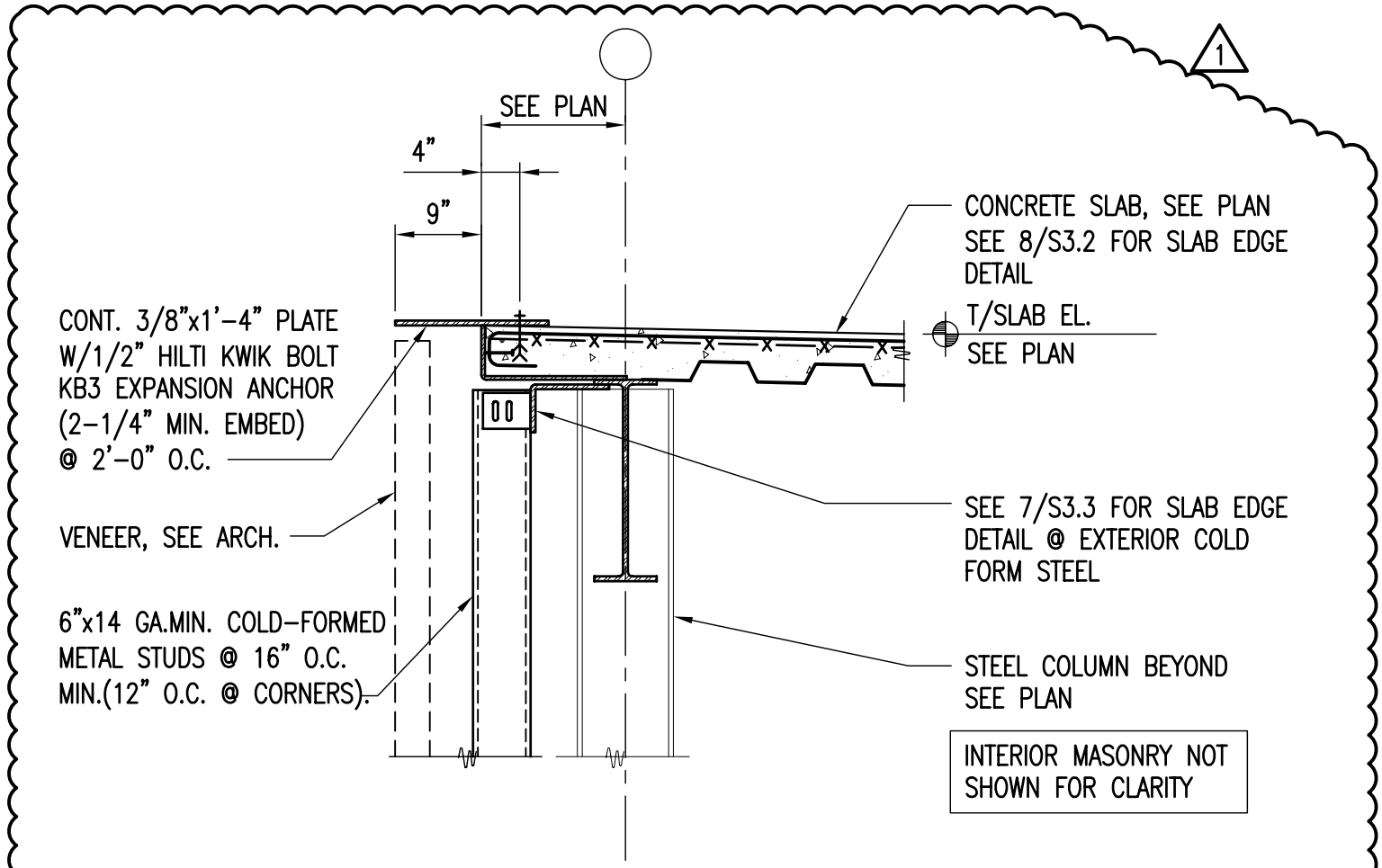
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: TYPICAL SECTION @ CANT. ROOF BEAM AT COLUMN WEB
REFERENCE: S3.5

COMMENTS: N.T.S. (SECTION HAVE SHORTEN ONLY FOR THIS SSK. SEE S3.5 FOR THE ENTIRE SECTION)

DATE 12/29/11

SSK-06



9 / S3.5

ROOF EDGE DETAIL @ COLD FORM STEEL

3/4"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

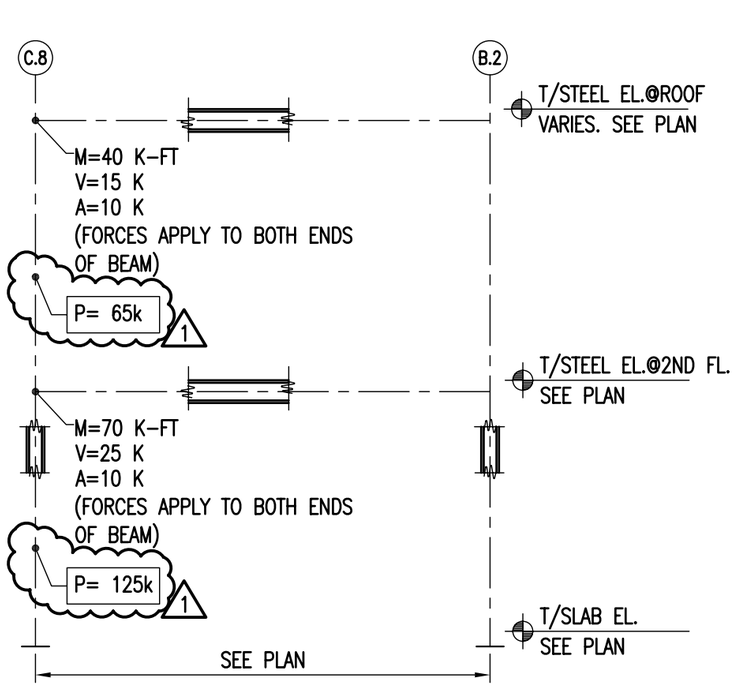
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: TYP. SLAB EDGE DETAIL @ CURTAIN WALL
REFERENCE: AS NOTED

