Chapter 3
Architectural Requirements

3-1. Exterior Design

a. The importance. Exterior design should be considered throughout the design process. In general, the design should receive most attention once the general arrangement of the powerhouse including floor and crane rail elevations and crane clearances is determined. It should utilize scale, proportion, rhythm, and composition to achieve an aesthetically pleasing structure which fits in with its natural surroundings. In achieving these ends economy is important, and, although decoration and complexity are not to be ruled out, simplicity should be the keynote.

b. Aesthetic appearance. The arrangement and dimensions of the various masses is determined by the physical requirements of the powerhouse components. However, in the design of the ensemble of these masses, the architect should be allowed freedom consistent with an efficient and economical plant layout. In addition, some of the devices that may be used to define and compose the masses and give scale, proportion, and rhythm are changes in texture and materials, emphasis of horizontal pour joints and vertical contraction joints, and placement and sizing of fenestration and openings. The exact size and location of openings should be determined from the standpoint of aesthetics after the structural, mechanical, and functional requirements have been investigated. Windows need not be used, but they may be desirable in order to let in natural light and increase employee morale. When used, their form and location should relate to their function and the aesthetic appearance of the structure. In general, large glass areas in operating portions of the powerhouse should be avoided to minimize blast damage, but small windows high in the powerhouse walls may have value in this respect as blast pressure relief openings.

c. Final selection. Selection of the final powerhouse design should be made after a careful study of at least three designs having basically different exterior treatments. Each proposed design should be carefully developed and perspective drawings prepared. The point of vision for the perspectives should be a point from which the general public will view the structure. The sketches, which are to be used for the selection of exterior treatment, should include all of the adjacent structures and surroundings.

3-2. Exterior Details

Exterior details are discussed in the following subparagraphs.

a. Roofing. Powerhouse roofs may be pitched (gabled, hipped, vaulted, etc.) or flat (pitch not greater than 1 inch per foot nor flatter than 1/2 inch per foot). Pitched roofs are preferred because of lower maintenance costs (flat roofs must be waterproof, whereas pitched roofs need only be watershedding). Parapets that meet current safety codes should be provided at all roof edges. Cants should be provided at the intersection of roof and all vertical surfaces in order to eliminate sharp angles in the roofing. In designing the roofing system, i.e. insulation, roofing, flashing, and expansion joint covers, the most current roofing technology should be utilized. Whenever roofs are exposed to public view from the top of the dam or the abutments, special materials may be used for appearance, e.g. marble chips in place of gravel surfacing.

b. Decks. Exterior concrete decks covering interior spaces should be of watertight construction. Where the deck is covering habitable areas, or areas containing equipment which could be damaged by water, a waterproof membrane with concrete topping shall be added to the structural slab.

c. Walls. Due to structural considerations, e.g. the usual necessity to support crane rails, and the fact that concrete is the main material used in powerhouse construction, concrete is the most commonly used material for the exterior walls of superstructure. However, other systems such as prefabricated insulated aluminum or stainless steel wall panels, concrete masonry, brick, etc. may be used provided an overall economy is effected. Concrete should always be used below maximum powerhouse design tailwater elevation. The finish of the exterior surface of powerhouse superstructures is discussed in paragraph 4-14*b*. All details for concrete construction such as joints, rustication, V-grooves, corner chamfers, and fillets should be studied and considered in the architectural design. The V-grooves, where required should not be less than 1 inch across the face and 1/2-inch deep. The angle at the bottom of the V-grooves should be about 90 degrees. All contraction joints in the substructure should be continued through the superstructure and considered in the design, regardless of the material used for the walls. Wall panels should not be laid continuously across such joints. Flashings or waterstops should be used in all exterior vertical contraction joints.

Flashing, jamb closures, corner plates, parapet and eave closure plates for insulated metal walls should be of the same material and the same gage as specified for exterior wall plates.

d. Entrances. Entrances should conform to OSHA requirements. Not only should all entrances be located for proper and efficient operation of the plant, but they also should be placed to obtain a pleasing exterior architectural design. The dimensions of the door openings should be governed by the required use and should not be sized for the exterior appearance alone. Doors required for proper operation of the plant should not be of monumental type, but should give the impression that the doors are for plant operation. The public entrance may be more decorative than other plant doorways and, if desired, may be massive when used as a design feature. Doors of structural glass or of glass and aluminum are recommended for public entrances. Large doors should either be hinged at the sides and supported at the top by a trolley for folding-door operation or should be of the motor-operated, vertical-lift or overhead rolling doors type where clearances are adequate and where considered desirable from an operation standpoint. A pilot door should be provided in any large door, when a small entrance door is not nearby.

