

## APPENDIX A

### CONSTRUCTIBILITY REVIEW GENERAL GUIDANCE

#### BIDDING INFORMATION

1. Correct Bid Item wording and correct annotation on drawings. It is extremely important that the wording of the bid items is reflected on the contract drawings to define what work is included in the basic contract and what work is included in the bid alternates items.
2. Multiple Bid Items  
  
When it appears that funds available for a project may be insufficient for all the desired features of a construction project, provide a first (base bid) item covering the major portion of the work. Include one or more additive bid items which progressively add specified features of work in order of Priority (most important first).
3. Bidding place address correct. Check that the bidding place address shown in the Invitation for Bids is correct.
4. Plan Issue Office address and telephone number correct. The address must be complete with zip code and the telephone number must contain the area code designation.
5. Correct telephone number for bid inquiries. Bid and procurement inquiries should be addressed to Purchasing. Technical questions shall be addressed by the Project Manager.
6. Pre-bid Site Visitation. Check to see if the proper telephone number is shown and provide specific dates for those visits as deemed necessary.

#### GENERAL PARAGRAPHS

7. Adequacy of General Intention and General Description paragraphs. Verify that the General Description of the work is complete and properly describes salient features of the project.
8. Adequate time for completion. Evaluate reasonableness of specified contract time for completion of work taking into consideration the following items: material - delivery schedule, long lead time items (switchgear, generators, etc.), unusual construction requirements, seasonal constraints (i.e., roofing during rainy season, etc.), work in occupied areas, other contractors and/or agencies working in the same area, potential delay on

site availability, etc. Contract time must be reasonable - neither too long nor too short.

9. Contract completion dates compatible with phasing/sequencing schedule. Scheduling and phasing of work specified to suit needs of the user and coordinated with the contract work. Identify a separate completion date for each phase of the work. Include work sequencing schedule in the specifications. Phasing requirements should be practical and clearly portrayed.
10. Provision of liquidated damages for multiple completion dates specified. Check to assure that the contract with multiple completion dates has separate liquidated damages for each completion date.
11. Correct drawing numbers and titles in both specs and drawings. Verify that drawing numbers and titles in both plans and specifications are correct. Insure that all sections of specifications listed in the Table of Contents are in fact included. Verify that the construction contract number on all pages of the plans and specifications is correct.
12. Salvage material and equipment requirements clearly specified. Plans and specifications should properly specify, define, and identify materials and equipment to be salvaged. Which will become contractor's property and which will be turned over to the City? Where are the salvage items to be delivered and who is authorized to receive them? Check requirements for inspection prior to start of removal of all materials and/or equipment specified to be removed and remain City property.
13. Site conditions verified. Conduct a site visit to verify actual existing site conditions for early detection of any obstructions or problems.
  - a. Are all existing manholes, vaults, valve boxes shown?
  - b. In the path of new utilities, are there any obvious interferences (e.g., corners of buildings, sidewalks or curbs, storm drains, paving) not shown on the site plan?
  - c. Do details indicating excavation for trenches or structures include an accurate depiction of known existing pavement thickness?
  - d. The "older" the area (in terms of the City's development), the more likely there are unexpected obstructions. Look for clues of abandoned underground tanks, utilities, foundations, paving, railroad tracks, etc.
  - e. Is the responsibility for providing utility connections (telephone, electric, gas, water, sewer) clearly defined, particularly as to who

pays? Again, there are procedural requirements involving advance planning.