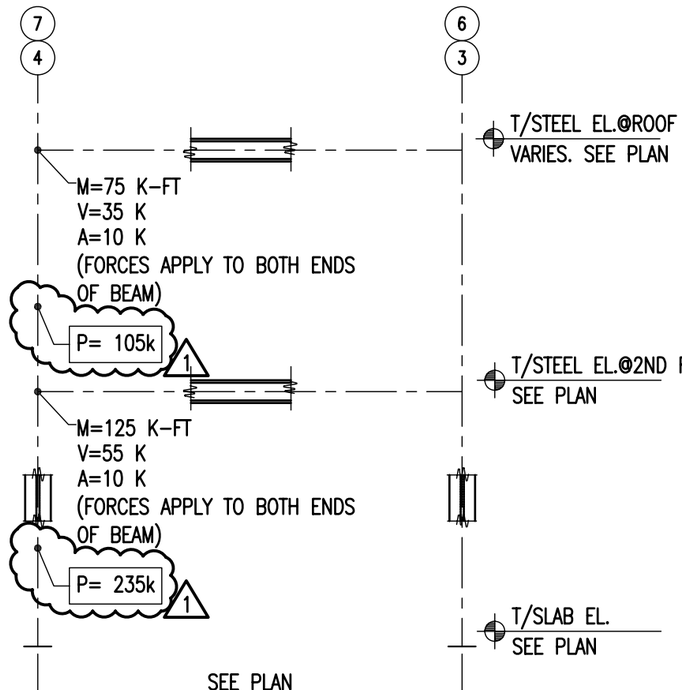
COMMENTS: N.T.S.

DATE: 12/29/11

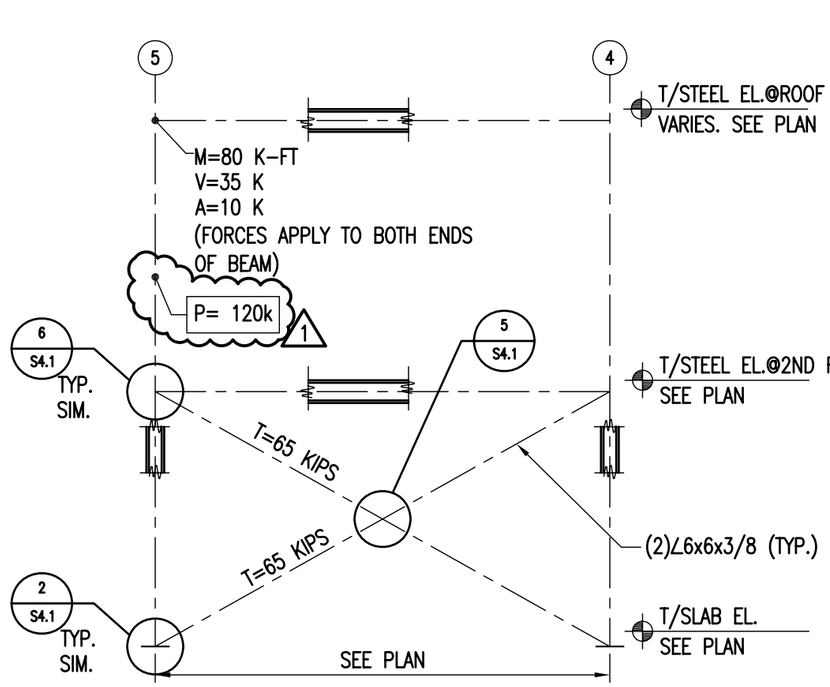
SSK-07



LINE "1" (LOOKING EAST)



LINE "A" (LOOKING NORTH)
"3"-"4" & "6"-"7"



LINE "E" (LOOKING NORTH)

1 / S4.1 LATERAL BRACING ELEVATIONS

SCHEMATIC

NOTE: ALL INDICATED BRACING FORCES ARE UNFACTORED
T = TENSION
C = COMPRESSION
A = AXIAL (APPLIES TO BOTH ENDS OF BEAMS)
P = AXIAL LOAD IN COLUMN ONLY FOR THE DESIGN OF MOMENT FRAME DOUBLER PLATES (FORCE APPLIES AT BOTH COLUMN LINES) 1

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

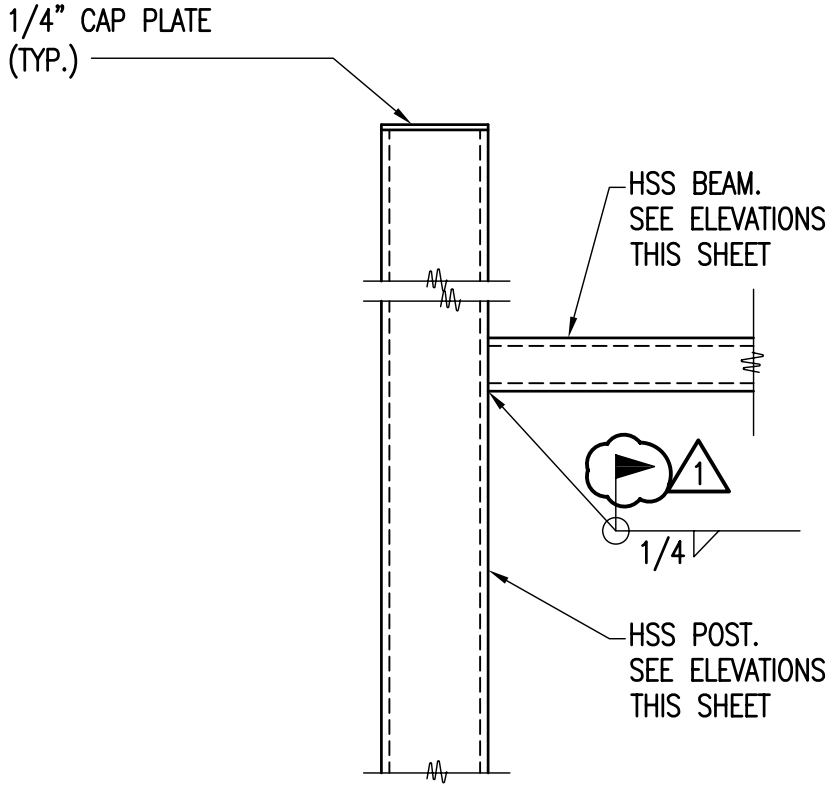
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: LATERAL BRACING ELEVATIONS
REFERENCE: AS NOTED

COMMENTS: N.T.S.

