

ABOR Minimum Requirements for Construction Related Documents

**ARIZONA BOARD OF REGENTS MINIMUM REQUIREMENTS
FOR SCHEMATIC DESIGN DOCUMENTS (SD)**

(This List of Requirements will be attached to a Fee for Service Request)

A. ALL CHECKED REQUIREMENTS INCLUDED IN THIS AGREEMENT

B. ALL REQUIREMENTS INCLUDED IN THIS AGREEMENT

C. NO ITEMS INCLUDED IN THIS AGREEMENT

- 1. Site Plan (Scale: 1" = 40'-0").
 - a. Preliminary architectural site plan.
- 2. Site Survey (Scale: 1/16" = 1'-0").
- 3. Soil boring data and consultant's foundation recommendations, if appropriate.
- 4. Structural Plan(s) showing proposed bay arrangements, materials: (Scale: Plan – 1/8" = 1'-0"; Details, Sections 3/8" = 1'-0").
 - a. Typical interior framing details showing intended materials
 - b. Typical exterior framing detail.
 - c. Typical column, foundation schedule.
 - d. Vibration Isolation Review.
 - e. Section(s).
- 5. Schematic Floor Plans (Scale: 1/8" = 1'-0").
 - a. Using existing building plans and indicated new work, including demolition.
- 6. Roof details.
- 7. Diagrammatic building sections (Scale: 1/8" = 1'-0").
- 8. Typical wall sections to show materials, relationships, construction intent.
- 9. Typical key architectural details (Scale: 3/8" = 1'-0").
- 10. Room material and equipment outline.
- 11. Schematic narrative of design rationale, proposed construction, code analysis, structural systems. Possible review with ASU Public Arts and Design Review Council.
- 12. Preliminary mechanical equipment room layouts (major equipment only) (Scale: 1/8" = 1'-0").
- 13. Preliminary one-line HVAC duct layouts and/or preliminary mechanical piping diagram (Scale: 1/8" = 1'-0").
- 14. Preliminary one-line electrical distribution diagrams (Scale: 1/8" = 1'-0").

- 15. Preliminary one-line telecommunication distribution diagrams for voice, data and video (Scale: 1/16" = 1'- 0").
- 16. Outline specifications (marked up for project) and product cut-sheets.
- 17. Narrative descriptions of proposed mechanical system(s) electrical system(s), special systems.
- 18. Line-item Construction Cost Estimate for schematic design with line item breakdowns for optional items.
- 19. Perform an annual energy consumption analysis and develop a summary of the usage of electrical (KW/h/yr.), chilled water (Ton Hrs./yr.), and steam (lbs./yr.) used under normal building operation. Provide a computer printout as back-up.

DELIVERABLES: Twelve (12) copies of drawing sets, specification and product cut-sheets shall be required for Building Committee review. Additional drawing sets as required for progress review and submission to local, state and federal code and approved agencies.

- 1 – Facilities Planning and Space Management
- 2 – Capital Programs Management Group
- 2 – User Group
- 1 – Risk Management
- 1 – Telecom Group
- 1 – Building Inspections Group
- 3 – CMAR
- 1 – ADA Review
- 12

