ADDITIONAL VAIPITO METAL BUILDING SPECIFICATIONS

SECTION 09910: PAINTING

1. GENERAL

WORK INCLUDED

This Section includes but is not limited to: Finishing of all exposed interior and exterior surfaces, except those specifically indicated as not to receive paint. Touch-up prime coat of shop primed metal items as necessary. Priming and finishing all woodwork. Glass cleaning.

WORK NOT INCLUDED

Do not job finish the following exposed surfaces: Factory finished surfaces, flooring or base, acoustical tiles and ceiling grids, copper, aluminum, bronze or stainless steel. Mechanical equipment such as pumps, fans, motors, etc., furnished with an approved factory finish except as otherwise specified above. Concrete walks, pavements and curbs, except striping, arrows and wheelchair symbols in driveway. Concrete floors scheduled to receive floor covering. Cast Stone products with integral color. Exterior finish system containing integral color.

GENERAL REQUIREMENTS

General Intent: To provide a complete finishing system for all surfaces except those designated not to receive a painted finish. Be responsible for any need for correction of improper preparation or workmanship, and for finishes in the manner and form prescribed herein. Do not begin any part of the job where the surfaces are not in condition to receive specified coating. Inspection: Carefully examine all surfaces to be painted and promptly notify the Architect in writing of any conditions detrimental to a satisfactory paint job. Receive the surfaces to be painted or otherwise treated, free from foreign matter such as residue of concrete, mortar, grease, etc., caused by other crafts. Paint all air handling wall and ceiling registers, grilles and diffusers other than prefinished, chrome, bronze or stainless steel to match the wall or ceiling surface in which they appear, except as otherwise approved. Protect all property and the work of all other trades against damage or injury caused by this activity. Reference Standards: Woodwork Institute of California (WIC) “Manual of Millwork- Standards of the Industry”, 1988 Edition, shall govern all wood finish, including stain and paint treatments. Colors: To be selected by Architect. The Architect will furnish a color schedule for all paint and stain colors to be used prior to start of work. Provide samples of each color and stain, interior and exterior. Submit samples of paint on heavy cardboard or sandpaper, and samples for stain on the species of wood to which the finish is to be applied. Interior stain samples submitted shall include their finish seal coats applied over the stain. Submit in triplicate and of sufficient size to indicate clearly the quality of the work. Each applied coat shall match approved samples. Store all painting materials in approved areas. Keep the jobsite free at all times from waste or surplus material to minimize fire hazard. Clean-up before painting: Prior to painting, all areas are to be cleaned up. Interior and exterior areas are to be broom-clean, exterior areas rake clean. All work covered in this Section must be done under the direction of a licensed

painting contractor. LEED Data: Submit data indicating compliance with IEQ Credit 4.1 Low Emitting materials- Paints & Coatings.

2. PRODUCTS

2.1. MATERIALS

Paint and stain materials designated herein as specified to establish the type and quality of materials required. Corresponding quality products of Ameritone, Aspen, Benjamin Moore, Devoe, DecraTrend, Dutch Boy, Glidden, Martin Senour, Pittsburgh, and SpectraTone shall be considered equal. Use only the type and quality of specified herein. No claim as to the unsuitability or unavailability of any material specified, or unwillingness to use those specified, or inability to produce first-class work with those specified, will be entertained unless such claims are submitted for approval in writing. Other manufacturer's requests for substitution must be made in writing. Such submittals shall list the specific product numbers of the proposed manufacturer for each coat of each treatment specified herein; follow the herewith format to simplify evaluation of the submitted request. Standards: All materials shall be factory or distributor mixed and delivered to the job in their original containers with label intact and seals unbroken. No other paints shall be brought on the job. Use only those oils, thinners, and driers approved for use by the manufacturer of the paint. No paint shall be reduced, or faster drying induced by the addition of any product other than those recommended by the paint manufacturer.

3. EXECUTION

3.1. WORKMANSHIP

It is the intent that finishes meet the best standards of practice, and experienced painters; mediocre workmanship will not be accepted. Mix, thin and apply each coat at the proper consistency. Prepare surfaces and apply coatings in strict accordance with the paint manufacturer's instructions. Each coat to be flowed on or well brushed out, depending on the material, to obtain a uniform even finish, free from brush marks, runs, sags, crawls, dust pimples, encrusted brush bristles, and variance in finish (color, shade, sheen or other blemishes to mar the finished surfaces. Surface shall be clean and dry when materials are applied. Do no exterior painting in rainy, damp, misty or excessively windy weather. Do no painting until concrete, plaster, masonry, drywall, and similar wet work have been completed and the structure has sufficiently dried out. Test all concrete surfaces with litmus paper or phenolphthalein for the presence of chemically active alkalis, and apply no finish to surfaces showing positive reactions. Lightly sand surfaces intended to be smooth and dust thereafter. Each coat of paint shall be separately inspected and approved before the next coat is applied. Notify the Architect that such work is ready for inspection. Failure to get this approval may result in rejection entailing the application of an additional approved coat. Prime coat shall closely approach the color finish coat; however, each coat is to be tinted slightly different from the preceding coat so that each may be readily identified. Final coat every portion of the work to match approved samples. Touch up suction-spots noticeable after application of the first coat or neutralize to produce an even finish with the successive coat. Provide a completed finish, uniform in color, shade and sheen, and free from alkali, burning, and dull spots. Before painting and finishing is begun: Remove or arrange to have removed all hardware which is not primed for painting, electric switch and receptacle plates, prefinished grilles or louvers, and similar prefinished items. Lower canopies and/or lens frames on ceiling fixtures. Properly protect all factory finished

materials to keep them free from paint spots, stains, or similar damage. Cover and fully protect both new and existing work at all times and exercise care to prevent marring or spattering adjacent work, including furnishings and equipment, and new unpainted surface. Clean spattered or defaced surfaces and leave them finished as intended. Touch-up prime coat of shop primed metal items where prime coat has been damaged or abraded, and provide finish coats as specified herein. Provide prime coats and finish coats for metal items which were not shop primed and are scheduled to receive paint treatment. Putty and sand flush over all set nails and cracks in surfaces to be painted. On surfaces to be stained, tint putty with stain for filling holes. Apply two coats of 4 lb cut clear shellac over all sap and pitch pockets before applying paint treatment. Where wood trim color is different from wall color, return the trim color on edges of trim back to the wall. Do not leave open containers of paints and solvents at the job site. Use necessary precautions for the prevention of fire. Do not use plumbing fixtures or piping for washing, or disposal of waste from paint pots, paint rags, brushes or paint material.

3.2. SCHEDULE OF PAINT AND STAIN TREATMENTS

The various paint and stain treatments to be applied to the surfaces indicated:

3.2.1 EXTERIOR FINISH SCHEDULE

Under the eaves- plywood. Glulam beams- Primer: 024 Fresh Start Multi Purpose Oil-Based Primer Finish (2 coats): 632 Aura Exterior Semi-Gloss Finish

3.2.2 INTERIOR FINISH SCHEDULE

Gypsum drywall- Offices- eggshell Primer: N023 Fresh Start Multi Purpose Latex Primer Finish (2 coats): 524 Aura Interior Eggshell Finish Breakrooms and bathrooms- semi-gloss (walls & ceilings)- Primer: N023 Fresh Start Multi Purpose Latex Primer Finish (2 coats): 528 Aura Interior Semi-Gloss Finish Plywood ceilings- semi-gloss- Primer: 024 Fresh Start Multi Purpose Oil-Based Primer Finish (2 coats): 528 Aura Interior Semi-Gloss Finish Glulam beams- clear coat. Low Lustre- Finish (2 coats): N423 Benwood Stays Clear Acrylic Polyurethane Low Lustre Hardwood veneer doors- clear coat. Low Lustre- Finish (2 coats): N423 Benwood Stays Clear Acrylic Polyurethane Low Lustre Galvanized steel structural members- Primer: V175 Corotech Waterborne Bonding Primer Finish (2 coats): V510 Corotech Acrylic Aliphatic Urethane Semi- Gloss

3.3. CLEAN-UP

Upon completion, remove extra materials and debris from the building, clean surplus paint, shellac, oil, varnish, and similar material off hardware, fixtures, floors, glass or any other portion of the building and its contents. Glass Cleaning: Thoroughly wash and polish all glass and leave in a clean condition.

SECTION 02220 DEMOLITION AND REMOVAL

4. GENERAL

4.1. WORK INCLUDED

Accomplish all demolition, removal, and related work indicated on or required by the drawings, and as specified herein. Work shall include, but not be limited to the following: All demolition works and removal shall be as indicated on the Drawings. Clearing and disposing of all debris, rubbish, junk and miscellaneous items. Temporary Environmental Controls shall be implemented prior to commencing demolition work.

4.2. GENERAL REQUIREMENTS

It shall be the responsibility of the Contractor to examine the project site and determine for himself the existing conditions. Obvious conditions which exist on the site shall be accepted as part of the work, even though they may not be clearly indicated on the drawings and/or described herein, or may vary there from. All debris of any kind accumulated from the work of this section shall be disposed of off the site. Burning of any debris on site will not be permitted. Permits and Notices The Contractor shall apply for and obtain all necessary permits or certificates that may be required in connection with this work. The Contractor shall pay for fees required by other regulatory agencies. The Contractor shall serve proper notice and consult with the ASPA Construction Manager regarding any temporary disconnections of utility lines in the area which may interfere with the removal work, and all such lines where necessary shall be properly disconnected before commencing with the work. The Contractor shall complete and submit a Notification of Demolition to the ASPA Construction Manager 10 working days prior to the start of any demolition activities. Protection: Throughout the work, protection shall be provided for all roads, walks, property, scheduled to remain. Safe working conditions shall be maintained at all times for all personnel, and temporary lights and barricades shall be provided and maintained. Work shall be done in accordance with the ASPA Construction Manager requirements.

5. PRODUCTS (Not used)

6. EXECUTION

6.1. DEMOLITION AND REMOVAL

All work shall be executed in an orderly and careful manner, with due consideration for all items to remain, and the Contractor shall be strictly responsible for any damage thereto. Water facilities shall be available and in operating condition at all times. All dust, shall be suppressed by a fog spray or other approved method. Demolish existing concrete curbs and gutters, structure, remove trees, and other obstructions or encumbrances of any kind or character as indicated on the drawings, any active sanitary, water, drainage, electrical, etc., lines, vaults, boxes and manholes, shall be preserved and protected.

6.2. PROCEDURES

The procedures and the timetable proposed for the demolition work shall be submitted to the ASPA Construction Manager for approval prior to the start of the work. The procedure shall provide for safe conduct of the work, careful removal and disposition of materials, protection of property which is to remain undisturbed, coordination with other work in progress. The procedures shall include a description of the method and equipment to be

used for each operation and the sequence of each operation. Contractor shall be responsible for the restoration of any utility disconnected for this work.

6.3. DUST CONTROL

The amount of dust resulting from the demolition of the concrete curb and gutter and structure shall be controlled to prevent the spread of dust and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, a hazardous condition such as flooding, pollution, or contamination of surrounding air or soil.

6.4. LIMITS OF DEMOLITION

The Limits of Demolition shall be as directed on the Demolition Plans; however, work outside the Limits of Demolition necessary to complete the project shall be included. 3.5 BARRICADE Erect temporary barricade as required to prevent people and animals from entering the project area to the extent as approved by the Construction Manager. Such barricade shall not be less than 5' - 0" in height. The extent of barricade may be adjusted as necessary with the approval of the Construction Manager. Barricade shall be removed upon completion of work, and job site premises left clean and operational.

6.5. MAINTAINING TRAFFIC

The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, etc. When necessary, the Contractor shall provide, erect and maintain lights, barriers, etc., as required by traffic and safety regulations with special attention to protection of life.

6.6. CLEAN UP

Debris and rubbish shall be removed from the site daily. Debris and rubbish shall not be allowed to accumulate on site. Debris shall be removed and transported in a manner that will prevent spillage on streets or adjacent areas.

SECTION 02230 CLEARING AND GRUBBING

1. GENERAL

1.1. SUMMARY

This section covers the requirements for clearing and grubbing, within the areas shown on the plan or as directed by the ASPA Construction Manager. The above work shall include the removal and disposal of designated trees outside the clearing limits. Also included is the protection from injury or defacement of trees and other objects designated to remain and treatment or removal of damaged trees.

2. PRODUCTS (Not Used)

3. EXECUTION

3.1. PRESERVATION OF PROPERTY

The areas to be cleared and grubbed shall be to the dimensions shown on the Drawings. Every precaution shall be taken to prevent injury to such growth as well as adjacent property line of the project site.

3.2. CLEARING

The natural ground within the limits of the property lines shall be cleared of all obstructions interfering with the proposed work.

3.3. GRUBBING

Grubbing shall consist of the removal and disposal of stumps, matted roots, from the designated grubbing areas. Depressions made by grubbing shall be filled with satisfactory or suitable material and compacted to make the surface conform to the original adjacent surface of the ground.

3.4. REMOVAL AND DISPOSAL OF MATERIAL

All materials cleared shall be hauled away from the site and disposed of by the Contractor. No materials shall be dumped on private or public property without proper authority.

SECTION 01200- PROJECT MEETINGS

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period. Related Work Described Elsewhere: The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings contents.

1.3. QUALITY ASSURANCE

Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.4. SUBMITTALS AGENDA ITEMS:

To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding all items to be added to the agenda. Minutes: The Engineer will compile minutes of each project meeting and will furnish three (3) copies to the Contractor. The Contractor may make and distribute such other copies as he wishes.

2. PRODUCTS (NOT APPLICABLE)
3. EXECUTION

3.1. MEETING SCHEDULE

Except as noted below for Preconstruction Meeting contractor will hold project meetings weekly. Coordinate as necessary to establish mutually acceptable schedule for meetings.

Meeting Location To the maximum extent practicable, meetings will be held at the job site.

3.2. PRE-CONSTRUCTION MEETING

Schedule the Preconstruction Meeting as soon as possible after the Owner has issued Notice to Proceed. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance. Minimum Agenda: Distribute data on and discuss: Organizational arrangement of Contractor's forces and personnel and those of subcontractors, materials suppliers and Engineer Channels and procedures for communications Construction Schedule, including sequence of critical work Contract Documents, including distribution of required copies of original Documents and revisions Processing of Shop Drawings and other data submitted to the Engineer for review Processing of field decisions and Change

Orders Rules and regulations governing performance of the work Procedures for safety and first aid, security, quality control, housekeeping, and other related matters

3.3. PROJECT MEETINGS ATTENDANCE:

To the maximum extent practicable, assign the same person to represent the Contractor at project meetings throughout progress of the work. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved. Minimum Agenda: Review, revise as necessary and approve minutes of previous meeting. Review progress of the Work since last meeting, including status of submittals for approval. Identify problems that impede planned progress. Develop corrective measures and procedures to regain planned schedule. Complete other current business.

SECTION 01300- SUBMITTALS AND SUBSTITUTIONS

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Wherever possible throughout the Contract Documents, the minimum, acceptable quality of workmanship and materials has been defined by manufacturer's name and catalog number, reference to recognized industry and government standards, or description of required attributes and performance. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for their review by the ENGINEER. Make all submittals required by the Contract Documents, revise and resubmit as necessary to establish compliance with the specified requirements. Related Work Described Elsewhere: Individual requirements for submittals are described in pertinent other Sections of these Specifications.

1.3. QUALITY ASSURANCE COORDINATION OF SUBMITTALS:

Prior to each submittal carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittal for it conforms in all respects with the requirements of the Contract Documents. Affixing the Contractor's signature to each submittal certifies that this coordination has been performed. Certificates of Compliance: Certify that all materials used in the Work comply with all specified provisions thereof. Certification shall not be construed as relieving the Contractor from furnishing satisfactory materials if, after tests are performed on selected samples the material is found not to meet specified requirements. Show on each certification the name and location of the Work, name and address of Contractor, quantity and date or dates of shipment or delivery to which the certificate applies and name of the manufacturing or fabricating company. Certification shall be in the form of letter or company-standard forms containing all required data. An officer of the manufacturing or fabricating company shall sign

certificates. In addition to the above information all laboratory test reports submitted with Certificates of Compliance shall show the date or dates of testing, the specified requirements for which testing was performed and results of the test or test

1.4. SUBMITTALS SCHEDULE:

Within 35 days after award of Contract and before any items are submitted for approval submit to the ENGINEER two copies of the schedule described in Article 2.1 of this Section. Certificates of Compliance: Upon completion of the Work and as a condition of its acceptance submit to the ENGINEER all Certificates of Compliance. Procedures: Make submittals in strict accordance with the provisions of this Section.

2. PRODUCTS

2.1. SUBMITTAL SCHEDULE GENERAL:

Compile a complete and comprehensive schedule of all anticipated submittals during progress of the Work. Include a list of each type of item for which Contractor's drawings, Shop Drawings, Certificates of Compliance, material samples, guarantees or other types of submittals are required. Upon approval by the ENGINEER this schedule will become part of the Contract and the Contractor will be required to adhere to the schedule except when specifically otherwise permitted. Coordination: Coordinate the schedule with all necessary Subcontractors and materials suppliers to ensure their understanding of the importance of adhering to the approved schedule and their ability to so adhere. Coordinate as required to ensure the grouping of submittals as described in Paragraph 3.2. Revisions: Revise and update the schedule on a monthly basis as necessary to reflect conditions and sequences. Promptly submit revised schedules to the ENGINEER for review and comment.

2.2. SHOP DRAWINGS AND COORDINATION

Drawings Shop Drawings: Scale and Measurement: Make all Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work. Type of Prints Required: Submit all Shop Drawings in the form of six (6) copies shall be submitted for review, blue line or black line print of each sheet. Reproduction of Review Shop Drawings: Printing and distribution of review Shop Drawings for the Engineer's use will be by the ENGINEER. All review comments of the ENGINEER will be shown on the sepia transparency when it is returned to the Contractor. The Contractor shall make and distribute all copies required for his purposes.

2.3. MANUFACTURER'S LITERATURE GENERAL:

Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review. Number of Copies Required: Submit six (6) copies of all required shop drawings, product data, etc..

2.4. SAMPLES ACCURACY OF SAMPLES:

Samples shall be of the precise article proposed to be furnished. Number of Samples Required: Unless otherwise specified submit samples in the quantity that is required to be returned plus two (2) that will be retained by the ENGINEER. Reuse of Samples: In

situations specifically so approved by the ENGINEER, the Engineer's retained sample may be used in the construction as one of the installed items.

2.5. COLORS AND PATTERNS

Unless the precise color and pattern is specifically described in the Contract Documents and whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts to the ENGINEER or review and selection.

2.6. SUBSTITUTIONS APPROVALS REQUIRED:

The Contract is based on the standards of quality established in the Contract Documents. All products proposed for use, including those specified by requirement attributes and performance shall require approval by the ENGINEER before being incorporated into the Work. Do not substitute materials, equipment, or methods unless the ENGINEER has specifically approved such substitution for this Work. "Or Equal": Where the phrase "or equal" or "equal as approved by the ENGINEER" occurs in the Contract Documents. Do not assume that materials, equipment, or methods will be approved or are equal unless the item has been specifically approved for this Work by the ENGINEER. The decision of the Engineer shall be final.