e. Fenestration. The openings in the exterior walls of the generator room should be confined to the necessary access doors and to ventilation louvers or small windows above the crane rails. All sash, trim, or exposed exterior metal should be of aluminum or corrosion-resisting metal requiring no painting and, in general, should be detailed for standard manufactured products. The use of specially designed sash and trim should be limited to the public entrance. When the main transformers are to be located close to the powerhouse wall on either the upstream or downstream decks, no windows should be planned in the adjacent portion of the wall. Where possible, the use of windows in office areas and lunch rooms is encouraged. They should be operable for ventilation and easy to clean such as tilt-turn windows. Glazing should generally be insulating glass. Full-length glass doors and sidelights should be glazed with tempered glass. In certain cases, where the admission of light is desired but a clear view is not necessary, the use of double skin insulating plastics may be considered. Wire glass and glass block will give security and light blast protection. Glass block may be used as a design element.

f. Draft tube deck. The draft tube deck should be wide enough to provide safe clearances for operating the gantry crane, painting and repairing the crane and gates, and removing and reinstalling the gratings. Hose bibbs of the nonfreeze type should be recessed in the wall of the powerhouse. A concrete parapet, with or without a pipe handrailing on top, should be provided on the downstream side of the deck and should have an overall height above the deck of three and one-half feet or as required by current safety codes. The design of the lighting system for the draft tube deck may include provisions in the parapet to accommodate lighting fixtures. Drainage lines from the deck should be as short and direct as possible, but the outlets should be concealed. To avoid a tripping hazard, crane rails should be installed in blockouts with the top of the rail approximately flush with the deck. Blockout should be partially filled with non-shrink grout, and the top remainder of the recess filled with a two-component, cold-applied, self leveling type sealant. The thickness of the sealant is determined by the compressive space required for the crane wheel flange depth.

g. Stairs and railings. Exterior stairs should be provided with safety treads made of a material that will not rust or require painting and may consist of abrasive material troweled into the finish or abrasive strips embedded in the tread and nosing. Handrailings should be made of concrete, concrete and metal, or metal only. The metal railings should be treated or a material specified so that maintenance painting will not be required. All railings should be designed to comply with the most current safety codes.

h. Skylights. Skylights can present leakage and maintenance problems and should therefore be limited to use in visitor's areas where a special effect is desired. The framing should be aluminum or corrosion-resisting metal. They should be glazed with insulating glass or double-skin insulating plastic. Insulating glass should consist of a top layer of tempered glass and a bottom layer of laminated safety glass or as required by current local codes.

3-3. Interior Design

Interior details are discussed in the following subparagraphs.

a. Visitor's facilities. All attended power plants will normally be provided with limited space for the visiting public. This space should be kept to the minimum required for the estimated attendance. The items mentioned in the following paragraphs should be considered in planning the public spaces for all power plants. The public entrance for small plants may be combined with

the employee entrance, and when so located it should be properly marked as a visitors' entrance. For larger plants, a separate, prominently located visitors' entrance should be provided. The entrance to the visitors' area should be as direct as possible from the avenue of public approach and should be accessible to handicapped visitors. An entry vestibule is desirable, but not essential. The design of the visitors' area should take into consideration provisions for exhibits, and location of drinking fountains, public toilet rooms, and vertical transportation, e.g. elevators for handicapped access. The visitors' areas should be arranged so that they are isolated from all other parts of the plant except for access through locked doors. The room finishes should be attractive, serviceable, and easily maintained. Some of the materials that should be considered for use are terrazzo, ceramic and quarry tiles, plaster coated with a durable enamel paint, acoustical tile ceilings, etc. Each material should be evaluated on the basis of cost, appearance, durability, and ease of maintenance.

b. Control room facilities. The control room space should be planned for the ultimate development of the powerhouse, regardless of the number of units installed initially. The control room should be planned for convenience in operation and the equipment should be spaced to permit easy circulation, easy access to equipment for repair or replacement, and convenient installation of future equipment. A minimum space of 4 feet should be provided between the switchboards and the walls and between switchboards and other major equipment. Doors or removable panels of adequate size should be provided to accommodate the installation of future switchboard panels. Items such as specially designed operator's desks, control consoles, and key and map cases should be considered in planning the control room.