**ARIZONA BOARD OF REGENTS MINIMUM REQUIREMENTS
FOR DESIGN DEVELOPMENT DOCUMENTS**

D. ALL CHECKED REQUIREMENTS INCLUDED IN THIS AGREEMENT

E. ALL REQUIREMENTS INCLUDED IN THIS AGREEMENT

F. NO ITEMS INCLUDED IN THIS AGREEMENT

- 1. Site Survey (Scale: 1" = 40' – 0")
- 2. Site Plan (Scale: 1/16" = 1' – 0"):
 - a. Final contours/grading.
 - b. Paving, sidewalk, curb, fence, parking, and other site improvements (showing location and overall dimensions). Construction staging areas.
 - c. Retaining walls and details.
- 3. Foundation Plans (Scale: 1/8" = 1' – 0")
 - a. Footing and foundation sizes, reinforcing, elevations.
 - b. Below grade concrete wall thickness.
 - c. Waterproofing, damp-proofing, drainage – standard details, types.
- 4. Structural Framing Plans, including (Scale: 1/8" = 1' – 0"):
 - a. Horizontal and vertical member size, sample reinforcing.
 - b. Typical floor and roof, construction details, thicknesses.
 - c. Typical exterior wall supports, bracing, ties, reinforcing.
 - d. Lateral bracing methods, location.
 - e. Fireproofing – NFPA designation.
 - f. Vibration isolation or other special details.
 - g. Design live and dead loads tabulated for all floors, areas, and roofs.
- 5. Exterior wall elevations, all planes (Scale: 1/4" = 1' – 0").
- 6. Typical wall sections (Scale: 1/2" = 1' 0").
- 7. Typical roofing and sheet metal details (Scale: 3/8" = 1' – 0").
- 8. Floor plans, all levels and roofs (Scale: 1/8" = 1' – 0").
 - a. Partition type identification.
 - b. Smoke and fire compartmentalizing.
 - c. Built-ins and fixed equipment shown and noted.

- d. ¼" scale furniture and movable equipment layouts, for ALL spaces.
- 9. Stair and elevator details, types (Scale: 3/8" = 1' – 0").
- 10. Room finish and door schedule for typical areas/spaces.
- 11. Miscellaneous specialties and equipment schedule.
- 12. Fixed equipment schedule, locations, service requirements.
- 13. Plumbing work, plans (Scale: 1/8" = 1' – 0").
 - a. Fixture schedule, locations.
 - b. Equipment schedule, locations.
 - c. Waste and vent riser diagram with types, locations, key sizes.
 - d. Water piping, locations (sizes for pipes larger than 1").
- 14. Roof drainage system, location, key sizes.
- 15. Fire protection systems.
- 16. Mechanical systems (Plan Scale: 1/8" = 1' – 0").
 - a. Equipment schedule, locations, sizes, types.
 - b. Chilled, condenser, hot water, steam, and condensate piping systems, locations, riser diagrams.
 - c. Equipment connections and supports – standard details.
- 17. HVAC piping, locations (sizes for pipes larger than 1")(Scale: 1/8" = 1' – 0").
- 18. Power distribution diagram (Plan Scale: 1/8" = 1' – 0").
 - a. Power distribution equipment schedule, locations.
 - b. Feeder sizes.
 - c. Emergency generator size, locations.
 - d. Uninterruptible power supply equipment size, locations if required.
 - e. Grounding – standard details (DP).
- 19. Interior lighting and power, plans details (Scale: 1/8" = 1' – 0").
 - a. Fixture and switch locations with identification.
 - b. Typical receptacle and power outlet locations.
 - c. Special requirements noted.
- 20. Motor control schedule with starter and circuit sizing.

- 21. All telecommunication and data systems and equipment, Fire Alarm systems, Security systems, Energy Management systems.
- 22. Telecommunication distribution diagrams in accordance with “Arizona State University New Construction Guidelines and Specifications for Telecommunication Services.”
- 23. Proposed cash allowances.
- 24. Outline specifications (marked-up for project).
- 25. Description of proposed alternates and Cost Estimates for each.
- 26. Construction Cost Estimate for Design Development design with area breakdowns (net and gross) and analysis.
- 27. Based on the design requirements, revise/update the annual Energy Consumption Analysis for the building. Submit the summary results along with the Design Documents.
- 28. Based on the design requirements, develop a preliminary list of building systems and systems/equipment commissioning standards.

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**ARIZONA BOARD OF REGENTS MINIMUM REQUIREMENTS
FOR CONSTRUCTION DOCUMENTS (CD)**