- f. Are special soil conditions identified?
14. Requirement for Network Analysis System. What kind of progress schedule (CPM Network or Bar Chart) is required? Specifications should address the detailed information that is to be incorporated into the specified schedule. Is the specified schedule suitable for the type of work to be performed?
  15. Special utility outage requirements. Specifications should clearly define procedures and restrictions for scheduling outages and the feasibility of utility interruptions. Check against statements made in the General Paragraphs for consistency, and that the two are cross referenced. Specifications should address availability of utility services, and point of connections should be indicated. Utility rates should be stated, if a charge is to be made. All utilities must be shut off or disconnected unless specified otherwise. Specify who will shut off or disconnect utilities.
  16. CFE/CFM requirements clearly specified. City-Furnished Material (CFM) / City-Furnished Equipment (CFE) should be completely and accurately specified and indicated or scheduled. When CFM/CFE is specified, indicate the place of delivery or pick-up point by the contractor.
  17. Restricted working areas and adequacy of working space  
Access to site:
    - a. Are there any hindrances spelled out on the plans or in the specifications? If not, unrestricted access can be anticipated.
    - b. Are there cars parked in lots or around buildings, which will not be moved?
    - c. Have the conditions or user requirements changed recently?
    - d. If contract includes renovation work indoors, are the spaces presently occupied and will they remain occupied during contract work?
    - e. Is the user (i.e., building occupant) fully aware of the interferences, such as parking, bathroom facilities, utility interruptions, access to occupied spaces, ventilation, dust and noise?

- f. Is it clear to the contractor which areas must be worked around, such as furniture, partitions, etc.?
  - g. Is the entire work area available at one time, or only portions? If only portions, are they clearly defined in both limits and time duration?
18. Requirement for Contractor Quality Control (CQC) provisions (for projects over \$2 million).
- a. Edit CQC provisions properly and tailor to suit the requirements of the project.
  - b. Identify in the specifications the items to be tested (e.g., concrete, reinforcing steel, soil compaction, on-site insulation assemblies, etc.), and frequency of testing.
  - c. What test procedures apply and what is the required level of performance? (e.g., compression test for concrete, tensile strength test for reinforcing bars, etc.).
  - d. Who will perform the test? (i.e. City personnel, Contractor CQC representative, or Private Testing Laboratory Personnel).
  - e. Check requirements for experience qualifications for those specialties (e.g., metal curtain wall, foundation piles, dewatering, pre cast architectural concrete, sprayed-on fire protection, laboratory equipment, mechanical and electrical equipment) in which production capability and competence in performing installations and services requires a substantial amount of experience.
  - f. Check requirements for factory inspection of custom products (e.g., pre-cast concrete structural members). Identify type of inspection to be performed.
  - g. Check if submittal requirements in each technical section appear complete.
19. Environmental Protection requirements. Edit environmental protection requirements properly and tailor to suit project needs. Specific requirements for the following should be included: submittals, protection of natural resources, erosion and sediment control measures, control and disposal of solid waste, dust control and noise control. If burning is

permitted on site, contractor must comply with City fire regulations including Federal, State, and County regulations which apply to burning.

## SPECIFICATIONS AND DRAWINGS

### DIVISION 1 - GENERAL REQUIREMENTS

- \_\_\_ Verify all concrete columns and walls against structural.
- \_\_\_ Verify on site plans that both existing and new work are clearly identified.
- \_\_\_ Verify building elevations against floor plan openings, and check, in particular, roof lines, window and door openings.
- \_\_\_ Verify building sections against elevations and plans, lines, windows, and door locations.
- \_\_\_ Verify wall sections against architectural building sections and structural
- \_\_\_ Verify masonry openings for windows and doors.
- \_\_\_ Verify expansion joints through building.
- \_\_\_ Verify partial floor plans against small scale floor plans.
- \_\_\_ Verify reflected ceiling plan against architectural floor plan to ensure no variance with rooms. Check ceiling materials against finish schedule, check light fixture layout against electrical, check ceiling diffusers/registers against mechanical, check all soffits and locations of vents.
- \_\_\_ Verify room numbers, names of rooms, finishes and ceiling heights. Look for omissions, duplications and inconsistencies.
- \_\_\_ Indicate all finished slab elevations on the drawings.
- \_\_\_ Reinforced concrete elevator pit dimensions should be with the overall dimensions of the specified elevator.
- \_\_\_ Verify column lines on structural and architectural.
- \_\_\_ Verify that all column locations are same on structural and architectural.
- \_\_\_ Verify perimeter slab on structural matches architectural.
- \_\_\_ Verify that all depressed or raised slabs are indicated.