DATE 12/29/11

SSK-08



5
S6.1

TYPICAL HSS BEAM TO HSS POST CONNECTION

3/4"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

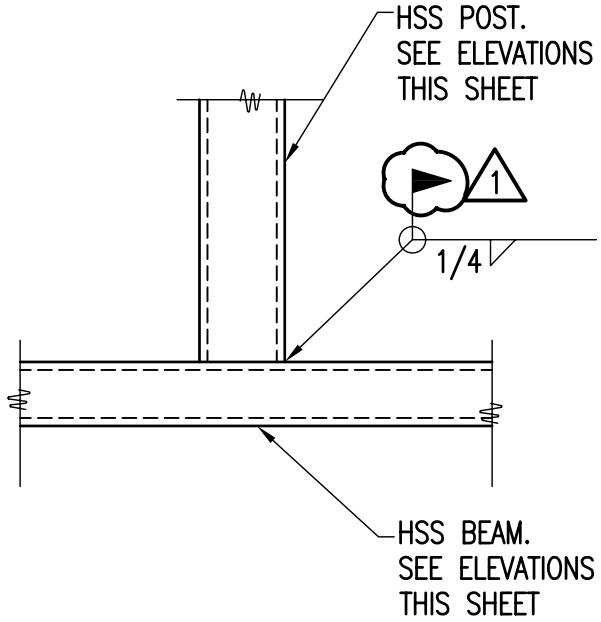
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: TYPICAL HSS BEAM TO HSS POST CONNECTION
REFERENCE: AS NOTED

COMMENTS: N.T.S.

DATE: 12/29/11

SSK-09



7
S6.1

TYPICAL HSS BEAM TO HSS POST CONNECTION

3/4"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

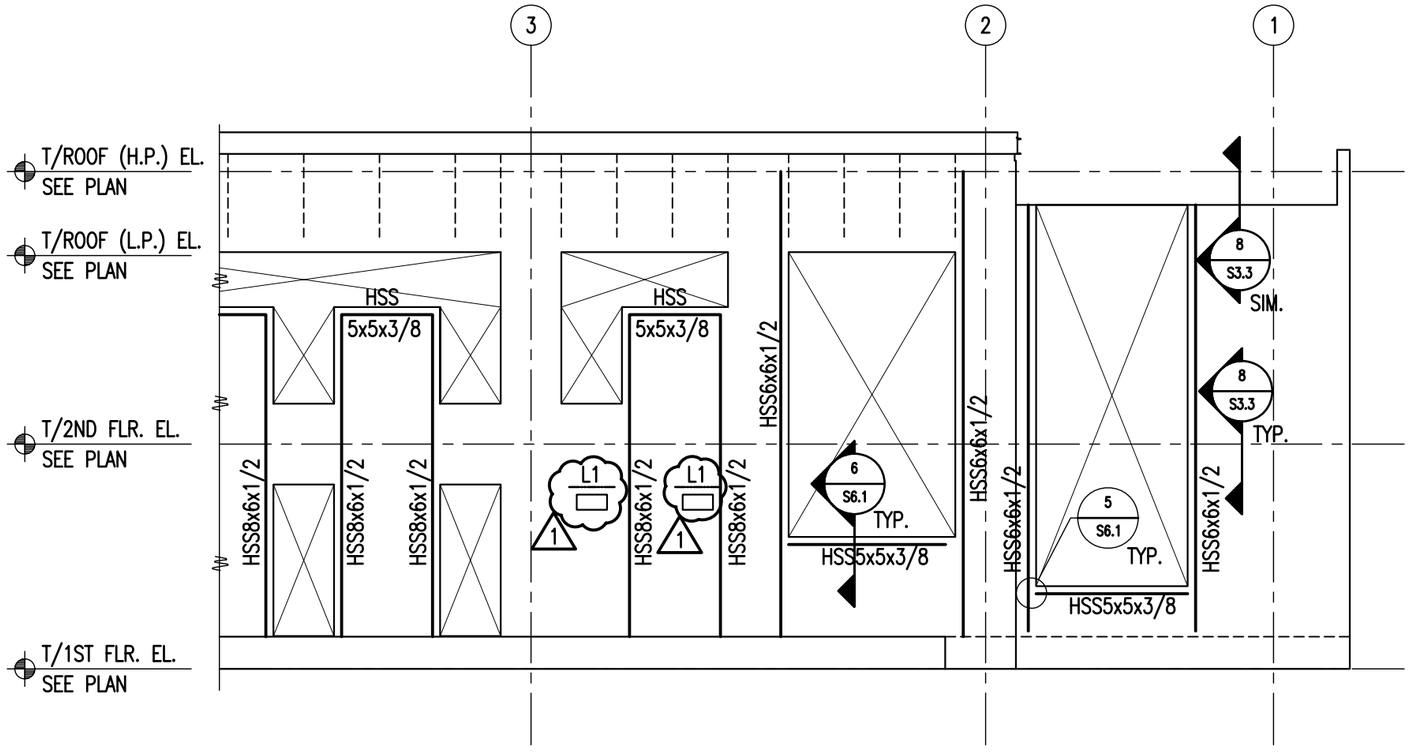
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: TYPICAL HSS BEAM TO HSS POST CONNECTION
REFERENCE: AS NOTED

COMMENTS: N.T.S.

DATE: 12/29/11

SSK-10



2 PARTIAL SOUTH ELEVATION

S6.1 — 1/8"=1'-0"

NOTE:
"LX" INDICATES LINTEL, SEE LINTEL SCHEDULE ON S5.1 (1)

