

CHAPTER 4. PROJECT ENGINEERING400. INTRODUCTION

a. Scope. This chapter outlines the responsibilities, procedures, and accomplishments involved during the engineering phase of an F&E project. It covers environmental and electronic engineering responsibilities for F&E projects from receipt of the work order from the Planning and Program Management Section, AAL-454, until construction and/or installation activities begin as described on Chapter 5. All F&E projects, regardless of size, are covered by this chapter and shall be subject to the same engineering considerations, coordination, review, and approval requirements. Only the procedures will vary based on a consideration for cost effective project management. For some projects it may be advantageous to conduct more than one level of review at a single meeting of the involved parties. The level or levels of review conducted will be determined by the size and complexity of the project.

b. Objective. This chapter will ensure the involvement of the user and other interested principals by providing guidelines for the coordination of projects and the input of recommendations. This involvement should result in more cost effective projects which are not only functional, but are readily accepted by the user.

401. Work Order. Approved F&E and reimbursable projects will be assigned to AAL-451 and AAL-452 by AAL-454 by means of FAA Form 6030.6, AFD Work Order. Prior to transmittal, AAL-454 will process assignments as outlined on Chapter 3.

402. RESPONSIBILITIES.

a. General. While most regional office divisions contribute to the accomplishment of F&E projects by providing information and/or services, the primary responsibility for project engineering lies with the Environmental Section, AAL-451, and the Electronics Section, AAL-452. The current issue of Order 1100.5, FAA Organization Field, contains the branch functional statements along with the assigned field responsibilities. The responsibilities of AAL-451 and AAL-452, along with other offices that are significantly involved during the engineering phase of an F&E project involvement, are:

b. Airway Facilities Division, AAL-400.

(1) The Planning and Program Management Section, AAL-454, is responsible for:

(a) The overall fiscal management and control of the F&E program on coordination with the Program Support Branch, AAL-420. Budget year projects, regionally-developed projects (local projects) and reimbursable projects are assigned by allocation of funds and definition of scope. Any significant changes to the original project scope or adjustments to funding must be approved by AAL-454. All required reprogram actions shall be administered by AAL-454. AAL-454 is responsible for reviewing all changes proposed during the engineering phase which will have an effect on the original implementation effort; i.e.,

space layouts, siting, structure heights, etc. All such changes will require the concurrence of AAL-454.

(b) The preparation of the environmental assessment data for a proposed site after the engineering phase of the site selection process. All necessary data sheets required by the current issue of Order 1050.1, Policies and Procedures for Considering Environmental Impacts, will be completed by AAL-454. The assessment data shall be forwarded as early as possible to minimize any possibility of delay in the project.

(c) For determining if projects are covered by environmental policy and for the preparation of the Environmental Assessment (EA) submission of the FONSI and EIS. The statement shall be prepared in accordance with the current issue of Order 1050.1, Policies and Procedures for Considering Environmental Impacts, and shall be prepared and submitted as early as possible during the project engineering phase of a project.

(d) For assisting in the acquisition of data for any necessary permits. This data shall be prepared and submitted to the Real Estate and Utilities Branch, AAL-58, as early as possible during the project engineering phase of a project.

(2) The Maintenance Branch, AAL-460, is responsible for the overall fiscal management and control of leased telecommunications (DECCO) funds and procurement of specific telecommunications services. All services required to implement any F&E project must be budgeted for in accordance with the current 2500 series AL notice. AAL-460 is also responsible for assignment of electronic equipment frequencies for all F&E project projects and for initiating and monitoring service orders as requested by the initiating office. AAL-460 will also review all project drawings and specifications, and provide their comments to the appropriate section. Their concurrence with the drawings and specifications is necessary for the incorporation and/or satisfactory resolution of all comments and recommendations.

(3) The Environmental Section, AAL-451, performs all the engineering and associated project management functions required for the plants and structures portion of establishment, relocation, or modernization projects. These responsibilities include, but are not limited to, the civil, architectural, structural, electrical, and mechanical engineering functions.

(4) The Electronics Section, AAL-452, performs all the engineering and associated project management functions required for the establishment, relocation, or modernization of electronic equipment. This office is also responsible for budgeting for and initiating all frequency and telecommunications service requests.