- \_\_\_ Verify roof framing plan column lines and columns against foundation plan column lines and columns.
- \_\_\_ Verify perimeter roof line against architectural roof plan.
- \_\_\_ Verify all columns and beams are listed in column and beam schedules.
- \_\_\_ Verify length of all columns in column schedule.
- \_\_\_ Verify all sections are properly labeled.
- \_\_\_ Verify all expansion joint locations against architectural.
- \_\_\_ Verify overall dimensions of mechanical equipment (i.e., air handling units, compressors, steam generators, etc.) to insure that it will fit in the space provided. Also, what electrical, piping, sprinkler, structural, architectural items are within limited spaces.
- \_\_\_ Verify all plumbing fixture locations against architectural equipment and electrical plans. Verify all plumbing fixtures against schedule and/or specifications.

#### Rehabilitation and Repair

- \_\_\_ Taylor specifications sections and edit to suit work. Clearly delineate the new work, repair work, and existing work.
- \_\_\_ Verify that new materials to match existing materials are properly described, and acceptable sources specified (if necessary).
- \_\_\_ Quantities for bidding purposes should be specified or indicated, where appropriate.
- \_\_\_ Replacement of existing materials with new: Specification should detail what should be done on adjacent work to remain which may require cleaning and refinishing; i.e., existing suspended grid system to receive new acoustical panels, existing frame/trim to receive new doors and windows.
- \_\_\_ On repainting jobs, plans and specifications should clearly identify which walls or ceilings will be painted.
- \_\_\_ Plans and specifications should delineate where new work will start.

## DIVISION 2 - SITE WORK

- \_\_\_ Borrow and waste area including truck routes to the construction sites should be clearly indicated on the drawings.
- \_\_\_ Drawings should clearly indicate clearing and grubbing limits. Horizontal and vertical survey control monuments must be shown.
- \_\_\_ Specifications should have proper and sufficient sheeting and shoring requirements for the job and state that those materials are on the site prior to starting excavation operations.
- \_\_\_ Has provision been made in the specifications for positive control temperature of the bituminous material?
- \_\_\_ Test results on samples of asphalt, aggregate, sand, and mix should be obtained from the plant prior to placing any bituminous concrete.
- \_\_\_ Locations and elevations of existing underground obstructions should be clearly indicated on the drawings (e.g., cables, abandoned pipes, old foundations, logs, etc.).
- \_\_\_ Drawings must include boring logs and soil classification along with ground water level.
- \_\_\_ Verify line and grade of ditches particularly on "Match Line" (i.e., often the line and grade of the same ditch are erroneous and will not match).
- \_\_\_ Check project drawings for location and extent of the various types of pavements.
- \_\_\_ Know location of all hand holes, manholes, observation risers and other structures or features to be installed within the pavement area.
- \_\_\_ Drawings should indicate total thickness of each base course type (check pavement details). Verify cross-section indicated to insure that it agrees with specifications for base and sub-base courses, and wearing course.
- \_\_\_ When Test Piles and Pile Load Tests are specified, verify that drawings show number and locations of these piles.
- \_\_\_ Check fence line and grade for conflict with existing structures (e.g., sewer manholes, electrical manholes, water or gas meters, etc.).
- \_\_\_ Verify property line dimensions on site plan against architectural.

- \_\_\_ Sewers should be below water lines if they are within 10 feet horizontally. Sewer and water line crossing details should be included in the drawings. Allowable clearances between water and sewer lines under the building should be clearly shown in detail drawings. Do not install water and sewer lines in the same trench side by side.
- \_\_\_ Profile of underground works (sewer lines, water lines, electrical and communication lines, vaults, etc.) should be shown.
- \_\_\_ The specification should also establish criteria for maintenance of landscaping such as frequency of irrigation; mowing and fertilizing.
- \_\_\_ In phased work, can irrigation system be provided in phases to new and/or existing landscaping?
- \_\_\_ Check the number of trees and shrubs shown on the landscaping planting plan with their corresponding quantities shown on the "Plant Legend or "Trees and Shrubs Schedule."
- \_\_\_ Do not plant trees over sewer or other underground utility lines.
- \_\_\_ Types of fertilizer, times of application and the amount to be applied each time should be included in the project specifications.
- \_\_\_ Specifications should require that before planting trees and shrubs, contractor must investigate the possibility that the site may have previously been treated with herbicides or soil sterilants and make sure that soil condition is suitable for planting.
- \_\_\_ Existing trees to remain within an area should be protected from accidental damage with barricades or wooden planks strapped around their trunks.
- \_\_\_ Check schedule of availability of the areas to be demolished. Notice to City prior to demolition, how much time needed?
- \_\_\_ Demolition requirements should address the following: (a) phasing-work (salvage operations, demolition, disposal) and (b) coordinating with other phases of the construction.
- \_\_\_ Dump Sites: If excavation is included in the project, is a dump site clearly identified in the plans and specifications? Is a distance given? Is it correct?
- \_\_\_ Check possible requirements for dewatering operation at proposed excavation areas.
- \_\_\_ Verify all new electrical, gas, water, sewer, etc., lines connect to existing.