(1) Rooms which should be provided as auxiliaries of the control room at attended power plants usually include a small kitchen, a toilet, a supplyroom, and a clothes closet. These rooms should be directly accessible to the operators without the use of hallways. The toilet room should contain one water closet and a lavatory complete with necessary accessories. The supply room should include shelving for storage of forms and supplies used by the operators. The clothes closet should have a hat shelf and clothes rod.

(2) The control room floor may be carpeted or have resilient floor covering such as rubber or vinyl-plastic tile. The walls should be smooth, e.g. plaster or sheetrock, and painted. The ceiling should be suspended acoustical tile. Special thought should be given to sound control. Sound-absorbing wall panels should be considered. They should be covered with perforated vinyl for ease of maintenance. Windows between the control room and the main powerhouse area should have insulated glazing and sound absorbing insulation in the frame. The control room will usually have special lighting, carefully placed to prevent annoying reflections on the instrument panel glass.

(3) The toilet should have ceramic tile floor and walls and painted plaster ceiling. The other small rooms should have the same floor covering as the control room and should have painted plaster or gypsum wallboard walls and ceilings. Cove bases of rubber, vinyl, or ceramic tile should be used in all of the rooms. In some plants, an instrument and relay testing room and a telephone and electronic equipment room may be required. Such rooms should be located near the control room. A photographic darkroom should also be provided in this area for plants using oscillographic equipment. In the darkroom, there should be a stainless steel sink and drainboard for developing and washing films, storage space for developing apparatus, and a storage cabinet for films. A workbench with the necessary electrical connections and a storage cabinet or closest should be provided in the instrument and relay test room. The telephone and electronic equipment room should also be located convenient to the control room and preferably should be above maximum design tailwater elevation. This room must be kept clean and free from dust and should be located with this in mind.

c. Generator room and auxiliary spaces. The arrangement of the rooms and spaces that will house the electrical and mechanical equipment essential to the operation and maintenance of the plant should be determined on the basis of an over-all study of the requirements of the functions involved. A workable, convenient, economical arrangement should be developed that is structurally and architecturally sound.

(1) The criteria governing the layout of the generator room are given in paragraph 2-7*a*. A sufficient amount may be added to the minimum clearances required for installation, operation, repair, and overhaul to secure reasonably convenient space for carrying out these functions. It is not intended that clearances and operating spaces should be arbitrarily overdesigned, but reasonable operating convenience should not be sacrificed in order to secure minimum cost. The space allotment for the erection bay is discussed in paragraph 2-7*b*. As the erection bay is merely an extension of the generator

room, the entire space should be treated architecturally as one room. In general, the treatment should be as simple as possible. The floor finish selected should be the economic one for the plant under consideration. It should be one that will not dust, will resist damage during minor repairs to equipment, and can be satisfactorily repaired if accidentally damaged. Also, a finish shall be used that will clean easily and will not deteriorate with frequent cleaning. Terrazzo is usually justified due to its extreme durability, ease of maintenance, and attractive appearance. In certain cases a wainscot of ceramic tile or some other material may be justified, however, concrete walls are usually sufficient. Concrete walls and ceiling should be painted or sealed to prevent dusting. Special consideration should be given to the design of the roof framing, as well as any ventilation duct work and piping that must be carried under the roof, in order to obtain as pleasing an appearance as possible.

(2) The allotment of space for a maintenance shop should be determined from a layout of the equipment considered necessary to maintain the plant. This room should be located on the generator room floor level and should adjoin the erection bay if possible. The ceiling height should be adequate to provide for the use of a small overhead crane for handling equipment being repaired. The capacity of the crane must be determined by the weight of equipment to be handled. Where partitions form a wall of this room, the partition should be of concrete or concrete masonry units. Partition and walls may be painted or sealed.

(3) The general arrangement of auxiliary equipment is usually determined in making the basic plant layout. An economical and convenient arrangement of this equipment may be achieved only by thorough study of all the requirements and by careful coordination of the various systems. The auxiliary equipment and services for which space will usually be required are listed under paragraph 2-10.

(a) The spaces allotted for the electrical shop, for sewage disposal, and for oil purification and storage should be enclosed; but it is not essential that separate rooms be provided for all of the other functions. In many cases, open bays housing several functions will be practicable, and such an arrangement will usually be more economical than a layout that provides separate rooms for each function.