(5) The Program Support Branch, AAL-420, monitors, administers, and analyzes the Airway Facilities fiscal program.

c. The Air Traffic Division Plans/Program and Resource Branch, AAL-510, in coordination with involved field Air Traffic managers, reviews and approves changes to operational areas, operational equipment configuration, and administrative areas. In addition, they provide operations requirements, (such as leased telecommunications services, etc.) recommendations, and other data requested during project engineering activities.

d. The Flight Standards Division, Airspace and Procedures Branch, AAL-220, provides data and approval for the siting of terminal navigational and visual aid facilities.

e. Logistics Division, AAL-50.

(1) The Materiel Management Branch, AAL-52, processes all requests for materiel and equipment to be furnished from the FAA Depot and excess property for F&E projects. They are also responsible for the transfer of materials from one project to another and from operations (in-use) stock to F&E projects.

(2) Acquisition Management Branch, AAL-55, manages construction contracts and accomplishes the procurement of project services, equipment, and materiel from commercial sources.

(3) Real Estate and Utilities Branch, AAL-58, is responsible for all negotiations leading to the acquisition and modification of leases, permits, easements, property and real estate, etc. The Environmental Section, AAL-451, and the Electronics Section, AAL-452, are responsible for forwarding utility lease, and/or easement requirements to AAL-58 at the earliest possible date in the project management phase of a project. AAL-451 and AAL-452 shall coordinate all requirements through the Planning and Program Management Section, AAL-454. Whenever possible, real estate requirements for planned facilities should be identified when AIP projects and airport layout plans are under review by the Airports Division. The AIPs provide a means for the FAA to obtain cost-free real estate interest (easements, leases, rights-of-way, permits, etc).

f. Airway Facilities sectors and sector field offices are responsible for reviewing all project drawings and specifications, and for providing the Establishment Branch, AAL-450, with their comments, recommendations, requirements, and other requested data relative to project engineering. The sector's concurrence on the drawings and specifications is necessary for the incorporation and/or satisfactory resolution of all comments and recommendations.

g. Airports Division, AAL-600, is responsible for reviewing and conferring with project drawings and specifications for facilities constructed on an airport property. Of primary interest are access roads, cable routings, structure fragility, runway threshold locations, approach obstructions, runway and taxiway safety areas, security fences, and similar design features.

403. PROJECT MANAGEMENT.

a. General. During the engineering phase of a project, it will be necessary to accomplish numerous administrative and preparatory tasks in a timely manner if project schedules are to be met and unnecessary costs avoided. Long lead times are required since delays or difficulties may be encountered in obtaining approvals, materiel, and equipment. Performance of these tasks will depend on factors, such as schedules, size and type of projects, anticipated delays or lead times, etc. The accomplishment of project tasks requires close coordination and cooperation between Establishment Branch and sector personnel. While the Establishment Branch engineering sections are responsible for accomplishing most tasks, the sectors are responsible for accomplishing a number of tasks during the engineering phase. Some tasks require the combined efforts of the Establishment Branch engineering sections and the sectors. Tasks for which the Establishment Branch engineering sections are responsible shall be accomplished in a timely manner, based on the best judgment of the project engineer. The sector manager shall ensure that tasks for which the sector is responsible are accomplished on a manner which fully supports project requirements.

b. Fiscal Tracking. The Environmental Section, AAL-451, and the Electronics Section, AAL-452, shall implement a method by which each project can be tracked fiscally. This tracking system shall be maintained for all projects to ensure that authorized project funds are not overly obligated. Establishment of these records will be the first priority of the responsible section. The F&E 32-17F Report, AF Division Report of Estimates and Obligations, should be checked to ensure that all obligations which were made before the initiation of tracking records are entered into the tracking records or reconciled. A daily F&E 32-17F Report, titled the FSF-9 Report, is also available, upon request, from the Program Support Branch, AAL-420.