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

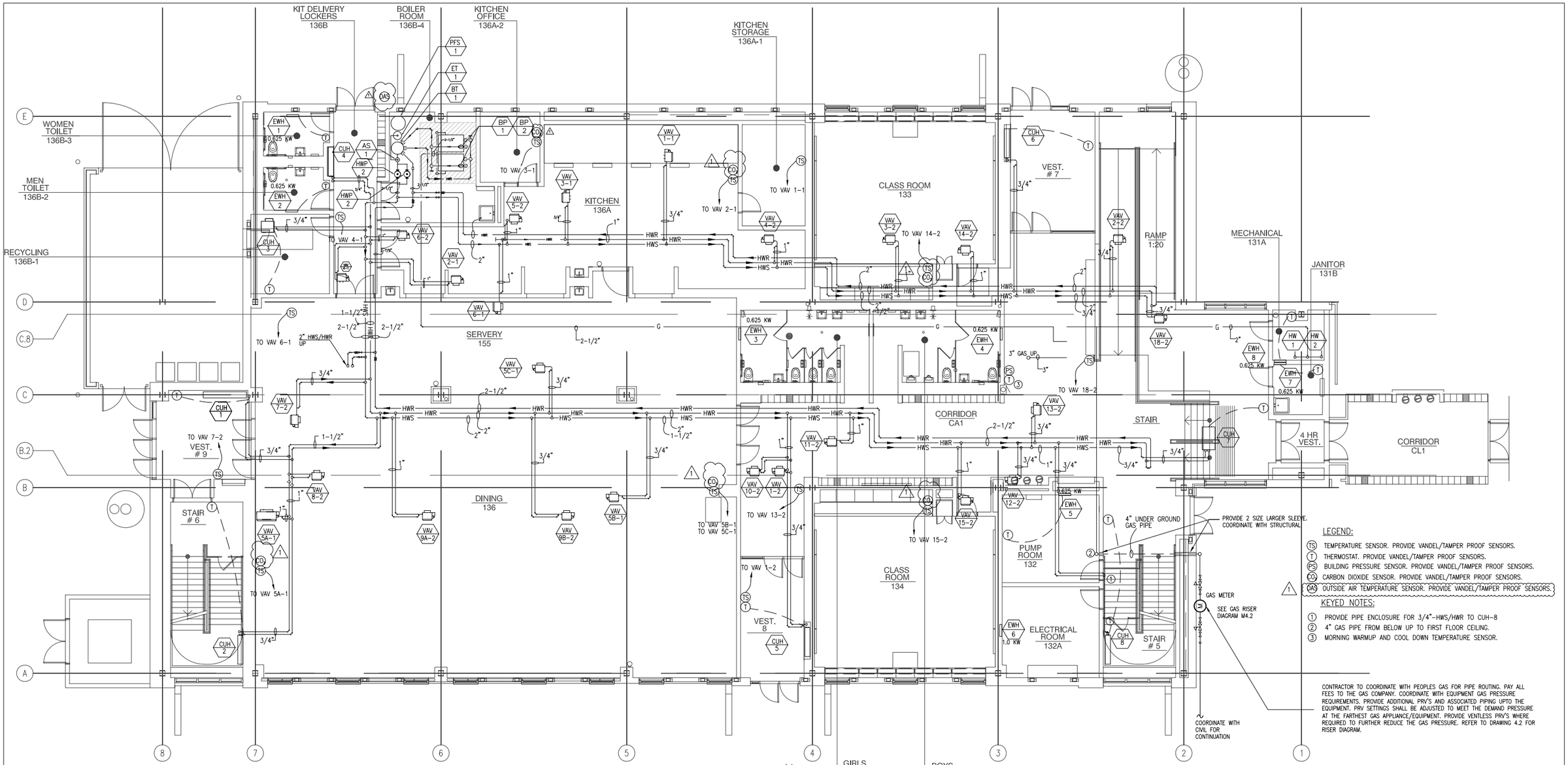
PROJECT: STEVENSON ANNEX 8010 S. KOSTNER AVE, CHICAGO IL 60652
MATRIX #: 11022

ISSUE: ADDENDUM 1
TITLE: PARTIAL SOUTH ELEVATION
REFERENCE: AS NOTED

COMMENTS: N.T.S.

DATE 12/29/11

SSK-11



1 MECHANICAL 1ST FLOOR PIPING PLAN-ANNEX
1/16" = 1'-0"
SHEET # M2.1A

ADDENDUM 1 NOTE:
PROVIDED CO_2 SENSOR IN EACH CLASS ROOMS TYP, OUTSIDE AIR TEMPERATURE SENSOR ON NORTH EAST WALL

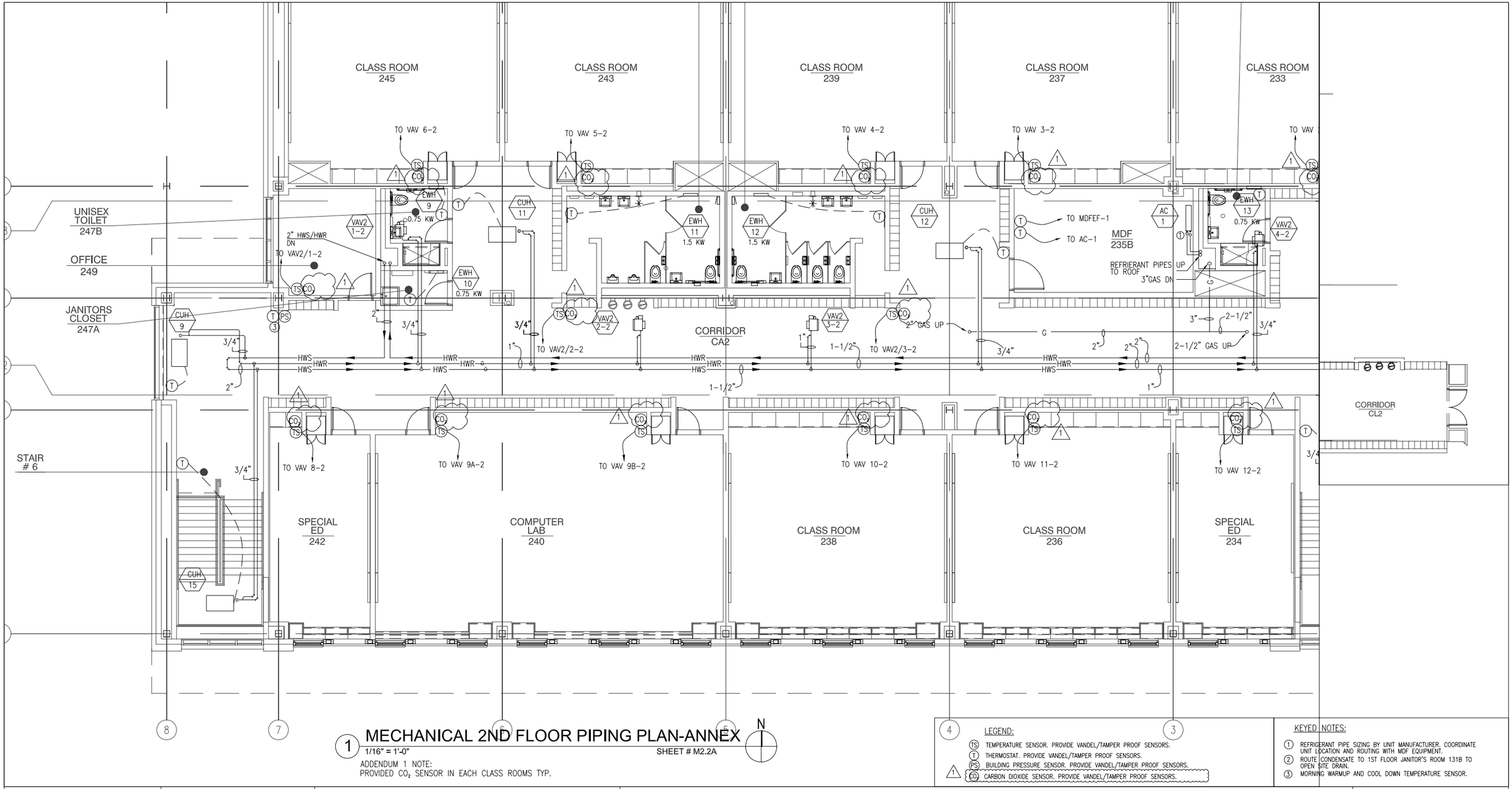
HMS
HEAT MASS SYSTEMS ENGINEERING
230 S. WESTMORE - MEYERS RD.
LOMBARD, IL 60148
T - 1-630-424-1501 F - 1-630-424-1502
hms@hmsmep.com