(b) Storage battery and charging rooms shall be designed to conform to Corps, OSHA, and NEC safety codes. Storage battery and battery charging rooms preferably should be located above high tailwater elevation and should be adequately ventilated. A sink constructed of acid-resistant material should be provided in the battery room. Drainage from the sink and floor drains should flow to an acid neutralization tank, then discharge to the sewer system. All piping to the neutralization tank and floor drain, including the drains themselves, should be acid resistant. The walls and floor of this room should be painted with an acid-resistant enamel. The ceiling may be painted to improve lighting conditions if desired. Access to the rooms should be adequate for easy installation and replacement of equipment.

(c) The floors of the oil purification and storage rooms should be trowel- finished concrete, painted with oil-resistant paint or sealed. The lower 6 feet of the walls should have an oil-resistant painted dado, with the walls above the dado and the ceiling unpainted. All other rooms should receive no special finishes.

d. Personnel facilities. Employee facilities required for efficient plant operation should be based upon approved design memorandum on plant staffing. These facilities usually include the offices, toilet, shower, locker rooms, employees' lunchroom, stairways, corridors, and elevator. In the larger plants, it is usually necessary to provide a conference room suitable for employee management meetings.

(1) The requirements for office space will probably vary with each plant, but at all attended powerplants it is recommended that offices be provided for the plant superintendent and for general clerical space. The requirements of each plant should govern the allotment of additional space for offices, and the expected operating organization must be determined before the planning can be completed. A fireproof vault, file and record rooms, storage closets, and clothes closets should be provided as required and should be conveniently located with respect to the offices. Plants should provide toilet rooms for both male and female employees in the office area. The minimum requirements for the men's toilet should be one water closet, one urinal,and one lavatory; and for the women's toilet, the requirements should be one water closet and one lavatory, but in all cases shall meet the requirements of local codes. Floors should be of rubber or vinyl-plastic tile with a light but serviceable color with a nondirectional pattern that will hide scuff marks and a dark cove base. Dark, patterned carpeting with rubber or vinyl cove base may be considered. Plastered masonry walls, gypsum wallboard, or metal partitions should be painted with interior enamel.

Ceilings should be suspended acoustical tile. The closets and storage rooms should be finished the same as the offices. The toilet rooms should have ceramic tile floors, tile cove bases, and glazed tile wainscot with painted plastered or concrete masonry walls above. The stalls in toilet rooms should be metal with factory-applied enamel or other durable coating.

(2) A minimum width of 5 feet should be used for all office corridors and a minimum of 6 feet for all corridors in work areas where corridors may be used for handling equipment. In planning corridors and openings, consideration should always be given to the desirability (and in some cases the necessity) of bringing bulky equipment into the plant and installing it intact. The corridors on the office floor levels will normally be finished similarly to the offices. Floors of corridors on the other levels should be trowel-finished concrete with hardener added. Where floors are likely to remain wet a light brush finish after troweling should be specified to prevent slipping. Painted concrete floors should be avoided because of the maintenance involved. Partitions should be concrete or concrete masonry as desired. Unfinished concrete ceilings should be used and may be painted or not as required to improve lighting.

(3) Stairways, aside from entrance steps or stairs, may be classed under three general types: office stairs, work area stairs, and limited-use stairs or ladders. The office stairways should have concrete or masonry walls, painted to match the finish in the adjacent areas; soffits or ceilings may be painted or left unfinished. The finish as described above should extend to the floor levels below and above the office floor. The office stairs should be of the pan type, steel- supported; with concrete safety treads with safety nosings and metal risers. Painted metal, galvanized pipe or extruded aluminum handrails may be used for these areas. Work area stairs should be similar to office stairs or concrete with safety tread nosings, and the walls and ceilings should be unfinished concrete. Limited-use stairs and ladders, which provide access to places requiring no regular service, may be of concrete or steel of simple design and provided with adequate protection as required by current safety codes.