3. EXECUTION

3.1. IDENTIFICATION OF SUBMITTALS

Consecutively number all submittals. Accompany each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals.

3.2. COORDINATION OF SUBMITTALS GENERAL:

Prior to submittal for approval, use all means necessary to fully coordinate all materials including, but not necessarily limited to: Determine and verify all interface conditions, catalog numbers and similar data. Coordinate with other trades as required. Clearly indicate all deviations from requirements of the Contract Documents. Grouping of Submittals: Unless otherwise specified make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays so occasioned.

3.3. TIMING OF SUBMITTALS GENERAL:

Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing delivery. Engineer's Review Time: In scheduling, allow at least 10 calendar days for review by the ENGINEER following his receipt of the submittal. Delays: Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the Contract completion date.

3.4. ENGINEER/ENGINEER'S REVIEW GENERAL:

Review by the ENGINEER shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the

Contractor from responsibility for errors that may exist. Authority to Proceed: The notations "Reviewed, no exceptions noted" or "Reviewed, exceptions noted" authorize the Contractor to proceed with fabrication, purchase, or both, of the items so noted subject to the revisions, if any, required by the Engineer's review comments. Revisions: Make all revisions required by the ENGINEER. If the Contractor considers any required revision to be a change, he shall so notify the ENGINEER provided for under "Changes" in the General Conditions. Show each drawing revision by number, date, and subject in a revision block on the drawing. Make only those revisions directed or approved by the ENGINEER. Revisions After Approval: When a submittal has been reviewed by the ENGINEER, re-submittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

SECTION 01310-CONSTRUCTION SCHEDULE

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

To assure adequate planning and execution of the work so that the work is completed within the number of calendar days allowed in the Contract, and to assist the ENGINEER in appraising the reasonableness of the proposed schedule and in evaluating progress of the work, prepare and maintain the schedules as described in this Section. Definition: "Day" used throughout the Contract, unless otherwise stated, means "calendar day".

1.3. QUALITY ASSURANCE QUALIFICATIONS OF SCHEDULING PERSONNEL:

Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule data, in analyzing by use of Critical Path Method or PERT, and in preparation and issue of periodic reports as required below. Reference Standards: Perform all data preparation, analysis, charting, and updating in accordance with all recommendations contained in the current edition of "CPM In Construction" manual of Associated General Contractors, or in accordance with other standards approved by the ENGINEER. Reliance upon approved schedule: The construction schedule as approved by the ENGINEER will be an integral part of the Contract, and will establish interim contract completion dates for the various activities. Should any activity not be completed within 15 days after the stated scheduled date, the ENGINEER should have the right to order the Contractor to expedite completion of the activity by whatever means the ENGINEER deems appropriate and necessary, without additional compensation to the Contractor. Should any activity be 30 or more days behind schedule, the ENGINEER shall have the right to perform the activity or have the activity performed by whatever method the ENGINEER deems appropriate. The Contractor shall reimburse cost incurred by the ENGINEER in connection with expediting construction activity under this Article to the ENGINEER. It is expressly understood and agreed that failure by the ENGINEER to exercise the option to either order the Contractor

to expedite an activity or to expedite the activity by other means shall not be considered precedent setting for any other activities.

1.4. SUBMITTALS GENERAL:

Comply with the provisions of Section 01300 - SUBMITTALS AND SUBSTITUTIONS. Preliminary Analysis: Within ten days after receipt of Notice to Proceed, submit one reproducible copy and four prints of a preliminary Construction Schedule, plus four prints of proposed forms for Materials Status Reports, prepared in accordance with Part 3 of this Section. Periodic Reports: On the first working day of each month, submit four prints of the Construction Schedule updated as described in Part Three of this Section. Accompanying each periodic submittal of Construction Schedule submit four prints of the Materials Status Reports updated as described in Part Three of this Section.

2. PRODUCTS

2.1. CONSTRUCTION ANALYSIS DIAGRAM:

Graphically show the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all Subcontractors whose work is shown on the diagram. Activities shown on the diagram shall include, but are not necessarily limited to: Project mobilization; Submittals and approvals of Shop Drawings and Samples; Procurement of equipment and critical materials; Fabrication of special material and equipment, and their installation and testing; Final cleanup; Final inspection and testing; All activities by the ENGINEER that affect progress, required dates for completion, or both, for all and for each part of the work The detail of information shall be such that duration times of activities shall normally range from one to 15 days. The selection and number of activities shall be subject to the Engineer's approval. Show on the diagram, as a minimum for each activity, preceding and following event numbers, description of each activity, cost, and activity duration in calendar days. Submit diagram on a sheet 75 cm (30") high by the width required. Mathematical Analysis: Furnish a mathematical analysis of the diagram by manual or computer aided means, including a tabulation of each activity. Show the following information as a minimum for each activity: Preceding and following event number; Activity description; Estimated duration of activities; Earliest start date (by calendar date); Latest start date (by calendar date); Earliest finish date (by calendar date); Latest finish date (by calendar date); Slack or float (in calendar days); Monetary value of the activity; Percentage of activity completed; Contractor's earnings based on portion of activity completed. The means used in making the mathematical analysis shall be capable of compiling the total value of completed and partially completed activities, and be capable of accepting modifications approved for time and logic adjustment. Periodic Reports: If computer-aided means are used, list the activities in computer printout sorts as follows: By the preceding event number from lowest to highest, and then in order of the following event number; By the amount of float, then in order of preceding event numbers, and then in order of succeeding event numbers; In order of preceding event numbers, and then in order of succeeding event numbers (show the dollar amount and dollars spent to date for each activity); Other sorts requested by the Engineer, for which the Contractor will be reimbursed in accordance with the General Conditions provisions for "Changes".

2.2. MATERIALS STATUS REPORT FORMAT:

The Contractor's standard materials status report form will be acceptable if, in the Engineer's judgment, it provides sufficient pertinent data to determine that materials procurement flow is adequate for all needs of the Work. Content: Show at least the following information: Item description, listed in accordance with Specifications Section number in which the item is called for Purchase Order number and date of issue Vendor name Date shipped, and shipping means utilized Estimated date of arrival at job site Actual date of arrival at job site, and receiving report number Data Processing: Process the data by manual or computer-aided methods, but to a degree of promptness and accuracy assuring complete display of all pertinent current information at date of each periodic report.

3. EXECUTION

3.1. PRELIMINARY ANALYSIS CONTENTS

Show all activities of the Contractor under this Work for the period between receipt of Notice to Proceed and submittal of Construction Schedule. Show the Contractor's general approach to remainder of the Work. Show cost of all activities scheduled for performance before submittal and approval of the Construction Schedule. Submittal Submittal shall be in accordance with submittal requirement.

3.2. CONSTRUCTION SCHEDULE

As soon as practicable after receipt of Notice to Proceed, complete the construction analysis described in Articles 2.01 above, in preliminary form. Meet with the ENGINEER, review contents of proposed Construction Schedule, and make all revisions agreed upon.

3.3. MATERIALS STATUS REPORT

As soon as practicable after receipt of Notice to Proceed, meet with the ENGINEER, review contents of proposed Materials Status Reports, and make all revisions to format agreed upon.

3.4. PERIODIC REPORTS CONSTRUCTION SCHEDULE:

Contents: Report actual progress by updating the mathematical analysis Note on the summary report, or clearly show on a revised issue of affected portions of the detailed diagram, all revisions causing changes in the detailed program. Revise the summary report as necessary for clarity. Show activities or portions of activities completed during the reporting period, and their actual value. State the percentage of Work actually completed as scheduled as of the report date, and the progress along the critical path in terms of days ahead of or behind the allowable dates. If the Work is behind schedule, also report progress along other paths with negative slack. Include a narrative report which shows, but is not necessarily limited to: A description of the problem areas, current and anticipated; Delaying factors, and their impact; An explanation of corrective actions taken or proposed Show the date of latest revision.

Submit in accordance with the provisions of section 01300-Submittal. Materials Status Report: On the letter of transmittal, accompanying periodic reports, on an accompanying summary sheet, or by other means acceptable to the ENGINEER, clearly indicate those

items the deliveries of which are critically overdue or otherwise hazardous to maintenance of the approved schedule. Submit in accordance with the provisions of section 01300-Submittal

3.5. REVISIONS

Make only those revisions to approved Construction Schedule and approved Materials Status Reports as are approved in advance by the ENGINEER.

SECTION 01500- TEMPORARY FACILITIES AND CONTROL

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Temporary facilities and controls required for this Work include, but are not necessarily limited to: Temporary utilities such as water, electricity and telephone Field offices and sheds Sanitary facilities Enclosures such as tarpaulins, barricades, and canopies Fencing of the construction area Haul roads. Related Work Described Elsewhere: Except that all equipment furnished by Subcontractors shall comply with all requirements of pertinent safety regulations, the ladders, planks, hoists, and similar items normally furnished by the individual trades in execution of their own portions of the work are not part of this Section. Permanent installation and hook-up of the various utility lines are described in pertinent other Sections of these Specifications.

1.3. PRODUCT HANDLING

Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

1.4. JOB CONDITIONS

Make all required connections to existing utility systems with minimum disruption to services in the existing utility systems, when disruption of the existing service is required, do not proceed without the ENGINEER's approval and, when required, provide alternate temporary service.

2. PRODUCTS

2.1. UTILITIES GENERAL:

All temporary facilities shall be subject to the Engineer's approval. Water: Furnish and install all necessary temporary water lines and water supply and, upon completion of the Work, remove all such temporary facilities. The Contractor will furnish all water needed for construction, at no cost to the Owner. Electricity: Furnish and install all necessary

temporary wiring and, upon completion of the work, remove all such temporary facility. Furnish and install area distribution boxes so located that the individual trades may use 30m (100') maximum length extension cords to obtain adequate power and artificial lighting at all points where required for the work, for inspection and for safety. The Contractor shall make arrangements for and pay for all temporary electrical power required for construction. Telephone: Make all necessary arrangements and pay all costs for operation and installation of telephone service to the Contractor's office at the site.

2.2. CONTRACTOR'S FACILITIES FIELD OFFICE:

Provide a field office building and sheds adequate in size and accommodation for all Contractor's Offices, supplies and storage. Within the Contractor's facilities, provide enclosed space adequate for holding weekly project meetings. Furnish with all required tables, chairs, and utilities. The entire facility, including furniture, will remain the property of the Contractor and shall be removed from the site after completion of the work. Sanitary Facilities: Provide temporary sanitary facilities in the quantity required, for use of all personnel. Maintain in a sanitary condition at all times.

Enclosures Furnish, install, and maintain for the duration of construction all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges, platforms, and other temporary construction necessary for proper completion of the work in compliance with all safety and other regulations.

2.3. PROJECT SIGNS

Allow no signs or advertising of any kind on the job site except as specifically approved in advance by the

2.4. ENGINEER

Fencing of the Construction Area General: Furnish and install temporary fence around construction areas on the site Construction: The temporary fence shall consist of woven wire mesh not less than 1.82 m (72") in height, complete with metal posts and all required bracing and with truck and pedestrian gates as required.

3. EXECUTION

3.1. MAINTENANCE AND REMOVAL

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the ENGINEER.

SECTION 01710- CLEANING

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section. Related Work Described Elsewhere: In addition to standards described in this Section, comply with all requirements for cleaning up as described in various other Sections of these Specifications.

1.3. QUALITY ASSURANCE INSPECTION:

Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met. Codes and Standards: In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

2. PRODUCTS

2.1. CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2. COMPATIBILITY

Use only the cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

3. EXECUTION

3.1. PROGRESS CLEANING GENERAL:

Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology. Site: Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site; restock, tidy, or otherwise service all arrangements to meet the requirements of subparagraphs 3.1.1. Maintain the site in a neat and orderly condition at all times. Structures: Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this sub-program, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and hand-held broom. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the

space in which finish materials have been installed. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from all foreign material that, in the opinion of the ENGINEER may be injurious to the finish floor material.

3.2. FINAL CLEANING DEFINITION:

Except as otherwise specifically provided, "clean" (for the purpose of this Article) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaning using commercial quality building maintenance equipment and materials. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01. Site: Unless otherwise specifically directed by the ENGINEER, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris. Structures: Exterior: Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the ENGINEER may require light sandblasting or other cleaning at no additional cost to the Owner. Interior: Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint dropping, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment. Timing: Schedule final cleaning as approved by the ENGINEER to enable the Owner to accept a completely clean project.

SECTION 02220- EXCAVATING, FILLING, AND GRADING

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Excavation, filling, and grading for this Work includes, but is not necessarily limited to: Excavating for footings and foundations; Filling and backfilling to attain indicated grades; Trenching and trench backfilling;

Rough and finish grading of the site. Related Work Described Elsewhere: Testing laboratory services

1.3. JOB CONDITIONS DUST CONTROL:

Use all means necessary to control dust on and near the Work and on and near all off-site other areas if such dust is caused by the Contractor's operations during performance of the Work or if resulting from the condition in which the Contractor leaves the site. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors and concurrent performance of other work on the site. Protection: Use all

means necessary to protect all materials of this Section before, during and after installation and to protect all objects designated to remain. In the event of damage, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to the Owner.

2. PRODUCTS

1 Fill Material - General All fill material shall be subject to the approval of the ENGINEER. 2 Fill Material All fill material shall have a plasticity index of 15 or less and shall be free from organic matter and other deleterious substance.

3. EXECUTION

3.1. GENERAL FAMILIARIZATION:

Prior to all work of this Section, become thoroughly familiar with the site, the site conditions, and all portions of the Work falling within this Section. Backfilling Prior to Approvals: Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to all required inspections, tests, and approvals. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner. After the work has been completely tested, inspected, and approved, make all repairs and replacements necessary to restore the Work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

3.2. FINISH EXCAVATION AND LINES

Accurately set all finish elevations and lines. Carefully preserve all data and monuments set and, if displaced or lost, immediately replace to the approval of the ENGINEER and at no additional cost to the Owner.

3.3. EXCAVATING DEPRESSIONS:

Where depressions result from, or have resulted from, the removal of surface or subsurface obstructions, open the depression to equipment working width and remove all debris and soft material as directed by the ENGINEER. Other Areas: Excavate to grades shown on the Drawings. Where excavation grades are not shown on the Drawings, excavate as required to accommodate the installation. Overexposing: Backfill and compact all over-excavated areas as specified for fill below, and at no additional cost to the Owner.

3.4. PREPARATION OF SUBGRADE SCARIFYING:

After the site has been cleared, stripped, and excavated to within six inches of the specified depths for re-compaction, scarify the exposed surface to a minimum depth of six inches, thoroughly moisture-condition, and compact to the requirements specified for fill below. Leveling: Remove all ruts, hummocks, and other uneven surfaces by surface grading prior to placement of fill.

3.5. EXCESS WATER CONTROL UNFAVORABLE WEATHER:

Do not place, spread, or roll fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the

ENGINEER. Flooding: Provide berms or channels to prevent flooding of subgrade. Promptly remove all water collecting in depression. Softened Subgrade: Where soil has been softened or eroded by flooding or placement during unfavorable weather, remove all damaged areas and re-compact as specified for fill and compaction below. Dewatering: Provide and maintain at all times during construction, ample means and devices with which to remove promptly and dispose of all water from every source entering the excavations or other parts of the Work. Dewater by means that will ensure dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3.6. FILL AND COMPACTION FILLING:

After subgrade, compaction has been approved by the ENGINEER spread approved fill material in layers not exceeding eight inches in un-compacted thickness. Moisture-Conditioning: Water or aerate the fill material as necessary, and thoroughly mix to obtain a moisture content at or within 3% of optimum which will permit proper compaction. Compaction, General: Compact each soil layer to at least the specified minimum degree. Repeat compaction process until plan grade is attained. Degree of Compaction Requirements: Structural Fill: Densify all structural fill, including re-compacted existing fill and backfill, to a minimum degree of compaction of 95%. Pavement Areas: Compact the upper six inches of fill in pavement areas to a minimum degree of compaction of 95%. Jetting: Jetting is prohibited unless specifically authorized by the ENGINEER for densification of cohesionless material.

3.7. GRADING GENERAL:

Except as otherwise directed by the ENGINEER, perform all rough and finish grading required to attain the elevations shown on the Drawings. Grading Tolerance: Rough Grade: Building and parking areas: Plus or minus 0.1 foot Finish Grade: Parking areas: Plus or minus 0.05 foot Landscaped areas: Plus or minus 0.05 foot Treatment After Completion of Grading: After grading is completed and the ENGINEER has finished his inspection, permit no further excavating, filling, or grading except with the approval of and inspection of the ENGINEER. Erosion Prevention: Use all means necessary to prevent erosion of freshly graded areas during construction and until permanent drainage and erosion control measures have been installed.

3.8. EXCAVATING FOR FOOTINGS PREPARATION:

To minimize differential settlement, it is essential that earth surfaces upon which footings will be placed be undisturbed natural earth or shall be compacted to the approval of the ENGINEER and in accordance with the compaction requirements established in this Section of these Specifications. Excavating: Excavate to the established lines and grades. Cut off bottom of trenches level, and remove all loose soil. Where soft spots are encountered, remove all defective MATERIAL AND REPLACE WITH LEAN CONCRETE AT NO ADDITIONAL COST TO THE OWNER.

3.9. PLACING OF GRANULAR CUSHION

Carefully place the specified granular cushion in areas to receive concrete slabs on grade, uniformly attaining the thickness indicated on the Drawings, and providing all required transition planes.

3.10. TRENCHING GENERAL:

Perform all trenching required for the installation of items where the trenching is not specifically described in other Sections of these Specifications. Make all trenches open vertical construction with sufficient width to provide free working space at both sides of the trench and around the installed item as required for caulking, joining, backfilling, and compacting. Depth: Trench as required to provide the elevations shown on the Drawings. Where elevations are not shown on the Drawings, trench to sufficient depth to give a minimum of 18 inches of fill above the top of the pipe, measured from the adjacent finished grade, except provide a minimum of 30 inches cover on asbestos-cement pipe. Correction of Faulty Grades: Where trench excavation is inadvertently carried below proper elevations, backfill with material approved by the ENGINEER, and then compact to provide a firm and unyielding subgrade and/or foundation to the approval of the ENGINEER and at no additional cost to the Owner. Trench Bracing: Properly support all trenches in strict accordance with all pertinent rules and regulations. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage. In the event of damage to such improvements, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to the Owner. Arrange bracing, sheeting, and shoring to not place stress on any portion of the completed Work until the general construction thereof has proceeded far enough to provide sufficient strength. Removal of Trench Bracing: Exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse and caving of the excavation faces being supported. Grading and Stockpiling Trenched Material: Control the stockpiling of trenched material in a manner to prevent water running into the excavations. Do not obstruct surface drainage, but provide means whereby storm and wastewaters maybe diverted into existing gutters, other surface drains, or temporary drains.

