1.3 PROJECT CONDITIONS
A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.
1.4 MATERIALS
A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
B. Water: Potable.
C. Lumber and Plywood:
1. For barriers, sidewalk/track protection and similar uses provide minimum 3/4" thick exterior grade plywood.
D. Portable Chain-link Fencing: Minimum 2-inch, 9 gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2 3/8" OD line posts and 2 7/8" OD corner and pull posts, with 1 5/8" OD top and bottom rails. Provide galvanized steel bases for supporting posts.
1.5 EQUIPMENT
A. General: Provide equipment suitable for use intended.
B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
C. Self-Contained Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
1.6 INSTALLATION, GENERAL
A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
1.7 SUPPORT FACILITIES INSTALLATION
A. General: Comply with the following:
1. Arrange storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
1.8 SECURITY AND PROTECTION FACILITIES INSTALLATION
A. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
B. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

END OF SECTION 01500

SECTION 01731 - CUTTING AND PATCHING

1.1 SUMMARY
A. This Section includes procedural requirements for cutting and patching.
B. Related Sections include the following:
1. Division 1 Section "Selective Demolition" for demolition of selected portions of the building for alterations.
2. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
a. Requirements in this Section apply to electrical installations. Refer to Division 16 Sections for other requirements and limitations applicable to cutting and patching electrical installations.
1.2 DEFINITIONS
A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.
1.3 QUALITY ASSURANCE
A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
1. Stair Stringers
2. Structural Framing in areas related to the Work without approval of Architect.
3. Exterior Masonry Walls without approval of Architect.
B. Operational Elements: Do not cut, patch, or disturb the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
1. Primary operational systems and equipment.
2. Fire-protection systems.
3. Control systems.
4. Communication systems.
5. Computer systems.
6. Electrical wiring systems.
C. Miscellaneous Elements: Do not cut, patch, or disturb the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
1. Water, moisture, or vapor barriers.
2. Exterior wall construction.
3. Equipment supports.
4. Piping, ductwork, conduit, vessels, and equipment.
D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
1.4 WARRANTY
A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.
1.5 MATERIALS
A. General: Comply with requirements specified in other Sections of these Specifications.
B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.
1.6 EXAMINATION
A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
1.7 PREPARATION
A. Temporary Support: Provide temporary support of Work to be cut.
B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.
1.8 PERFORMANCE
A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Proceed with patching after construction operations requiring cutting are complete.
C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

END OF SECTION 01731

SECTION 01732 - SELECTIVE DEMOLITION

1.1 SUMMARY
A. This Section includes demolition and removal of the following:
1. Selected portions of a building or structure.
1.2 MATERIALS OWNERSHIP
A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
1.3 SUBMITTALS
A. Proposed Control Measures: Submit statement that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate. Include measures for the following:
1. Dust control.
2. Noise control.
1.4 QUALITY ASSURANCE
A. Contractor Qualifications: An experienced contractor that has specialized in demolition work similar in material and extent to that indicated for this Project.
B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
C. Standards: Comply with ANSI A10.6 and NFPA 241.
1.5 PROJECT CONDITIONS
A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than **72** hours' notice to Owner of activities that will affect Owner's operations.
B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
C. Owner assumes no responsibility for condition of areas to be selectively demolished.
D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
E. Storage or sale of removed items or materials on-site will not be permitted.
F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.
1.6 WARRANTY
A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
1.7 REPAIR MATERIALS
A. Use repair materials identical to existing materials.
1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.
1.8 EXAMINATION
A. Verify that utilities have been disconnected and capped.
B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
1.9 UTILITY SERVICES
A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
1. Provide at least **72** hours' notice to Owner if shutdown of service is required during changeover.
1.10 PREPARATION
A. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
B. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
C. Temporary Shoring: Provide and maintain interior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1.11 POLLUTION CONTROLS
A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
1. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
1.12 SELECTIVE DEMOLITION
A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
B. Existing Facilities: Comply with building manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
1.13 PATCHING AND REPAIRS
A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
B. Patching: Comply with Division 1 Section "Cutting and Patching."
C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
E. Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
F. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
1.14 DISPOSAL OF DEMOLISHED MATERIALS
A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
B. Burning: Do not burn demolished materials.
C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 01732