G. ALL CHECKED REQUIREMENTS INCLUDED IN THIS AGREEMENT

H. ALL REQUIREMENTS INCLUDED IN THIS AGREEMENT

I. NO ITEMS INCLUDED IN THIS AGREEMENT

- 1. Civil Engineering Drawings (Scale: 1" = 30'-0" min.)
 - a. Complete engineering plans showing building location, paving, grading, utilities, easements, tunnels, retention areas, drainage, rights-of-way, etc.
- 2. Site Survey (Scale: 1" = 40'-0"), including proposed staging areas.
- 3. Landscaping Drawings (Scale: 1" = 30'-0" min.) if appropriate or required:
 - a. Complete planting plans and plant schedule.
 - b. Complete irrigation plans.
 - c. Complete landscape lighting if differs from general site lighting.
 - d. Planting details.
 - e. Complete landscaping and irrigation specifications.
- 4. Architectural Site Plan (Scale: 1/16" = 1'-0"):
 - a. Final contours/grading.
 - b. Building location, paving, sidewalk, curb, fence, parking, and other site improvements (showing location and overall dimensions). Construction staging areas and construction access roads.
 - c. Retaining walls and details.
 - d. Property lines, including R.O.W. and easements.
- 5. Exterior wall elevations, all planes (Scale: 1/8" = 1'-0"). Indicate expansion and control joints.
- 6. Typical wall sections and details (Scale: 1/2" = 1'-0" min.).
 - a. Show all caulking and sealant details and flashing details.
 - b. Masonry anchoring and reinforcement.
- 7. Typical roofing and sheet metal details (Scale: 3/8" = 1'-0").
 - a. Details specific to this project.
- 8. Floor plans (Scale: 1/8" = 1'-0" or 1/4" as required), including all work.
- 9. Interior elevations.
- 10. Finish Schedule.

- 11. Miscellaneous specialties and equipment schedule.
- 12. Fixed equipment schedule, locations, service requirements.
- 13. Description and details of proposed add-alternates and Cost Estimates for each.
- 14. Construction Cost Estimate with line item breakdowns.
- 15. Composite drawings: it shall be the responsibility of the consultant to coordinate the design of the architectural, structural, plumbing, HVAC and electrical work so that interferences among and within the several trades will be avoided.
- 16. Complete specifications, C.S.I. (Construction Specifications Institute) format. Include a commissioning schedule for building systems and equipment.
- 17. Foundation plans (Scale: 1/8" = 1'-0"):
 - a. Footing and foundation sizes, reinforcing, elevations, and schedule.
 - b. Below grade concrete wall thickness, wall openings, knock-out panels, beam pockets, and pipe chases.
 - c. Waterproofing, damp-proofing, drainage – standard details, types.
 - d. General notes.
 - e. Any special foundation requirements, including de-watering, pilings, caissons, shoring, etc.
- 18. Structural Framing Plans, including (Scale: 1/8" = 1'-0"):
 - a. Horizontal and vertical member sizes and schedules w/all connection details.
 - b. All reinforcing types and sizes in concrete members.
 - c. All floor and roof construction details, thicknesses, openings, depressions and slopes.
 - d. All exterior wall supports, bracing, ties, reinforcing.
 - e. Lateral bracing methods, location.
 - f. Fireproofing – N.F.P.A. designation.
 - g. Expansion joints and control joints.
 - h. Isolation or other special details.
 - i. Design live and dead loads tabulated for all floors, areas, and roofs.
 - j. Design calculations.
 - k. General notes.
- 19. Plumbing work, plans (Scale: 1/8" = 1'-0"):

- a. Fixture schedule, locations (including all handicapped fixtures in accordance with Arizona State Law requirements).
 - b. Equipment schedule, locations (Scale: $\frac{1}{4}'' = 1'0''$). Equipment room layouts, with means of access for larger size equipment.
 - c. Waste and vent riser diagram with types, locations, key sizes.
 - d. Water piping, locations (sizes for pipes larger than 1"), diagrams.
 - e. Water and gas meters (sizes and locations).
- 20. Roof drainage system, locations, key sizes.
- 21. Storm drain calculations, retention and other means of collecting rain water.
- 22. Fire protection systems.
 - a. Complete alarm systems.
 - b. Complete sprinkler layouts with risers and head locations (coordinate fully with number 8, a through d).
 - c. Fire extinguishers.
 - d. Backflow preventer.
- 23. Mechanical systems (Plan Scale: $\frac{1}{8}'' = 1'-0''$):
 - a. Equipment schedule, locations, sizes, types.
 - b. Chilled, condenser, hot water, steam, and condensate piping systems, locations, riser diagrams.
 - c. Manual and automatic dampers and fire dampers required by code.
 - d. Equipment connections and supports – standard details.
 - e. Outlets, grills, registers properly selected and sized (indicating cfm).
 - f. Fixture schedules.
 - g. Flow diagrams; control diagrams.
 - h. Equipment room layouts (Scale: $\frac{1}{4}'' = 1'0''$).
 - i. Submit heating and cooling load calculations as per ASHRAE.
 - j. HVAC plans – equipment room layouts to show location and size of major equipment to scale, means of access for larger size equipment and its replacement, sizes of and locations of air intakes and discharge openings. In critical locations, composite drawings shall be prepared, indicating equipment of all trades involved.
- 24. HVAC piping, locations (sizes for pipes larger than 1") Anchors, guides, supports, expansion joints and loops. (Scale: $\frac{1}{8}'' = 1'-0''$).

