

CHAPTER II  
PRESENTATION OF DATA

<u>Paragraph</u>	<u>Subject</u>	<u>Page</u>
1.0.	GENERAL	II-1
2.0.	DRAWINGS	II-1
3.0.	SPECIFICATIONS	II-14
4.0.	COST ESTIMATE	II-15
5.0.	DESIGN ANALYSIS - CONTENT	II-16
6.0.	DESIGN ANALYSIS - PREPARATION & ASSEMBLY	II-20
Figure 3	Typical Drawing Set	II-23
Figure 4	Typical Design Analysis Assembly	II-25

"The bitterness of poor quality is remembered long after  
the exultation of meeting the schedule has passed."



## CHAPTER II

### PRESENTATION OF DATA

#### 1.0. GENERAL

1.1. The standards for data presentation contained in this chapter shall be strictly adhered to in the preparation of the project documents required by the A-E Scope of Work. No exceptions will be allowed unless authorized by the COE in the Scope of Work.

1.2. These standards describe the quality expected and the various technical features and requirements of the drawings and specific information that must be included in the various documents. It is not intended to be a complete list of all features. The A-E has the responsibility to show all information necessary to completely describe the project. Regardless of local practice or procedures, the designer must prepare the drawings with the expectation that both the COE, in the role of construction manager, and the construction contractors will be able to construct the building or facility without numerous modifications to correct design deficiencies.

#### 2.0. DRAWINGS

2.1. Drawing Media: Original drawings are defined as the final design drawings submitted to the COE by the designer. These originals may be first generation drawings produced by the designer/draftsman or they may be copies of those drawings subject to the allowable media, processes and techniques of preparation described herein. Original drawings as submitted will be used to produce bid and construction documents and will eventually become record As-Built documents. Therefore, they must be of durable material and be able to produce quality prints. All sheets shall be 30" x 42" and have COE standard borders and title blocks. A sample title block is shown in Chapter IV, Plate 1. This title block is for all sheets other than the cover sheet. The cover sheet title block, Chapter IV, Plate 2, requires a number of signatures by COE personnel. Drafting media of the following types are available for use on roads, airfields, utilities, and railroad projects: single plan and profile, double plan and profile, and cross-section (grid 10 x 10). All original drawings submitted shall be capable of being changed by use of erasers or liquid erasing fluids and drawn upon with plastic lead, pencil or ink on both sides. Paper diazo reproducibles are not acceptable.

2.1.1. Allowable media for original drawings are as follows:

- a. Drawing film as supplied by COE PM (equivalent to Dietrick Post DPD.3).
- b. Photo wash-off polyester drafting film (3 mil minimum thickness, double matted, equivalent to "Cronoflex").
- c. Polyester draft film (3 mil minimum thickness, double matted, equivalent to "Mylar").

2.1.2. It is understood that A-E firms utilize many different design/drafting techniques rather than drafting "final" on original material, especially for drawings such as standard detail sheets. The A-E may use whatever technique he feels comfortable with. However, for final originals, the COE will accept only the material described in paragraph 2.1.1 above. If the A-E does not utilize drawing film provided by the COE PM or "Mylar"

"The bitterness of poor quality is remembered long after  
the exultation of meeting the schedule has passed."

material, he must submit "Cronoflex's" that meet the following criteria:

- a. Image to be on reverse side that is erasable or fluid removable.
- b. Must be high contrast photo quality (no background and with all line work dark and dense), suitable for the production of diazo prints, offset 1/2 size prints, and 35 mm film record copy. If drawings are not of photo quality, as determined by the COE, A-E shall resubmit drawings of acceptable quality. Poor Cronoflex's reflect poorly done originals and will not be accepted.
- c. Exposure must be made using a vacuum-frame contact printer.
- d. Must resist yellowing and/or darkening of background from exposure to ultraviolet light and during print storage in file.

2.1.3. The final originals to be submitted to the COE must be single thickness drawing sheets and sized no less than the Government-supplied drawing paper.

2.1.4. Drawing material that does not meet COE standards shall be rejected at any time during design. The A-E is liable for replacing rejected drawings at his own expense.