SECTION 01770 - CLOSEOUT PROCEDURES

1.1 SUMMARY
A. Inspection procedures.
B. Warranties.
C. Final cleaning.
1.2 PROCEDURES
A. Substantial Completion: Before inspection by Architect/Owner PM:
1. List of incomplete items (punch list) prepared.
2. Owner advised of insurance changeover.
3. Warranties submitted.
4. Releases, occupancy permits, and operating certificates obtained.
5. Project Record Documents submitted.
6. Spare parts and extra materials delivered.
7. Final changeover of locks performed.
8. Startup testing completed.
9. Test/adjust/balance records submitted.
10. Temporary facilities removed.
11. Owner advised of utility changeover.
12. Final cleaning performed.
13. Touch-up performed.
14. Turnover assessment survey submitted.
B. Final Completion: Before final inspection by Architect:
1. Final Application for Payment submitted.
2. List of incomplete items (punch list) endorsed by Architect as completed.
3. Evidence of continuing insurance coverage submitted.
4. Final pest-control inspection report and warranty submitted.
5. Owner's personnel instructed in operation, adjustment, and maintenance of equipment and systems.
C. Warranties: Submitted within 15 days for areas of partial occupancy.
1. Organized and bound in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, with paper dividers. Binder front and spine identified with title, Project name, and name of Contractor.
D. Final Cleaning: Each surface or unit cleaned to condition expected in an average commercial building cleaning and maintenance program.
1. Clean ducts, blowers, and coils for units operated without filters during construction.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

1.1 SUMMARY
A. Record Drawings and Record Specifications.
1.2 SUBMITTALS
A. Record Drawings:
1. 3 sets of marked-up Record Prints.
B. Record Specifications: 3 copies.
1.3 PRODUCTS
A. Record Prints: Blue- or black-line white prints of Contract Documents and Shop Drawings, marked to show actual installation.

END OF SECTION 01781

SECTION 01782 - OPERATION AND MAINTENANCE DATA

1.1 SUMMARY
A. Emergency operation and maintenance manuals.
1.2 PRODUCTS
A. Manuals: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, 3 copies.
B. Emergency Manuals: Types of emergencies, emergency instructions, and emergency procedures.
C. Operation Manuals: System and equipment descriptions, operating procedures, wiring diagrams, control diagrams and sequence of operation, and piped system diagrams.
D. Product Maintenance Manuals: Source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds.
E. System and Equipment Maintenance Manuals: Source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds.

END OF SECTION 01782

DIVISION 2 - SITE CONSTRUCTION

SECTION 02230 - SITE CLEARING

1.1 SUMMARY
A. Removing existing trees, shrubs, ground covers, plants and grass.
B. Clearing and grubbing obstructions, trees, shrubs, grass, and other vegetation including grinding stumps and removing roots and debris.
C. Stripping and stockpiling topsoil and disposing of excess topsoil.
D. Removing existing above and below-grade site improvements.
E. Disconnecting, capping or sealing, abandoning site utilities in place and removing site utilities.
F. Providing temporary erosion and sedimentation control measures.
G. Contractor to examine and benchmark existing site and existing elevation and include in bid any cut/fill required to provided indicated final floor elevation and necessary sub-grade preparation. See soils report and foundations drawings.

END OF SECTION 02230

SECTION 02300 - EARTHWORK

1.1 SUMMARY
A. Preparing sub-grades for slabs-on-grade.
B. De-watering to protect excavated sub-grades.
C. Excavating and backfilling or filling for buildings and structures, including footings and foundations.
D. Excavating and backfilling for utility trenches.
E. Excavation: Unclassified.
F. Grading.
G. Subsurface drainage backfill for walls and trenches.
H. Sub-base course for concrete walks and pavements.
I. Sub-base and base course for hot-mix asphalt pavement.
J. Drainage course for cast-in-place concrete slabs-on-grade.
1.2 MATERIALS
A. Soil Materials:
1. Satisfactory Soils: ASTM D 2487 soil classification groups.
2. Unsatisfactory Soils: ASTM D 2487 soil classification groups.
3. Backfill and Fill: Satisfactory soil materials.
4. Sub-base and Base Course: Natural or crushed gravel, crushed stone, and natural or crushed sand.
5. Engineered Fill: Natural or crushed gravel, crushed stone, and natural or crushed sand.
6. Bedding Course: Natural or crushed gravel, crushed stone, and natural or crushed sand.
7. Drainage Course: Crushed stone, or crushed or uncrushed gravel.
8. Filter Material: Natural or crushed gravel, or crushed stone and natural sand.
9. Sand: Natural or manufactured.
10. Impervious Fill: Clayey gravel and sand mixture.
B. Geotextiles: Subsurface drainage and separation geotextile.
C. Controlled low-strength material.
D. Warning Tape: Polyethylene film.
1.3 EXCAVATION
A. Explosives: Not permitted.
B. Disposal of Surplus and Waste Materials: Off Owner's property.
1.4 FIELD QUALITY CONTROL
A. Geotechnical Testing Agency: Owner engaged.