c. Working Files. Working files will be established by the responsible engineering sections. The working files shall contain copies of the engineer's checksheet, the F&E Project Coordination and Concurrence Sheet, work order, budget estimates, fiscal year budget item, planning data, and any other reports and correspondence or background data pertinent to the project. It is the responsibility of the project engineer to ensure that copies of pertinent documentation is forwarded to the program manager for inclusion into the branch permanent project files.

d. Initial Review. After establishment of the project tracking records and the working file, AAL-451 and/or AAL-452 shall review this file, the section files, and other data relevant to project accomplishment. Based on this initial review, the engineer shall revalidate the project cost estimate and scope, and notify AAL-454 if anticipated funding or scope definition problems.

e. A Bar Chart Project Schedule shall be used to develop the project schedule. An example of this form is depicted on as Figure 4-1. The current coordination team chairperson will prepare the bar chart and transfer the chart to the succeeding chairperson.

f. Engineering Checksheets. Since there are numerous tasks which must be accomplished and events which must take place in a timely manner, it is important that project engineers prepare and maintain task and event checksheets for all projects. AL Form 6000-11, Engineering Checksheet, is shown in Figure 4-2. The checksheet is arranged in approximate chronological order for events which would take place for any project. Engineers shall use this checksheet, in conjunction with the planning checksheets in Chapter 3, to ensure that items are not overlooked, and actions that require long lead times are initiated in a timely manner. This practice will ensure accountability with the responsible establishment engineering section and ensure that work completed during the program management phase can be fully utilized, and not repeated, during project engineering.

(1) Work orders transmitted to AAL-451 and AAL-452 by AAL-454 will document the items completed during the program management phase. Completed items at this point will vary according to the type and size of the project and other factors.

(2) The responsible engineering section supervisor shall ensure that project checksheets properly reflect items which have been accomplished during the project implementation phase and those that remain to be accomplished during the engineering phase.

(3) At the start of the project, inapplicable items shall be annotated "N/A" in the "Status" block.

(4) As the project progresses, all applicable items shall be annotated as "Completed" in the "Status" block with the date of completion entered in the "Completion Date" block.

g. Procurement of Project Materiel.

(1) National Project Materiel Lists (NPML). Timely action is necessary when ordering and updating Washington-furnished material listed on the NPML Project Status Report (PSR). Requisitions for this materiel shall be submitted by AAL-451 and AAL-452 engineers, through AAL-454 program managers, to the Property Management Section, AAL-52B, of the Logistics Division, AAL-50. Details for handling this materiel are contained in Handbook 4650.7, Management of Project Materiel, and Order 4650.21, Management and Control of In-Use Personal Property.

(a) FAA Form 4650-3, Project Flange Document (PCD). This form shall be used to make additions or deletions and other changes to the Project Status Report (PSR) which, when approved, will change the NPML. Approximately 90 days should be allowed for approval and processing changes. Engineers shall continually keep project materiel lists updated to reflect actual project requirements.

(b) Priority Requirements. Engineers shall not bypass the Logistics Division, AAL-50, when ordering project materiel; however, the process can be expedited when priority requirements exist. AAL-52B will initiate

priority orders by telephone when requested by the project engineer. AAL-52B shall be provided confirmation copies of the completed priority materiel requisitions.

(2) Transfer of Project Materiel.

(a) General. FAA Form 4650-12, Material Requisition/Issue/Receipt, shall be used to request materiel from excess property, to transfer materiel under regional control from one F&E project to another, and to obtain personal property assigned to operations stock. The principal reasons for obtaining materiel from these sources are nonavailability through the NPML system and cost savings resulting from the utilization of excess property.

(b) Materiel Status. Materiel status categories for excess property and operations property are defined in Handbook 4650.7, Management of Project Materiel, and Order 4650.21, Management and Control of In-Use Personal Property. Engineers shall check the appropriate status category for all requested excess materiel, in-use property and real property. Transfer of project materiel does not require a status check.

(c) Excess Property. Excess property lists from within the region, from other regions, and GSA will be circulated through the Establishment Branch engineering sections by the Logistics Division, AAL-50. Engineers shall make every effort to utilize this material since materiel not requested in the national screening process may be donated or sold.

(d) Transfer of Project Materiel Between Projects. Engineers will make every effort to obtain required project materiel through the PML system, excess property, and commercial sources. Materials may be transferred, with the program manager's approval, to meet priority scheduling requirements.