## DIVISION 3 - CONCRETE

- \_\_\_ Review specifics on concrete mix design, placement, curing and - finishing. Include concrete testing requirements.
- \_\_\_ All Portland cement to be used in the concrete for any individual walk, curb or gutter should be of the same brand and type.
- \_\_\_ Project specifications should specify a minimum curing period for cast-in-place concrete before permitting the application of primer and subsequent work for built-up roofing.
- \_\_\_ Specifications should require that all reinforcement should be supported and wired together before pouring concrete. Is there enough room for reinforcing bars and other embedded items?
- \_\_\_ Specification should state the type of finish needed to achieve a functional slab. Important points of the specifications are: slope floors to drains; bleed water should be removed only by dragging with rubber hose over the surface and not by dusting with dry cement to absorb water.
- \_\_\_ When there is a requirement to test the cement, a sample from the mill which supplies the job, or preferably from the job itself, should be shipped in air-tight containers.
- \_\_\_ Specification should state within how many days (minimum) or percent of concrete strength removal of forms will commence on different types of concrete structures.
- \_\_\_ Minimum required cover over reinforcing steel for concrete surfaces and exposed to the weather and for interior concrete surfaces not exposed to weather conditions should be stated in the specifications.
- \_\_\_ Specification should include the recommended/acceptable Casting and Erection Tolerances of precast panels.
- \_\_\_ Prestressed concrete shop drawings shall include, but not be limited to, the following items: bed layouts, cable tensioning data, sequences for stressing and detensioning (releasing).
- \_\_\_ When prestressed products are factory fabricated, specifications require the adherence to catalog guarantees as to capacities, dimension, tolerances, and permissible alterations in field, such as coring for utility lines.

- \_\_\_ Plans and specifications should limit the number of cut strands in the members during coring or cutting planks.
- \_\_\_ Drawings must include reinforcing bar splicing details.
- \_\_\_ Strand ends of pre-cast panels must be recessed and backfilled or otherwise carefully protected to avoid corrosion.

#### DIVISION 4 - MASONRY

- \_\_\_ Specifications should identify all the requirements if a sample masonry wall is needed.
- \_\_\_ Is full-time inspection by special inspector required/necessary on masonry work?

#### DIVISION 5 - METALS

- \_\_\_ Make sure that stud types, sizes and spacing are spelled out in the plans and specifications.
- \_\_\_ Are miscellaneous metal items described adequately?
- \_\_\_ The specifications should clearly identify which materials or components (e.g., steel trusses, beams, girders, etc.) are to be factory inspected.
- \_\_\_ All welders that will be assigned to the project should possess a certification that he/she passed the qualification tests in accordance with the appropriate section of the American Welding Society Standard D1.1 within the past 12 months.
- \_\_\_ Make sure that detail of all major structural steel connections in the project are shown in the drawings.

#### DIVISION 6 - WOOD WORK

- \_\_\_ Specifications should indicate that oversize cuts and holes will not be permitted during cutting and boring for service runs to minimize strength reduction of structural members.
- \_\_\_ Specifications should state width, length, method of nailing or fastening and materials to be used for fastening finish carpentry and mill work.
- \_\_\_ The specifications shall cover such items as grades, moisture content, size and pattern, surface texture and grain of materials for finish carpentry and mill work.
- \_\_\_ Verify all cabinets will fit.