3.11. FOUNDATIONS FOR PIPES GENERAL:

Grade the trench bottoms to provide a smooth, firm, and stable foundation throughout the length of the pipe. Foundation Material: Place a minimum of six inches of the specified material in the bottom of the trench. Sub-Surface Conditions: In areas where soft, unstable materials are encountered, remove the unstable material and replace it with material approved. Make sufficient depth to develop a firm foundation for the item being installed. If the need for such over-excavation has been occasioned by an act or failure to act on the part of the Contractor, make the over-excavation and replacement at no additional cost to the Owner. Shaping: At each joint in pipe, recess the bottom of the trench as required into the firm foundation in such a manner as to relieve the bell of the pipe of all load and to ensure continuous bearing of the pipe barrel on the firm foundation. Accurately shape all pipe subgrade and fit the bottom of the trench to the pipe shape. Use a drag template shaped to conform to the outer surface of the pipe if other methods do not produce satisfactory results.

3.12. BEDDING FOR PIPES GENERAL:

Place the specified material in the trench, simultaneously on each side of the pipe for the full width of the trench, to a maximum depth of three feet and a minimum of one foot above the outside diameter of the pipe barrel. Densification: Densify the bedding material after placing by thoroughly saturating with water and vibrating with jetting equipment and

a concrete vibrator stinger, at maximum intervals of two feet along both sides of the pipe. Take special care to provide firm bedding support on the underside of the pipe and fittings for the full length of the pipe. Alternate Bedding: Other bedding procedures and materials may be used if prior written approval has been obtained.

3.13. BACKFILL FOR PIPES USING ON-SITE MATERIALS:

After the pipe has been thoroughly bedded and covered, spread the on-site material in uniform lifts of not more than eight inches in un-compacted thickness, and then compact as specified in this Section. Repeat the spreading and compacting procedure until adjacent grade level is attained.

SECTION 02250- SITE CONCRETE WORK

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Concrete walks. Concrete curbs and gutters. Precast concrete parking bumpers. Related Work Described Elsewhere: Concrete formwork Concrete Reinforcing Structural concrete for buildings

1.3. QUALITY ASSURANCE

Comply with standards as specified in this Section and as listed in Section 03310 - STRUCTURAL CONCRETE. In case of conflict between the referenced standards, the more stringent requirements shall govern. 4 Materials, Workmanship, Tests, and Inspection All concrete Work under this section shall be in accordance with the requirements under section "Structural Concrete", unless otherwise specified herein. Testing shall be in accordance with Section 03310 - STRUCTURAL CONCRETE.

1.4. EXPANSION JOINTS

Provide expansion joints in curbs and walks spaced not more than 20'-0" on centers unless otherwise indicated or specified. Joints shall be made using preformed expansion joint filler strip material as specified under the section "Structural Concrete".

2. PRODUCTS

2.1. PORTLAND CEMENT CONCRETE

See Section 03310 - STRUCTURAL CONCRETE. All concrete shall be of the “Transit-Mixed” type furnished by a concrete supplier regularly engaged in the production of Portland cement concrete. Submit a mix design based to the Engineer for approval prior to ordering any concrete. Site mixed concrete in portable mixers will not be permitted.

2.2. CONCRETE STRENGTH:

All concrete for the Work under this section shall be 3,000 p.s.i. compressive strength at 28 days

3. EXECUTION

3.1. PLACING AND FINISHING EXTERIOR FINISH SLABS:

Final troweling shall produce hard, impervious, and nonslip surfaces, free from defects and blemishes. The finished surface shall be free from low and high spots and shall contact a 10-foot straight edge for its entire length. A maximum of 1/8" tolerance will be permitted. No dry cement or mixture of dry cement and sand shall be sprinkled on the surface to absorb moisture or stiffen the mix. Burnishing which produces a smooth, slick surface shall be avoided. Exterior paving and Cement Walks: Finish as specified above, except the surface shall be given a non-slip broom finish. Monolithic stair treads shall be given a hair broom finish.

3.2. EXPANSION JOINTS:

Provide expansion joints where indicated in walks and exterior slabs. If joints are not indicated, they shall be spaced approximately 20'-0" apart. Joints shall extend entirely through the slab with joint filler in one piece for the width of the walk or slab. Joint filler shall be 3/8" thick unless otherwise indicated.

3.3. MARKINGS:

Slabs, walks, and paving shall be marked into areas as indicated with markings made with a "V"-grooving tool. Marks shall be round-edged, free from burrs or obstructions with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

SECTION 03100- CONCRETE FORMWORK

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Provide formwork in accordance with the provisions of this Section for all cast-in-place concrete shown on the Drawings or required by other Sections of these Specifications. Related Work Described Elsewhere: Excavating for footings is described in Section 02220 - EXCAVATING, FILLING, AND GRADING.

1.3. QUALITY ASSURANCE DESIGN OF FORMWORK:

Design of formwork is the Contractor's responsibility. Standards: Comply with pertinent provisions of the ACI 347 as listed in Section 01085 - APPLICABLE STANDARDS.

1.4. SUBMITTALS GENERAL:

Comply with pertinent provisions of Section 01300 - SUBMITTALS AND SUBSTITUTIONS. Manufacturer's Data: Within 30 calendar days after award of the Contract, submit manufacturers' data and installation instructions for proprietary materials including form coatings, ties and accessories, and manufactured form systems if used.

2. PRODUCTS

2.1. FORM MATERIALS FORMS:

Construct formwork for exposed (painted or unpainted) concrete surfaces with smooth faced undamaged plywood or other panel type materials acceptable to the Engineer, to provide continuous, straight, smooth as-cast surfaces. Furnish in largest practicable sizes to minimize number of joints. Construct formwork for concrete concealed from view or covered with cement plaster with rough sawn boards of sound grade, as approved by the Engineer, to provide a mechanical bond for subsequent application of plaster. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without excessive and objectionable bow or deflection.

2.2. FORM TIES:

Provide factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal. Provide ties so that portion remaining within concrete after removal of exterior parts is at least 3.8 cm (1-1/2") from the outer concrete surface. Provide form ties that will not leave a hole larger than 2.5 cm (1") diameter in the concrete surface.

2.3. FORM COATINGS:

Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds.

2.4. DESIGN OF FORMWORK GENERAL:

Design, erect, support, brace, and maintain formwork so that it will safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure. Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose. Construct formwork so that concrete members and structure are of correct size, shape, alignment, elevation and position. Support form facing materials by structural members spaced sufficiently close to prevent objectionable deflection. Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities, and within-allowable tolerances. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

2.5. EARTH FORMS:

Side forms of footings may be omitted and concrete placed directly against excavation only when requested by the Contractor and accepted by the Engineer. When omission of forms is accepted, provide minimum additional concrete 2.5 cm (1") on each side of the minimum design profiles and dimensions shown.

3. EXECUTION

3.1. SURFACE CONDITIONS

Examine the substrate and conditions under which work of the Section is to be performed, and correct unsatisfactory conditions that would prevent proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2. FORM CONSTRUCTION GENERAL:

Construct forms complying with ACI 347, to the exact sizes, shapes, lines, and dimensions shown and as required to obtain accurate alignment, location, grades, level, and plumb work in finish structures. Provide for openings, offsets, linkage, keyways, recesses, moldings, reglets, chamfers, blocking, screeds, bullheads, anchorages, inserts, and other features required. Use selected materials to obtain required finishes. Forms for openings and construction that accommodates installation by other trades whose materials and products must be fabricated before the opportunity exists to verify the measurements of adjacent construction which affects such installations, shall be accurately sized and located as dimensioned on the Drawings. In the event that deviation from the Drawing dimensions results in problems in the field, the Contractor shall be responsible for resolution of the conditions as approved by the ENGINEER without additional expense to the Owner.

3.3. FABRICATION:

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where the slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses and the like to prevent swelling and assure ease of removal. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement and for placement of concrete. Brace temporary closures and set tightly to temporary openings on forms in as inconspicuous locations as possible, consistent with design requirements. Form intersecting planes to provide true, clean out corners. Forms for Exposed Concrete: Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared intersections. Provide sharp, clean corners at intersecting planes without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections. Use extra studs, walers, and bracing to prevent objectionable bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material that will produce bow. Assemble forms so they may be readily removed without damage to exposed concrete surfaces.

3.4. CORNER TREATMENT:

Unless shown otherwise, form chamfers with 2 cm x 2 cm (3/4" x 3/4") strips, accurately formed and surfaced to produce uniformly straight lines and tight edge joints on exposed concrete. Extend terminal edges to required limit and miter chamfer strips at changes in direction. Control Joints: Locate as indicated. Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Verify size and location of openings, recesses and chases with the trade requiring such items. Accurately place and securely support items to be built into forms.

3.5. CLEANING AND TIGHTENING:

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before concrete is placed. Re-tighten forms immediately after concrete placement as required to eliminate mortar leaks.

3.6. FORM COATINGS

Coat form contact surfaces with form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to be exposed to surfaces that will be bonded to fresh concrete. Apply in compliance with manufacturer's instruction.

3.7. INSTALLATION OF EMBEDDED ITEMS GENERAL:

Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

3.8. EDGE FORMS AND SCREED STRIPS FOR SLABS:

Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support types of screeds required.

3.9. REMOVAL OF FORMS GENERAL:

Formwork not supporting concrete, such as sides of beams, walls, columns, and similar parts of the Work, may be removed after cumulatively curing at not less than 10 degree C (50 degrees F) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operation, and provided that curing and protection operations are maintained.

3.10. FORM FACING MATERIAL:

Form facing material may be removed four days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.11. RE-USE OF FORMS

Clean and repair surfaces of forms to be re-used in the Work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork. When forms are reused for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets.

SECTION 03200- CONCRETE REINFORCEMENT

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Provide complete, in place, all steel required for reinforcement of cast-in-place concrete as shown on the Drawings. Related Work Described Elsewhere: Steel reinforcement is also required under Section 03310 - STRUCTURAL CONCRETE.

1.3. QUALITY ASSURANCE

Comply with pertinent provisions of following standards as listed in Section 01085, except as herein modified. CRSI "Manual of Standard Practice" ACI 318

1.4. SUBMITTALS GENERAL:

Comply with pertinent provisions of Section 01300 - SUBMITTALS AND SUBSTITUTIONS. Shop Drawings: Within 20 calendar days after award of the Contract, submit complete Shop Drawings of all material proposed to be furnished and installed under this Section. Show: Bar schedules, stirrup spacing, diagrams of bent bars, and arrangement and assemblies. Make Shop Drawings in accordance with ACI 315. Mill Certificates: Accompanying the Shop Drawings, submit steel producer's certificates of mill analysis, tensile, and bend tests for reinforcing steel.

1.5. PRODUCT HANDLING DELIVERY:

Deliver reinforcement to the job site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams. Storage: Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

2. PRODUCTS

2.1. MATERIALS REINFORCING BARS:

Comply with ASTM A 615, Grade 60 for #7 bars and larger; and grade 60 all other bars, domestic manufacture. Steel Wire: Comply with ASTM A 82. Welded Wire Fabric: Comply with ASTM A 185. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement in place: Use wire bar type supports complying with CRSI recommendations, unless otherwise indicated. Do not use wood, brick, and other unacceptable materials. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with hot-dip galvanized or plastic protected legs.

2.2. FABRICATION GENERAL:

Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI Manual. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted in the Work: Bar lengths, depths and bends exceeding specified fabrication tolerances. Bends or kinks not indicated on Drawings or final Shop Drawings. Bars with reduced cross-section due to excessive rusting or other causes

3. EXECUTION

3.1. INSPECTION

Examine the substrate, formwork and the conditions under which concrete reinforcement is to be placed, and correct conditions that would prevent proper and timely completion of the work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2. INSTALLATION GENERAL:

Comply with the specified standards for details and methods of reinforcement, placement and support, and as herein specified. Clean reinforcement to remove loose rust and mill scale, earth, and other materials that reduce or destroy bond with concrete. Position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers as required. Place reinforcement to obtain the minimum coverage for concrete protection. Arrange, space and securely tie bars and bar supports together with 16-gage wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away form exposed concrete surfaces. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh. Provide sufficient numbers of supports and of strength sufficient to carry reinforcement. Do not place reinforcing bars more that 5 cm (2") beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

3.3. SPLICES:

Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly tying wire.

SECTION 03310- STRUCTURAL CONCRETE

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Provide all cast-in-place concrete, complete, in place, as indicated on the Drawings, specified herein, and needed for a complete and proper installation.

1.3. RELATED WORK ELSEWHERE

Section 03100 - CONCRETE FRAMEWORK, Section 03200 - CONCRETE REINFORCEMENT

1.4. QUALITY ASSURANCE STANDARDS

Comply with standards specified in this Section as listed in Section 01085 - APPLICABLE STANDARDS. In case of conflict between the referenced standards, the more stringent requirements shall govern.

1.5. QUALIFICATIONS OF INSTALLER:

Throughout the progress of installation of the work of this Section, provide at least one person who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills, and who shall be present at the site and shall direct all work performed under this Section. In actual installation of the work of this Section, use adequate numbers of skilled workers to ensure installation in strict accordance with the approved design. In acceptance or rejection of work performed under this Section, the ENGINEER will make no allowance for lack of skill on the part of workers.

1.6. LABORATORY TESTS AND CONTROLS:

Coordinate with concrete supplier's or an independent laboratory to obtain the following: Tests on cement and aggregate Design and control of mixes Testing of concrete cylinders Furnishing reports of all test. Deliver test cylinders to Laboratory in sufficient time to permit testing specified number of days The Contractor shall work with the testing laboratory personnel to assist with any field-testing which may be required. The required tests on cement and aggregate are covered by ASTM C-150 and C-33 respectively. Design mix shall be established to provide concrete of 10% higher strength than the specified job strength, and proposed mix shall be submitted to the ENGINEER for review and approval

prior to use on the job. Laboratory cylinders shall be made in accordance with ASTM C-192. Compression tests shall be made in accordance with ASTM C-39, using representative materials. Control of mixes shall be maintained at the Ready-Mix plant and on the job. When the mix is approved, no change shall be made without the written consent of the ENGINEER. Cylinders shall be cast on the job in accordance with ASTM C-31 and laboratory compression tests made in accordance with ASTM C-39. For each pour, two cylinders shall be cured in the laboratory and two in the field. One cylinder from each location shall be tested at 7 days and the other at 28 days. Results from field cylinders will determine compliance with specifications. Copies of all test reports shall be furnished as directed.

2. PRODUCTS

2.1. CEMENT

Portland cement, ASTM C-150, Type II.

Use only one brand of cement for the entire work.

2.2. WATER

From ASPA Water Supply, or from ASPA approved source

2.3. AGGREGATE

ASTM C-33 with maximum size of 1", except for concrete block fill with 1/2" cinders. Aggregate must be free of lignite or any other deleterious materials (0.5% limit).

2.4. CURING MATERIALS

Liquid Curing and Sealing Compounds: Shall conform to ASTM C-309, Type 1. Sheet Materials: Shall conform to ASTM C-171. Burlap Cloth: Burlap cloth made from jute or kenaf and weighing approximately 305 grams per sq. m. (9 oz. per sq. yd.) for moist curing shall conform to AASHTO M 182 and shall use two layers.

2.5. OTHER MATERIALS

Preformed expansion joint filler material shall be bituminous fiber type conforming to ASTM D1751. Water-stops shall be extruded from new stock polyvinyl chloride, ribbed, and expandable center bulb. The minimum width shall be 6 inch and minimum thickness shall be 1/4 inch. Vapor barriers shall be polyethylene sheets having a thickness of 0.2 mm (0.06 inch) minimum. Chemical floor hardener shall be colorless aqueous solution containing a blend of magnesium fluorosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 28oz. per gallon. Non-shrink grout shall be a ready-to-use metallic aggregate product requiring only the addition of water at the job site, and shall have the following attributes: Be capable of producing a flowable grouting material having no drying shrinkage or settlement at any age. The compressive strength of grout (50 mm or 2" cubes) shall be not less than 360 kg per sq. cm (5000 psi) at age seven days, and 527 kg per sq. cm (7500 psi) at age 28 days. Store, mix, and place the non-shrink grout in strict accordance with manufacturer's recommendations as approved by the ENGINEER.

2.6. CONCRETE ADMIXTURES:

Admixtures shall conform to ASTM C 494, Type A for water reducing and Type D for water-reducing/set retarding. Acceptable Substitutes: The ENGINEER will only consider those proposed admixture substitutions that have been completely tested and reported upon by the testing laboratory in accordance with the provisions of subparagraph 1.2.3.1 above.

2.7. BATCHING, MIXING, AND DELIVERY EQUIPMENT

Use transit mixed concrete from approved batching and mixing plant or approved on-site mixing equipment and methods. Batch, mix and transport concrete to site in accordance with provisions of ASTM C 94.

Concrete Mixes Requirements: All concrete shall be of the “Transit-Mix” type supplied by a producer regularly engaged in the production and sale of Portland cement concrete. Job mixed concrete in portable batch mixers will not be accepted. Mix: Uniformly and accurately, control proportion of material weight. Control mixes for concrete as follows: 3500 psi -- at least 5.0 sacks of cement per cubic yard and not over 6.75 gallons of water per sack. Slump: Concrete mixes shall be from 3" to 5", except block fill that shall be 4" to 6". Calcium Chloride: Calcium chloride shall not be used. Strength: 28-day strength for all concrete shall be 3500 psi.

3. EXECUTION

3.1. INSPECTION

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2. CONCRETE PLACEMENT GENERAL:

Place concrete in compliance with practices and recommendations of ACI 304, and as herein specified.

3.3. PROCEDURES:

Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete, that has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as herein specified. Perform concrete placing at such a rate that concrete that is being integrated with fresh concrete is still plastic. Deposit concrete as nearly as practicable in its final location to avoid segregation due to rehandling and flowing. Do not subject concrete to any procedure that will cause segregation. Screed concrete that is to receive other construction to the proper level to avoid excessive skimming and grouting. Do not use concrete which becomes non-plastic and unworkable, or does not meet the required quality limits, or which has been contaminated by foreign materials. Remove rejected concrete from the site and dispose of it in a location approved by the ENGINEER for that purpose. Placement Schedule: Place concrete in conformance with the placement schedule to ensure an even distribution of loads throughout the entire structure.