2.2. Drawing Preparation. Preparation of all work shall be for one-half size reduction unless instructed otherwise. Most modern reproduction processes of half-size or smaller do not tolerate shading, whether it be by color or background shading; therefore, shading is not permitted on final originals. Parallel lines shall never be so close together that they will merge into one line. The clear space between lines shall always be of greater width than the adjoining lines. Lettering shall be single stroke, freehand or mechanical, all capitals, with a minimum height of 1/8 inch; again keeping in mind that lettering must be fully legible at half-size reduction. Lettering styles and sizes shall be standardized within a set of drawings regardless of discipline involved.

2.2.1. Unacceptable Processes and Techniques: the following items are not acceptable on original drawings:

- a. Transfer type letters and symbols.
- b. Details and notes applied with adhesives (stick-ons).
- c. Drawings made of pieces of different drawing sheet media and taped together in composite form.
- d. Tapes of transfer type letters applied with adhesives.

2.2.2. Numbering of drawings: All drawings shall be consecutively numbered, and numbered by disciplines, as shown in Plate 6, Chapter IV. The drawings shall be placed in the drawing set in the discipline sequence as shown in Figure 3. The cover sheet (G-1) must be the first sheet of the drawing set.

2.2.3. Signature: All final drawings prepared and submitted by the A-E shall bear the stamp and signature of a registered engineer or architect, as identified in the A-E's DQC Plan, preferably one of the principals of the firm under contract to the COE (see Plate 2, Chapter IV for preferred location of stamp). Drawings submitted by the designer shall not be dated.

2.2.4. Orientation: Orientation of plans for all disciplines shall be consistent, with north-arrow pointing toward the top of the sheet or towards the left when necessary.

2.2.5. Cross references: Cross referencing for sections and details shall be based on the discipline drawing number (i.e., S-1, S-3 etc.). The symbol below shall be used for such referencing. Cross referencing between different discipline drawings shall be done by adding a note at the appropriate location stating for example: "For continuation, see Civil drawing C-2." General statements such as "See Civil Drawings" are unacceptable.

2.2.6. "Keyed" Notes. The carte blanche use of "keyed" notes on the drawings is unacceptable. Specific items/features of the design shall be called out by description, detail symbol, equipment symbol, size, etc. at the location shown on the drawing or as close as possible with an arrow pointing to the location on the drawing. In no case will a "mass" of keyed notes placed on one drawing, but referring to items on another drawing be acceptable. "Keyed" notes are allowed in details or sections similar to the extent utilized in COE Standard Details.

2.2.7. Scales: Scales shall be selected to avoid overcrowded and cluttered conditions on the drawings. Drawing layout, together with the proper scales to properly delineate the project, shall be carefully planned in advance. Where necessary to maintain proper scale, drawings or large structures shall be placed on two or more sheets. A graphic scale for each of the different scales used on a drawing shall be placed on the drawing preferably near the title block. See Plate 7, Chapter IV. The design shall be prepared to the scales called for below. Scales shall be consistent throughout all disciplines drawings. For large, open structures, a smaller scale than required may be allowed on a case-by-case basis, subject to discussion with and approval by the DQA Section and the COE PM at the Pre-Negotiation Conference. If a smaller scale is approved and used, congested areas such as toilet rooms, mechanical or electrical equipment rooms, etc., must be drawn to a minimum 1/4" scale. Acceptability of scale is determined by clarity of drawings at one-half scale reduction.

- Cover sheet: G-
  - . General information - scale n/a
- Civil Drawings: C-
  - . Site plan C-, 1" = 40' minimum;  
to avoid a crowded condition it may be necessary to use  
1" = 20' or 1" = 10'

"The bitterness of poor quality is remembered long after  
the exultation of meeting the schedule has passed."