(4) Both male and female personnel of the plant should be provided with adjoining locker, shower, and toilet rooms, located near the maintenance shop and erection bay. In large plants, additional toilet rooms should be provided toward the far end of the plant. The locker rooms should have forced ventilation and should contain benches and built-in type metal lockers. The shower rooms should have gang-type showers for men with one shower head for each ten men to be accommodated per day, and individual shower and drying stalls for women with one shower for each ten women to be accommodated per day. In general, an increasing percentage of female workers should be planned for. The toilet rooms adjoining the locker and shower room should have one water closet, one lavatory and for men, one urinal for each ten personnel to be accommodated per day. The additional toilet rooms shall be limited to one water closet, one lavatory and for men, one urinal. In some cases unisex toilet rooms may be used. A drinking fountain should be located in the corridor adjacent to the area. Walls should be concrete, masonry or gypsum wall board on steel studs. Shower and toilet room walls should have a standard height, glazed tile wainscot, except in the showers, where it should extend to the height of the shower head. Ceilings and concrete portion of the walls of the shower room subject to steam vapors should be given a prime coat of primer-sealer (conforming to the latest edition of Federal Specification TT-P-56), one coat of enamel undercoat (conforming to the latest edition of Federal Specification (TT-E-543) followed by one coat of gloss enamel (conforming to the latest edition of Federal Specification TT-E-506). Concrete masonry walls should receive one coat of concrete emulsion filler prior to the above treatment. A janitor's closet should be provided and should have a service sink and shelves for supplies. The walls of the janitor's closet shall be painted gypsum wall board or unpainted concrete or masonry. The floor shall be trowel-finished concrete with no base.

(5) A lunch and break room should be provided. It should include adequate counter space and storage cabinets and a range top with ventilation. It should provide space for a refrigerator, microwave ovens, and vending machines. There should be adequate electrical outlets for coffee pots, microwave ovens, vending machines, etc. It should have sufficient room to accommodate anticipated plant personnel. Finishes should consist of rubber or vinyl plastic resilient flooring with cove base, painted walls, and suspended acoustical tile ceiling. Insofar as practical, the lunch room should be located so as to minimize the noise and vibration of the powerplant. The use of sound absorbing wall panels covered with perforated vinyl should be considered. Sound dampers may have to be used for the lunch room HVAC system. Unnecessary wall penetrations should be avoided. If practical, consideration should be given to locating the lunch room at a level where windows to the outside can provided. This is highly desirable considering the indoor nature of the work.

(6) A first-aid room should be planned adjacent to the control room, if practicable, or otherwise on either the office or locker floor level. This room should contain a first-aid cabinet, a cot, and a lavatory and should have rubber or vinyl-plastic tile floor and cove base, painted walls, and ceiling. The door should be wide enough to accommodate a stretcher.

(7) A powerhouse having more than three floor levels should be provided with one or more elevators designed in conformance with the ANSI Safety Code for Elevators and Dumbwaiters, Escalators and Moving Walks, A 17.1. The location should be established to enable omission of a penthouse above the roof of the structure if possible and to reduce corridor travel to a minimum. The elevator should be a passenger type having minimum inside dimensions of five feet by seven feet, and a minimum capacity in conformance with ANSI A 17.1. Car speed should not be less than 200 feet per minute and controls should be of the pushbutton, automatic selective, collective type. Car and hoistway doors should be of the horizontal sliding type equipped with automatic, two-speed power operators. In large powerhouses, a freight elevator may also be provided.

3-4. Interior Details

In order to obtain reasonable uniformity and to establish a high standard of quality, certain interior details are described in the following paragraphs. However, these details are not mandatory. The designer should use his knowledge of equipment and materials to achieve simplicity and first-cost economy consistent with utility, safety, aesthetics, and low maintenance costs.

a. Floor and wall finishes. All floors should be designed for serviceability and appearance and should adjoin all walls with a cove base if practical. These cove bases should be of concrete, ceramic or quarry tile, or rubber or vinyl-plastic material. Where wet walls and floors may be expected because of seepage, condensation, and similar conditions, gutters should be provided around the room at the walls. Cove bases are not required where gutters are used. Floors in rooms where oil or water is stored, processed, or handled should be adequately drained. A floor slope of 1/8-inch per foot is recommended where floor drains are installed. Curbs should not be provided at doors in these rooms except as a last resort. The floors should be recessed below adjacent floor whenever feasible. Steps should not be located at the immediate entrance. A platform or a ramp with nonslip finish and maximum slope of 1 in 12 should be provided.

b. Acoustical tile ceiling. Where flat acoustical ceilings are required, acoustical tile of suitable design may be supported on steel supports.

c. Door trim. All trim for doors throughout the plant should be of metal. It is recommended that bucks be used for mounting all trim. Poured-in-place, integral jambs, and trim are not desired except in areas where structural shapes are used as the finish trim.

d. Plumbing fixtures. Maintenance of the toilet rooms of the plant will be made easier if the floor area is clear of fixture mountings. For this reason, wall-hung urinals, water-closets, and lavatories should be used throughout the plant. Wall-hung, foot-operated flush valves should be furnished for water closets and urinals. Unit coolers should be provided for drinking water, positioned in such manner as not to unduly restrict passage through corridors. Because of possible damage due to leaks and to facilitate access for repairs, plumbing fixtures, water supply, or drain piping should not be located above the control room or directly over electrical switchgear and similar equipment.