3.4. CONCRETE CONVEYING:

Handle concrete from the point of delivery and transfer to the concrete conveying equipment and to the point of final deposit, as rapidly as practicable and by methods that will prevent segregation and loss of concrete mix materials. Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit. Keep interior surfaces of conveying equipment, including chutes and tremies, free from hardened concrete, debris, water, and other deleterious materials. Pumps may be used only if they can pump the mix designed. Do not add fine aggregate or water to the mix to satisfy needs of a pumping device. Use chutes or tremies for placing concrete where a drop of more than 2 m (72") is required. Where free drop through tremies exceeds 6 m (18'-0"), use flow-checking devices. Placing

3.5. CONCRETE SLABS:

Deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed. Consolidate concrete during placement by use of the specified equipment, thoroughly working concrete around the reinforcement and into corners. Consolidate concrete in remainder of slabs by vibrating bridge screeds, roller pipe screeds, or other methods acceptable to the ENGINEER. Limit the time of vibrating consolidation to prevent bringing an excess of fine aggregate to the surface. Bring slab surfaces to the correct level with a straight edge, and then strike off. Use bull floats or darbies to smooth the surface, leaving it free from bumps and hollows. Do not sprinkle water on the plastic surface; do not disturb the slab surfaces prior to start of finishing operations.

3.6. HOT WEATHER PLACING:

When hot weather conditions exist, that would seriously impair the quality and strength of concrete, place the concrete as follows: Maintain concrete temperature at time of placement below 32 degrees C (90 degrees F). Use chilled mixing water or chopped ice to control concrete temperature, provided the water equivalent of the ice is calculated to the total amount of water. Cover reinforcing steel with water-soaked burlap if the steel becomes too hot. Steel temperature shall not exceed the ambient air temperature immediately prior to placement of concrete. Wet forms thoroughly prior to placement of concrete Use set-control admixtures in the mix.

3.7. CONSOLIDATION GENERAL:

Consolidate all concrete in accordance with provisions of ACI 309. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand spading, rodding or tamping. Do not use vibrators to transport concrete inside the forms. During all phrases of operation, maintain a frequency of not less than 10,000 vibrations per minute internal vibrator. Do not vibrate forms or reinforcement.

3.8. EQUIPMENT:

Provide adequate number of units and power source at all times. Maintain spare units on hand to ensure adequacy. If, in the opinion of the ENGINEER the equipment being used is not adequate to accomplish proper consolidation, the ENGINEER may order delay in

further placement of concrete until such equipment is available for use at the location of placement of concrete.

3.9. PROCEDURES:

Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation of aggregates. Insert the vibrator to penetrate the lift immediately below the one being placed and manipulate to blend the two lifts. Use the vibrator to melt down the concrete as it is being placed, and use the vibrator to consolidate the mass of concrete. Spacing between insertions of the vibrator that is used to consolidate shall not exceed twice the radius of action as shown in tables 5.1.4 of ACI 309. Under no circumstances shall the points of insertion during the consolidation phase be more than 45 cm (18") apart. Maintenance of Vibrators: Initiate a maintenance program for the vibrators to assure that they are operating at peak efficiency at all times, and to facilitate effective consolidation of the concrete.

3.10. JOINTS ISOLATION JOINTS IN SLABS ON GRADE:

Provide isolation joints in slabs on grade at points of contact between slabs on grade and vertical surfaces where indicated. Calk in accordance with provisions of Section 07951-SEALANTS AND CAULKING. Control Joints in Slabs on Grade: Provide control joints in slabs on grade to form panels or patterns as shown. Use inserts 6 mm (1\4") wide by 1\5 to 1\4 of the slab depth. Form control joints by inserting a pre-molded hardboard or fiberboard strip into the fresh concrete until the top surface of the strip is flush with the slab surface. After the concrete has cured for at least seven days, remove inserts and clean loose debris from the grooves. Caulk in accordance with provisions of Section 07951-SEALANTS AND CAULKING

3.11. CONCRETE PLACEMENT MONOLITHIC SLAB FINISHES:

Trowel Finish: Apply trowel finish to monolithic slab surfaces that are to be exposed to view, unless otherwise shown and to slab surfaces that are to be covered with resilient flooring, carpeting, paint or other thin-film finish coating system. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface. Consolidate the concrete surface by the final hand troweling operation, free from trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 3 mm (1\8") in 3 m (10'0") when tested with a 3 m (10'-0") straightedge. Grind smooth those surface defects that would telegraph through applied floor covering system. Non-Slip Broom Finish: Apply nonslip broom finish to exterior concrete platforms, steps, and ramps and elsewhere as shown on the Drawings or in the schedules. Immediately after trowel finishing, slightly roughen the concrete surface by brooming in the directing perpendicular to the main traffic route. Use a fiber bristle broom. Coordinate the required finish with the ENGINEER prior to application. Chemical Hardener Finish: Apply chemical hardener finish to exposed dry interior concrete floors where required by the Drawings and the schedules. Apply liquid chemical hardener after complete curing and drying of the concrete surface. Dilute the liquid hardener with water and apply three (3) coats. First coat 1/3 strength Second coat 1/2 strength Third coat 2/3 strength Evenly apply all coats and allow 24 hours drying time between coats.

3.12. CURING

Keep all concrete moist for five days after placing. Cover with 4-mil polyethylene film, or leave forms in place, or use curing compound that does not interfere with finish -- all combined with regular wetting as necessary.

3.13. REMEDIAL WORK

General: Reinforce or replace deficient work as directed by the ENGINEER and at no additional cost to the Owner. Patching: Repair defective areas and fill form-tie holes and similar defects in accordance with Chapter 9 of ACI 301. Where in the opinion of the ENGINEER, surface defects such as honeycomb occur, repair the defective areas as directed by the ENGINEER, without cost to ASPA.

SECTION 05500- MISCELLANEOUS METAL

1. GENERAL

General Provisions

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

Description Work Included:

Provide all miscellaneous metal and metal fabrication complete, in place, as shown on the Drawings, specified herein, or needed for a complete and proper installation and not specifically called for under other Sections of these Specifications. Related Work Described Elsewhere: Other metal items are specifically called for and described in other Sections.

Quality Assurance Standards:

Comply with standards specified herein as listed in Section 01085 - APPLICABLE STANDARDS. Qualifications of Personnel: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section. Welding: Perform all shop and field welding required in connection with the work of this Section, adhering strictly to the current pertinent recommendations of the American Welding Society.

Submittals General:

Comply with provisions of Section 01300 - SUBMITTALS AND SUBSTITUTIONS. Product Data: Within 30 calendar days after award of Contract. Complete materials list of all items proposed to be furnished and installed under this Section. Manufacturers' specifications and other data required to demonstrate compliance with specified requirements. Shop Drawings of all items proposed to be furnished and installed under this Section. Include plans, sections, elevations, and details as needed. Templates for anchor and bolt installation by other trades 5

Product Handling Protection:

Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades. Replacement: In the event, at damage, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to ASPA.

2. PRODUCTS

2.1. MATERIALS AND COMPONENTS

General: For fabrication of the work of the Section that will be exposed to view, use only those materials that are smooth and free from surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness. Standards: All materials shall comply with: Steel plates, shapes, and bars: ASTM A36 Steel plates to be bent or cold formed: ASTM A283, Grade C Steel tubing, hot-formed, welded, or seamless: ASTM A501 Steel bars and bar-size shapes: ASTM A306, Grade 65, or ASTM A36 Cold-finished steel bars: ASTM A108, grade as selected by the fabricator Cold-rolled carbon steel sheets: ASTM A336 Galvanized carbon steel sheets: ASTM A526, with ASMT A525, 390 zinc coating Stainless steel sheets: Type 302/304 of American Iron and Steel Institute, 24 gage, with number 4 finish Gray iron castings: ASTM A48, Class 30 Malleable iron castings: ASTM A47, grade as selected by the fabricator Steel pipe: ASTM A53, type as selected, Grade A, black finish unless galvanizing is required, standard weight (Schedule 40) unless otherwise indicated Concrete inserts: Threaded or wedge type, galvanized ferrous castings, malleable iron ASTM A47 or cast steel ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized, ASTM A153 Non-shrink nonferrous grout, CE CRD C588

2.2. FASTENERS GENERAL:

Provide zinc-coated fasteners for exterior use and where built into exterior walls. Select fasteners for the type, grade, and class required. Standards: All fasteners shall comply with: Bolts and nuts: Regular hexagon-head type, ASTM A307, Grade A Lag bolts: Square-head type, Federal Specification FF-B-561 Machine screws: Cadmium plated steel, Federal Specification FF-S-92 Wood screws: Flat-head carbon steel, Federal Specification FF-S-11 Plain washers: Round, carbon steel, Federal Specification FF-W-92 Masonry anchorage devices: Expansion shields, Federal Specification FF-S-36 Toggle bolts: Tumble-wing type, Federal Specification FF-B-588, type, class, and style as required Lock washers: Helical spring type carbon steel, Federal Specification FF-W-84

2.3. PAINT METAL PRIMER PAINT:

Use red lead mixed pigment, alkyd varnish, linseed oil paint complying with Federal Specification TT-P-86, Type II; or red lead iron oxide, raw linseed oil, alkyd paint, complying with SSPC Paint 2-64; or basic lead silicon chromate base iron oxide, linseed oil, alkyd paint complying with Federal Specification TT-P-615, Type II. Primer selected shall be compatible with finish coats of paint. Coordinate selection of metal primer with actual finish paint provided under Section 09900 of these Specifications. Galvanizing Repair Paint: Use a high zinc dust content paint for redefinition welds in galvanized steel, complying with MIL SPEC MIL-P-21035.

2.4. FABRICATION WORKMANSHIP:

Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in the finished product. Work to dimensions shown or accepted on the Shop Drawings, using proven details of fabrication and support. Use type of materials shown or specified for the various components of the Work. Form exposed work true to line and level, with accurate angles and surfaces and with straight sharp edges. Ease the exposed edges to a radius of approximately 0.8 mm (1/32") unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush; match and blend with adjoining surfaces. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, use Phillips flat head (countersunk) screws or bolts. Provide for anchorage of the type shown. Coordinate with supporting structure. Fabricate and space the anchoring devices to provide adequate support for intended use. Cut, reinforce, drill, and tap miscellaneous metalwork as indicated to receive finish hardware and similar items. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows: ASTM A153 for galvanizing iron and steel hardware ASTM A123 for galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strip 3 mm (1/8") thick and heavier ASTM A386 for galvanizing assembled steel products Shop Painting: Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise specified Remove scale, rust, and other deleterious materials before applying shop coat Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 or SSPC-SP-3 Remove oil, grease, and similar contaminants in accordance with SSPC-SP-1 Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's recommendations, and at a rate to provide the recommended dry film thickness Use painting methods that will result in full coverage of joints, corners, edges, and exposed surfaces Apply one shop coat to fabricated metal items; except, apply two shop coats to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first coat

2.5. MISCELLANEOUS METAL FABRICATION ROUGH HARDWARE:

Provide bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete and other structures. Manufacture or fabricate items of sizes, shapes, and dimensions required. Provide malleable iron washers for heads and nuts that bear on wood structural connections; elsewhere furnish steel washers. Ladders: Fabricate ladders for locations shown with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3, except as otherwise indicated. Fit rungs in centerline of side rails, plug-weld, and grind smooth on outer rail faces. Support each ladder at top and bottom, and at intermediate points spaced not more than 1.5 m (60") on centers. Use welded or bolted steel brackets designed for adequate support and anchorage, and to hold the ladder clear of wall with minimum 18 cm (7") clearance from wall to rung centurion. Extend rails 106 cm (42") above top rung, and return rails to wall or structure unless other secure handholds are provided. If adjacent structure does not extend above top rung, gooseneck the extended rails back to structure for ladder access. Provide non-slip surface on the top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by

using a type of manufactured rung that is permeated with aluminum oxide grout. Provide sloping ladders, where indicated, fabricated of open type construction with structural steel channel or steel plate stringers, pipe handrails, and open steel grating treads, unless otherwise indicated. Provide all necessary brackets and fittings for installation. Loose, bearing and leveling Plates: Provide loose bearing and leveling plates for steel items, bearing on concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication. Miscellaneous Framing and Supports: Provide miscellaneous steel framing and supports that are not part of structural steel framework, as required to complete work. Fabricate miscellaneous units to sizes, shapes, and profiles shown or, if not shown, of required dimensions, to receive adjacent other work to be retained by framing. Fabricate the miscellaneous units from structural steel shapes, plates, and steel bars of welded construction with mitered joints for field connection, unless otherwise shown. Cut, drill, and tap units to receive hardware. Equip units with integrally welded anchors for casting into concrete or building into masonry, and furnish inserts if units must be installed after concrete is placed. Except as otherwise shown, space anchors 60 cm (24") on centers, and provide minimum anchor units of 3.2 cm x 0.6 cm x 20 cm (1-1/4" x 1/4" x 8") steel straps. Galvanize miscellaneous frames and supports where indicated.

3. EXECUTION

3.1. INSPECTION

Examine the areas and conditions under which miscellaneous metal items are to be installed, and correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2. PREPARATION

Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.

3.3. INSTALLATION

Setting Loose Plates: Clean concrete bearing surfaces free from bond-reducing materials, and roughen to improve bond to surfaces. Clean the bottom surface of bearing plates. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims; but if protruding, cut off flush with the edges of the bearing plate before packing with grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in place construction including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

SECTION 07210- BUILDING INSULATION

1. GENERAL

1.1. GENERAL

Conditions As specified in Section 00700.

1.2. DESCRIPTION OF WORK

Provide all materials, labor, equipment and tools necessary to complete building insulation work as indicated on the drawings, by the generic name and as specified herein. The type of building insulation specified in this section includes the following: Batt type thermal insulation installed in exterior framed walls Batt type thermal insulation installed in framed roof

1.3. SUBMITTALS

Submit under provisions of Section 01300 - SUBMITTALS AND SUBSTITUTIONS. Product Data: Submit manufacturer's specifications and installation instructions for type of insulation required. Include data substantiating that materials comply with specified requirements.

1.4. QUALITY ASSURANCE SOURCE LIMITATIONS:

Obtain each type of building insulation through one source. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting. agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing

1.5. PRODUCT HANDLING PROTECTION FROM DETERIORATION:

Do not allow insulation materials to become wet or soiled. Comply with manufacturer's recommendations for handling, storage and protection during installation.

2. PRODUCTS

2.1. MATERIALS

Thermal Batt Insulation in Exterior Stud Walls: Fiberglass kraft-faced batt, ASTM C 665, Type II, Class A; approximately 3-1/2 inch thick (R = 11). Width of blankets shall be selected for friction fit between stud framing members without sag or bulges

3. EXECUTION

3.1. INSPECTION

Examine surfaces and conditions under which batt insulation is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.2. INSTALLATION GENERAL

Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.

3.3. INSULATION:

Extend insulation full thickness as shown over entire area to be insulated (entire roofs and walls). Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement. Application: Apply a single layer of insulation of the required thickness.

3.4. WALL & ROOF INSULATION:

Install insulation to fit tightly against frame. Carry insulation full height from floor to underside of structure unless otherwise indicated on the drawings. Protection: Protect installed insulation from harmful weather exposure and physical damage where possible by not delaying installation of covering work or where not possible, by temporary covering of enclosure.

SECTION 07620- FLASHING AND SHEET METAL

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION

Provide all flashing and sheet metal not specifically described in the Roofing, Siding or other Sections of these Specifications but required to prevent penetration of water through exterior of the building.

1.3. QUALITY ASSURANCE STANDARDS:

Comply with standards specified in this section as listed in Section 01085 - APPLICABLE STANDARDS. Qualifications of Manufacturer: Products used in the work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable to the ENGINEER. Qualifications of Installer: Use adequate numbers of skilled worker who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.4. SUBMITTALS GENERAL:

Comply with provisions of Section 01300 - SUBMITTALS AND SUBSTITUTIONS. Manufacturer's Data: Within 30 calendar days after award of the Contract, submit: Complete materials list of all items proposed to be furnished and installed under this Section Manufacturer's specifications and other data required to demonstrate compliance with the specified requirements Shop Drawings showing all proposed work of this Section Manufacturers recommended installation procedures The manufacturer's recommended installation procedures, when approved by the ENGINEER will become the basis for inspecting and accepting or rejecting actual installation procedures used on the work

1.5. PRODUCT HANDLING 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. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to ASPA.

2. PRODUCTS

2.1. DESIGN

Standard commercial items may be used for flashing, trim, and reglets, provided all such items meet or exceed the quality standards specified herein. Quality Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations contained in "Engineerural Sheet Metal Manual", current edition, of the Sheet Metal and Air Conditioning Contractors National Association.

2.2. MATERIALS AND GAUGE

Where sheet metal is required, and no material or gauge is indicated on the Drawings, provide the highest quality and gage commensurate with the referenced standards.

2.3. STAINLESS STEEL

Sheet metal or steel shall be a standard brand conforming to ASTM A 167, Type 302 or 304, finish 2D, fully annealed, dead soft temper. All stainless steel sheets shall be furnished in 8 to 10 ft. lengths, single pieces less than 8 ft. may be used to connect at end runs.

2.4. NAILS, RIVETS, AND FASTENERS

Use only soft iron rivets having rust-resistive coating, galvanized nails, and cadmium plated screws and washers in connection with sheet flashings and gutters.

2.5. FLUX

All flux used for stainless steel shall conform to Fed. Spec. Q-F-506, Type I, Form A or B.

2.6. SOLDER

All solder used on stainless steel shall conform to Federal Specifications QQ-S-571, Composition Sn. 60.

2.7. OTHER MATERIAL

All other materials, not specifically described but required for a complete and proper installation of the work of this Section, shall be new, first quality of their respective kinds, and as selected by the Contractor subject to the approval of the ENGINEER.

3. EXECUTION

3.1. INSPECTION

Examine the areas and conditions under which work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2. WORKMANSHIP GENERAL:

Form all sheet metal accurately and to the dimensions and shapes required, finishing all molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit, soldering securely. Unless otherwise specifically permitted by the ENGINEER, turn all exposed edges back 18 mm (1/2").

3.3. EXPANSION:

Form, fabricate, and install all sheet metal to adequately provide for expansion and contraction in the finished Work.

3.4. WEATHERPROOFING:

Finish watertight and weather tight where so required. Make all lock seam work flat and true to line, sweating full of solder. Make all lock seams and lap seams, when soldered, at least 13 mm (1/2") wide. Where lap seams are not soldered, lap according to pitch but in no case less than 3". Make all flat and lap seams in direction of flow.

3.5. JOINTS:

Join parts with rivets or sheet metal screws where necessary for strength or stiffness. Provide suitable watertight expansion joints for all runs of more than 12.4 m (40'), except where closer spacing is indicated on the Drawings or required for proper installation.

3.6. NAILING:

Whenever possible, secure metal by means of clips or cleats without nailing through the metal. In general, space all nails, rivets, and screws not more than 20 cm (8") apart and, where exposed to the weather, use lead washers. For nailing into wood, use barbed roofing nails 32 mm (1-1/4") long by 11 gage. For nailing into concrete, use drilled plugholes and plugs.

3.7. EMBEDMENT

Embed all metal in connection with roofs in a solid bed of sealant, using materials and methods described in Section 07951 - SEALANTS AND CAULKING of these Specifications or other materials and methods approved in advance by the ENGINEER.