- Demolition plan C-, 1" = 40' minimum
- Grading and Paving C-  
Grading Plan: As appropriate for clarity.  
Profile: As required by topography.  
Sections: As appropriate for clarity.  
Details: As appropriate for clarity.
- Utilities: U-  
For projects that involve supply, collection, and/or distribution utility conduits, use a horizontal scale of 1" = 20' for both the Plan and Profile. Use a vertical scale the Profile of 1" = 1' for flat slopes and up to 1" = 10' for steep slopes. Use double plan and profile sheets when applicable.
- Landscape drawings: L-  
Site plan and legend - 1" = 40', or 1" = 20', as appropriate.  
Details - as appropriate for clarity
- Architectural Drawings: A-  
· Floor plan and legend - 1/4" = 1'-0"  
When a 1/4" = 1'-0" scale does not fit on one sheet, discuss alternatives available with the COE PM and DQA Section prior to proceeding with design. For large, open structures, a 1/8" = 1'-0" scale may be used, with congested areas such as toilet rooms, mechanical rooms, etc. being blown-up to 1'-0"  
· Elevations - 1/8" = 1'-0"  
· Door and Finish schedule - n/a  
· Building section - 1/8" = 1'-0"  
· Wall section - 3/4" = 1'-0" (Minimum 1/2" = 1'-0")  
· Ceiling plan - 1/4" = 1'-0" or 1/8" = 1'-0"  
· Roof plan - 1/16" = 1'-0"  
· Details - as appropriate for clarity
- Structural Drawings: S-  
· Foundation plan, legend and general notes - Same scale as architectural floor plan  
· Foundation details - as appropriate for clarity  
  
· Floor plan - same scale as foundation plan  
· Wall sections - 3/4" = 1'-0"  
· Roof plan - same scale as floor plan  
· Details - as appropriate for clarity
- Mechanical drawings:  
· P - Plumbing plan, legend and fixture schedule - same scale as architectural floor plan, with congested areas enlarged as required for clarity.  
· Details and equipment schedule - as appropriate for clarity  
· M - HVAC plan and legend - same scale as architectural floor plan, with congested areas enlarged as required for clarity  
· Building section - 1/4" = 1'-0"  
· Details - as appropriate for clarity  
· Schedule - n/a  
· FP - Fire Protection Plan - same scale as HVAC

- Electrical drawings: E-
- . Site plan and legend - 1" = 40'
- . Lighting plan - same scale as architectural floor plan
- . Power plan - same scale as architectural floor plan
- . Details and schedule - as appropriate for clarity

2.2.8. Legends: Legends of symbols shall be listed on the first sheet of each design discipline. If two or more disciplines are representing the same item, they must use the same symbol.

2.2.9. Abbreviations: Define abbreviations on the first sheet of each discipline.

2.2.10. Schedules: Provide the following schedules:

a. Door Schedules: A tabular schedule of doors shall be included on the drawings. Every door shall be assigned a separate number and this number shall be clearly indicated on the plans. Doors shall be numbered in consecutive order, by floor, beginning with the principal entrance and progressing counter-clockwise through the plans. An elevation drawing of each type of door identified by an upper case letter shall be provided. Details of each frame type shall be shown and each type shall be identified. See Plate 8, Chapter IV.

b. Window Schedules: A tabular schedule of windows shall also be included. Each window type shall be assigned a number preceded by the letter "W". An elevation drawing of each type of window shall be provided along with pertinent details. Every window shall be clearly indicated by type on the elevation drawings. See Plate 9, Chapter IV.

c. Finish and Color Schedules: Tabular schedules of interior finishes and colors shall be included on the drawings. Finish and color schedules shall identify by room number the finish materials and colors to be used for the floor to include the base; the walls to include any wainscoting and trim;

"The bitterness of poor quality is remembered long after  
the exultation of meeting the schedule has passed."

and the ceiling. Meanings of abbreviations used in naming materials and finishes shall be included on the legend sheet or on the same sheet as the schedules. See Plates 10, 11, 12 and 13, Chapter IV.

d. Plumbing and Mechanical Equipment Schedules. Tabular schedules of equipment shall be included on the mechanical drawings. Items shall be identified by equipment type, number, and symbol. Tabulated information shall be sufficient to define the capacity, performance, and requirements of the equipment. (Note: The Sacramento District has developed standard equipment schedules for various types of mechanical equipment. They are on 30" x 42" drawing material and/or floppy disk and are available from the COE PM.)