## DIVISION 7 - THERMAL AND MOISTURE PROTECTION

- \_\_\_ Specifications should indicate roofing inspection requirements.
- \_\_\_ Specification should require that roof insulating materials are to be kept dry before, during, and after applications.
- \_\_\_ The type of expansion joints sealant material must be identified on both plans and specifications (e.g., asphalt-latex emulsion, hot poured rubber-asphalt, premolded joint filler, etc.).
- \_\_\_ Specification should indicate the acceptable range of moisture contents and surface moisture.
- \_\_\_ Include pre-installation conference requirement in the specifications to make sure the thickness of the roofing insulation, the number of layers, and the method of application are understood by the contractor and workers.
- \_\_\_ The rate of application of the hot bitumen over the top ply should be specified.
- \_\_\_ It is mandatory that the top surface of the exposed roofing be given a glazed-coating if the work stops for any reason; i.e., weather, night fall, or a large volume of work on the roof by other building trades.
- \_\_\_ For safety, bitumen heating kettles must not be put on top of any building.
- \_\_\_ Specifications should include a provision to insure that all items (i.e., drains, curbs, wood cants, vents, pipes, etc.) which penetrate the built-up membrane are in place before laying any plies.
- \_\_\_ Materials at the job site should be properly and neatly stacked with protective covering if necessary to minimize damage.
- \_\_\_ Specification should indicate the items required for test cut (i.e. size of test cut, where it should be taken, how often test cut will be done, etc.).
- \_\_\_ Specifications should indicate sealant amount of coverage per lineal feet on joints of various widths and depths.
- \_\_\_ Contract documents should clearly indicate which surfaces are to be damp-proofed.

## DIVISION 8 - DOORS AND WINDOWS

- \_\_\_ Keying System requirements should be coordinated with the needs of the using activity. When the new system is to be an extension of an existing system, state the manufacturer's name of the existing system.
- \_\_\_ Specifications should include provisions on how delivery, storage and handling of doors and windows will be done by the contractor on different types of doors (metal doors and wood doors).
- \_\_\_ Door hardware schedule should provide the following information for each item of hardware: model number, finish, sizes, types of fasteners, including any designation of optional features or accessories.
- \_\_\_ Glass and glazing specifications should address the following items: sash preparation, glazing clearances, glass selection, glass Preparation and glass positioning.
- \_\_\_ Specifications for glass and glazing should indicate that installation of glass and glazing materials should not be attempted when the temperature is below 40 degrees Fahrenheit to avoid moisture being trapped which will cause failure of the weather tight seal
- \_\_\_ Verify measurements of doors and windows as soon as they are delivered on site.
- \_\_\_ Make sure that all "Detail Numbers" for doors and windows as shown on the floor plans have a corresponding detail on the architectural drawings.
- \_\_\_ Verify all door schedule information including sizes, types, labels, etc. Look for omissions, duplications, and inconsistencies.

## DIVISION 9 – FINISHES

- \_\_\_ Compare architectural finish schedule to specification index. Insure that all finish materials are specified.
- \_\_\_ There should be provisions in the specifications for exterior and interior plastering concerning temperature and ventilation control for proper curing and drying.
- \_\_\_ Surfaces requiring waxing and buffing should be spelled out in the contract documents.
- \_\_\_ Specifications should indicate what surfaces require no field painting, what surfaces come to the job site already primed and require no field priming, what surfaces are to be field primed and painted, how many coats each surface is to

receive, the type of primer and intermediate and finish coatings each surface is to receive, and the color and gloss of the finish coat to be applied to each surface.

- \_\_\_ Specifications should indicate the paint minimum and maximum coverage per gallon or the dry film thickness for each type or kind of paint material.
- \_\_\_ Specification should indicate whether patched/repaired areas are to be painted. Provide color schedule.
- \_\_\_ Plans and specifications should address which method of carpet installation ("tackless strip" method or "glue down" method) will be used.
- \_\_\_ Check drawings to determine which walls terminate at the underside of the construction above ceilings. These walls should be clearly identified.
- \_\_\_ Areas in plenum or attic which are to be plastered as required for fire protection or sound barriers should be clearly marked in the drawings. (This area is often overlooked by contractors and inspectors.)
- \_\_\_ All fire rated walls should be clearly identified on the drawings (floor plans, sections and wall schedule.)
- \_\_\_ Check floor and wall finish schedule with that of the floor plans and elevation to determine which areas will receive tile. Height of wall tile should also be shown. (Finish schedule occasionally is not consistent with what is called for in the floor plans and elevation).