3.8. SOLDERING GENERAL

Thoroughly clean and tin all joint materials prior to soldering. Perform all soldering slowly with a well-heated copper in order to heat the seams thoroughly and to completely fill them with solder. Perform all soldering with a heavy soldering copper of blunt design, properly tinned for use. Make all exposed soldering on finished surfaces neat, full flowing, and smooth. Cleaning: After soldering, thoroughly wash acid flux with a soda solution.

3.9. TEST

Upon request of the ENGINEER, demonstrate by hose or standing water that all flashing and sheet metal is watertight.

SECTION 07951-SEALANTS AND CAULKING

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Throughout the Work, caulk and seal all joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of air and passage of moisture. Related Work Described Elsewhere: Adhere strictly to the caulking and sealant details shown on the Drawings.

1.3. QUALITY ASSURANCE STANDARDS:

Comply with standards specified in this Section as listed in Section 01085 - APPLICABLE STANDARDS. Qualifications of Manufacturer's: Products used in the work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable to the ENGINEER. Qualifications of Installers: Proper caulking and proper installation of sealants require that installers be thoroughly trained and experienced in the necessary skills and thoroughly familiar with the specified requirements.

1.4. SUBMITTALS GENERAL:

Comply with provisions of Section 01300 - SUBMITTALS AND SUBSTITUTIONS. Manufacturer's Data: Within 45 calendar days after award of the Contract, submit: A complete materials list showing all items proposed to be furnished and installed under this

Section. Sufficient data to demonstrate that all such materials meet or exceed the specified requirements Specifications, installation instructions, and general recommendations from the materials manufacturers showing procedures under which it is proposed that the materials will be installed. Upon approval by the ENGINEER, the proposed installation procedures will become the basis for inspecting and accepting or rejecting actual installation procedures used on the work. Samples: Accompanying the submittal required in Paragraph 1.3.2 submit Samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used.

1.5. PRODUCT HANDLING DELIVERY AND STORAGE:

Deliver all materials of this section to the job site in the original unopened containers with all labels intact and legible at time of use. Store only under conditions recommended by the manufacturers. Do not retain on the job site any material that has exceeded the shelf life recommended by its manufacturer. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to ASPA.

2. PRODUCTS

2.1. SEALANTS GENERAL:

Except as specifically otherwise directed by the ENGINEER, use only the type of sealants described in this section. Composition: Sealant shall be a two-component, rubber-based compound conforming to Federal Specification TT-S-00227c. Each color and each class of sealant shall be the product of a single manufacturer selected from the following, or shall be equal products as approved in advance by the ENGINEER. "Class A" (for non-traffic bearing horizontal surfaces): "Novacaulk 200 Series" manufactured by Novagard Corp, 835 New York Avenue, Trenton, New Jersey 08638; "Paramastic" manufactured by Parr, Inc., 18400 Syracuse Avenue, Cleveland, Ohio 44110; "Hornflex TG" or "Vertiseal" manufactured by W.R. Grace Co., 6051 W. 65th Street, Chicago, Illinois 60638. "Class B" (for vertical surfaces): "Churchill 3c-50" manufactured by Churchill Chemical Corp., 3137 E. 26th Street, Los Angeles, California 90223; "Ultratite 101 Series" manufactured by Essex Chemical Corp., 19451 Susana Road, Compton, California 90221; "Rubber Caulk 250 Sealant" manufactured by Products Research & Chemical Corp., 5454 San Fernando Road, Glendale, California 91203. Colors: Colors for each sealant installation will be selected by the ENGINEER from standard colors normally available from the specified manufacturers. In concealed installations and in partially or fully exposed installations where so approved by the ENGINEER, standard gray or black sealant may be used.

2.2. PRIMERS

Use only those primers which are non-staining, tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.3. BACKUP-MATERIALS GENERAL:

Use only those backup materials specifically recommended for this installation by the manufacturer of the sealant used, and which are nonabsorbent and non-staining. Acceptable Types Include: Closed-cell resilient urethane or polyvinyl-chloride foam Closed-cell polyethylene foam Closed-cell-sponge of vinyl or rubber Polychloroprene tubes or beads Polyisobutylene extrusions Oil-less dry jute Preformed support strips for ceramic tile control-joint and expansion-joint work shall be polyisobutylene or polychloroprene rubber

2.4. BOND PREVENTATIVE MATERIALS

Use only one of the following as best suited for the application and as recommended by the manufacturer of the sealant used: Polyethylene tape, pressure-sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated Aluminum foil conforming to MIL-SPEC-MIL-A-148E Wax paper conforming to Federal Specification UU-P-270

2.5. MASKING TAPE

For masking around joints, provide masking tape conforming to Federal Specification UU-T-106c.

2.6. OTHER MATERIALS

All other materials not specifically described but required for complete and proper caulking and installation of sealants, shall be first quality of their respective kinds, new, and as selected by the Contractor subject to the approval of the ENGINEER.

3. EXECUTION

3.1. INSPECTION

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2. PREPARATION

Concrete and Ceramic Tile Surfaces: All surfaces in contact with sealant shall be dry, sound, and well brushed and wiped free from dust. Use solvent to remove oil and grease, wiping the surfaces with clean rags. Where surfaces have been treated, remove the surface treatment by use of sandblasting or wire brushing. Remove all laitance and mortar from the joint cavity. Where backstop is required, insert the approved backup material in the joint cavity to the depth required.

Steel Surfaces: Steel surfaces in contact with sealant shall be sandblasted or, if sandblasting would not be practical or would damage adjacent finish, the metal shall be scraped or wire-brushed to remove mill scale. Use solvent to remove oil and grease, wiping the surfaces with clean rags. Remove protective coatings on steel by sandblasting or by a solvent that leaves no residue.

Aluminum Surfaces: Aluminum surfaces in contact with sealant shall be cleaned of temporary protective coatings, dirt, oil, and grease. When masking tape is used for a protective cover, remove the tape just prior to applying the sealant. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.3. INSTALLATION OF OTHER BACKUP MATERIAL

Use only the backup material recommended by the manufacturer of the sealant and approved by the ENGINEER for the particular installation, compressing the backup material 25% to 50% to secure a positive and secure fit. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

3.4. PRIMING

Use only the primer recommended by the manufacturer of the sealant and approved by the ENGINEER for the particular installation. Apply the primer in strict accordance with the manufacturer's recommendations as approved by the ENGINEER.

3.5. BOND BREAKER INSTALLATION

Install an approved bond-breaker where recommended by the manufacturer of the sealant and where directed by the ENGINEER, adhering strictly to the installation recommendations as approved by the ENGINEER.

3.6. INSTALLATION OF SEALANTS GENERAL:

Prior to start of installation in each joint, verify the joint type according to the Details in the Drawings, and verify that the required proportion of width of joint to depth of joint has been secured.

3.7. EQUIPMENT:

Apply sealant under pressure with hand or power-actuated gun or other appropriate means. Guns shall have nozzle of proper size and shall provide sufficient pressure to fill joints completely, as designed.

3.8. MASKING:

Thoroughly and completely mask all joints where the appearance of sealant on adjacent surfaces would be objectionable.

3.9. INSTALLATION OF SEALANT:

Install the sealant in strict accordance with the manufacturer's recommendations as approved by the ENGINEER thoroughly filling all joints to the recommend depth.
Tooling: Tool all joints to the profile shown on the Details in the Drawings.

3.10. CLEANING UP:

Remove masking tape immediately after joints have been tooled. Clean adjacent surfaces free from sealant as the installation progresses. Use solvent or cleaning as the installation progresses. Use solvent or cleaning agent as recommended by the sealant manufacturer.

SECTION 08331-OVERHEAD COILING DOORS AND GRILLES PART

1. GENERAL

1.1. DESCRIPTION

This section specifies coiling doors and grilles dual combination door and grille assemblies of sizes shown, complete as specified

1.2. RELATED WORK LOCK CYLINDERS FOR CYLINDRICAL LOCKS:

Section 08710 Electric devices and wiring: DIVISION 16100 ELECTRICAL

1.3. MANUFACTURER'S AND INSTALLER'S QUALIFICATIONS

Coiling doors and grilles shall be products of manufacturers regularly engaged in manufacturing items of type specified. Install items under direct supervision of manufacturer's representative or trained personnel.

1.4. FIRE DOOR REQUIREMENTS

Where fire doors exceed the size for which testing and labeling is available, submit certificates stating that the doors and hardware is identical in design, materials, and construction to a door that has been tested and meets the requirements for the class indicated.

1.5. SUBMITTALS

Submit in accordance with Section 01300. Shop Drawings: Each type of door and grille showing details of construction, accessories and hardware, electrical and mechanical items supporting brackets for motors, location, and ratings of motors, and safety devices Wiring diagrams for motors and controls, including wiring diagram for door and grille, showing electrical interlock of motor with manually operated dead lock, electrical rough-in Manufacturer's Literature and Data: Brochures or catalog cuts, each type door or grille Manufacturer's installation procedures and instructions Maintenance instructions, parts list Certificates: Attesting doors, anchors and hardware will withstand the horizontal loads specified. Attesting oversize fire doors and hardware are identical in design, material, and construction to doors that meet the requirements for the class specified.

1.6. APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. American Society for Testing and Materials (ASTM): A36/A36M-03 Structural Steel A167_99 Stainless and

Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip A653/A653M-03 Steel Sheet, Zinc Coated (Galvanized) Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dipped Process B209/209M-02. Aluminum and Aluminum-Alloy Sheet and Plate B221/B221M-02 Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, And Tubes National Electrical Manufacturers Association (NEMA): ICS 1_00 Industrial Control and Systems General Requirements ICS 2-00 Industrial Control, and Systems, Controllers, Contactors, and Overload Relays ICS 6-93 (R2001) Industrial Control and Systems Enclosures MG 1-03Motors and Generators ST 20-92 (Rl997) Dry-Type Transformers for General Applications Master Painters Institute (MPI): MPI #35 Exterior Bituminous Coating MPI #76 Quick Drying Alkyd Metal Primer National Fire Protection Association (NFPA): 70_98 National Electrical Code 1999 Edition 80_99 Fire Doors and Fire Windows National Association of Engineerural Metal Manufacturers (NAAMM) AMP 500 Series Metal Finishes Manual Underwriters Laboratories, Inc. (UL): 2004 Fire Resistance Directory

2. PRODUCTS

2.1. MATERIAL STEEL:

A653 for forming operation, ASTM A36 for structural sections Stainless Steel: ASTM A167, Type 302 or 304 Aluminum, Plate and Sheet: ASTM B209/B209M Aluminum, Extruded: ASTM B221/B221M Alkyd Metal Primer: MPI No. 76 Bituminous Coating: MPI No. 35

2.2. DESIGN REQUIREMENTS

Coiling doors and grilles shall be spring counter balanced, overhead coiling type, inside face mounted with guides at jambs set back a sufficient distance to provide a clear opening when door is in open position. Doors, hardware, and anchors shall be designed to withstand a horizontal or maximum wind Velocity of 140 MPH. All motor operators shall have manual emergency mechanical operators. Fire rated doors shall conform to the requirements specified herein and to NFPA 80 for the class indicated. Doors shall bear Underwriters Laboratories, Inc. label indicating the applicable fire rating. (1-Hour fire rating) Where doors in excess of 7.4 m2 (80 sf) are indicated to be manually operated, provision shall be made in the design and construction that will permit future installation of electric_power operation. The coiling door shall be superimposed over the coiling grille in a common assembly where dual installation is required.

2.3. FABRICATION CURTAINS:

Form of interlocking slats of galvanized steel aluminum of shapes standard with the manufacturer, except that slats for exterior doors shall be flat type. Thickness of slats shall be as required to resist loads specified except not less than the following: For doors less than 4500 mm (15 feet) wide: 0.75 mm (0.0299 inch). For doors from 4530 mm (15 feet 1 inch) to 6300 mm (21 feet wide): 0.90 mm (0.0359 inch). For doors wider than 6330 mm (21 feet 1 inch): 1.20 mm (0.0478 inch). Thickness of aluminum slats shall be as follows: For doors less than 4500 mm (15 feet wide): 1 mm (0.040 inch). For doors from 4530 mm (15 feet 1 inch) to 6300 mm (21 feet wide): 1.45 mm (0.057 inch). For doors wider than 6330 mm (21 feet 1 inch): 1.65 mm (0.064 inch). End locks and Wind locks: Manufacturer's stock design of galvanized malleable iron or galvanized steel or stamped cadmium steel for doors or grilles. The ends of each slat for exterior doors and each

alternate slat for grilles and interior doors shall have end locks. Doors shall have wind locks at ends of at least every sixth slat. Wind locks shall prevent curtain from leaving guide because of deflection from wind pressure or other forces. Bottom Bar: Two angles of equal weight, one on each side, standard extruded aluminum members not less than 3 mm (0.125 inch) thick. Bottom bar designed to receive weather-stripping and safety device, and be securely fastened to bottom of curtain or grille. Barrel and Spring Counterbalance: Curtain shall coil on a barrel supported at end of opening on brackets and be balanced by helical springs. Barrel fabricated of steel pipe or commercial welded steel tubing of proper diameter and thickness for the size of curtain, to limit deflection with curtain rolled up, not to exceed 1 in 400 (0.03 inch per foot) of span. Close ends of barrel with cast iron plugs, machined to fit the opening. Within the barrel, install an oil_tempered, helical, counter balancing steel spring, capable of producing sufficient torque to assure easy operation of the door curtain from any position. At least 80 percent of the door weight shall be counter balanced at any position. Spring_tension shall be adjustable from outside of bracket without removing the hood or motor operator. Brackets: Steel plate designed to form end closure and support for hood and the end of the barrel assembly. End of barrel or shaft shall screw into bracket hubs fabricated of cast iron or steel. Equip bracket hubs or barrel plugs with prelubricated ball bearings, shielded or sealed. Hoods: Steel galvanized, 0.6 mm (0.0239 inch) thick OR Aluminum, not less than 1 mm (0.040 inch) thick. Form hood to fit contour of end brackets. Reinforce at top and bottom edges with rolled beads, rods or angles. Hoods more than 3600 mm (12 feet) in length shall have intermediate supporting brackets. Fasten to brackets with screws or bolts and provide for attachment to wall with bolts. Provide a weather baffle at the lintel or inside the hood of each exterior door to minimize seepage of air through the hood enclosure. Use steel guides with steel curtains and grilles, and aluminum guides with aluminum curtains and grilles. Guides: Manufacturer's standard formed sections or angles of steel or aluminum. Steel sections not less than 5 mm (3/16 inch) thick. Aluminum sections not less than 5 mm (0.1875 inch) thick. Form a channel pocket of sufficient depth to retain the curtain in place under the horizontal pressure specified, and prevent ends of curtain from slipping out of guide slots. Top sections flared for smooth entry of curtain to vertical sections that will facilitate entry of curtain. Provide stops to limit curtain travel above top of guides. Provide guide of aluminum with replaceable wear strips to prevent metal-to-metal contact. Mounting brackets shall provide closure between guides and jambs. Weather-Stripping Manually Operated Doors: Exterior doors shall have a compressible and replaceable rubber, neoprene, or vinyl weather seal attached to bottom bar. Motor Operated Doors: Bottom bar safety device shall be a combination compressible seal and safety device as specified in paragraph, ELECTRIC MOTOR OPERATORS. At exterior doors, provide replaceable sweep type continuous vinyl or neoprene weather seals on guides and across head on exterior to seal against wind infiltration. Locking: Locking devices are not required. Separate entry to the building will be specified.

2.4. MANUAL OPERATORS HAND CHAIN OPERATION:

Galvanized, endless chain operating over a sprocket and extending to within 900 mm (3 feet) of floor. Obtain reduction by use of suitable permanently lubricated gearing connected by roller chain and sprocket drive. Calculate gear reduction to reduce pull required on hand chain, not to exceed 1676 Pa (35 psi).

Fire Doors

B_labeled fire doors shall be complete with hardware, accessories, and automatic closing device as required by NFPA 80. Equip fire doors with an automatic closing mechanism actuated by fusible links to release at 54 oC (130 oF). Doors shall be forced into a closed position by an auxiliary spring in the barrel which is inoperative during normal operation and when activated will not affect the adjustment of the counterbalance spring. The auxiliary spring shall exert pressure on the curtain until the release device is reset. Door shall come to rest on the floor without impact. Control descent of curtain by an oscillating governor. Provide handles for push up operation.

2.5. FINISHES GALVANIZED STEEL:

Apply a phosphate treatment and a corrosion inhibitive primer.

PART 3 - EXECUTION

2.6. INSTALLATION

Install doors and grilles in accordance with approved shop drawings and manufacturer's instructions. Locate anchors and inserts for guides, brackets, motors, switches, hardware, and other accessories accurately. Securely attach guides to adjoining construction with not less than 9 mm (3/8 inch) diameter bolts, near each end and spaced not over 600 mm (24 inches) apart. Locate control switches where shown. Install all electric devices and wiring as specified in DIVISION 16100 ELECTRICAL.

2.7. REPAIR

Repair prime painted zinc_coated surfaces and bare zinc_coated surfaces that are damaged by the application of galvanizing repair compound. Spot prime all damaged shop prime painted surfaces including repaired prime painted zinc_coated surfaces. Coiling Doors and grilles shall be lubricated, properly adjusted, and demonstrated to operate freely

2.8. PROTECTION

Isolate aluminum in contact with or fastened to dissimilar metals other than stainless steel, white bronze or other metals not compatible with aluminum by one of the following: Paint the dissimilar metal with a prime coat of zinc-Molybdate or other suitable primer, followed by two coats of aluminum paint. Place an approved caulking compound, or a non absorptive tape, or gasket between the aluminum and the dissimilar metal. Paint aluminum in contact with or built into mortar, concrete, plaster or other masonry materials with a coat of bituminous paint. Paint aluminum in contact with wood or other absorptive materials that may repeatedly become wet, with a coat of bituminous paint or two coats of aluminum paint.

2.9. INSPECTION

Upon completion, doors shall be weather tight and doors and grilles shall be free from warp, twist, or distortion.

SECTION 08111-STANDARD STEEL DOORS AND FRAMES

1. GENERAL

Related Work Specified Elsewhere Finish Hardware Approved Manufacturers Product Mfg. Listed In Hwd. Sets Others Approved Hinges Lawrence Bros Hager, Mckinney Locks & Latches Schlage Pdq, Corbin Exit Devices Monarch Corbin, Sargent Closers Rixon-Firemark Norton, Yale Trim Quality Rockwood, Trimco Stops Quality Rockwood, Trimco Weatherseal National Guard Reese, Pemko Thresholds National Guard Reese, Pemko

References

Comply with the requirements of Recommended Specifications for Standard Steel Doors and Frames (ANSI/SDI-100-85) sponsored by the Steel Door Institute.

Submittals Product Data:

Catalog sheets, standard details, specifications, and installation instructions.

Quality Assurance

Fire Rated Assemblies: Provide door and frame units with metal UL, FM, or WHI labels for fire classification indicated, and complying with National Fire Protection Association (NFPA) Standard No. 80. Rivet or weld labels on the hinge edge of door and jamb rabbet of frame.