Wallin ▪ Gomez
ARCHITECTS LTD
711 South Dearborn Street, Suite 606
Chicago, Illinois 60605-1827
P: 312-427-4702 ■ F: 312-427-6611
E: admin@wgaltd.com

STEVENSON ANNEX
8010 S.KOSTNER AVE. CHICAGO, IL 60652

Title : MECHANICAL 1ST FLOOR PIPING PLAN-ANNEX
Dwg Ref :M2.1A
Issued for : ADDENDUM-1 (1)
Date : 12/29/2011

MSK-1



1 MECHANICAL 2ND FLOOR PIPING PLAN-ANNEX

1/16" = 1'-0"

SHEET # M2.2A

ADDENDUM 1 NOTE:
PROVIDED CO_2 SENSOR IN EACH CLASS ROOMS TYP.

LEGEND:

- (TS) TEMPERATURE SENSOR. PROVIDE VANDEL/TAMPER PROOF SENSORS.
- (T) THERMOSTAT. PROVIDE VANDEL/TAMPER PROOF SENSORS.
- (PS) BUILDING PRESSURE SENSOR. PROVIDE VANDEL/TAMPER PROOF SENSORS.
- (1) (CO_2) CARBON DIOXIDE SENSOR. PROVIDE VANDEL/TAMPER PROOF SENSORS.

KEYED NOTES:

1. REFRIGERANT PIPE SIZING BY UNIT MANUFACTURER. COORDINATE UNIT LOCATION AND ROUTING WITH MDF EQUIPMENT.
2. ROUTE CONDENSATE TO 1ST FLOOR JANITOR'S ROOM 131B TO OPEN SITE DRAIN.
3. MORNING WARMUP AND COOL DOWN TEMPERATURE SENSOR.

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STEVENSON ANNEX

8010 S.KOSTNER AVE. CHICAGO, IL 60652

Title : MECHANICAL 2ND FLOOR PIPING PLAN-ANNEX

Dwg Ref :M2.2A

Issued for : ADDENDUM-1 (1)

Date : 12/29/2011

MSK-2

ROOF TOP HVAC UNIT SCHEDULE (GAS HEATING)

TAG	SERVICE TYPE			LOCATION	NOM. TONS	O.A. CFM	COOLING SECTION				HEATING CAPACITY		GAS INPUT MBH	GAS PRESSURE MIN/MAX	EVAPOR. FAN				RETURN RELIEF FAN				COMPRESSOR		CONDENS. FAN		COMB. AIR BLOWER HP	UNIT ELECTRICAL DATA						OPERATING WT. (LBS)	MANUFACTURER AND MODEL	REMARKS
	CAV	VAV	MULTI-ZONE (NO. OF ZONES)				TOTAL MBH	SENSIBLE MBH	EAT°F DB/WB	LAT°F DB/WB	OUTPUT MBH	STAGES			CFM	HP	TSP IN.W.C.	ESP IN.W.C.	CFM	HP	TSP IN.W.C.	ESP IN.W.C.	QTY	HP	HP	NO. OF FANS		FLA	MCA	MOCP	VOLT	PH	HZ			
RTU-1	NO	YES	NO	ROOF	44	5000	538	366	83/68	53/52	629	**	787	7"/14"	11000	30	7.5	3.5	11000	10	2.25	1.75	4	–	1.5	4	–	*	389	450	208	3	60	13,800	SEASONS 4 3SJI30-0444-MN7.9-11SE	1 THRU 13
RTU-2	NO	YES	NO	ROOF	61	5000	737	522	79/66	53/52	720	**	900	7"/14"	18000	40	7.5	3.5	18000	15	2.25	1.75	4	–	1.5	4	–	*	531	600	208	3	60	16,850	SEASONS 4 3SJK34-0614-MN9.0-18SE	1 THRU 13

** MODULATING

NOTE:

1. COORDINATE INLET GAS PRESSURE REGULATOR WITH BUILDING GAS PRESSURE.
2. EACH COMPRESSOR MUST HAVE AN INDEPENDENT CIRCUIT.
3. PROVIDE MERV 8 PRE-FILTER (2"), AND MERV 13 FINAL FILTER.
4. PROVIDE SINGLE POINT POWER CONNECTION AND WEATHER PROOF MAIN DISCONNECT.
5. PROVIDE SUPPLY AND RETURN DUCT SMOKE DETECTOR FOR EACH UNIT TO BE HARD-WIRED TO RTU CONTROLS. UPON SMOKE DETECTION, UNIT WILL DISABLE AND OA DAMPER CLOSE.
6. PROVIDE FREEZE-STAT AT DX COIL DISCHARGE TO DISABLE MECHANICAL COOLING.
7. PROVIDE LOW PRESSURE SAFETY SWITCH AT FAN INLET AND HIGH PRESSURE SAFETY SWITCH AT FAN DISCHARGE TO BE HARD-WIRED TO SHUT THE SYSTEM OFF UPON ACTIVATION INCLUDING THE HEATERS.
8. PROVIDE SELF ADJUSTING PREFABRICATED VIBRATION 24" HIGH ROOF CURB (2" DEFLECTION MINIMUM) VIBRATION ISOLATORS.
9. PROVIDE SELF-CONTAINED CONTROLS. PROVIDE TERMINAL POINTS FOR HARDWIRED INTERFACE TO EXTERNAL DEVICES. SEE TEMP CONTROLS DRAWING FOR DETAILS.
10. VENDOR TO PROVIDE FINAL TSP AND HP DATA. NUMBER OF ROW & FPI SHALL BE SUCH AS TO REDUCE PRESSURE DROP AS LOW AS POSSIBLE.
11. VENDORS SHALL MATCH THE DIMENSIONAL INTEGRITY SHOWN ON THE SCHEDULES. ACOUSTICAL PERFORMANCE SHALL NOT EXCEED THE DATA SHOWN ON THE SCHEDULE. ANY MODIFICATIONS TO ARCH, STRUCTURAL AND MEP DRAWINGS AS A RESULT OF INDIFFERENT PHYSICAL DIMENSIONS SHALL BE THE RESPONSIBILITY OF CONTRACTOR AT NO COST TO THE OWNER.
12. * DISCHARGE AIR TEMP DURING THE SCHEDULED OA INTAKE.
13. MORNING WARM UP TEMPERATURE SHALL BE 60 °F PLUS THE TEMP RISE WITH NO OUTSIDE AIR (RECIRCULATION ONLY).