- 25. Plumbing and HVAC piping modifications, locations (sized for pipes larger than 1”), anchors, guides, supports, expansion joints and loops (Scale 1/8” = 1’-0”).
- 26. Power distribution diagram (Plan Scale: 1/8” = 1’-0”):
 - a. Power distribution equipment schedule, locations.
 - b. Feeder sizes.
 - c. Emergency generator size, locations.
 - d. Un-interruptible power supply equipment size, locations if required.
 - e. Grounding – standard details (DP).
- 27. Exterior lighting and power, plans details (Scale: 1/8” = 1’-0”):
 - a. Fixture and switch locations with identification.
 - b. Typical receptacle and power outlet locations.
 - c. Lighting fixture schedule.
 - d. Riser diagrams from utility source to all equipment showing service switches and disconnects, metering, switchboards, power and lighting panels, motor controls, etc.
 - e. All cable and wire sizes and conduit sizes.
 - f. Special requirements noted.
- 28. Motor control schedule with starter and circuit sizing.
- 29. All telecommunication and data systems and equipment, Fire Alarm systems, Security systems, Energy Management systems.
- 30. Telecommunication distribution diagrams in accordance with “Arizona State University New Construction Guidelines and Specifications for Telecommunication Services.”
- 31. Renovation Projects. Clearly differentiate between new and existing construction; visit the site; examine existing documents; request that test pits and observation openings in existing structures be made for determining design and cost.

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ARIZONA BOARD OF REGENTS MINIMUM REQUIREMENTS FOR PROJECT DRAWINGS

The Design Professional (DP) will be required to provide construction documents and “as-built” documents in AutoCAD format on electronic media for all architectural, mechanical, electrical, plumbing, roof and site plans. Site plans may include area beyond the footprint of the actual structure.

Final payment will not be made until the electronic copy is provided and reviewed by the Arizona State University (ASU) staff.

SUBMITTAL REQUIREMENTS:

- I The DP shall maintain a complete set of CADD drawing files throughout the project. The complete CADD drawing files, including those from each consultant, shall be in the same format and identical to the hard copy submittal.
 - A. Construction Submittal – The entire 100% complete set of construction CADD drawing files, in AutoCad version 14 or newer DWG format, shall be submitted to ASU, on CD-Rom, no later than 30 days after submittal to ASU of the construction documents.
- J. As-Built Submittal – Once the construction phase is complete, the DP shall update the construction drawing set to an “as-built” condition. DP shall bind all as-built drawing files and submit the complete set, on CD-Rom, to ASU no later than 60 days post construction completion.
 - II Media Labeling – DP submittals (CD-Rom or other) must be labeled with the project name, ASU project number, table of contents, date, company name, contact name, and phone number.

STANDARDS. The following is a list of the in-house CADD drawing standards that have been developed for the ASU Facilities Management.

- I. Disks
 - A. Prefer Read/Write CD-Rom
- II. Software
 - A. Prefer AutoCAD Release 2006 or later.

RECOMMENDED LAYER CONVENTIONS

- I. Identification
 - A. Since more layers may be required for different disciplines, further definition is needed to describe that layer and may be added after the discipline identification.
 - B. Layering should be reduced to small amounts of graphic information.
- II. Specific Drawings Required with Specified Layers
 - A. Reflected Ceiling Plan
 1. Ceiling grid on layer RCP_CEILGRID (white).
 2. Light fixtures on layer RCP_FIXT (yellow).
 3. Heating, Ventilation and Air Conditioning (HVAC) equipment on layer RCP_HVAC (cyan).
 4. Smoke detectors, fire alarm equipment and exit signs on layer RCP_FIRE (red).
 5. Sprinkler systems on layer RCP_SPRINKLE (blue).
 6. Special systems such as Public Address (PA), Audio, etc. on layer RCP_PA (magenta).
 - B. Mechanical Plan