2. PRODUCTS

Materials Doors and Frames: Steel, cold rolled or hot rolled pickled and oiled; door faces with a stretcher leveled degree of flatness. Anchors and Supports: Minimum 18-gage sheet steel Bolts and Other Fastening Devices: Manufacturer's standard units

Doors Exterior Doors:

SDI-100-85, Grade III, Model 3 or 4, 1-3/4 inches thick, 16 gage, with weather cap. Maximum coefficient of thermal transmittance (apparent “U” Factor): 0.40. PARAGRAPH BELOW IS “FULL FLUSH” (SEAM IN EDGES) FOR ECONOMY (20% COST SAVINGS). MODEL 1 IS IS HOLLOW STEEL CONSTRUCTION; MODEL 2 IS COMPOSITE CONSTRUCTION. Exterior Doors: SDI-100-85, Grade III, Model 1 or 2, 1-3/4 inches thick, 16 gage, with weather cap. Maximum seam opening: 1/8 inch. Maximum coefficient of thermal transmittance (apparent “U” Factor): 0.40. PARAGRAPH BELOW IS “SEAMLESS” (HIGH COST). MODEL 3 IS HOLLOW STEEL CONSTRUCTION; MODEL 4 IS COMPOSITE CONSTRUCTION Interior Doors: SDI-100-85, Grade II, Model 3 or 4, 1-3/4 inches thick, 18 gage. PARAGRAPH BELOW IS “FULL FLUSH” (SEAM IN EDGES) FOR ECONOMY. MODEL 1 IS HOLLOW STEEL CONSTRUCTION; MODEL 2 IS COMPOSITE CONSTRUCTION. Interior Doors: SDI-100-85, Grade II, Model 1 or 2, 1-3/4 inches thick, 18 gage. Maximum seam opening: 1/8 inch. Internal Construction: Manufacturer's standard core or internal reinforcing, with minimum 18 gage end closures. Sound Deadening (ASTM E

90): Minimum Sound Transmission Class (STC) of 25. STANDARD LOUVERS BELOW ARE NOT INTENDED FOR EXTERIOR DOORS OR FOR SECURITY PURPOSES. Louvers: Inserted type, sight proof, minimum 20 gage steel frame, minimum 24 gage steel blades welded or tenoned to frame. Shop finish to match door. LOUVER SIZE AND BLADE TYPE, WHICH DETERMINE FREE (AIR FLOW) AREA, SHOULD BE SHOWN ON THE DRAWINGS. Louver Moldings: Non-removable steel moldings on the secure side of doors. Screw-on type steel moldings or beads on other side of louver panels. Glazing Stops and Beads: Non-removable steel stops on the outside of exterior doors and on the secure side of interior doors. Screw-on type steel beads on the other side of glass panels. Shop Paint: Door and frame manufacturer's standard rust-inhibitive primer

Frames Type:

Standard 16 gage steel welded unit type frames for doors, transoms, sidelites, borrowed lites and other openings. Prepare doorframes for silencers as required. DELETE SUBPARAGRAPH BELOW IF THERE IS NO GLAZED OPENINGS IN FRAMES. Frame Glazing Beads: Screw-on type steel beads on non-secure side of frame.

Fabrications

Fabricate units to be rigid, neat in appearance, and free from dents, warp, and buckle. Clearances: Provide single swing doors with not more than 1/8 inch clearance at jambs and heads, not more than 1/4 inch clearance at meeting edges of pairs of doors (1/8 inch on fire rated doors), and not more than 3/4 inch clearance at bottom. Clearance dimensions are nominal and subject to a tolerance of plus or minus 1/32 inch. Prepare units to receive mortised and concealed finish hardware, including cutouts and reinforcing. Reinforce units to receive surface applied finish hardware to be field applied. Drill and tap units to receive finish hardware, except surface applied hardware.

Shop Finish

Thoroughly clean doors and frames after fabrication. Paint metal surfaces with a coat of shop paint, baked-on.

3. EXECUTION

3.1. INSTALLATION

Install the Work of this Section in accordance with the manufacturer's printed instructions except as shown otherwise on the Drawings and approved shop drawings.

3.2. CLEARANCES:

Install doors in their respective frames within the clearances specified in Part 2. Fire Rated Assemblies: Place fire rated doors with clearances specified in NFPA Standard No. 80. Drill and tap doors and frames to receive surface applied hardware, if any. Touch-up damaged areas of shop paint coat after installation with same type of paint.

SECTION 08520-ALUMINUM WINDOWS

1. GENERAL

1.1. DESCRIPTION

Aluminum windows of type and size shown, complete with hardware, related components and accessories. Types: Hung windows Casement Projected Dual Horizontal Sliding Single Horizontal Sliding Fixed

1.2. DEFINITIONS ACCESSORIES:

Mullions, staff beads, casings, closures, trim, moldings, panning systems, sub-sills, clips anchors, fasteners, weather stripping and other necessary components required for fabrication and installation of window units. Uncontrolled Water: Water not drained to the exterior, or water appearing on the room side of the window.

1.3. DELIVERY, STORAGE, AND HANDLING

Protect windows from damage during handling and construction operations before, during and after installation. Store windows under cover, setting upright Do not stack windows flat Do not lay building materials or equipment on windows.

1.4. QUALITY ASSURANCE

Approval by contracting officer is required of products or service of proposed manufacturers and installers. Approval will be based on submission of certification by Contractor that: Manufacturer regularly and presently manufactures the specified windows as one of its principal products. Installer has technical qualifications, experience, trained personnel and facilities to install specified items. Provide each type of window produced from one source of manufacture. Quality Certified Labels or certificate: Engineerural Aluminum Manufacturers Association, "AAMA label" affixed to each window indicating compliance with specification. Certificates in lieu of label with copy of recent test report (not more than 4 years old) from an independent testing laboratory and certificate signed by window manufacturer stating that windows provided comply with specified requirements and AAMA 101/I.S.2 for type of window specified.

1.5. SUBMITTAL

Submit in accordance with Section 01310, SAMPLE AND SHOP DRAWINGS. Shop Drawings: Minimum of 1/2 full scale types of windows on project. Identifying parts of window units by name and kind of metal or material, show construction, locking systems, mechanical operators, trim, installation and anchorages. Include glazing details and standards for factory glazed units. Manufacturer's Literature and Data: Window Sash locks, keepers, and key Certificates: Certificates as specified in paragraph QUALITY ASSURANCE. Indicating manufacturers and installers qualifications. Manufacturer's Certification that windows delivered to project are identical to windows tested. Test Reports: Copies of test reports as specified in paragraph QUALITY ASSURANCE. Samples are not required for clear anodizing. Samples: Provide 150 mm (six-inch) length samples showing finishes, specified.

1.6. WARRANTY

Warranty windows against malfunctions due to defects in thermal breaks, hardware, materials and workmanship.

1.7. APPLICABLE PUBLICATIONS

Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only. American Engineerural Manufacturers Association (AAMA) 101/I.S.2-97 Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors 505-98 Dry Shrinkage and Composite Performance Thermal Cycling Test Procedures 2605-98Superior Performing Organic Coatings on Engineerural Aluminum Extrusions and Panels TIR-A8-90 Structural Performance of Poured and Debridged Framing Systems American Society for Testing and Materials (ASTM): A653/A653M-02 Steel Sheet, Zinc Coated (Galvanized), Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-dip Process E 90-02 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions National Fenestration Rating Council (NFRC): NFRC 100-2001 Determining Fenestration Product U-Factors NFRC 200Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence National Association of Engineerural Metal Manufacturers (NAAMM): AMP 500 Series Metal Finishes Manual

2. PRODUCTS

2.1. MATERIAL ALUMINUM EXTRUSIONS; SHEET AND PLATE:

AAMA 101/I.S.2. Sheet Steel, Galvanized: ASTM A653; G90 galvanized coating. Weather-strips: AAMA 101/I.S.2; except leaf type weather-stripping is not permitted. Insect Screening: Regular mesh, 18 by 18, AAMA 101/I.S.2. Aluminum with dark bronze anodized finish unless specified otherwise. Fasteners: AAMA 101/I.S.2. Screws, bolts, nuts, rivets and other fastening devices to be non-magnetic stainless steel. Fasteners to be concealed when window is closed. Where wall thickness is less than 3 mm (0.125 inch) thick, provide backup plates or similar reinforcements for fasteners. Attach locking and hold-open devices to windows with concealed fasteners. Provide reinforcing plates where wall thickness is less than 3 mm (0.125 inch) thick. Weather-strips: AAMA 101/I.S.2. Hardware: Locks: Two position locking bolts or cam type tamperproof custodial locks with a single point control located not higher than five feet from floor level. Locate locking devices in the vent side rail. Fastenings for locks and keepers shall be concealed or nonremovable. Locking Device Strikes: Locate strikes in frame jamb. Strikes shall be adjustable for locking tension. Fabricate strikes from Type 304 stainless steel or white bronze. Fabricate hinges of noncorrosive metal. Hinges may be either fully concealed when window is closed or semi-concealed with exposed knuckles. All exposed knuckle hinges shall have hospital tips, at both ends. Surface mounted hinges will not be accepted. Guide Blocks: Fabricate guide blocks of injection molded nylon. Install guide block fully concealed in vent/frame sill. Hardware for Emergency Ventilation of Windows: Provide windows with a hold open linkage for emergency ventilation. Hold open hardware shall provide for maximum six inches of window opening and shall include an adjustable friction shoe to provide resistance when closing the window. Handles shall be removable. Hardware for Maintenance Opening of Windows: Opening beyond the six inch position shall be accomplished with a window washers key. The release device shall capture the key when window is in the open position. Design operating device to prevent opening with

standard tools, coins or bent wire devices. Pole Operators: Provide pole operator and pole hanger where operable windows have hardware more than 1500 mm five feet) above the floor, but not over 3000 mm (10 feet) above floor. Fabricate pole of tubular anodized aluminum with rubber cap at lower end and standard push-pull hook at top end to match hardware design. Provide sufficient length for window operation without reaching more than 1500 mm (five feet) above floor.

2.2. THERMAL AND CONDENSATION

Performance Condensation Resistance Factor (CRF): Minimum CRF C 45. Thermal Transmittance: Maximum U value class for insulating glass windows: U 50 Maximum U value class for dual glazed windows: U 70, or as required by State or local energy requirements Solar Heat Gain Coefficient (SHGC): SHGC shall comply with State or local energy code requirement.

2.3. FABRICATION

Fabrication to exceed or meet requirements of Physical Load Tests, Air Infiltration Test, and Water Resistance Test of AAMA 101/I.S.2. Glazing: Factory or field glazing optional Glaze in accordance with Section 08810, GLASS AND GLAZING Windows reglazable without dismantling sash framing Glaze from interior except where not accessible Provide removable fin type glazing beads Trim: Trim includes casings, closures, and panning. Fabricate to shapes shown of aluminum not less than 1.6 mm (0.062 inch) thick Exposed external corners mitered and internal corners coped; fitted with hairline joints. Reinforce 1.6 mm (0.062 inch) thick members with not less than 3 mm (1/8-inch) thick aluminum. Except for strap anchors, provide reinforcing for fastening near ends and at intervals not more than 305 mm (12 inches) between ends. Design to allow unrestricted expansion and contraction of members and window frames. Secure to window frames with machine screws or expansion rivets. Exposed screws, fasteners or pop rivets are not acceptable on exterior of the casing or trim cover system. Thermal-Break Construction: Manufacturer's Standard. Low conductance thermal barrier. Capable of structurally holding sash in position and together All Thermal Break Assemblies (Pour & Debridge, Insulbar or others) shall be tested as per AAMA TIR A8 and AAMA 505 for Dry Shrinkage and Composite Performance Location of thermal barrier and design of window shall be such that, in closed position, outside air shall not come in direct contact with interior frame of the window. Mullions: AAMA 101 Subsills and Stools: Fabricate to shapes shown of not less than 2 mm (0.080 inch) thick extruded aluminum. One-piece full length of opening with concealed anchors Sills turned up back edge not less than 6 mm (1/4-inch). Front edge provide with drip. Sill back edge behind face of window frame. Do not extend to interior surface or bridge thermal breaks. Do not perforate for anchorage, clip screws, or other requirements.

2.4. CASEMENT WINDOWS

AAMA 101/I.S.2; Type: C-H65. AAMA certified product to the AAMA 101/I.S.2. - 97 standard

2.5. FINISH

In accordance with NAAMM AMP 500 series Finish exposed aluminum surfaces as follows: Anodized Aluminum: Finish in accordance with AMP 501 letters and numbers.

Clear anodized Finish: AA-C22A41 Medium matte, clear anodic coating, Class 1 Engineerural, 0.7 mils thick. Colored anodized Finish: AA-C22A42 (anodized) or AA-C22A44 (electrolytically deposited metallic compound) medium matte, integrally colored coating, Class 1 Engineerural, 0.7 mils thick. Dyes not accepted. Coated Aluminum: Variation of more than 50 percent of maximum shade range approved will not be accepted in a single window or in adjacent windows and mullions on a continuous series. AMP 501 and 505 Fluorocarbon Finish: AAMA 2605, superior performing organic coating Steel: AMP 504 Stainless steel: AMP 503 Concealed: 2B or 2D Exposed: No. 4 unless specified otherwise. Hardware: Finish hardware exposed when window is in the closed position: Match window color.

3. EXECUTION

3.1. PROTECTION

(Dissimilar Materials): AAMA101 I.S.2

3.2. INSTALLATION

General Install window units in accordance with manufacturer's specifications and recommendations for installation of window units, hardware, operators and other components of work. Where type, size or spacing of fastenings for securing window accessories or equipment to building construction is not shown or specified, use expansion or toggle bolts or screws, as best suited to construction material. Provide bolts or screws minimum 6 mm (1/4-inch) in diameter. Sized and spaced to resist the tensile and shear loads imposed. Do not use exposed fasteners on exterior, except when unavoidable for application of hardware. Provide non-magnetic stainless steel Phillips flat-head machine screws for exposed fasteners, where required, or special tamper-proof fasteners. Locate fasteners to not disturb the thermal break construction of windows. Set windows plumb, level, true, and in alignment; without warp or rack of frames or sash. Anchor windows on four sides with anchor clips or fin trim. Do not allow anchor clips to bridge thermal breaks. Use separate clips for each side of thermal breaks. Make connections to allow for thermal and other movements. Do not allow building load to bear on windows. Use manufacturer's standard clips at corners and not over 600 mm (24 inches) on center. Where fin trim anchorage is shown build into adjacent construction, anchoring at corners and not over 600 mm (24 inches) on center.

3.3. MULLIONS CLOSURES, TRIM, AND PANNING

Cut mullion full height of opening and anchor directly to window frame on each side. Closures, Trim, and Panning: External corners mitered and internal corners coped, fitted with hairline, tightly closed joints. Fasten except for strap anchors, near ends and corners and at intervals not more than 300 mm (12 inches) between. Seal units following installation to provide weather tight system.

3.4. ADJUST AND CLEAN

Adjust ventilating sash and hardware to provide tight fit at contact points, and at weather-stripping for smooth operation and weather tight closure. 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. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances. Except when a window is being adjusted or tested, keep locked in the closed position during the progress of work on the project.

SECTION 08710- FINISH HARDWARE

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. DESCRIPTION WORK INCLUDED:

Provide finish hardware items as indicated on the drawings and/or in the specifications. Finish hardware is hereby defined to include all items known commercially as builder's hardware, as required for swinging doors and cabinets. Type of Finish Hardware Required: Hinges (Butts), Drips Lock cylinder and keys Lock and latch sets Door stops Thresholds Sweeps Work Not Included: The cabinet manufacturer will do the furnishing and installation of the finish hardware for Modular Cabinets and Plastic Laminate Cabinets under other sections of the specifications. Quality Assurance: Manufacturer: Obtain each type of hardware from only one manufacturer, although several may be indicated as offering products complying with requirements. Hardware schedule: Submit final hardware schedule to coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Substitutions: Requests for substitutions shall be in accordance to the requirements of the General Conditions. Any hardware substituted without approval, shall, at the direction of the Engineer or the Inspector, be removed and replaced with the proper hardware specified, at no additional cost to ASPA. Samples: When directed by the Engineer, a physical sample of any item of finish hardware proposed for use shall be for written approval. Such items shall not be used in the Work until approval is obtained. Keying: Locks for doors to separate rooms shall be keyed separately. All doors shall be master keyed, furnish four (4) keys for each lock and four (4) master keys. Numbering of Keys, Lock Cylinders and Cabinet Locks: Keys: Keys shall be stamped with only the set number listed in the Keying Schedule. Master Keys shall be stamped with only the letter listed in the Keying Schedule; do not include the word "MASTER". Lock Cylinders: All door lock cylinders shall have stamped on the cylinder face the set number of the change key only. Packaging and Marking: Package each item of hardware and each lock set individually, complete with necessary installation instructions, screws and fastenings, and installation templates, and marked with item number corresponding to number on the approved Finish Hardware Material List.

2. PRODUCTS

2.1. GENERAL FINISH OF HARDWARE:

Unless otherwise specified, the finish of all hardware shall be dull chromium plate US 26D, except kick plates, knobs, escutcheons, push plates, door pulls, pull plates, piano

hinges, lock strike plates and panic devise cross bars which shall be stainless steel, dull finish - US 32D. Door Lock Cylinders: Cylinders shall be institutional grade and of a standard key-way, and shall be from one of the following manufactures: CORBIN RUSSWIN SCHLAGE SARGENT YALE Lock Strikes: Strikes shall have curved lines with rounded edges and corners, of sufficient length to protect jamb trim, and shall not extend more than 1/8" beyond trim, jambs or face of doors in pairs. Box strikes shall be provided for all door locks. Butts-Hinges: Unless otherwise specified, butts for all doors shall be non-rising, loose pin button top button. All exterior doors swinging out shall have set screw in hinge barrel to make pin non-removable or security, non-removable type pin. Provide offset for 180-degree swing. Provide three (3) butts per door leaf. Template Hardware: All hardware attached to metal shall be template hardware. Hardware templates or physical samples of hardware for metal doors and frames shall be delivered to the door and frame manufacturer prior to fabrication of doors and frames. Fastening for Hardware Provide all necessary screws, bolts, anchors and fastenings, of required size and type for the proper installation of all hardware. All exposed screws shall have Phillips heads, and all wood screws shall be full thread. Hardware to be fastened to concrete, masonry or gunite construction, shall be provided with self-drill expansion anchors such as "Phillips Shells" or "Star Self-Drill Shields", except that thresholds less than 2-1/2" in width and interior door stops may be furnished with expanding anchors such as "Star Tampins" or "National Lead Drive Shields". Furnish proper caulking and/or expanding tools for the installation of the fastenings. All fastenings, unless otherwise specified, shall be of the following materials and finishes: Hardware Item Fastening Material Fastening Finish BronzeBronze or BrassTo match Hardware Item Stainless Steel, Bronze, Brass or Chrome Stainless Steel To match Hardware Item Aluminum Bronze, Brass or Stainless Steel To match Hardware Item Painted Ferrous Steel Painted to match Hardware Item Plated Ferrous Plated Steel To match Hardware Item Locksets: Cylindrical type w/curved lip strikes and wrought boxes, non-ferrous & stainless steel components equal to Schlage type D orbit, w/stain finish stainless steel or aluminum knobs. Alternates should be equal to Schlage Model C53PD entrance lock. Stops: Equal to "IVES", aluminum, 407 wall mounted w/rubber door silencers. Thresholds: Equal to "ZERO", aluminum, handicapped saddle type. Drips: Extruded aluminum, face mounted. Provide a one-year factory guarantee of satisfactory performance. Sweeps: Equal to "REMCO" No. 315CN

3. EXECUTION

3.1. INSTALLATION HARDWARE ATTACHMENT:

Unless otherwise specified, attachment shall be as follows: Template hardware and hardware attached to metal shall be attached with machine screws or bolts. Exposed heads of through bolts or machine screws for exterior door surface type hinges shall be installed in such a manner as to prevent removal with a screwdriver. Wood screws for all mortise door hinges, except cabinet doors, shall be full thread screws, 1-1/2" long and of proper size for hinges specified. Full surface and half-surface hinges for wood core and mineral core doors shall be secured with through bolts and grommet nuts. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, install each item completely, then remove, and store in a secure place during the finish application. After completion of the finishes, reinstall each item. Do not install surface-mounted items until finishes have been completed.