ACOUSTICAL CONSULTANT SPECIFIED SOUND INSERTION LEVELS

SYSTEM TAG	SOUND POWER LEVEL (dB re 10^12 W) FOR DIFFERENT OCTAVE BANDS									NOTES
	OVERALL dBA	OCT BAND 63 HZ	OCT BAND 125 HZ	OCT BAND 250 HZ	OCT BAND 500 HZ	OCT BAND 1K HZ	OCT BAND 2K HZ	OCT BAND 4K HZ	OCT BAND 8K HZ	
RTU-1 INLET NOISE		76	68	65	64	65	68	77	–	
RTU-1 OUTLET		85	85	84	87	88	91	90	–	
RTU-2 INLET NOISE		77	66	59	57	55	55	61	–	
RTU-2 OUTLET		86	83	82	85	86	89	91	–	

ADDENDUM 1 NOTE:
REVISED ACCOUSTICAL SOUND INSERTION LEVEL IN RTU

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STEVENSON ANNEX
8010 S.KOSTNER AVE. CHICAGO, IL 60652

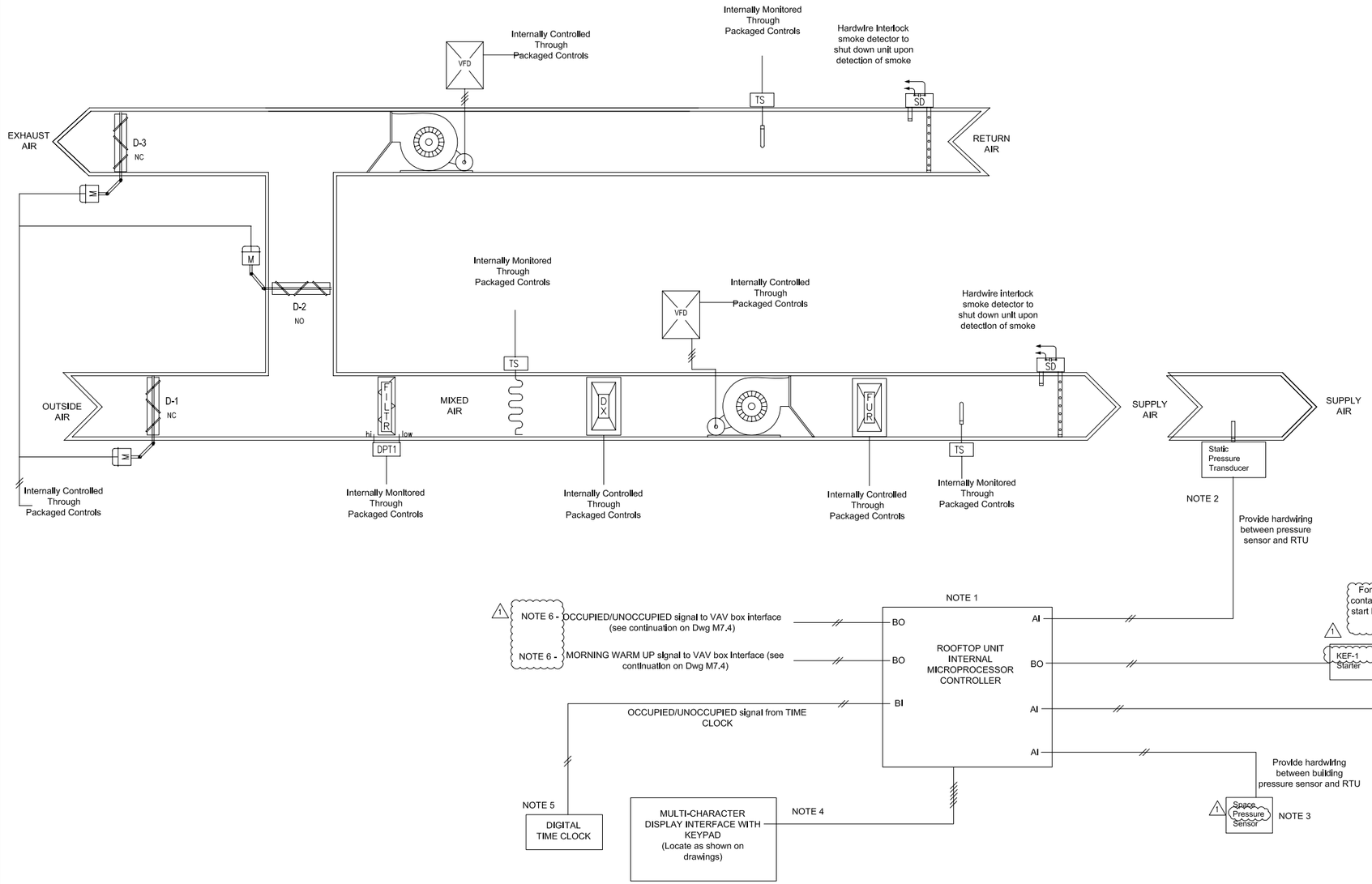
Title : MECHANICAL EQUIPMENT SCHEDULE

Issued for : ADDENDUM-1 (1)

Dwg Ref :M5.1

Date : 12/29/2011

MSK-3



Variable Air Volume RTU – Packaged Gas Heat and DX Cooling – RTU-1 and RTU-2

DRAWING NOTES:

1. The rooftop unit will be a packed unit with internal microprocessor controls that will be capable of operating in a stand-alone manner. The RTU controller will perform the control functions of supply and return fan enabling and speed modulation, direct expansion cooling coil control, compressor staging, condenser fan staging, gas heat modulation, minimum outdoor air and economizer functions. The contractor shall provide any field wiring required.

2. Provide hardwired interlock wiring between the RTU controller and the supply duct static pressure transducer. Locate the static pressure pickups in a location approximately two-thirds down the longest supply duct run.