(3) F&E Materiel From Operations Stock. F&E materiel can be requisitioned from FAA Depot operations stock to meet critically short project deadlines or to satisfy standard E&R requirements. Availability will be determined by AAL-451M by telephone to the depot. Engineers shall request the materiel on AL Form 4415-1-1, Project Material List, through AAL-451M. Whenever possible, F&E project materiel shall be obtained from F&E stock or from commercial sources.

(4) Initial Supplies and Working Equipment (IS&WE).

(a) Schedule "A" Items. AAL-451 and AAL-452 will circulate Schedule "A" requirements through the sectors, and AAL-451M will order the required items. Schedule "A" items shall be ordered from the FAA Depot by AAL-451M, through AAL-52B, on FAA Form 4650-12 at least 120 days prior to the project commissioning date.

(b) Schedule "B" Items.

1 General. The initial authorized allowance of Schedule "B" items for most facilities is listed in Order 4630.2, Standard Allowance of Supplies and Working Equipment for National Airspace System Facilities. The items and quantities listed are the maximum allowances for purchase using FEE funds. These items are purchased by the region from GSA or commercial sources.

2 Special Justification. In some instances, Schedule "B" items will be required for new facilities not covered by Order 4630.2. In other instances, items required may exceed or be in addition to the allowances specified by the order. Schedule "B" items may also be required for relocation, modification, and modernization projects. In these instances, special justification will be required for all variances to allowances listed in Order 4630.2.

3 Procurement. Upon receipt of the Schedule "B" requirements from the sectors, project engineers shall screen the list and forward the initial allowance request to AAL-451M. AAL-451M will forward the request to the Supply Cent Section, AAL-55B, at least 120 days prior to the project commissioning date. Items submitted for special justification will be additionally screened at the regional level by AAL-420, AAL-451, AAL-452, and AAL-460, as appropriate. All items approved for purchase will require the project engineer to submit a Procurement Request, Form DOT F 4200.1, automated FAA Form 4400-19, or the computer generated Procurement Request form, through AAL-451M, to the Acquisition Management Branch, AAL-55. The Procurement Request shall contain the project job order number (JON), facility identification, and facility type; e.g., JON: 81423/TKA VOR. Copies of procurement request, Chose orders, and other pertinent procurement documents will be placed on the appropriate material list files.

(5) Initial Supply Support Allowance Charts (ISSACs). ISSACs shall be requested by project engineers at the time materiel listed on the PSR is ordered. The ISSACS will be requisitioned by AAL-52B In accordance with the procedures contained in Order 4650.7, Management of Project Material. The sector office and AAL-454 shall be provided a listing of ISSACs ordered for each project.

(6) Test Equipment. Test equipment is normally furnished through national procurement in conjunction with major equipment acquisitions. It is the responsibility of the Washington Office program manager to procure necessary test equipment for all projects and programs. However, it is also the responsibility of the Establishment Branch to verify that necessary test equipment has been ordered and is scheduled to arrive on-site In sufficient time for alignment, testing, certification, and commissioning of installed F&E project equipment. The Establishment Branch will also forward to the regional test equipment coordinator (AAL-464) and appropriate sector office a list of project test equipment, including model number and manufacturer. The responsible Airway Facilities Division section, AAL-451, AAL-452, or AAL-464, as appropriate, will identify and procure any unique or special test equipment necessary to maintain the equipment after commissioning. In instances where the

Airway Facilities Division is unable to order or procure the necessary test equipment as the result of a national program oversight or other causes, the additional test equipment required by the project will be identified and budget action initiated to obtain this equipment. The appropriate sector office will be provided an itemized listing of all test equipment ordered for a project.