3.2. ADJUSTMENT AND CLEANING

Adjust and check each operating item of hardware and each door to insure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

3.3. FINAL ADJUSTMENT

When hardware has been installed more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and conducts a final check. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware. Guarantee: All finish hardware shall be guaranteed in accordance with the requirements of the contract documents, except that the guarantee period shall be for two (2) years.

SECTION 16100-ELECTRICAL GENERAL

1. GENERAL

1.1. GENERAL PROVISIONS

The General Conditions of Construction Contracts and Special Provisions preceding these specifications shall govern this section of the work.

1.2. SUPPLEMENTAL GENERAL PROVISIONS

General notes for the Electrical Contractor It is the intent of the electrical sections of the specifications and the accompanying plans to include all electrical work to be included in the Electrical Contract. The Contractor doing Work under the electrical section of the specifications and accompanying drawings shall hereinafter be referred to as the "Electrical Contractor" or the "Contractor". Work performed under other sections of the specifications shall be referred to as "by others" or by an appropriate designation, indicating type work being performed (General Contractor, Mechanical Contractor, etc.). The Contractor shall read carefully the General conditions and the Modifications to the General Conditions, which are considered a portion of the specifications applying to electrical Contractors work, and all Bid Forms. The drawings are diagrammatic, but as accurate as scale permits, and shall be followed as closely as possible. The Contractor shall be responsible for selection of equipment meeting space requirements as shown on equipment or in routing of raceways, chases, conduit, or bus duct shown as having a defined location on the plans. Changes shall be done only with the permission of the Engineer and without additional cost to ASPA. The specifications and accompanying plans include an electrical floor plan or plans, which show the location of outlets and switches, etc.. While items included in the specifications may not be shown on the plans, or vice versa, that which is included in the one shall be understood as included in the other and shall be as binding as if shown in both plans and specifications. All materials shall be new and shall be listed as approved by the Underwriters Laboratories, Inc. (U.L.), in every case where a standard has been established for the particular type of material in question. All conduit, fittings, wire, equipment, and

component parts shall be of reputable manufacturer. All work shall be executed in a workmanlike manner, and when completed shall present a neat and mechanical appearance. All work shall be in conformance with, and all material shall meet the approval of the National Electrical Code (N.E.C.) (Latest Edition), National Electrical Manufacturers Association (NEMA) Standards, and all local and National Codes. The selection and specifications of equipment and materials are with the intention of setting a standard of capacities and qualities and unless otherwise noted on schedules or specifications, products deemed by the Engineer to be equal to those specified will be accepted upon approval of submitted data, or by comparison of samples. Acceptance of substitutions however will not relieve the Contractor of the responsibility that such material and equipment will fit into allotted spaces, meet code requirement, are equal or better in capacities, etc. Electrical Contractors Responsibility The Electrical Contractor shall be responsible for payment of all fees, permits, royalties, service charges, insurance, etc., which are required by or related to the installation of the electrical Work. The Contractor shall visit the job site and carefully inspect the premises prior to submitting his bid shall include in his bid such necessary contingencies as might be required by conditions at the site. Failure of Contractor to visit the job site and include contingencies or failure to report conflicts or discrepancies shall not relieve the Contractor from complete and correct installation of his electrical Work. Conflicts, discrepancies and any errors of omission or commission discovered by the Contractor during preparation of his bid shall be promptly reported to the Engineer in order that all bidders may be notified. The Contractor shall carefully coordinate his Work with that of others, and shall cooperate in every way with others to prevent delays in construction and avoid conflicts in work. Work schedules shall be prepared for Engineer if required. The Contractor shall furnish and install all labor and materials, scaffolding, tools, equipment, hoists, accessories, etc., required for proper, complete and correct installation of all electrical Work. Electrical Contractor shall, at his own expense, do all cutting and chasing necessary to install his materials with prior approval of Engineer. He shall be responsible for all patching, repairing, refinishing, resurfacing and repainting to any portion of the building made necessary to install electrical material and/or damage done by his employees. The Contractor shall be responsible for the care and protection of equipment and material under his contract until final acceptance by the Owner.

1.3. SCOPE OF WORK

The work to be done under these specifications shall cover the furnishing of all materials, equipment, labor and supervision necessary for the completion of all Work covered herein or shown on the drawings. In general, the Work shall include the following. The Electrical Contractor shall furnish materials and equipment to provide panel circuit breakers, switches wiring, conduit and equipment as shown on the plans, as well as all equipment as shown schedules.

1.4. DESCRIPTION

The system shall be a 120/240 Volts/1 phase/3 wire grounded system.

1.5. APPROVALS

Before procuring equipment, the following items must be approved by the Electrical Engineer. Panels and circuit breakers Lighting fixtures Ceiling fans Exhaust fans Switches

& duplex receptacles Wire & conduit Disconnect switches Submittal data must have descriptive brochures or shop drawings in one binder. Submit four (4) binders.

1.6. WIRING

A complete system of wiring with all feeders, mains and branches as shown on the drawings shall be furnished and installed from the main service assembly to the panels, outlets, and apparatus. No wires shall be pulled in until the conduit system is complete. No grease, oil, or lubricant other than soapstone or wire-lube shall be used to facilitate the pulling of wires. Joints that may become necessary at the outlet and diction boxes shall be made with approved solder less type connectors or with solder and non-corrosive flux and then covered with an approved gum and friction tape, okoweld, or Scotch No. 33 electrical tape so that the insulation is equal to the conductor insulation. At each fixture, a loop or end not less than eight inches (8") long shall be left for connection to fixtures. Wire in capped outlets shall have ends taped. Multi-wire branch circuits shall be used as indicated. No joints or wire splices within conduit will be permitted.

1.7. POWER WIRING

Power feeders, branch circuits, switches, etc. shall be installed in raceways as shown on the drawings. Disconnect switches shall be provided for all motors and equipment indicated or required by the National Electrical Code, and shall be of the type specified on drawings in general purpose or weatherproof enclosures as shown. Connections from switches to motors or equipment shall be in flexible conduit. All power wiring shall be of the size shown, but not smaller than No. 12 except No. 14 for control circuits. Branch circuits shall be of No. 12 wire or larger. Unless otherwise shown on plans, branch circuits over fifty feet (50') to the first outlet on 120-volt circuits or over one hundred feet (100') to the first outlet on 240-volt circuits shall be of No. 10 wire or larger. All motors shall be furnished and installed by others, but shall be connected for correct rotation by the Electrical Contractor. Where A.C. system occurs, the control system of the A.C. system, shall be furnished by others and installed by the Electrical Contractor and to include control wire outlets, conduits, etc. The control wiring must not be run in conduit with power circuits. Outdoor and wet locations power wiring from a rain tight disconnect to a motor or equipment shall be made with THW wire in plastic encased flexible conduit with rain tight friction connectors.

1.8. CONDUCTORS

All conductors shall be copper of not less than ninety-eight percent (98 Electrical Code, (N.E.C.) Type THHN, 600 volt insulation, General Electric Company, Hairshaw or equal except as noted. Conductors No. 8 and smaller shall be solid and No. 6 and larger shall be stranded. No conductors shall be smaller than No. 12 except as otherwise noted. Conductor size and type insulation shall be stamped on conductors at intervals of 2'-0". Feeder conductors shall be tagged to show size and type insulation at all switches, panels, etc. Specified gauge sizes refer to American Wire Gauge. All fixtures with a rating of 300 watts or less shall be wired with a No. 16 type "AF" heat-resisting fixture wire. All fluorescent fixture wiring shall be type "TW-90" conductors or the size shown on the drawings.

1.9. CONDUIT WORK

Exterior Wiring Conduit: Rigid galvanized conduit shall be used in all concrete, buried in earth, exposed to weather and in locations subject to moisture. Electrical metallic tubing may be used in other portions of the structure (above furred ceiling, exposed, etc.). All conduits shall be exposed or concealed as shown on the drawings. No bends shall be made with a radius of less than six (6) times the diameter of the conduit, nor more than ninety degrees. Trapped conduit shall not be installed unless unavoidable. If trapped runs are unavoidable, Type THHW wire shall be installed. Exposed conduit shall be run parallel with or at right angles to the building walls and shall be supported from walls, bottom chord of bar joists, bar joists bridging or roof deck by means of approved galvanized clamps or hangers. For attachment to surface of masonry or concrete, provide screws and expansion sleeves, inserts and bolts or power driven studs. Arrangement and method of fastening all raceways shall be subject to the Engineers direction and approval. Wire or strap steel, shall not be used as fasteners or supports. All conduits shall be installed so as to maintain a minimum clearance of three inches (3") to hot water pipes and flues and twelve inches (12") to telephone circuits, audio circuits, control circuits, power mains and feeders. Connections to switchboards, panel boards, and boxes shall be provided with plastic insulating bushings for rigid conduit and Appleton screwed connectors for EMT. Rigid conduit over 1-1/2" shall have two locknuts. Where holes other than knockouts are required, they shall be made with Greenlee type broaching tool. Schedule 40 and schedule 80 conduit may be used with approval of the engineer.

1.10. HANGERS, SUPPORTS AND SLEEVES

Securely attach all hangers, supports and devices to the building structure with approved clamps, bolts and nuts, or other approved anchors as applicable to the types of building construction involved. Provide all necessary auxiliary supports for the electrical work. Hangers or supports for conduits and raceways shall be approved standard conduit or raceway straps or other approved clamping devices. Perforated strap iron hangers will not be permitted. Maximum hanger or support spacings for all conduits shall be eight feet (8') for 1" and smaller conduit, and ten feet (10') for 1-1/2 and larger conduit. All boxes, gutters, panel boards, switches, starters, fixtures and other devices and equipment shall be adequately supported. Provide all necessary sleeves for all conduits and other electrical items passing through concrete or masonry construction. All sleeves through concrete walls, concrete columns, and concrete beams shall be I.P.S. steel pipe or rigid steel conduit, flush with finished concrete surfaces. All other sleeves may be sheet metal.

1.11. GROUNDING

The neutral conductor and metal enclosures of the wiring system shall be grounded to grounding rod with bare copper conductor of the size shown on the drawings and approved type of ground clamps. The entire system and all equipment shall be grounded. Where dielectric unions are installed in the water pipe the grounding connection shall be made upstream of the dielectric union. 12 Over Current Protection The over current protection for the branch feeders from the main service assembly shall be equal to Bussman "Limitron", or circuit breakers as shown on panel schedule. Ground fault circuit Interrupting breakers will be used in panels where required by the N.E.C. or in duplex receptacles required to have ground fault protection.

SECTION 09250: GYPSUM DRYWALL

1. GENERAL

1.1. WORK INCLUDED

This Section includes but is not limited to: Gypsum board partitions, ceilings and soffits as indicated. Trim and reinforcing at all outside corners and at intersections with dissimilar materials. Taping and sealing of all exposed joints.

1.2. GENERAL REQUIREMENTS

Reference Standards: ASTM C840 “Application and Finishing of Gypsum Board”. Cooperate with those whose work connects with, is affected, or concealed by, gypsum board work. Before proceeding, make certain that all proper and required installations and inspections have been made. Electrical work which will be concealed in partitions shall be inspected and approved prior to installing covering panels. Deliver all manufactured materials in the original packages and containers bearing the manufacturer’s name and brand. Use only one make of each material throughout the job. Installation and workmanship shall be done in accordance with the referenced ASTM Specifications. Finish surfaces straight, true and free from defects of any kind. Guarantee all work in writing for a period of one year.

2. PRODUCTS

2.1. MATERIALS

Gypsum Board: Comply with ASTM C36. Except as otherwise specified below: 5/8” thick, 4 ft. wide by longest practical lengths, eased edges, standard paper finish. USG “Sheetrock Fire Code board”, Domtar “Null-A-Fire (type X)”, Gold Bond “Fire-Shield”, or approved equal. Install layer of Hardie cementations tile backer board over gyp. bd. where tile will be installed. Water resistant “green board” at restroom walls, kitchen walls, and janitor closets. Fasteners: Minimum 1 ¼” ceramic coated drywall screws. Corner Reinforcing: White PVC with minimum 1 ¼” flanges, as manufactured by Plastic Components No. 209, or approved equal (“square” corner beads). Edge Trim: White PVC “J” shaped edge trim as manufactured by Plastic Components No. 200-58, or approved equal, at intersections of gypsum board with dissimilar materials. Joint Treatment: ASTM C475. Asbestos-free, quick-drying, nonshrinking type powdered compound and perforated fiber tape with beveled edges, as standard with the gypsum board manufacturer. Use water-resistant compound at water resistant board. Light gage metal framing: 3-5/8”, 6” or in widths indicated in the Drawings. Minimum 6” at plumbing walls. 20 gage for walls up to 9 feet high; 18 gage for higher walls. Hot dipped galvanized. Access Panels: Style Mark Drywall Ceiling access panels, in sizes required for proper access & maintenance of equipment above ceilings.

3. EXECUTION

3.1. GYPSUM BOARD INSTALLATION

Apply boards in strict accordance with the referenced ASTM Standards. Reinforce all corners and intersections with other materials, using the specified plastic trim. Cut gypsum board to fit neatly around all pipes, outlets, switch boxes, and other built-in items.

3.2. JOINT TREATMENT

Tape joints as recommended by manufacturer. Tape all wall angles and inside corners with folded tape to form straight, true angles. Use quick-drying compound and do all work in one operation. Apply joint compound under and over tape using tool or machine. Clean off excess immediately. Form compound over joints to smooth slight crown. Cover all metal reinforcing, trim, joints, nailing dimples, etc. Sand joint compound to a smooth, even surface. Finished work shall show no joint lines or irregularities of any kind.

3.3. FINISH

Smooth (level 5) Finish.

SECTION 10520: FIRE PROTECTION SPECIALTIES

1. GENERAL

1.1. DESCRIPTION OF WORK:

Furnish & Install Fire extinguishers and fire extinguisher cabinets as shown in the Drawings and/ or as required by applicable laws.

1.2. QUALITY ASSURANCE:

Provide materials under this Section in accordance with specified product manufacturer's written certifications, tests and other quality assurance data or approved equals.

1.3. SUBMITTALS:

Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.

1.4. DELIVERY, STORAGE AND HANDLING:

Deliver materials cartoned or crated to provide protection during transit and job storage. Inspect materials upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed. Store materials at building site under cover. Place materials on minimum 4" high wood blocking.

2. MATERIALS

Fire Extinguishers - Kidde 1770 size and type as required by ASG fire department. Fire extinguisher cabinets - Potter Roemer Break Rite (Suffix-B) recessed cabinet, with full break glass. 14 gage stainless steel. Size as required to store required to fit required fire extinguisher.

3. EXECUTION

Install in accordance with manufacturer’s instructions. If cabinets are installed in a framed wall, encase with 5/8” type x gyp board.

SECTION 10800 TOILET AND BATH ACCESSORIES

1. GENERAL

Furnish and install all toilet and bath accessory items at locations indicated on Drawings.

2. PRODUCTS

Manufacturer: Bradley Corporation. Toilet Accessories: See Drawings Fastenings: Furnish all necessary screws, bolts and other fastenings for proper application of toilet accessories. Fasteners shall harmonize with accessories as to material and finish.

3. EXECUTION

Install all accessories per manufacturer’s instructions. Mount accessories at heights indicated or, if not indicated, at industry standard heights and locations to conform with ADA Guidelines. Provide adequate blocking during framing. Set units level, plumb, true to line and location, and in accordance with manufacturer's printed instructions for each intended item. D. Upon completion of installation, clean all surfaces to restore accessories to original finish.

SECTION 03300: CAST-IN-PLACE CONCRETE

1. GENERAL

Furnish and construct concrete work, including slabs, walls, roofs, structural members, paving, curbs and driveways as indicated on the drawings. Pay particular attention to Architectural concrete work- walls to have sandblasted finish. Lobby floor to have stained & polished finish.

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

1.3. SUBMITTALS

Product Data: For each type of manufactured material and product indicated. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments. Indicate amounts of mix water to be withheld for later addition at Project site. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the requirements indicated. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements: Cementitious materials and aggregates.

1.4. QUALITY ASSURANCE

Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer. ACI Publications: Comply with the following, unless more stringent provisions are indicated: ACI 318-11

1.5. DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle steel reinforcement to prevent bending and damage.

2. PRODUCTS

2.1. STEEL REINFORCEMENT

Reinforcing Bars: ASTM A 615, Grade 60 except for stirrups and ties which may be Grade 40 or 60. Welded Wire Fabric: ASTM A 185, Galvanized.

2.2. REINFORCEMENT ACCESSORIES

Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows: For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

2.3. CONCRETE MATERIALS

Portland Cement: ASTM C 150, Type I or II. Normal-Weight Aggregate: ASTM C 33 Size 57 or 67 only, uniformly graded, and as follows: Nominal Maximum Aggregate Size: Conform to ACI 318, but in no case more than 1 Use 3/4" maximum aggregate size when concrete is to be pumped, poured into tight spaces or with closely spaced reinforcement, or where there is limited concrete Use 1" maximum aggregate size for slabs-on-grade, where possible. A portion of the coarse aggregate in exposed walls shall be black lava rock cinders. When cinders are used, the proportion of cinders shall be such that the unit weight of plain concrete, when cured, is not less than 135 pounds per cubic foot. At least one of the proposed mix designs shall provide the highest possible cinder content that will meet this unit weight requirement. All other requirements, such as slump and compressive strength, shall also be met. Submit unit weight data for the proposed mixes and provide 3’ x 3’ mock up for at least three different proportions of cinder to basalt coarse aggregate for approval. Sandblast mock up to expose coarse aggregate to desired finish. Water: Potable and complying with ASTM C 94.