END OF SECTION 02300

DIVISION 3 - CONCRETE

SECTION 03300 - CONCRETE WORK

1.01 Summary
A. Section Includes:
1. Formwork, complete with required shoring, bracing, and anchorage.
2. Concrete reinforcing, complete with required supports, spacers and related accessories.
3. Cast-in-place concrete, including finishing and curing.
4. Coordinate slab leave outs where indicated.
1.02 REFERENCES
A. American Concrete Institute (ACI):
B. ASTM International:
C. Concrete Reinforcing Steel Institute (CRSI):
1.03 SUBMITTALS
A. Product Data:
1. General -Submit Product Data for proprietary materials and items, including - but not limited to - the following:
a. Reinforcement and Forming Accessories.
b. Admixtures.
c. Aggregate Sizes and Usage (for each class of concrete).
d. Curing Compounds.
B. Quality Control Submittals:
1. Design Data: Submit concrete mix design for each type of concrete.
1.04 QUALITY ASSURANCE
A. General:
1. Unless specified otherwise in this Section, furnish and install cast-in-place concrete per:
a. ACI 301: Passages from ACI 301 cited in this Section are hereby incorporated into the requirements of this Section. Where differences occur between the requirements of ACI 301 and this Section, the latter shall govern.
2. Evaluation and Acceptance Criteria: Evaluation and acceptance of the Work of this Section will be per the provisions of ACI 117 and ACI 301.
1.05 CEMENT (ACI 301: 4.2.1.1)
A. Cement: Conform to ASTM C-150, Type I.
1. Use one brand and type of cement throughout the Project.
B. Aggregates:
1. Fine: Sand aggregate conforming to ASTM C-33, consisting of clean, sharp uncoated grains of strong material.
2. Coarse: Gravel or crushed stone conforming to ASTM C-33, consisting of clean, sharp uncoated grains of strong material. In general, provide coarse aggregates with the following maximum sizes:
a. No larger than one fifth of the narrowest dimension between the sides of the forms in which concrete is to be placed, and
b. No larger than three quarters of the minimum clear spacing between reinforcing bars.
3. Slightly larger aggregate may be used where it is apparent that placing can be accomplished without hazard to the finish.
4. Combined aggregate gradation for slabs and other designated concrete shall be between eight and 18 percent for large top size aggregates (1 1/2 inch) or between eight and 22 percent for smaller top size aggregates (1 inch or 3/4 inch) retained on each sieve below the top size and above the No. 100.
D. Water: Potable and clean, free from oils, acids, organic materials, or other deleterious substances.
1.06 ADMIXTURES (ACI 301: 4.2.1.4) [(ACI 302.1R: 5.6)]
A. General: Use of concrete admixtures shall have prior approval of the Architect/Engineer and shall be used in strict conformance with the Admixture Manufacturer's Instructions and recommendations.
B. Water Reducing Admixtures: All concrete shall contain a high-range water-reducing admixture / superplasticizer, a mid-range water reducing admixture, or water-reducing admixture. Water reducing admixtures shall contain no more chloride ions than are present in municipal drinking water.
1. High-Range Water-Reducing Admixture / Superplasticizer:
a. Conforming to ASTM C-494 / C-494M, Type F or G:
1) EUCON 37 or 537 by EUCO.
2) Rheobuild 1000 by DeGussa Admixtures.
3) Sikament 300 by Sika.
b. Use "flowing" concrete containing the specified high-range water-reducing admixture where:
1) Conditions make consolidation difficult.
2) Reinforcement is congested.
2. Other concrete with a water/cement ratio between 0.45 and 0.50, shall contain either a high-range water-reducing admixture/superplasticizer (specified above) - or a mid-range water-reducing admixture conforming to ASTM C-494 / C-494M, Type A:
a. EUCON MR by EUCO.
b. Sikament HP by Sika.
3. Remaining concrete shall contain the specified water-reducing admixture conforming to ASTM C-494 / C-494M, Type A:
a. EUCON WR-75 or WR-91 by EUCO.
b. Plastocrete 160 by Sika.
C. Non-Corrosive, Non-Chloride Accelerator: Concrete slabs placed at air temperatures below 50-degrees Fahrenheit shall contain a non-corrosive, non-chloride accelerator conforming to ASTM C-494 / C-494M, Type C or E, and containing no more chloride ions than are present in municipal drinking water.
1. Accelguard 80 by EUCO.
2. Rapid-1 by Sika.
D. Water-Reducing, Retarding Admixture: Conforming to ASTM C-494 / C-494M, Type D and containing no more chloride ions than are present in municipal drinking water.
1. EUCON Retarder 75 by EUCO.
2. Plastiment by Sika.
E. Air-Entraining Admixture: Concrete required to be air entrained shall contain an air-entraining admixture approved by the Architect/Engineer and conforming to ASTM C-260.
