ARCHITECTURE

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 Related Documents:

A. Drawings, Specifications, Division 1 and Contract

1.2 Description of Work:

A. The extent of concrete work shown on drawings.

B. Vapor Barrier installed under all interior slabs on grade.
Vapor Barrier will be placed above the Base Course.
Vapor Barrier will be taped and sealed at all overlapping joints and at all penetrations.

1.3 Quality Assurance:

A. Comply with provisions American Concrete Institute 318 “Building Code Requirements for Reinforced Concrete” and 301 “Structural Concrete for Buildings” except where more stringent requirements are shown or specified.

B. Form all footing and foundations. Unformed placement of concrete is not allowed.

C. Conform to ACI 305R when concreting during hot weather.

D. Conform to ACI 306R when concreting during cold weather.

E. Owner to engage the services of an independent testing agency to observe reinforcing installation, formwork installation, concrete placement, and test concrete materials per ACI requirements.

1.4 Pre-placement meeting(s) shall be held at the project site, prior to installation of concrete.

Refer to Bid Documents - Pre-Installation Meetings.
The attendees shall include:
General Contractor Project Manager and Superintendent
Placement Subcontractor and Foreman
Concrete Supplier
Structural Engineer and/or Architect

A. Meeting #1 - Pre-foundation placement.
All footing excavations shall be inspected by PCIA **prior** to placement of Concrete.

B. Meeting #2 - Pre-slab placement.
All below slab excavations, vapor barriers, and fill shall be inspected by PCIA **prior** to placement of Concrete.

C. Meeting #3 – Sitework Concrete Pre-placement.

1.5. Submittals:

A. Provide Mix designs including cylinder breaks for the specific mix.
Provide designs for each type of concrete to be used on the project.

B. Provide data sheet s for aggregates, fiber reinforcing, etc. to be incorporated into the concrete.

C. Special additives for curing acceleration, curing retardation, etc. must be approved in writing by the Structural Engineer prior to placement.

PART 2 - PRODUCTS

2.1 Form Materials:

A. Forms for Concrete Surfaces: Plywood, lumber, metal or other acceptable material.

B. Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces**.**

2.2 Reinforcing Materials:

A. Reinforcing Bars: ASTM A-615 Grade 60, deformed.

B. Welded Wire Fabric: Plain cold-drawn welded steel wire, ASTM A-185 at all exterior locations.

C. Provide metal bolster, chairs and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Bricks, blocks, stones, etc are not acceptable.

D. Synthetic fiber reinforcing for slabs: Virgin nylon monofilament fiber reinforcement additive conforming to ASTM C-116. Specific gravity of fibers must be greater than 1.0.

2.3 Concrete Materials:

A. Portland Cement: ASTM C 150, Type II.

B. Normal Weight-Aggregates: ASTM C33, with maximum 1 1/2" for footing and other mass concrete and 3/4" maximum for other concrete.

C. Water: Clean and not detrimental to concrete.

D. Calcium Chloride. Not permitted.

E. Admixtures: Do not use any additives without prior written approval from the Architect or Structural Engineer.

2.4 Accessories:

A. Provide minimum 10 mil reinforced polyethylene vapor barrier cover over prepared sub-base material for floor slabs as indicated on the drawings. Vapor Barrier to be taped to all sides of pile caps prior to installation of structural slab. Tape all utility penetrations.

B. Provide base course for all floor slabs of evenly graded natural gravel 3/8" maximum to 1/8" minimum (pea gravel). Refer to Geo-Technical Report for additional information.

C. Non-shrink Cement Grout Below Column Base Plates: Non-metallic, flowable, high strength (4000 psi main at 7 days) conforming with CRD-C 621.

D. Membrane Curing Compound: ASTM C309.

E. Absorptive Mats: ASTM C171.

F. Bonding Agent: Polymer resin emulsion.

2.5 Proportioning and Design of Mixes:

A. Use proprietary standard design mix that meets the following qualities and furnish satisfactory evidence of such conformance prior to placement of concrete. Accompany each mixer truck with a delivery ticket noting type of concrete and materials and time of batching. Note placement location and time of each load on these tickets and file all tickets on the job site.

B. Concrete: Proportion to design strengths indicated on drawings.

2.6 Concrete Mixes:

A. Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified:

1. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1 1/2 hours to 75 minutes, and when air temperature is above 90 degrees F reduce mixing and delivery time to 60 minutes.