2.4. ADMIXTURES

General: Admixtures shall be certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride. Air-Entraining Admixture: ASTM C 260. Water-Reducing and or Water-Reducing and Set Retarding Admixture: ASTM C 494, Type A or D. High Range Water-

Reducing Admixture: ASTM C 494, Type F or G. High range water reducing admixture may be used, at Contactor's option, for vertical members only. Crystalline Waterproofing Admixture: Xypex Admix C-1000 or approved equal, concrete waterproofing admixture that chemically controls and permanently fixes a nonsoluble crystalline structure throughout capillary voids in concrete. The additive shall be distributed uniformly in the concrete mix, cause the concrete to become sealed against penetration of liquids in any direction, and protect the concrete from deterioration due to harsh environmental conditions.

2.5. CURING MATERIALS

Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet. Water: Potable.

2.6. RELATED MATERIALS

Expansion Joint Filler: Premolded material conforming to ASTM D 1751 or ASTM D 994, 3/8 inch thick unless otherwise indicated. Joint Sealant: For horizontal slab joints provide two-component self-leveling traffic grade sealant conforming to ASTM D 1190. For vertical and overhead joints provide silicone rubber based sealant with viscosity required for proper placement. Epoxy-Bonding Agents: ASTM C 881, two or three component epoxy resin based system capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements. Provide Types IV or V for structural purposes such as bonding hardened or freshly mixed concrete to hardened concrete, mortars for filling and patching holes and defective concrete, and as a binder for epoxy grouts.

2.7. REPAIR MATERIALS

Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219. Primer: Product of topping manufacturer recommended for substrate, conditions, and application. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer. Compressive Strength: Not less than 5700 psi at 28 days when tested according to ASTM C 109/C 109M.

2.8. CONCRETE MIXES

Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows: Proportion normal-weight concrete according to ACI 211.1 and ACI 301. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis. Footings and Foundation Walls: Proportion normal-weight concrete mix as indicated on Drawings. Admixtures: Use admixtures according to manufacturer's written instructions. Provide

crystalline waterproofing admixture in concrete for suspended slabs and supporting members, stairs, and walls.

2.9. FABRICATING REINFORCEMENT

Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10. CONCRETE MIXING

Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

3. EXECUTION

3.1. FORMWORK

Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows: Class A, 1/8 inch. Construct forms tight enough to prevent loss of concrete mortar. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal. Do not use rust-stained steel form-facing material. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations. Chamfer exterior corners and edges of permanently exposed concrete. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2. EMBEDDED ITEMS

Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

3.3. REMOVING AND REUSING FORMS

General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4. STEEL REINFORCEMENT

General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete. Clean reinforcement of loose rust and mill scale, earth, and other foreign materials. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars. Shop- or field-weld reinforcement according to AWS D1.4, where indicated. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5. JOINTS

General: Construct joints true to line with faces perpendicular to surface plane of concrete. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows: Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/4 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groove tool marks on concrete surfaces. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical

surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6. CONCRETE PLACEMENT

Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate. Deposit and consolidate concrete for slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners. Maintain reinforcement in position on chairs during concrete placement. Screed slab surfaces with a straightedge and strike off to correct elevations. Slope surfaces uniformly to drains where required. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.7. FINISHING FORMED SURFACES

Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height. Sandblast Finish for Exposed Walls: All surfaces of walls exposed to view in the completed work that are not indicated to be painted or otherwise coated, shall be sandblasted to expose coarse aggregates. Sandblast finish shall be of uniform texture and appearance matching the selected finish and the selected sample panel shall be the basis of acceptance of the actual finish. Acceptance of sandblast finished walls shall be at the sole discretion of the Architect. Unsatisfactory surfaces shall be corrected to the satisfaction of the Architect, or replaced at contractor’s expense.

3.8. FINISHING FLOORS AND SLABS

General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Scratch Finish (bathrooms): While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for

ceramic or quarry tile, Portland cement terrazzo, and other bonded cementitious floor finishes. Trowel Finish (interior areas): After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system. Where exposed to view, stain concrete floor with Lithochrome Chemstain acid stain, and apply Lithochrome Colorwax sealer (Schofield). Broom Finish (misc exterior surfaces): Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9. MISCELLANEOUS CONCRETE ITEMS

Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment. General: Protect freshly placed concrete from premature drying. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods: Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials: Water. Continuous water-fog spray. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.10. JOINT FILLING

Prepare, clean, and install joint filler according to manufacturer's written instructions. Defer joint filling until concrete has cured at least 28 days; longer if possible within project schedule. Do not fill joints until construction traffic has permanently ceased and preferably after prefinal clean up. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry. Install expansion joint filler to full depth in saw-cut joints and at least 2 inches deep in formed joints. Provide grooves and

bond breaker for joint sealants. Fill grooves and sawcut joints with self-leveling joint sealant slightly recessed below top of slab.

3.11. CONCRETE SURFACE REPAIRS

Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.12. FIELD QUALITY CONTROL

Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

SECTION 05500- METAL FABRICATIONS

1. GENERAL

1.1. SUMMARY

This Section includes the following: Miscellaneous metal trim. Metal railings & stainless steel cable railing. Miscellaneous metal hardware.

1.2. PERFORMANCE REQUIREMENTS FOR ALUMINUM RAILINGS

Structural Performance: Provide railings & anchorages capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated: Rails: Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction. Concentrated load of 200 lbf (0.89 kN) applied in any direction. For cable railings, applied tension of cables at end anchorages and posts including additional tension caused by the above loads. Uniform and concentrated loads need not be assumed to act concurrently. Cable tension shall be taken concurrently with the applicable uniform or concentrated load.

1.3. SUBMITTALS

Shop Drawings: Detail fabrication and erection of railings & decorative metal work. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Shop drawings for miscellaneous metal fabrications (structural

1.4. QUALITY ASSURANCE

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

procedures and personnel according to the following: AWS D1.1, "Structural Welding Code - Steel." AWS D1.3, "Structural Welding Code - Sheet Steel." AWS D1.2, "Structural Welding Code - Aluminum." AWS D1.4, "Structural Welding Code - Reinforcing Steel"

1.5. PROJECT CONDITIONS

Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting

1.6. COORDINATION

Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items

2. PRODUCTS

2.1. METALS, GENERAL

Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M Steel Pipe: ASTM A 53, Type E or S, Grade B for 3" nominal diameter (N.D.) or larger and Grade A for smaller than 3" N.D. Provide standard weight (Schedule 40), unless another weight is indicated or required by structural loads. Square or Rectangular Steel Tubing: ASTM A500, Grade B. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316. Stainless steel used for structural purposes shall meet strength requirements for similar mild steel items. Cable Railing: Cable & terminals shall be Type 316 stainless steel. Cable shall be 3/16” diameter, type 1 x 19. Cable spacing shall be maximum 3-1/2” on center. Cable tension shall be as required by the cable railing manufacturer to maintain long term cable spacing and to meet IBC load requirements. Welding Rods and Bar Electrodes: Select according to AWS specifications for metal alloy welded.

2.2. FASTENERS

General: Provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required. Fasteners must be compatible with type of material being fastened. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers. Anchor Bolts: ASTM F 1554, Grade 36 or ASTM A 36. Machine Screws: ASME B18.6.3 (ASME B18.6.7M). Lag Bolts:

ASME B18.2.1 (ASME B18.2.3.8M). Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M). Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M). Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and

nuts complying with ASTM F 594 (ASTM F 836M). Toggle Bolts: FS FF-B-588, tumble-wing type,

2.3. FABRICATION, GENERAL

Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials. Shear and punch metals cleanly and accurately. Remove burrs. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Shop Weld corners and seams continuously to comply with the following: Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate. Typical application to include weephole 1” above bottom of post, fill inside of tube with Sonneborn SL1 polyurethane sealant to level of weephole. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Remove sharp or rough areas on exposed traffic surfaces. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.4. LOOSE BEARING AND LEVELING PLATES

Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.5. MISCELLANEOUS STEEL TRIM & CONNECTORS

Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches (150 mm) from each end, 6 inches (150 mm) from corners, and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6. FINISHES, GENERAL

Unless otherwise noted, finish metal fabrications after assembly. Submit sample of finish for Architect’s approval.

2.7. STEEL FINISHES

Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below: ASTM A 123, for galvanizing steel and iron products. ASTM A 153/A 153M, for galvanizing steel and iron hardware. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications: Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning." Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning." Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Stripe paint corners, crevices, bolts, welds, and sharp edges. See Section 09910 of Specifications for painting of galvanized steel. Colors to be selected.

2.8. STAINLESS-STEEL FINISHES

Remove tool and die marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece. Do not use plain steel or galvanized steel grinding wheels on stainless steel surfaces. ASPA OPERATIONS CENTER BUILDING Satin Finish- all stainless steel satin finishes to match. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. EXECUTION

3.1. INSTALLATION, GENERAL

Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hotdip galvanized after fabrication and are for bolted or screwed field connections. Field Welding: Shop fabricate and hot dip galvanize metal fabrications after assembly wherever possible. Field welding shall be minimized. When field welding is required comply with the following requirements: Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.2. ADJUSTING AND CLEANING

Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Field touch-up of Kynar finish is not practical and will be rejected. Except for minor blemishes (as judged by the Architect), all other areas with damaged finishes must be removed and replaced with new shop finished material. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

SECTION 06100: ROUGH CARPENTRY

1. GENERAL

1.1. WORK INCLUDED

This section includes but is not limited to: Glu-laminated roof truss framing. Structural insulated panel roof decking. Wood framing and backing for other trades. Provide all necessary wood blocks, nailing strips, plugs, anchor bolts, door bucks, etc., installed as required by subcontractors for their work as it progresses. Rough structural hardware required for rough carpentry work. Wood preservative treatment.

1.2. GENERAL REQUIREMENTS

Preservative Treatment: Treat all lumber and plywood, including glued & laminated products, with Hi- Bor. Field treat cuts and holes as recommended by preservative manufacturer. Protect erected lumber from excessive moisture, such as repeated rainfall events. Standards: Western Wood Products Association (WWPA) Standard grading rules for Western Lumber shall govern all grading of lumber. American Plywood Association (APA) Guide to Plywood Grades shall govern grading of all plywood.

1.3. SUBMITTALS

Within 30 days after award of Contract, make all proposals for substitution in strict accordance with the provisions of the Contract.

2. PRODUCTS

2.1. MATERIALS

Lumber, Beams, Joists, Posts, and Glued Laminated Lumber: See Structural Drawings/ Notes. Framing Connectors: See Structural Drawings/ Notes. A minimum of 50% (based on cost) of all wood-based permanently affixed materials and products shall be “certified” in accordance with the Forest Stewardship Council’s principles and criteria for wood building components. These components include, at a minimum, structural framing and general dimensions framing, wood doors, and manufactured cabinets.

3. EXECUTION

3.1. WORKMANSHIP

Accurately cut and fit all work; assemble level, plumb, square and true-to-line. Exposed work shall not show hammer marks or other erection damage. Nailing Blocks and Bucks: Firmly secure in position to support the related work. Securely anchor bucks and nailing blocks to be embedded in concrete or masonry therein with stainless steel bolts or spikes. Wood Backing and Blocking: Provide as required to properly support wall hung fixtures and other equipment. Accurately cut and fit to structural condition, and securely fasten with bolts and clamps as required.

SECTION 06200: FINISH CARPENTRY

1. GENERAL

1.1. WORK INCLUDED

This Section includes but is not limited to: Installation of miscellaneous trims, and countertops. Furnishing & Installation of Architectural Woodwork & manufactured cabinets. Installation of finish hardware furnished under Section 08710.

1.2. GENERAL REQUIREMENTS

Preservative Treatment: Treat all lumber and plywood with Hi-Bor. Standards: Western Wood Products Association (WWPA) Standard grading rules for Western Lumber shall govern all grading of lumber. American Plywood Association (APA) Guide to Plywood Grades shall govern grading of all plywood. Woodwork Institute (WI) “Manual of Millwork Standards of the Woodwork Industry”, Latest Edition, shall govern all wood finish, millwork and casework. Quality Standards: Wood finish, millwork and casework shall be done by skilled workmen in accordance with the “Premium” Quality Standards of the referenced Woodwork Institute’s specifications with the same effect as if incorporated herein. Moisture Content of Wood: All wood finish and cabinet materials shall have a moisture content within the range of 12 to 15 percent by weight. *Condition to local ambient humidity. Job Assembled Work: When installing “Premium” Grade items not shop assembled, distribute to best over-all advantage the defects allowed in the quality grade specified. Delivery and Storage: The millwork manufacturer and the general contractor shall jointly be responsible to make certain that items of woodwork are not delivered until the building and/or storage area is sufficiently dry so that the woodwork will not be damaged by excessive changes in moisture content.

1.3. SUBMITTALS

Submit shop drawings for manufactured cabinetry.

2. PRODUCTS

2.1. MATERIALS

Lumber: Well seasoned, and free from cupping, warping, etc., in excess of that allowed by the referenced WI Standards; also free of damage due to shipping or storage. Plywood: Douglas Fir Plywood: Complying with the referenced WI Standards. Particle board, MDF or similar products are not acceptable. Use of bamboo plywood products is encouraged. Miscellaneous Trims: Clear Douglas Fir or Birch. Rough Hardware, such as angle supports, screws, nuts, bolts, etc., shall be of stock manufacture, top quality of its kind, hot dipped galvanized or as noted on the Drawings. Manufactured Cabinets: Crystal Cabinet Works, Inc. (rep: Archipelago Hawaii, Laurent Chouari, tel (808) 263-8891) Door style: Slab “Arden Hills” (full overlay with greencore) Wood: bamboo, narrow. Finish: Quest stain Carbonized Bamboo Honeytone; standard sheen. Style line: GreenQuest Box Material: Greencore Plus Plywood Drawer Box: ¾” dovetail soft-close, full-extention Hinge: 110-degree Soft-close doors Leg levelers

3. EXECUTION

3.1. WORKMANSHIP

Verification of Dimensions: Verify dimensions from the job when fabricated materials are required to conform to, and fit adjacent building surfaces. Verify dimensions of items furnished under other Sections for installation under this Section and provide facilities for installation of same. Protect millwork against abuse, moisture, and other damage at all times. The concrete, plaster, and gypsum board work shall be dry before millwork is applies to the walls or stored nearby. Temporary storage shall be in a dry, well ventilated enclosure. Protect all portions of the woodwork likely to suffer injury from accidental bumping by temporary sheathing or boxing until time for painting. Back prime all woodwork to be placed against concrete, or other efflorescing materials. Nail Trim securely, and set nails for putty where exposed. Join in as long lengths as possible, with vertical pieces in single lengths. Scarf necessary joints in continuous horizontal trim and miter corners. Finish Woodwork: S4S, kiln-dried, mill-sanded and hand-sanded in place with 120 grit sandpaper, with no chips, checks, hammer marks or other blemishes visible, and in condition for the Finish Painter. Comply, as a minimum requirement, with the specified WIC Standards.

SECTION 07200 - INSULATION

1. GENERAL

1.1. RELATED DOCUMENTS:

Drawings and other divisions of the specifications apply to work of this section.

1.2. DESCRIPTION OF WORK:

Extent of insulation work is specified herein and/or indicated on drawings; and includes thermal foam (rigid or spray) roof insulation, and acoustical batt insulation in interior partitions.

1.3. QUALITY ASSURANCE:

Provide materials under this Section in accordance with specified product manufacturer's written certifications, tests and other quality assurance data or approved equals.

1.4. SUBMITTALS:

Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.

1.5. DELIVERY, STORAGE AND HANDLING:

Deliver materials cartoned or crated to provide protection during transit and job storage. Inspect materials upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed. Store materials at building site under cover. Place materials on minimum 4" high wood blocking.

2. PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS:

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following: Owens-Corning Fiberglas

2.2. MATERIALS:

Acoustical Insulation shall be Owens Corning Pink Fiberglas batt- thickness that fits wall cavities for all full-height wall areas. Thermal Roof insulation shall be Faced Rigid Cellular Polyicocyanurate Thermal Insulation Board in thickness to fill 2 x 6 roof deck cavity, and minimum R-13. See Section 07540 for additional requirements. Note spray foam insulation, Icynene is an approved alternate. Comply with IBC requirements for fire resistance requirements and flame spread requirements.

3. EXECUTION

3.1. INSULATION INSTALLATION

Install insulation closely butted and secured to framing. Install in accordance with manufacturer’s instructions.

SECTION 07600: FLASHING AND SHEETMETAL

1. GENERAL

Furnish and install flashing and sheet metal work where indicated on the Drawings or as required for water and weather tight conditions throughout.

1.1. WORK INCLUDED:

This Section includes but is not limited to: Sheet metal gutters and downspouts Sheet metal flashing

1.2. SUBMITTALS:

Submit shop drawings for manufactured flashing and sheet metals

2. MATERIALS

The Gutters: 22 gage stainless steel, type 316 (or duplex stainless steel, lean). Provide concealed gutter hangers @ 36" on center. Downspouts- 24 gage stainless steel, type 316 (or duplex stainless steel, lean). Vent pipe flashing: per roofing manufacturer's recommendations the miscellaneous flashing and sheet metal: 24 gage stainless steel, type 316 (or duplex stainless steel, lean). Fasteners: Same material as flashing or sheet metal, or other non-corrosive metal as recommended by metal manufacturer for application in. Match finish of exposed heads with material being fastened.

3. EXECUTION

Anchor work in place with non-corrosive fasteners, adhesives, setting compounds, tapes, and other materials and devices as recommended by manufacturer of each material or Provide for thermal expansion and building movements. Separate dissimilar metals with bituminous coating (not in a manner that would be exposed to view). Comply with recommendations of SMACNA- "Architectural Sheet Metal Manual". Solder or weld joints as recommended by SMACNA. Seal moving joints in metal work with elastomeric sealant. Clean metal surfaces of substances which could cause corrosion.

SECTION 07700: JOINT SEALERS

1. GENERAL

Furnish and install joint sealers where shown on the Drawings or where required for water and weather tight conditions, and where required for finished appearance. Colors: Manufacturer's standard highest performance color, to match adjacent surfaces. Compatibility: Provide materials selected for compatibility with each other and with substrates in each joint system; confirm with manufacturer. General characteristics: Comply with manufacturer's recommendations relative to exposures, traffic, weather conditions, and other factors of the joint system for best possible overall performance.

2. PRODUCTS

Sealant: Single component polyurethane-Tremco Dimonic or Sikaflex Equal to meet requirements. Sealant backer rod: Non-absorptive closed-cell (or jacketed open-cell) compressible/flexible plastic or rubber rod stock which is compatible with sealant (polyethylene, butyl, neoprene, polyurethane, PVC).

3. EXECUTION

Install exterior sealants when weather conditions are favorable for proper cure and development of high early bond strength. Clean joint surfaces and prime or seal as recommended by sealant manufacturer. Support sealants from back with construction as shown, or with joint filler or backer rod.