F. Prohibited Admixtures: When used at the Admixture Manufacturer's recommended dosage, thiocyanate ions contributed by the proposed admixture shall not exceed 0.30 percent by weight of cement. Proposed admixture shall not cause an increase in shrinkage when tested per ASTM C-494 / C-494M and ASTM C-157.
1.07 CONCRETE MIX
A. Proportion concrete to be homogeneous, readily place-able, uniformly workable, conforming to required setting time, and designed to attain the specified properties of strength, slump, entrained air, and water/cement ratio.
B. Establish, based on mix designs from independent testing laboratories, minimum standards of proportions for all types of concrete to be used on the Project prior to concreting operations.
C. If, at any time, tests indicate failure to meet strength, slump, or water/cement ratio, change the standard proportions to meet the requirements.
D. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods per ACI 301. Minimum requirements for each class of concrete are listed in the Concrete Schedule (below).
E. Concrete may be mixed to a moderate slump to enable the proper placing and finishing of slab areas but added care shall be taken in the placing.
F. The Contractor, at no additional cost to the Owner, shall arrange for an approved independent testing laboratory to prepare the mix designs for the classes of concrete scheduled to be used.
1. Design concrete mixes per ACI 211.1 to produce the strength for each class of concrete required on the Drawings or specified herein.
2. Design the concrete so that the concrete materials do not segregate.
G. Laboratory Test Reports: For concrete materials and mix designs, test as follows:
1. Mix designs shall be accompanied by complete standard deviation analysis or trial mixture test reports. If trial batches are used, the mix designs shall be prepared by an independent testing laboratory and shall achieve an average compressive strength that is 1200 PSI higher than the strength specified.
a. Increase this over-design to 1400 PSI when concrete strengths over 5000 PSI are used.
2. Prepare trial mixes and cylinders in sufficient time to demonstrate the reliability of the mix designs prior to the placing of any concrete.
1.08 STRENGTH (ACI 301: 4.2.2.8.C)
A. Compressive strength at 28 days: 4000 PSI.
1.09 AIR-ENTRAINMENT (ACI 301: 4.2.2.4) (ACI 302.1R: 5.6.1)
A. Add five percent plus or minus 1.0 percent air-entrainment to concrete.
1.10 SLUMP (ACI 301: 4.2.2.2)
A. Upon arrival at the Site, maximum slump for conventional concrete shall be 4 inches.
B. In concrete containing the high-range water-reducing admixture (superplasticizer) conforming to ASTM C-1017 / C-1017M - or when a Type F or G high-range water-reducing admixture conforming to ASTM C-494 / C-494M is permitted - provide concrete with:
1. A water slump of between 2 and 3 inches before the admixture is added. This initial slump is increased to between 3 and 4 inches for concrete receiving a dry-shake hardener or for lightweight concrete.
2. A maximum slump of 9 inches at the point of delivery after the admixture is added.
C. Concrete containing the mid-range water-reducing admixture shall have a maximum slump of 5 to 6 inches.
1.11 REINFORCING STEEL (ACI 301: 3)
A. Reinforcing Steel: ASTM A-615 / 615M, 60 KSI yield grade, deformed billet steel bars. Provide the following finish: Plain.
B. Include spacers, chairs, bolsters, ties, and other devices necessary for proper placing, spacing, supporting, and fastening reinforcement in place. Hooking of wire mesh will be grounds for rejection of the installation.
1.12 CURING COMPOUNDS
A. Liquid Membrane-Forming Non-Wax Curing Compound: Dissipating resin type conforming to ASTM C-309, Types S-1 and D-1, Class B. Minimum coverage shall be 300 square feet per gallon per coat. Subject to compatibility with selected fluid-applied flooring material, provide products by one of the following:
1. KUREZ DR VOX by EUCO.
2. (Or approved equal).
1.13 BONDING AGENTS
A. Epoxy Bonding Agent: ASTM C 881/C 881M, Type II.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
a. ChemCo Systems; CCS Bonder Liquid, LWL or SWL.
b. Euclid Chemical Company (The); Euco #352 Epoxy System Euco #452 Epoxy System or Euco #620 Epoxy System.
c. Sika Corporation; Sikadur 31, Hi-Mod Gel Sikadur 32, Hi-Mod Sikadur 32, Hi-Mod LPL Sikadur 35, Hi-Mod LV or Sikadur 35, Hi-Mod LV LPL.
d. Sonneborn, Div. of ChemRex; Epogel or Epogrip.
2. Thin Film Open Time: Not less than two hours.
1.14 CONCRETE DYE
A. PROSOCO, Inc., Consolideck Gemstone Stain
1.15 GENERAL
A. Excessive honeycombing or the presence of embedded debris will be grounds for rejection of the installation. Notify the Architect/Engineer upon discovery.
B. During hot weather, conform to ACI 305R.
C. During cold weather, conform to ACI 306.1 and ACI 306R.