(7) Approved Modifications. It is often necessary to modify new and existing equipment involved in F&E projects prior to the completion of the Facility Reference Data File and commissioning of the equipment. New equipment is defined as that equipment specified for installation by the responsible engineering section(s); existing equipment is defined as equipment that is presently installed, operating, and/or commissioned. The responsibilities for accomplishing modifications are as follows:

(a) The Environmental Section, AAL-451, or the Electronics Section, AAL-452, shall perform the modifications for which kits/materials are available for new equipment. They shall requisition the necessary materials/kits from the FAA Depot through AAL-451M or purchase the kits with F&E funds. When necessary, the sector will be requested to assist AAL-451 or AAL-452 personnel in performing modifications. Requests for assistance will be forwarded by the Establishment Branch Manager to the appropriate sector manager. With the concurrence of AAL-451/452 personnel, sector personnel may assist on performing modifications to become familiar with the new equipment. The sectors shall be advised if modification materials are to be shipped to the sector/sector field offices. A list of applicable modifications will be included with each project/contract specification.

(b) The Airway Facilities sector shall perform modifications on existing equipment. The sector shall requisition the necessary materials/kits from the FAA Depot or by local purchase with sector funds.

(8) Software. The majority of the software and firmware incorporated into new electronic equipment systems is under configuration control management. Changes to the standard configuration can only be obtained through the NCP process. In radar/automation systems, the electronics section will coordinate software requirements with the Washington Office and the regional Air Traffic Division during the initial phases of project engineering. It is the responsibility of the engineering section to review site adaptation and unique site data that will be incorporated into the standard operating program. For systems which Air Traffic does not have operational software responsibility, the project engineer will collect site data required by the Washington Office or contractor. The project engineer will consult with the Washington Office and make every effort to ensure that all required operational and diagnostic software, firmware, and supporting documentation are on site by the start of the Initial Operational Capability (IOC).

(9) Regionally Purchased Materials. Project engineers will submit requirements for regionally purchased project materials to AAL-451M on AL Form 4415-1-1. Procurement requests will then be forwarded to AAL-55, through AAL-52B, on DOT Form 4200.1, FAA Form 4400-19, or the computer generated procurement request form.

h. Leases. Requests to lease or to modify existing leases of buildings, land, or structures shall be submitted to the Real Estate and Utilities Branch, AAL-58. These requests should be submitted as soon as possible in the project engineering phase. Lease requests involving restrictions and other rights shall be closely coordinated with the Planning and Program Management Section, AAL-454, and the involved Airway Facilities sector in order to ensure that there is consistency with commitments that were made during the planning stage, and that all needs and restrictions required by the sector are covered under the lease requirements. Lease requests should contain, as a minimum:

(1) Clear description of the land, building space, structure, or other requested rights. Metes and bounds legal descriptions should be provided for all plot areas and access roads. Easements and permits should be requested for cable right-of-way, small structures, and other similar installations.

(2) Required length of the lease.

(3) Estimated cost of the lease, including estimated costs for any modifications.

(4) The engineer shall ensure that all desired rights as required by facility siting criteria and other considerations and restrictions are included in the lease request. Some examples of these are:

(a) Clear zones.

(b) Construction and building restrictions.

(c) Tree cutting requirements.

(d) Electromagnetic interference restrictions.

(e) 24-hour access requirements.

(f) Security requirements.

(g) Parking requirements.

(h) Janitorial requirements.

i. Telecommunications. Procedures and responsibilities for leased and procured telecommunications services are as follows:

(1) The requesting office, AAL-451/AAL-452, shall notify the Leased Communications/Frequency Management and Test Equipment Section, AAL-464, of the requested service on accordance with established procedures. Lead time is generally 6 months.

(2) AAL-464 shall follow up on service requests to ensure timely installation by the serving companies and shall keep the requesting office advised of availability status.

(3) Upon notification by AAL-464 or the telephone company that the service has been completed, it is the responsibility of the requesting office to ensure that all required technical installation and performance parameters are met by visual inspection, technical evaluations, and completion of required documentation. This checkout may be delegated to the sector personnel as required. The checkout must be completed in a timely manner so as not to delay commissioning of the service/project.

(4) Upon notification by the requesting office that the service is acceptable, AAL-464 will notify DECCO to begin payment. As a matter of practice, DECCO usually begins payment on the service date when advised by the telephone company that the requested service has been completed. This makes prompt checkout by the FAA very important.