1. Registers on layer MECH_REG (yellow).
 2. Controls on layer MECH_CONTROL (cyan).
 3. Diffusers on layer MECH_DIF (yellow).
 4. Ductwork on layer MECH_DUCT (white).
 5. Exhaust on layer MECH_EXH (green).
 6. Vents on layer MECH_VENT (yellow).
- C. Plumbing Plan
1. Hot water lines on layer PLUM_HW (red).
 2. Cold water lines on layer PLUM_CW (blue).
 3. Sewer on layer PLUM_SWR (magenta).
 4. Fixtures on layer PLUM_FIXT (green).
 5. All process piping on layers befitting material transported through pipe. All process piping layers in cyan [i.e., pipes carrying acids on layer PLUM_ACID (cyan)].
 6. Fire sprinkler lines on layer PLUM_FIRESPR (yellow).
- D. Electrical
1. Telecommunications on layer ELEC_TELE (cyan).
 2. Computer on layer ELEC_COMP (cyan).
 3. Fire Alarms on layer ELEC_FAL (red).
 4. All 120 V power on layer ELEC_120 (green).
 5. All circuits greater than 120 V on layer ELEC_120PLUS (yellow).
 6. Intercom on layer ELEC_INTCOM (blue).
 7. Switches and lighting fixtures on layer ELEC_SX (white).
 8. Special systems (including security systems) on layer ELEC_SS (magenta).
- E. Roof Plan
1. Roof drains, overflow drains, scuppers and slope lines on layer ROOF_RDR (cyan).
 2. Slope arrows on layer ROOF_SLAR (white).
 3. Roof vents on layer ROOF_RVENT (red).
 4. Plumbing and exhaust vents on layer ROOF_PVENT (red).
 5. Mechanical equipment on layer ROOF_MECH (magenta).
 6. HVAC on layer ROOF_HVAC (magenta).
 7. Skylights on layer ROOF_SKYLITE (yellow).
 8. Walking surfaces on layer ROOF_WALK (white).
 9. Smoke Hatches on layer ROOF_SMHATCH (blue).
 10. Access Hatches on layer ROOF_ACCHATCH (blue).
 11. Antennae and other special equipment on layer ROOF_SPEQ (green).
- F. Site Utilities (Civil)
1. Electric on layer SITE_ELEC (yellow).
 2. Telephone on layer SITE_TELE (cyan).
 3. Gas on layer SITE_GAS (red).
 4. Water on layer SITE_H2O (blue).
 5. Storm sewer on layer SITE_STRM (magenta).
 6. Fire lines and hydrant locations on layer SITE_FIRE (green).
- G. Site
1. Buildings on layer BLDG (green).
 2. Sidewalks on layer WALK (white).
 3. Miscellaneous structures on layer MSTR (blue).
 4. Walls and fences on layer FNCE (yellow).
 5. Curb and gutter on layer C&G (cyan).
- APPENDIX H (continued)**
6. Irrigation on layer IRR1 (blue).
 7. Vegetation (including plants, trees, shrubs and all landscaping) on layer VEG (green).
 8. Parking on layer PARK (yellow).

9. Site lighting on layer SITELITE (white).
10. Fountains and any special features on layer FNT (blue).

H. Survey (TOPO)

1. Property/Boundary lines on layer BOUND (cyan).
2. Easements on layer EASE (cyan).
3. Centerlines on layer CL (blue).
4. Index contours @ 10' increments on layer INDEX (yellow).
5. Intermediate contours @ 2' increments on layer INTER (magenta).
6. Spot elevations on layer SPOT (white).
7. Building footprints on layer BLDG (red).
8. Dimensions on layer DIM (white).
9. Other topographic features on layer TOPO (green).

I. The layers listed below are to be used for the Architectural Floor Plans, Structural Plans and Roof Plans as applicable.