2. Concrete design mixes ASTM C94, 28-day compressive strength:

a. Walls, foundations and footings: 4000 psi
b. Pile Caps: 4000 psi.
c. Interior Slab on grade: 4000 psi with nylon fiber reinforcing. Structural slab with steel reinforcing bar, does not require nylon fiber reinforcing, all other interior slabs shall be 3000 psi with nylon fiber reinforcing.
d. Slabs on deck: 3000 psi with w.w.f. reinforcing.
e. Exterior site concrete exposed to weather: 4000 psi with steel WWF reinforcing, 6% (+/- 1%) air entrainment.

3. Concrete with slumps in excess of 5" maximum will not be placed, unless approved by the structural engineer. Slump will be taken at the truck prior to discharge into pumps.

2.8. Admixtures:

A. Air entrainment – 6% (+/- 1%) in all exterior slabs, per ASTM C 260.

PART 3 - EXECUTION

3.1 Forms:

A. Arrange and assemble formwork which is readily removable without damage to cast-in-place concrete surfaces and adjacent materials.

B. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work. Support brace and maintain formwork to support vertical and lateral loads until such loads can be supported by concrete.

C. Use factory fabricated, adjustable length, removable or snap-off metal form ties.

D. Provide PVC sleeves openings in concrete formwork to accommodate work of other trades, schedule 40 PVC.

E. Expansion joint material, asphalt impregnated formed felt; thickness as indicated; depth as required for concrete section being placed, position flush with surface of concrete. Material shall be compatible with joint sealant.

3.2 Placing Reinforcement:

A. Accurately position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations.

1. All bars shall be continuous in longest length possible with minimum 36 bar diameter laps. Reinforcing shall not be continuous through control joints.
2. Bent corner reinforcing shall be provided to lap and match horizontal reinforcement.
3. Minimum coverage for any reinforcing steel shall be as per A.C.I. Standards.
4. Welding for fabrication and installation is not permitted.

B. Install welded wire fabric in as long lengths as practicable at the mid-height of the slab. Lap adjoining pieces at least two full mesh and lace splices with wire.

3.3 Installation of embedded Items:

A. Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cost-in-place concrete.

3.4 Preparation of Form Surfaces:

A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

3.5 Form Cleaning:

A. Clean forms to remove foreign matter within forms.

B. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 Concrete Placement:

A. Comply with American Concrete Institute 304, and herein specified.

B. Install vapor barrier under interior slabs on grade. Lap joints minimum 6 inches and seal watertight.

C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness.

D. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding or tamping (except for slabs).

E. Deposit and consolidate concrete slabs in a continuous operation.

F. Bring slab surfaces to correct level with straightedge and strike-off. Use bull floats or darbies to smooth surface, free of humps and hollows.

G. Maintain mesh reinforcing in approximately the middle of slab during concrete placement operations.

H. Protect concrete work from physical damage or reduced strength, which could be caused by frost, freezing actions, or low temperatures.

I. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.

J. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with American Concrete Institute 305R.

K. When cold weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with American Concrete Institute 306R.

3.7 Finish of Formed Surfaces:

A. Concrete surfaces not exposed-to-view in the finish work have texture imported by form facing material used. Repair and patch tie holes and defective areas and chip off fins and other projections exceeding 1/4” in height.

3.8 Monolithic Slab Finishes:

A. Apply float finish to monolithic slab surfaces. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power driven floats, finished to a tolerance of Ff20/Fl 13.

B. Provide 1/4" pitch in 4'-0" diameter of all floor drains.

3.9 Concrete slab Curing and Protection:

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Specific criteria for the project shall be established at the Pre-Placement meeting held at the project site.

B. Provide moisture curing by one of the following methods for a period of 7 days.

1. Cover concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet.
2. Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width.
3. Curing compounds in accordance with ASTM C-309 may be used as directed by the Owner.

3.10 Removal of Forms:

A. Form work may not be removed in less than 36 hours or until concrete has attained sufficient strength to carry loads.

B. **Immediately upon removing forms – all joints are to be rubbed to a smooth finish.**

3.11 Concrete Surface Repairs:

A. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete, but in no case, to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

B. Excessive honeycomb or embedded debris in concrete is unacceptable.

END OF SECTION