3-5. Schedule of Finishes

The finishes of some of the rooms in the plant are described above in detail. The finishes for all rooms in a plant should be shown in the form of schedules to be included in the contract drawings. The schedules should define the “finish” and “color” of the various components of each room, such as floors, walls, ceilings, trim, doors, and equipment and should indicate the number and type of prime and finish coats of paint required. Paint colors should be specified by the numbering system of the paint color chips shown in Federal Standard No. 595, “Colors”.

3-6. Painting

The painting requirements for both the above and below water level portions of the powerhouse are adequately covered, both as to the surface preparation and paint systems to be specified in Guide Specification CW-09940, provisions of which should be followed in preparing the painting portion of the Schedule of Finishes.

a. Special formulations. The special formulations listed in the above guide specification, or Standard Federal Specifications should be used to procure the paint ingredients required in lieu of reference to a specific manufacturer’s product.

b. Aesthetic goals. Paint used to achieve aesthetic goals and super-graphics used to convey information and directions are considered appropriate in areas open to the public.

c. Reasons for painting. With the few exceptions already listed, painting should not be used for decorative purposes but should be confined to preventing corrosion of the surfaces requiring protection, to improving lighting efficiency, and to stopping dusting of concrete. When painting is required for concrete walls, the concrete in area visible to the public should have a sack- rubbed finish before applying the paint.

d. Requirements. Painting requirements should be covered by general provisions in the specifications and detailed information shown on the Schedule of Finishes. Some painting requirements may need to be indicated on the details.

3-7. Design Memorandum

The architectural design of the powerhouse should be thoroughly discussed in a design memorandum. General and specific consideration that influenced the exterior design and type of construction should be given. The reasons for designing a windowless plant or for using windows and also the reasons for using various materials such as precast concrete panels, concrete poured monolithically, prefabricated aluminum or stainless steel wall panels for the exterior finishes of the powerhouse should be stated. The method of determining the amount of space allotted for public use and for offices should be explained.

3-8. Drawings

The architectural drawings required for the construction of the powerplant should include the layout of grounds and access roads, exterior and interior elevations of the powerhouse, cross sections through the powerhouse showing all types of construction and floor elevations, detail elevations of all tile work and special interior treatments, detail sections of stairs, stair and handrail details, window and door schedules and details, plans of all floors and roofs, detail plans of special areas such as public reception room, details of special decorative items, details of dado and tile finishes, details of roofing and flashings, and any other architectural details that will be needed for the construction of the powerhouse. A rectangular system of column reference lines should be established and, in general, all dimensions should be tied to these reference lines.

a. General layout. The general layout should be drawn at such a scale as to require only one sheet and should show means of access to the plant, public and employee parking facilities, grading, drainage, lighting, and landscaping. Details of architectural features of the layout, such as floodlighting arrangements and landscaping, should be shown at a larger scale on other drawings.

b. Elevations. The exterior elevations of the powerhouse should be made at a scale that will allow the full length of the powerhouse to be shown on a standard size sheet. These elevations should show all roof and floor elevations, finish grade elevations, all windows, doors, or other openings, V-rustications, surface treatments and special decorations and should make reference to the proper drawings for details. Interior elevations of powerhouse walls may usually be shown adequately on the cross sections. All tile wainscots should be drawn in elevation at not less than a 1/4-inch scale and should show the vertical and horizontal courses of tile and should give dimensions of the tile and of wall openings. All wainscots, floors, and door openings should be laid out, using the 4-inch modular system as proposed by the American Standards Association.

c. Plans. Construction drawings required for the construction of the powerplant shall be in accordance with specific requirements of Paragraph 7c of CE-4000, “Lump-sum Contract for Engineer Services for Design of Hydroelectric Power Plant.”