3. Provide hardwired interlock wiring between the RTU controller and the space temperature sensor and building static pressure sensor. Locate the space temperature sensor as shown on drawings.

4. Provide field wiring as required between the RTU controller and the Multi-Character Display with Keypad Module. The Display Module will be provided by the RTU manufacturer.

5. Furnish and install a Digital Time Clock as specified. Provide field wiring between time clock and RTU controller to index the RTU between OCCUPIED and UNOCCUPIED modes.

6. Provide wiring from VAV box interface and RTU controller for OCCUPIED/UNOCCUPIED signal and MORNING WARM UP signal. See VAV box control detail for additional information.

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STEVENSON ANNEX

8010 S.KOSTNER AVE. CHICAGO, IL 60652

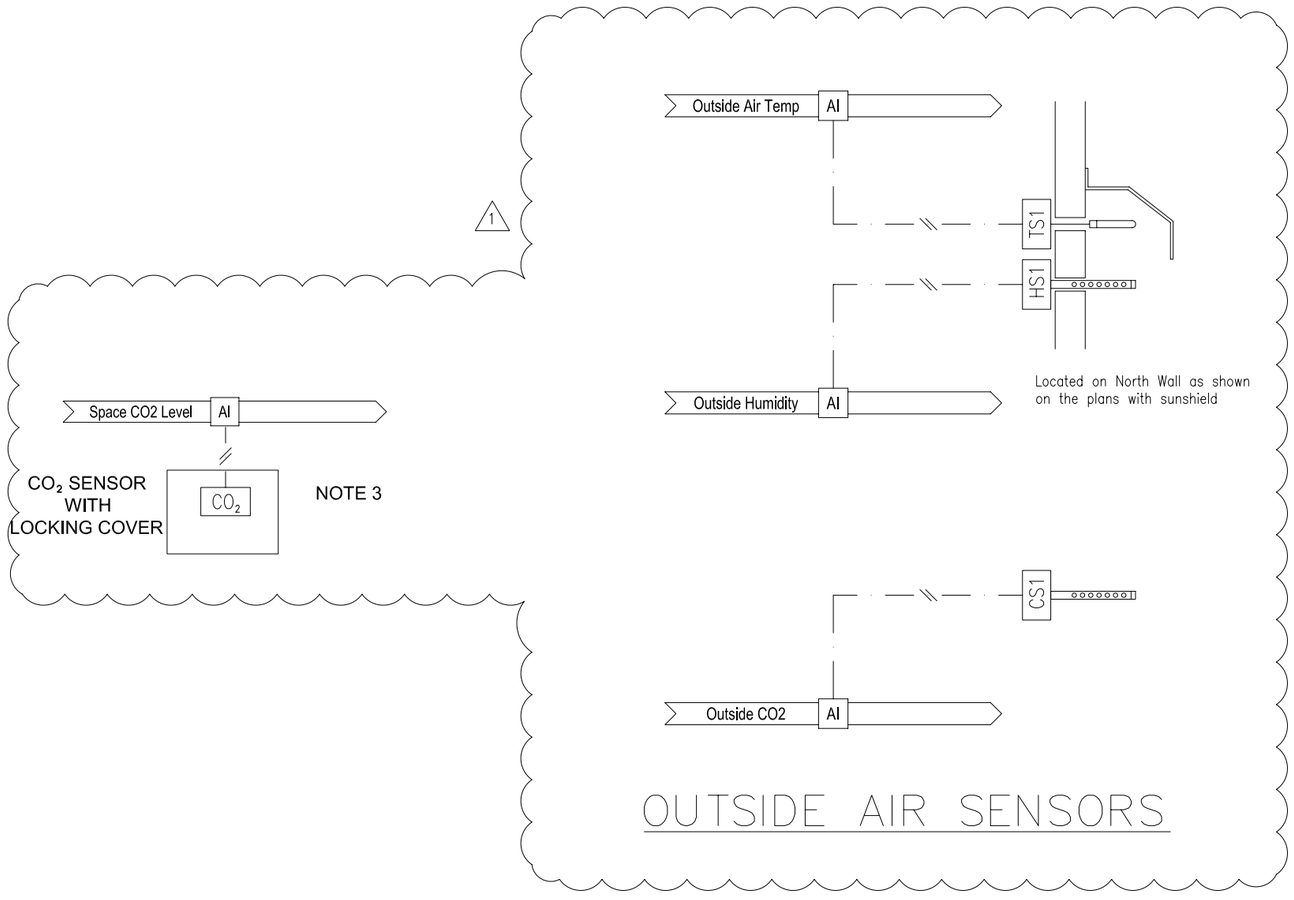
Title : RTU CONTROL DIAGRAM

Dwg Ref :M7.3

Issued for : ADDENDUM-1 (1)

Date : 12/29/2011

MSK-4



DRAWING NOTES:

1. Provide communication wiring between VAV box controllers and a VAV box interface with global broadcast capabilities for communication of global points. The VAV box interface shall have an Ethernet connection to allow a standard laptop with Microsoft Internet Explorer (or equivalent web browser software) to access programming for all VAV boxes on communication bus.

2. The rooftop unit controllers will provide outputs for OCCUPIED/UNOCCUPIED and MORNING WARM UP. The control points shall be inputs to a controller capable of broadcasting these data as global points to each VAV box. See Dwg M7.3 for additional information.

1

3. The space temperature sensors and CO_2 sensor for each VAV box controller shall have digital display of space temperature and digital setpoint adjustment buttons. Provide locking covers for all space temperature sensors.

4. Note that this system will not be connected to a front end workstation nor will it be connected to the CPS LAN/WAN for remote monitoring.

5. The boiler controller will provide outputs for HOT WATER AVAILABLE. The control points shall be inputs to a controller capable of broadcasting these data as global points to each VAV box. See Dwg M7.6 for additional information.

ADDENDUM 1 NOTE:
- PROVIDED OUTSIDE AIR SWNSORS CONTROL DETAIL
- PROVIDED CO_2 SENSOR WITH LOCKING COVER.