2.2.11. Room Numbering: Every room shall be assigned a separate number and this number shall be clearly indicated on the plans. The numbers shall be generally assigned as follows:

Basement	001 thru 099
First Floor	100 thru 199
Second Floor	200 thru 299

Rooms shall be numbered in consecutive order, beginning with the principal entry area and progressing counter-clockwise through the plan. Spaces added by revision shall be given the number of the primary or nearest room followed by the letter, "A", or if more than one additional space, "B".

2.2.12. Key Plans: For projects where more than one drawing sheet is required to show the entire floor plan, "key plans" at minimum 1/32" scale shall be provided on all disciplines floor and roof plans. The area depicted on each drawing shall be cross-hatched accordingly on the "key plan". Show column lines and provide column line designations.

2.3. General information sheets (G-1, G-2, etc): For most projects, one or two sheets will be adequate to show the title and location of the project, schedule of drawings, a project location plan, a vicinity map, legend and list of abbreviations. Sheet G-1 on all projects shall contain as a minimum, the project title, installation name, project number and fiscal year.

2.3.1. Schedule of Drawings. The schedule of drawings shall include the consecutive sheet numbers, the design discipline sheet numbers, and the drawing titles as shown on Plate 6, Chapter IV. Spaces shall be left between each discipline's drawings to allow room for insertion of additional drawings by revisions to the design during design or construction.

2.3.2. Vicinity Map. The vicinity map shall be a single-line type showing major cities, nearby towns, major rivers, streams, current routes of nearby highways and railroads, and a north arrow. See Plate 14 in Chapter IV. Appendix I contains vicinity maps for the various Air Force installations.

2.3.3. Location Map. Show location of the project on a small scale location map indicating the general relationship between the new facility and major existing structures and/or streets to facilitate identification of the proposed site. On the location map show the north arrow and highlight the approved project boundaries, the Contractor's equipment yard, the Contractors' entrance to the installation, haul roads, location of the COE Resident/Project office, location and phone numbers of nearest medical facility, location of the BCE office, and the approved location of the borrow and disposal areas. If there are no on-base borrow or disposal areas, provide a note to that effect on this sheet. See Plate 15 in Chapter IV.

2.4. Revisions to Drawings After Project has Advertised for Construction. These can include drawing revisions issued by amendment during the bidding period and construction change orders requiring changes to drawings. Generally, the A-E will be required to make all necessary revisions. Revisions to the drawings shall be made as follows:

a. All changes to the drawings shall be identified by the triangle symbol located at the points of revisions. NOTE: The triangle symbol shall not be used for identifying any item other than revisions.

b. Revision numbers shall be identified by a number located in the center of the triangle. It is important to note that numerous revisions made to a drawing at a given point in time will be identified by the same number in each triangle. As an example, a set of drawings has 10 sheets. Sheets 1, 5, and 7 are revised on 5 July 87. All items revised on these sheets as a result of this revision shall be identified by triangles with the number 1 in the center, indicating the first revision to sheets 1, 5, and 7. A second revision dated 9 August 87 revises items on sheets 1, 4, and 9. The items revised on sheet 1 at this time shall have triangles with the number 2 in the center indicating the second revisions to this sheet, whereas items revised on sheets 4 and 9 at this time shall have the number 1 in the center of the triangles, as above, indicating the first revisions to these sheets.

c. Complete the revision block (located just above the title block, see plates 1 and 2, Chapter IV) by inserting the triangle, with appropriate revision number, in the "revision" column, the date the revision was made in the "date" column, a brief description of the revision in the "description" column, and the initials of the person making the revision in the first "By" column. When more than one type of revision is made to a drawing at a particular time, the revisions will be described as "Miscellaneous Revisions".

d. Where revisions result in new drawings to be added, they shall be added at the end of the disciplines to which they belong. As an example, if the previous drawing to the one being added is C8, consecutive sheet 10, then the numbering of the added sheet would be C9, 10A. When new drawings are added, the Schedule of Drawings (included in the G-Sheets) shall be revised to indicate the new drawing number(s). (NOTE: This procedure also applies to contract modifications and preparation of as-built drawings.)