1. Construction grids on layer 0 (yellow).
 - a. Including construction lines used to further define building elements (i.e., center lines, major axis lines). Lines of symmetry should be phantom linetype (magenta).
2. Columns on layer COL (blue).
3. Exterior walls on layer EXT-WALL (white).
 - a. Exterior windows and walks are to be yellow.
4. Interior walls on layer INT-WALL (green).
5. All doors, interior windows, counters and other features on layer DOOR (yellow).
6. Dimensions on layer DIM (white).
7. Stairs and elevations on layer STAIR (cyan).
 - a. Includes ramps.
8. Lines, arrows and text showing direction of stairway (i.e., UP, DN) on layer STAIRDIR (white).
9. Restroom fixtures, toilet partitions, sinks and drinking fountains on layer BATH (magenta).
10. Fire-Hose cabinets on layer FHC (red).
11. Room numbers on layer RMNO (white) – per Manual for Consulting Architects, Engineers, and Construction Managers.
12. Room use on layer RMNAME (white) – per Space Management Guidelines.
13. Room Net Assignable Square Feet (NASF) on layer SQFT (white). Definition for Net Assignable area is the floor area in any building or structure, except separate parking structures which:
 - a. can be used by the building occupants to carry out their function(s);
 - b. is covered by a ceiling at 6'-6" or higher;
 - c. is enclosed on all sides by walls, partitions, doors, or functionally equivalent;
 - d. is inclusive of:
 - (1) is measured between the principal interior surfaces of the enclosing fixed walls, partitions, or doors at or near floor level with movable room dividers normally ignored;
 - (2) is expressed in square feet to the nearest whole number;
 - (3) columns or similar structural obstructions;
 - (4) built-in or free-standing furniture and equipment; and
 - (5) alcoves and similarly recessed areas.

This layer also includes Non-Assignable Area as defined below:

14. Non-assignable area is the floor space in any building or structure which is used for:
 - a. public corridors, lobbies, stairways, elevators (floor openings), and other general-circulation facilities. (To avoid double counting in stairwells, only the actual floor area is counted at the first or lowest level. The entire stairwell use area is included for each floor above the first.);
 - b. janitors' closets and other specialized custodial facilities which are used only for building maintenance;
 - c. heating, ventilation, air conditioning, electrical, and other such utility rooms or spaces required for building operation (including pipe chases and mechanical shaft space); and

- d. public toilets.

Actual dimensions should be used to calculate gross, assignable and non-assignable areas.

15. Building gross square footage (GSF) on layer GSF (white). Definition of building GSF is the sum of the floor areas of the building included within the outside face of the exterior walls for all stories or areas that have floor surfaces. Measurement:
 - a. Gross area is computed by measuring within the outside face of exterior falls excluding fins, pilasters, and other projections beyond the face of the wall. Every floor level gross area is computed and included in the total.
 - b. Mezzanines, stacks, interior balconies, etc., are included in the total, but only for the floor area they represent.
 - c. Penthouses of headroom height (6'-6") are included.
 - d. Stair, elevator, utility, core, and similar shafts are treated as floor area at each level.
 - e. A room extending through more than one floor is counted only once at the level on which its floor occurs.
 - f. Exterior covered areas attached or related to the building are counted at one-half (1/2) value.
 - g. Full-height (6'-6") unfinished areas (i.e., excavated basement areas not developed, or unfinished floors) are counted at one-half (1/2) value.
 - h. Exterior terraces, uncovered loading docks, courts, light wells, roof decks, and covered walks between buildings are not included.
 - i. Unexcavated areas in basements and undeveloped attic spaces are not included.
 - j. Footnote areas where exceptional cases are involved.
 - k. Gross area should be rounded to the nearest 100 square feet.
16. Floor drains and floor slope lines on layer FLDR (cyan).

III. General Notes

- A. All drawings are to be in full scale (1'-0"=1'-0"), on disk.
 - B. No un-editable blocks should be used when in-putting the drawing. This applies to user-defined blocks, and not the pre-defined blocks indigenous to AutoCAD. (Refer to AutoCAD Manual: Block, Wblock and Insert Commands.)
 - C. Layering conventions can be originally generated according to bidder's in-house standards. Only a few commands are required to change the transferred copy of the documents on disk to the required standards for Facilities Management.
- K. Exterior elevations are required, but do not need to concur with any Facilities Management CADD Drawing Requirements. The bidder's in-house standards are acceptable for Exterior Elevation Documents.