(5) Following acceptance, but prior to implementation of the service, it is the responsibility of the requesting office to ensure continuing reliability of the service and to notify the telephone company of requirements to correct any circuit/system deficiencies. It must be noted that service restoration is subject to operating tolerances in accordance with Order 6000.22, Maintenance of Two-Point Private Lines, even though the total F&E project is not completed.

J. NAS Flange Proposals (NCP's) and Configuration Control Decisions (CCD's). AAL-451 and AAL-452 are responsible for determining any requirement for NCP siting waivers during the site evaluation and selection process for a new or relocated facility. Requests for NCP's/CCD's shall be submitted in accordance with the current issue of FAA Order 1800.8, National Airspace System Configuration Management. All requests for NCP's/CCD's shall be coordinated with the project coordination team and forwarded to the Maintenance Branch, AAL-460.

k. Airspace Approval. An evaluation of the effect that a new or relocated facility may have on the configuration and/or operations of affected airspace must be accomplished during the project engineering phase. The establishment or relocation of a facility is subject to airspace review and approval by other divisions, particularly the Air Traffic Division and the Flight Standards Division. AAL-454 will prepare requests for airspace reviews, and forward the airspace requests to the appropriate divisions. Since operational facilities may be affected, airspace reviews must also be coordinated with the Maintenance Branch, AAL-460.

1. Facility Shutdowns. Based on the FAA's primary mission of air safety, the establishment, modification, or modernization of airway facilities should be accomplished, if possible, without shutdowns or with a ~~minimum~~ minimum of disruptions to facility operations. The Establishment Branch engineering sections shall carefully weigh cost/benefit considerations before requesting a facility shutdown. Facility shutdown requests shall be submitted to AAL-460 through AAL-454 on accordance with the current issue of Order AL 6020.4, Facility Shutdown, Commissioning, and Decommissioning Committee. Facility shutdowns request will be submitted no later than 45 days prior to the required shutdown dates to permit publication in the Regional Monthly Facility Shutdown Schedule and in the Airmens' Information Manual in accordance with the current issue of Order 7930.2, Notice to Airmen (NOTAM) System.

m. Frequency Assignments. Requests for frequency assignments shall be submitted by AAL-452 in writing, with a completed AC Form 8200-14 (Facility Data Sheet) or a completed AL Form 6050-7, Request for Frequency Assignment, to AAL-464. Approval of frequency assignments will be requested by AAL-464 from Washington in accordance with the current issue of Order 6050.32, Spectrum Management Regulations and Procedures Manual. Frequency assignment approval requires 90 to 180 days from the date of submittal.

n. Reporting the Establishment or Relocation of Navigation Aids and Communications Facilities to the National Flight Data Center, (NFDC). Data related to the establishment of new or the relocation of existing navigation aids and communications facilities must be reported to the NFDC (ATC-250) 90 calendar days prior to the anticipated commissioning or relocation date. Detailed reporting requirements are contained in Order 7900.2A, Reporting of Electronic Navigation Aids and Communications Facilities Data to the National Flight Data Center. The required data will be collected and transmitted to the NFDC through AAL-464 with copies to AAL-222 and AAL-530. Required data will be recorded on AC Form 8200-14 (Facility Data Sheet), by the Electronics Section, AAL-452, for electronics facilities and by the Environmental Section, AAL-451, for visual aids.

o. Architect-Engineering (A-E) and Professional Services. All questions relating to acquisition procedures and to the interpretation for A-E or professional services should be referred to the Acquisition Management Branch, AAL-55.

p. Professional Services. Requests for professional services shall be submitted to AAL-55 on Form DOT F 4200.1, Procurement Request; FAA Form 4400-19, or the computer generated Procurement Request form. Procurement for professional services such as soils investigation and surveying can be accomplished pursuant to special procurement procedures that do not rely solely on the sealed bid competitive process for reasonableness of price. These procedures, however, require greater scrutiny in assessing price reasonableness for the requested service. For services acquired through this process, AAL-55 shall obtain cost estimates from interested firms and AAL-450 shall evaluate these costs for reasonableness by comparing these costs with standard estimates guides, adjusted for Alaskan geographical considerations. The SF-44 shall not be used for acquisition or payment of professional services.

q. Advance Notice to Bidders. Federal Acquisition Regulations (FARs) require that all bid proposals expected to exceed \$25,000 be advertised in the Commerce Business Daily. The Establishment Branch shall provide the Logistics Division, AAL-50, information needed to prepare a synopsis approximately 45 days before the estimated bid solicitation date. The information listed below shall be provided on the synopsis:

- (1) Project location and title.
- (2) A brief but reasonably comprehensive description of the work.