D. Adding water to the concrete mix, while at the Site, is prohibited. Only make field adjustments to the design mix using pre-approved admixture materials.
1.16 FORMWORK (ACI 301: 2)
A. Obtain the Architect/Engineer's review for use of earth forms. When using earth forms, hand-trim sides and bottoms, and remove loose dirt prior to placing concrete.
1.17 REINFORCEMENT PLACEMENT
A. Handle and place reinforcing steel per the recommendations of ACI 318 unless otherwise indicated by the requirements of this Section.
B. Before placing concrete, verify that reinforcing steel is free from rust and scale, or other detrimental materials that could destroy or reduce the bond placement.
1.18 PLACING CONCRETE (ACI 301: 5.3.2.6)
A. Deposit concrete into the final position at the specified slumps without segregation by re-handling or flowing. Deposit concrete at a rate that concrete remains plastic and flow-able into the spaces between the reinforcing bars. Do not deposit partially hardened concrete or concrete that has been contaminated by foreign materials. Do not re-temper concrete.
B. Schedule concreting that once started, remains a continuous operation until the particular section or panel has been completed. Do not deposit fresh concrete on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section or panel. Provide construction joints as specified.
C. Thoroughly compact concrete by means of mechanical vibrators supervised by experienced personnel. Provide sufficient vibration intensity to cause flow or settlement around reinforcement, embedded items, and corners of the forms; but not long enough to cause segregation of the mix. Follow ACI 309R for use of vibrators and type of vibrators. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into receding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
D. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. Comply with provisions of ACI 306.1 and ACI 306R and as follows:
1. When air temperature has fallen to or is expected to fall below 40-degrees Fahrenheit (4-degrees Celsius), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50-degrees Fahrenheit (10-degrees Celsius) and not more than 80-degrees Fahrenheit (27-degrees Celsius) at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Use only the specified non-chloride, non-corrosive accelerator. Calcium chloride or thiocyanates are not permitted.
E. Hot-Weather Placement: When hot weather conditions exist that would impair quality or strength of concrete, place concrete complying with ACI 305R and as specified:
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90-degrees Fahrenheit (32-degrees Celsius). Mixing water may be chilled - or chopped ice may be used to control temperature - provided water equivalent of ice is calculated to equal total amount of mixing water.
2. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to the Architect/Engineer.
1.19 MONOLITHIC SLAB FINISHES
A. Float Finish: Apply float finish to monolithic slab surfaces.
1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.
B. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view.
1. After floating, begin first trowel-finish operation using a trowel of the Contractor's choice. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance. Grind smooth surface defects that would telegraph through applied floor covering system.
C. Slip-Resistant Broom Finish: Apply a slip-resistant broom finish to exterior concrete platforms, slabs, walks, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with the Architect/Engineer before application.
1.20 CURING AND PROTECTION (ACI 301: 5.3.6) (ACI 302.1R: 9.1) (ACI 308.1)
A. Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures - and maintain with minimal moisture loss at a relatively constant temperature - for the period of time necessary for early hydration of the cement and the proper hardening of the concrete.
B. Cure exposed surfaces of concrete directly after finishing operations. Accomplish curing by one of the following approved methods.
1. Water curing consisting of ponding, fogging, or absorptive mat.
2. Sheet materials consisting of placing an approved waterproof cover on the exposed surfaces. Provide sheet materials meeting the requirements of ASTM C-171.
3. Curing Compounds.
C. Cure concrete continuously for a minimum duration of seven days when the ambient temperature exceeds 50-degrees Fahrenheit. Do not permit concrete to dry out prematurely. Reapply water as required to maintain a wet mat or sheet.
1.21 CLEANING
A. General:
1. Upon completion of the Work, remove:
a. Debris resulting from the Work of this Section.
b. Excess materials, tools, and equipment.
2. Leave the Site in a clean and neat condition acceptable to the Architect/Engineer.