2.5. Definitive, Standard, and Site Adaptive Drawings. Definitive, Standard or Site Adaptive drawings shall not be used on a project unless specifically stated in the Scope of Work issued by the COE PM.

"The bitterness of poor quality is remembered long after  
the exultation of meeting the schedule has passed."

2.5.1. Definitive Drawings do not include sufficient information for use in construction, but establish basic functional features in preparation of final project design. The following revisions may be required when definitive drawings are used:

- a. Change dimensions to fit modular design.
- b. Change fenestration and other features pertinent to adapt to local climatic conditions.
- c. Modify for compliance with life safety code and handicap criteria.
- d. Change shape and interior arrangement of building as required to conform to site or topographic requirements or tie to existing building.
- e. Provide vestibules when required.
- f. Modify exterior elevations including roof slopes to comply with current criteria including compatibility with architectural theme.

When definitive drawings are used it is not permissible to increase the gross area, or add, omit, or effect a major change in area allotted to the various functions of the building. Approved programmed scopes shall not be exceeded.

2.5.2. Standard Drawings. Standard Drawings are working drawings issued by the Corps of Engineers to establish uniform standards in scope and quality for structures likely to be repeated in several locations. All possible local variations with respect to siting, foundation conditions, earthquake forces, topography and climatic conditions cannot be anticipated. When standard drawings are used for a design, applicable portions of those drawings shall be used to the maximum extent practicable. Structural or architectural changes shall be made only if specifically authorized in the directive or design instructions. From time to time the Chief of Engineers publishes general changes to design criteria by means of Engineering Technical Letters (ETL's), revised Technical Manuals (TM's) and Guide Specifications. These changes are officially reflected in instructional data addressed in Paragraph 6.0 of Chapter I. Modification of previously issued standard drawings to reflect these changes for project (final) drawings is both authorized and required. Otherwise, project documents shall be prepared by modification of the standard documents for site, seismic, and climatic conditions only.

2.5.2.1. The following revisions to standard drawings shall be made where applicable without prior approval.

- a. Increase depth of footings and foundations to depth of frost line.
- b. Redesign footings for local soil conditions.
- c. Add elevation figures to drawings to relate plans to local bench marks.

d. Revise heating, air conditioning and insulation requirements due to climatic conditions. Provide for admission of combustion air to furnace and boiler rooms, and rooms containing diesel or gasoline engine-driven equipment.

e. Redesign for seismic loads when structure was not designed to resist seismic forces.

2.5.2.2. The following item is not dependent on local conditions and revisions shall not be made without prior approval of the COE:

a. Selection of type of materials except as required by directive, or Notes contained in Guide Specifications.

2.5.3. Site Adaptive (Existing Working) Drawings other than "Standard Drawings" as discussed hereinbefore are working drawings previously prepared for a specific installation, under the supervision of this or another District. Changes are required on these drawings to "adapt" them to a specific site. Any specific changes to be made in site adaptive drawings will be called out in the "Scope of Work" and discussed at the predesign conference. Drawings shall also be corrected as hereinbefore required for "Standard Drawings".

2.5.4. All sheets shall have COE standard borders and title blocks. A sample cover sheet title block requiring a number of signatures by COE personnel is shown in Chapter IV, Plate 4. A sample title block for all remaining sheets is shown on Plate 5, Chapter IV.

### 3.0. SPECIFICATIONS

3.1. Detailed instructions for preparation of specifications are presented in the A-E Guide, Volume 3, SPECIFICATIONS. In the interest of uniform construction, it is mandatory for the A-E to use COE Guide Specifications on all projects unless otherwise noted in the A-E's Scope of Work. A check list of available guide specifications is provided in A-E Guide, Volume 3. The A-E shall complete the check list to identify those specifications he needs for the project and submit it to the COE PM. (Note: Guide Specifications are also available on our Electronic Bulletin Board, however, specifications on the Board are not all current.) Specifications should be followed without deviations; if a change is needed, the A-E must consult with the COE PM.