(3) The estimated date drawings and specifications will be forwarded to the Logistics Division, AAL-50.

(4) An estimated construction contract cost range; i.e., \$25,000 to \$50,000, etc.

(5) Rounded contract performance time in calendar days.

404. PREDESIGN COORDINATION.

a. General. The purpose of the predesign and pre-engineering coordination is to provide a vehicle for project familiarization, discussion of proposed project engineering techniques and concepts to be employed, and to enhance the exchange of information and ideas. Predesign and pre-engineering coordination is the responsibility of the appropriate establishment engineering section, and shall be initiated by the coordination team chairperson or his/her designee (usually the project engineer) when:

(1) Fiscal tracking records have been initiated.

(2) Working files have been established and all background data has been reviewed.

(3) Initial funding revalidation has been accomplished.

(4) An engineering checklist has been initiated.

(5) A Bar Chart Project Schedule has been developed.

b. Coordination Contacts. After the review and implementation of the items listed above, the coordination team chairperson or his/her designee shall coordinate the project with all involved principals. No involved office shall be omitted from the coordination process. These offices may include but are not limited to the following:

(1) The Engineering Sections, AAL-451 and/or AAL-452, as appropriate.

(2) Airway Facilities Sector Manager's Office. All coordination with sectors and sector field offices will be handled through the sector manager's office. The Assistant Manager for Technical Support (AMTS) will represent the sector for coordination of F&E projects unless otherwise designated by the sector manager.

(3) Program Support Branch, AAL-420.

(4) Maintenance Branch, AAL-460.

(5) Logistics Division, AAL-50.

(6) Flight Standards Division, AAL-200.

(7) Plan/Programs & Resource Branch, AAL-510, of the Air Traffic Division, AAL-500.

(8) Airports Division, AAL-600.

(9) Any involved military organization.

(10) Planning and Program Management Branch, AAL-454

c. Discussions. Records of the predesign coordination discussions shall be annotated in the project working file. These initial coordination should largely involve:

(1) A thorough briefing on the project scope. At this stage of a project, AAL-451, AAL-452, AAL-454, AAL-460, AAL-510, and the sector offices should have a copy of the work order sheet; however, the briefing should serve to define the project on more detail, as well as to initiate the development of the project.

(2) Preliminary information on project schedules, material/equipment availabilities, shutdown requirements, cutovers, etc.

(3) Solicitation of recommendations and other input which may be relevant.

(4) Preliminary discussions on alternatives and concepts.

d. User Input. At this stage of a project, it is particularly critical that the sectors and local Air Traffic personnel provide related project information and recommendations. The coordination team chairperson shall solicit the sectors' input, paying particular attention to concepts and alternatives. Sectors, on coordination with local Air Traffic Managers (if appropriate), shall be responsible for providing field input and recommendations as requested.

405. SURVEYS AND INVESTIGATIONS.

a. General. After predesign coordination has been accomplished, site surveys and/or investigations will be conducted to obtain information for the project design effort. The required information may include but is not limited to:

(1) Site selection.

(2) The collection of field data such as topographic and property surveys, soil investigation, and panoramic surveys, necessary for the preparation of a siting report, will be performed by the Environmental Section, AAL-451. Results of such data collection will be forwarded to the Planning and Program Management Section, AAL-454, for evaluation and for use on the preparation of a siting report. Field visits required for data collection shall be coordinated with the appropriate sector office, AAL-58, (when permission is

needed to enter private property), and, as appropriate, with the airport manager/sponsor.

(3) RML/TML/RCL path surveys.

(4) Direct earth burial (DEB) cable and duct surveys and investigations.