#### DIVISION 10 - SPECIALTIES

- \_\_\_ Structural drawings should include detail of wood backing and supports for wall or ceiling mounted items (often omitted or overlooked).
- \_\_\_ Check locations of chalkboards, tackboards, directory and bulletin boards, etc.; should be addressed in the plans and/or specifications.
- \_\_\_ Make sure that toilet partitions and urinal screens supported only on walls, or units supported on wall and overhead construction are not secured to plaster or gypsum board alone, but are secured to solid wood or steel backing material which is, in turn, secured to joists, studs, or other structural elements of the framing system.
- \_\_\_ Mounting heights and locations of all toilet and bath accessories should be indicated in the plans. Verify also handicapped toilets and access route requirements.

- Items that project out from the wall in general, and grab bars in particular, should be mounted directly to the wall framing system or to the built-in anchorages attached to the framing system.
- Windows that will receive venetian or vertical blinds should be clearly identified in the plans and specifications.
- Plans and specifications should include a suitable drapery schedule which include information such as areas and rooms to receive draperies, size and placement of each, type and location of rod and track, type of fabric, etc.

#### DIVISION 11 - EQUIPMENT

- This is a speciality Division. When it is material/methods should be checked against facility for space, interconnection, etc.

#### DIVISION 12 - FURNISHINGS

- This is a speciality Division. When it is material methods should be checked against facility for space, interconnection, etc.

#### DIVISION 13 - SPECIAL CONSTRUCTION

- This is a speciality Division. When it is material/methods should be checked against facility for space, interconnection, etc.

#### DIVISION 14 - CONVEYING SYSTEM

- This is a specialty Division. When it is material/methods should be checked against facility for space, interconnection, etc.

#### DIVISION 15 - MECHANICAL

- Requirements for submission of Operation and Maintenance manual for major mechanical equipment should also be included in the specifications. Specifications should require Contractor to train operating personnel to operate the newly installed mechanical equipment (e.g., air conditioning system, boiler plant, etc.) under the direction of a manufacturer's representative.
- Verify HVAC floor plans against architectural, especially for size.
- Verify that adequate ceiling height or attic space exists at major duct intersections.
- Spacing of pipe hangers and supports for each type of pipe should be addressed in the plans and specifications.

- \_\_\_ Asbestos removal specifications should be included in the General Paragraphs if there is asbestos on equipment to be removed.
- \_\_\_ Check specifications requirement for necessary spare parts and tools to be provided by the Contractor for all of the equipment.
- \_\_\_ Specifications should indicate that all Fire Sprinkler System submittals will be subject to review and approval of the Fire
- \_\_\_ Department coordinated with fire alarm specifications and Mechanical/Electrical drawings.
- \_\_\_ Specifications should include a required period of operation before the equipment turnover to the City.
- \_\_\_ Specifications should indicate who will perform the cutting and patching/repairs when installing on existing buildings.
- \_\_\_ Check major items of equipment and verify if they are coordinated with contract drawings. Pay particular attention to horsepower ratings and voltage requirements.
- \_\_\_ Gas lines should be above other utilities which cross or parallel.
- \_\_\_ Insure that roof drains are not going to be placed higher than surrounding roof. Verify discharge point. Cross-check against architectural drawing locations.
- \_\_\_ Make certain that access panels are provided for valves located behind ceilings and walls.
- \_\_\_ Insure that in large structures, water service is such that portions of the system may be isolated for repairs without interrupting service in entire building.
- \_\_\_ On existing building, check piping for possible interference with other existing utilities above ceiling and other parts of the building.
- \_\_\_ Floor drains should be provided for equipment blow-off.
- \_\_\_ Check ceiling height and size of doors of areas where mechanical equipment (AHU, compressors, steam generators, etc.) will enter into the building to make sure that there will be enough space and passage for the equipment.
- \_\_\_ Provide access doors at all fire dampers, automatic dampers, coils filters, heaters, thermostats, or at any item that requires servicing. Doors are to be

airtight, securely fastened and accessible and able to be fully opened. Are fire dampers shown?