3.2. Trade Names and Proprietary Items. The use of trade names, proprietary items, and the drafting of a specification by adopting a manufacturer's description of a particular commercial article shall be avoided. See Volume 3, A-E Guide, Specifications for a complete discussion on the subject of trade names and proprietary items.

### 4.0. COST ESTIMATE

4.1. Detailed instructions for preparation of cost estimates are presented in the A-E Guide, Volume 2, COST ESTIMATING. The cost estimate submitted with the Concept, Early Preliminary, Preliminary, or Final submittals must be as accurate as possible based on the design accomplished at that time. These

"The bitterness of poor quality is remembered long after  
the exultation of meeting the schedule has passed."

estimates shall follow the CSI format IAW the CACES system. The estimates will be used for programming and budgeting purposes and will be a major factor in determining if the project is to proceed through the final design and construction phases.

4.2. The A-E is reminded of his responsibility to design the project within the programmed funds. If, at any time, it becomes apparent that the project cost will exceed 90% of the programmed amount (85% on rehab or special projects), the A-E shall immediately notify the PM. The A-E shall, at the same time, suggest cost savings measures.

5.0. DESIGN ANALYSIS - CONTENT. See Chapter 3 of this Guide for specific content requirements since they vary depending on the stage of the submittal. If a standard design or other design is being site adapted and a design analysis exists, the analysis for the new project shall include appropriate material from the existing analysis modified to incorporate site adaptations and other essential requirements. The design analysis (D.A.) is to be a cumulative document in that it is to be developed and expanded upon with each subsequent submittal so that it represents the complete design history. The Table of Contents shall clearly define the location of all information contained therein, including the information and documents described hereinafter.

5.1. Design Quality Control Plan: Provide the A-E's Design Quality Control Plan, as approved by the COE.

5.2. Narrative: The purpose of the Narrative is to provide a complete explanation of the basis for the design on a discipline by discipline basis including the following: statement of the scope of work; purpose of the project; statement of the applicable criteria; a summary of the economic factors influencing the choice of systems for each discipline along with an explanation of how initial and life cycle costs were handled. It shall also include results of field investigations performed, including basic findings and discussion of need for utility easements, relocations of utilities and/or buildings, operation and maintenance requirements, and any other items discovered that warrant special attention.

5.3. Appendices. The following shall be included as appendices to the design analysis:

a. Geotechnical Report. Provide COE or A-E prepared geotechnical report commensurate with stage of design completion.

b. Egress Sketch. See Chapter III for specific requirements.

c. Handicapped Checklist. This checklist is provided by the COE PM and is to be completed by the COE PM at the Predesign Conference and turned over to the A-E for inclusion in the Design Analysis. For a sample of the checklist, see Plate 16, Chapter IV.

d. Environmental Permit Matrix. (Note: Include only if required by the scope of work.) For specific environmental documentation required by submittal, see Appendix C. The matrix is a summary of permit actions required for successful completion of the project. For a sample of the matrix, see Plate 17, Chapter IV and Appendix C.

e. Scopes of Work, Conference Minutes and other Pertinent Project Correspondence. The A-E shall include copies of all pertinent data such that the Design Analysis presents the project history from inception to completion of design documents.

f. Project Book (PB). The A-E shall incorporate the approved PB into the Design Analysis including any approved revisions. This document forms the basis for the functional requirements of the project. It is provided to the A-E by the COE PM.

g. O&M Provisions: This part of the design analysis shall provide a compilation of design provisions made to enhance and to reduce the cost of operating and maintaining the facility when completed. This shall include the O&M design intentions for each major discipline. This part of the design analysis shall be in a form that can be used separately to supplement the completion records required for formal transfer to the Using Service, or to form the basis for assembling a facility user's manual.