END OF SECTION 03300

DIVISION 4 - MASONRY

SECTION 04810 - UNIT MASONRY ASSEMBLIES

1.1 SUMMARY
A. Masonry Construction:
1. Single-wythe masonry.
2. Composite masonry.
3. Cavity walls.
1.2 PERFORMANCE REQUIREMENTS
B. Net-Area Compressive Strengths (f'm) of Structural Unit Masonry: As indicated.
C. Determine net-area compressive strength (f'm) of masonry by unit-strength method.
PART 2 - PRODUCTS
2.1 MATERIALS
A. Concrete Masonry Units (CMUs):
1. Units made with integral water repellent for exposed units.
2. Concrete Masonry Units: Normal weight.
3. Decorative Concrete Masonry Units: Normal-weight units with finish indicated on drawings.

B. Brick: Face brick as indicated on drawings.
C. Reinforcing Steel: Uncoated steel bars.
D. Masonry Joint Reinforcement:
1. Interior Walls: Hot-dip galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
E. Ties and Anchors: Galvanized steel. Mill galvanized in interior walls.
1. Corrugated metal ties.
2. Individual wire ties.
3. Adjustable anchors for connecting to structure.
4. Partition top anchors.
5. Rigid anchors.
6. Stone Anchors: Stainless steel.
7. Adjustable Masonry-Veneer Anchors: slip-in and seismic.
F. Embedded Flashing:
1. All Flashing: Copper.
2. Partially Exposed Flashing: Copper.
3. Concealed (Flexible) Flashing: elastomeric thermoplastic or EPDM (used with copper).
4. Single-Wythe CMU Flashing System: High-density polyethylene cell flashing pans and interlocking CMU web covers.
G. Weep/Vent Holes: round plastic tubing.
H. Cavity drainage material.
I. Reinforcing bar positioners.
J. Masonry-Cell Insulation: Loose-granular perlite or molded-polystyrene units.
K. Cavity-Wall Insulation: Extruded-polystyrene board.
L. Mortar: Natural color.
PART 3 - EXECUTION
3.1 INSTALLATION, GENERAL
A. Use full-size units without cutting if possible. If cutting is required, cut units with motor-driven saws; provide clean, sharp, edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
D. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3.2 LAYING MASONRY WALLS
A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
C. Built-in: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
D. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
E. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
3.3 MORTAR BEDDING AND JOINTING
A. Lay hollow concrete masonry units as follows:
1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.
3.4 MASONRY JOINT REINFORCEMENT
A. General: Install in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
C. Provide continuity at wall intersections by using prefabricated T-shaped units.
D. Provide continuity at corners by using prefabricated L-shaped units.
3.5 ANCHORING MASONRY TO STRUCTURAL MEMBERS
A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated.
2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.
3.6 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS
A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
B. Install flashing as follows, unless otherwise indicated:

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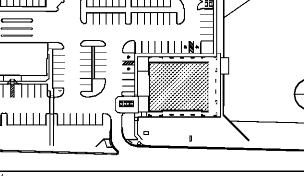

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James L. Cohen AR0015903

Project Title
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BUILDING SHELL
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