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STEVENSON ANNEX
8010 S.KOSTNER AVE. CHICAGO, IL 60652

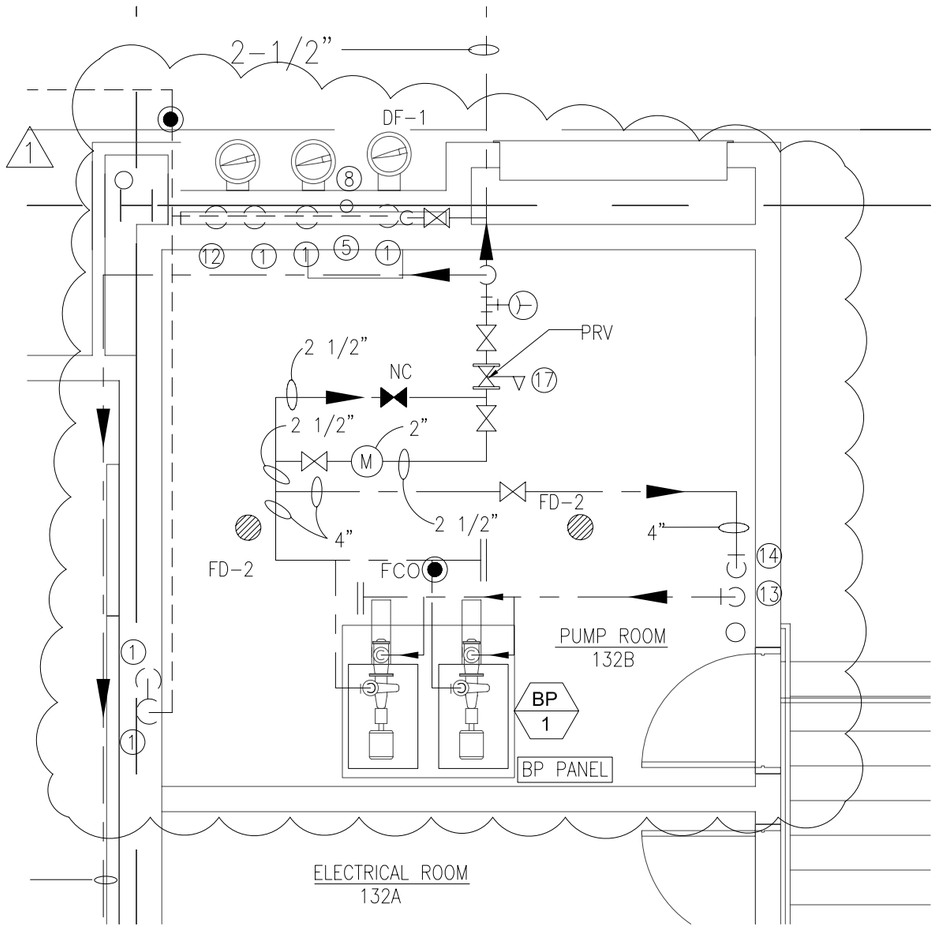
Title : VAV CONTROL DIAGRAM

Dwg Ref :M7.4

Issued for : ADDENDUM-1 1

Date : 12/29/2011

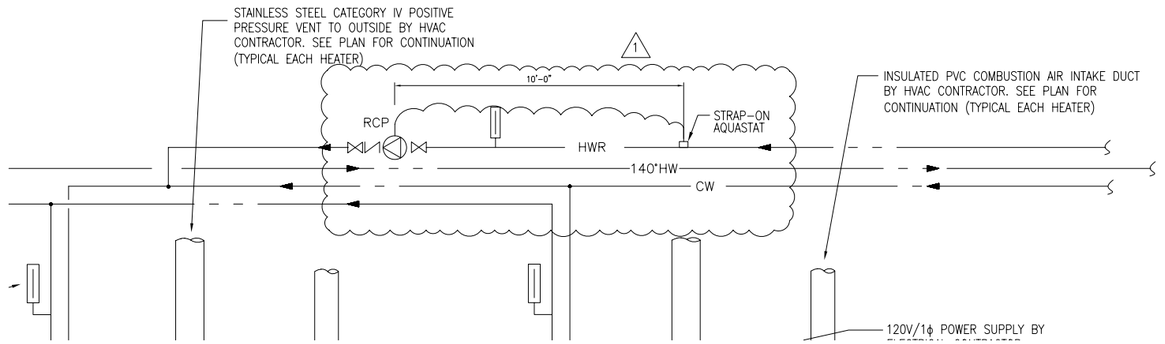
MSK-5



1 ENLARGED PUMP ROOM PLAN

1/4" = 1'-0" DWG # 2/P1.1A

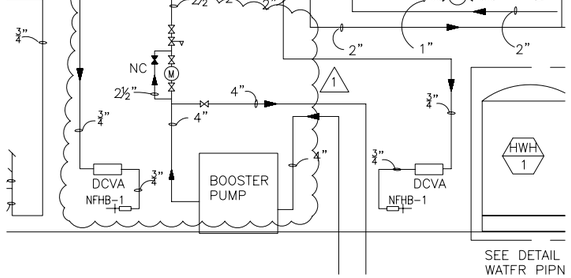
ADDENDUM 1 NOTE:
- PROVIDED DIGITAL WATER METER FOR WATER USE MONITORING DEDICATED FOR ANNEX BUILDING.
- BAS CONTRACTOR SHALL WIRE TO DDC.
- METER SHALL BE NEPTUNE MODEL.



2 DOMESTIC WATER HEATER DETAIL

N.T.S. DWG # 2/P6.2

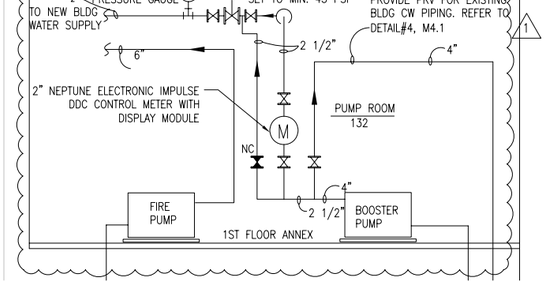
ADDENDUM 1 NOTE:
PROVIDED STRAP-ON AQUASTAT



3 DOMESTIC WATER RISER DIAGRAM

N.T.S. DWG # 2/P4.1

ADDENDUM 1 NOTE:
PROVIDED WATER METER DEDICATED FOR ANNEX BUILDING.



4 DOMESTIC WATER RISER DIAGRAM

N.T.S. DWG # 3/P4.1

ADDENDUM 1 NOTE:
PROVIDED WATER METER DEDICATED FOR ANNEX BUILDING.

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STEVENSON ANNEX

8010 S.KOSTNER AVE. CHICAGO, IL 60652

Title : PUMP ROOM PLAN (1ST FLOOR)

Dwg Ref : P1.1A, P4.1, P6.2

Issued for : ADDENDUM-1 (1)

Date : 12/29/2011

PSK-1