h. Engineering Considerations and Instructions for Field Personnel. This report is an extension of design into the construction phase of the project. It is a document in which design concepts, assumptions, details and instructions are transmitted to field personnel. The report establishes a basis for communication and coordination between design and construction personnel which is essential for the successful completion of a project. It is to be presented in outline form in the Early Preliminary submittal and bound separately for submission at Final Design. See Appendix B for specific content and submittal requirements.

i. DD Form 1354 Data Sheet. This document is utilized by COE construction personnel at construction completion to prepare transfer documentation required by the Air Force. The A-E shall complete the Data Sheet during final design. See Appendix D for instructions.

j. Design Calculations: Calculations shall be computed and checked by separate individuals. Checking shall be accomplished by registered architects, and/or engineers of the firm under contract to COE, as identified in the A-E's DQC Plan. The names of these individuals shall be indicated on the page or insert carrying the calculation. Presentation shall be clear and legible with a tabulation showing all design loads and conditions. The source of loading conditions, formulas, and references shall be identified. Assumptions and conclusions shall be explained and cross-referencing shall be clear.

k. Review Comments. All review comments generated by all reviewers on the project, annotated by the COE, and responded to by the A-E, shall be included as an appendix to the design analysis.

"The bitterness of poor quality is remembered long after  
the exultation of meeting the schedule has passed."

1. Other Appendices to the D.A. Provide any additional project required analyses such as Asbestos Survey results or special Seismic Analyses results, etc. and attach or bind separately as appropriate.

5.4. Use of Computer Programs: When a computer program is used for structural or mechanical analysis etc., the program shall be named and described to include a flow chart showing how the program reaches solution. This description must be sufficient to verify the validity of methods, assumptions, theories, and formulas, but will not require source code documentation or otherwise compromise proprietary programs.

5.5. Classified Material: Design Analyses containing classified material shall be marked and handled in accordance with instructions of the PM. Where only a minor portion of the criteria or calculation is of a classified nature, every effort shall be made to prepare the design analysis so as to permit it to be an unclassified document with proper references to sources of classified material.

5.6. Area Computations: Gross area of structures and net area breakdowns for each floor shall be provided in the Design Analysis. The method of computation is specified in Chapter IV, Plate 18. See also the architectural paragraphs in Chapter III.

#### 6.0. DESIGN ANALYSIS - PREPARATION & ASSEMBLY

6.1. Organization: The Design Analysis shall be organized as shown in Figure 4. Note that the Design Analysis defines the development of the project design. Do not delete information from earlier stages of design in subsequent design submittals.

6.2. Size and Layout: All material shall be prepared in relation to a vertically oriented 8-1/2 x 11 inch standard page size. Larger material, folded to 8-1/2 x 11, may be utilized when reduction is not feasible. This applies to all drawings, published data or automatic data processing printouts that must be included in the Design Analysis. Both side margins shall be 3/4 inch minimum to permit loose side binding and head to head printing.

6.3. Assembly and Identification: The original design analysis shall be loosely assembled with a complete table of contents. If more than one volume is required, no single component as shown in Figure 4 shall be segregated into different volumes. All volumes shall be numbered sequentially and loosely assembled under a cover page (see Plate 19, Chapter IV) indicating the volume number and total number of volumes for the project. Each volume shall have the complete table of contents for the entire Design Analysis with the items contained in that volume highlighted. For projects with more than one major facility, the design analysis may be assembled into separate volumes for each facility as per Figure 4.

# TYPICAL DRAWING SET

ELECTRICAL E - 1 thru E - X

FIRE PROTECTION FP - 1 thru FP - X when not Incl. in MECHANICAL

MECHANICAL M - 1 thru M - X

PLUMBING P - 1 thru P - X

STRUCTURAL S - 1 thru S - X

INTERIOR DESIGN ID - 1 thru ID - X Incl. SYSTEMS FURNITURE

ARCHITECTURE A - 1 thru A - X

LANDSCAPING L - 1 thru L - X

UTILITIES U - 1 thru U - X when not Incl. in CIVIL

CIVIL C - 1 thru C - X Incl. LOG OF BORINGS and TOPOGRAPHY

GENERAL G - 1 thru G - X

# TYPICAL DESIGN ANALYSIS ASSEMBLY