- \_\_\_ Verify that all fixtures are connected to the sanitary system and that pipe sizes agree.
- \_\_\_ Verify dampers are indicated at smoke and fire walls. Verify diffusers against architectural reflected ceiling plan.
- \_\_\_ Verify all roof penetrations (ducts, fans, etc.,) are indicated on roof plans.
- \_\_\_ Verify all Mechanical and Plumbing notes.
- \_\_\_ Verify all air conditioning units, heaters, and exhaust fans against architectural roof plans and mechanical schedules.

#### DIVISION 16 - ELECTRICAL

- \_\_\_ Requirements for submission of Operation and Maintenance manual for major electrical equipment should be included in the specifications. Specifications should require contractor to train operating personnel to operate the newly installed electrical equipment/facilities (e.g., substation, motor control center, intercom system, fire alarm system, generators, etc.) under the direction of a manufacturer's representative.
- \_\_\_ Specifications should clearly define procedures and restrictions for scheduling outages and the feasibility of utility interruptions. Check against statements made in the General Paragraphs for consistency, and that the two are cross-referenced.
- \_\_\_ Check ceiling height and size of doors of areas where electrical equipment (i.e., transformers, motor control center, etc.) will enter into the building to make sure that there will be enough space and passage for the equipment. Verify overall dimensions of electrical equipment (i.e., switchgear, transformer, etc.) to insure that it will fit in the space provided.
- \_\_\_ Verify sizes (diameter or thickness) of items supposed to be concealed in the wall to make sure they will not protrude beyond the face of the studs (i.e., electrical outlet boxes, sanitary pipes, vents, etc.).
- \_\_\_ Proper sag of conductor between poles should be addressed in the plans and specifications.
- \_\_\_ For major transformers and on primary circuit breakers, requirements for factory inspection should be included in the plans and specifications.

- \_\_\_ Specifications should indicate that all fire alarm system submittals will be subject for review and approval by the Fire Department, coordinated with fire sprinkler system specifications and Mechanical/Electrical drawings.
- \_\_\_ Existing building alarm system should interface with the proposed fire alarm system.
- \_\_\_ Check major items of equipment and verify if they are coordinated contract drawings. Pay particular attention to horsepower ratings and voltage requirements.
- \_\_\_ Insure that the required depth of pole holes is shown in the plans and specifications for each type of pole and type of soil.
- \_\_\_ Insure that outdoor transformer pads have adequate drainage; check also the area's susceptibility to flooding.
- \_\_\_ Each lighting fixture should be detailed on the drawings to show shape, lamp, diffuser, finish and construction and mounting method, gasketing and dimensions of poles for exterior lighting.
- \_\_\_ Plans and specifications should also indicate lighting fixture mounting heights and specific locations.
- \_\_\_ For underground electrical distribution system, check conduit for possible interference with other underground utilities.
- \_\_\_ On existing building, check conduits for possible interference with other existing utilities above ceiling and other parts of the building.
- \_\_\_ Plans and specifications should clearly address connections between new and existing equipment.
- \_\_\_ Electrical switches should not be put partly within the tile wall and partly within the non-tile wall , especially in bathrooms.
- \_\_\_ Electrical power source for new and old buildings should be clearly shown and explained on the drawings.
- \_\_\_ Verify all light fixtures against architectural reflected ceiling plan.
- \_\_\_ Verify location of all panel boards and that they are indicated on the electrical riser diagram.
- \_\_\_ Verify all Electrical notes. Make sure they make sense when compared with other notes.

- \_\_\_ Verify if there is sufficient space for all electrical panels to fit.
- \_\_\_ Provide general guidance on handling, removal, maintenance, etc. of transformers with Polychlorinated Biphenyls (PCB).
- \_\_\_ Verify if explosive hazard areas are shown/defined.
- \_\_\_ Verify if building frame is to be grounded. Are equipment/computer grounds shown?