(5) Utility surveys and investigations for the availability of water, sewer, gas, electrical power, telephone, water wells, septic tanks, etc. (The utility survey shall include consultations with AAL-58 and the electrical power, gas and water service companies to obtain the lowest rate services available for the facility based on consumption level, peak demand, etc. The utility survey record shall document service rate data obtained from the service companies.)

(6) Investigations of existing conditions, such as equipment and console layouts, space layouts, "as-built" construction conditions, electronic and electrical equipment configurations etc.

(7) Equipment interference investigations.

(8) Antenna layouts.

(9) Frequency management investigations.

b. Coordination. Generally, sector personnel will have same knowledge of matters involved on engineering surveys and investigations. Engineers and work order carriers shall consult with sector personnel on all survey and investigation matters. This requirement shall be included on all work orders.

c. Work Orders. The survey and investigation information required may be obtained by telephone, through correspondence, or by a visit to the site. Depending on the size and type of project, it may be accomplished during the predesign coordination. In most instances, work orders will be issued to project engineering personnel for accomplishment. Order AL 6000., Environmental Engineering Handbook, contains a survey data sheet along with instructions for preparing work orders. Order AL 6000., Electronic Equipment Installation Handbook, also contains instructions for preparing work orders and a sample copy of a work order.

(1) Information. Work orders shall be written on FAA Form 6030-6. In addition to the specific survey or investigative information requested, the work order should contain the following information:

(a) Location where work is to be performed.

(b) Estimated departure date.

(c) Guidance or instructions for the work to be performed.

(d) Specific coordination direction

- (e) Instructions not to over-obligate assigned funds.
- (f) Name and telephone number of office engineering contact.

(g) Reference to responsibilities contained in Order AL 6000., Electronic Equipment Installation Handbook, and Order AL 6000., Environmental Engineering Handbook.

- (h) The estimated length of the assignment.
- (l) Closeout instructions.
- (i) Cost accounting code and funding allocation.
- (k) Preparation and submission of LDRs.

(2) Notification. Situations often arise which require F&E personnel to accomplish work prior to the preparation of a work order. This practice is to be avoided if at all possible; however, if it cannot be avoided, the Establishment Branch, AAL-450, will notify the sector office by telephone of the work order delay and forward the completed work order as soon as possible. F&E personnel shall not be directed to perform surveys or investigations without coordination with the involved sector. The Establishment Branch, AAL-450, will ensure that copies of the work order are sent to the following offices:

(a) A copy shall be sent to the sector, the involved sector field office, AAL-420, and AAL-460.

(b) A copy shall be sent to all other involved or concerned offices within the region.

406. DESIGN COORDINATION, REVIEW, CHANGES, AND APPROVAL.

a. General. Engineering design can begin with the availability of data obtained from site investigations and surveys. There shall be a minimum of two coordination milestones established during the design stage of a project. These milestones are the start of design (Preliminary Review) and at the nominally 90-percent engineering completion point (Critical Review). During the period between the Preliminary Review and the Critical Review, coordination shall be on an as-needed basis. During this period, engineers shall coordinate the project development with the coordination team members, and others as appropriate. When requested during the engineering design, sector offices and other involved offices shall provide input and recommendations to the coordination team chairperson (or his/her designee), usually the responsible project engineer. Formal reviews will not be held during this period unless considered appropriate by the team members or team chairperson/project engineer.

b. Engineering Coordination. Projects which require both environmental and electronic engineering design efforts shall be closely coordinated between engineering sections to ensure the compatibility of engineering efforts and to assure that the project meets its intended purpose. Close coordination is extremely important for projects which have lengthy construction periods such as

ATCT/AFSS facilities. On projects where a concurrent engineering effort is not practicable, AAL-452 shall schedule the electronics engineering effort to allow adequate time for the Preliminary Design Review and Critical Design Review process.

c. Energy Conservation Measures. Energy conservation measures shall be considered on the engineering design of each project. Project engineers shall, to the maximum extent possible, incorporate acceptable and approved energy and cost-saving features into new and remodeled facilities. The factors listed below, and other appropriate factors, should be considered on the project design effort:

(1) HVAC systems with the highest efficiency justifiable by a cost-benefit assessment should be utilized. Care should also be taken to utilize properly sized HVAC systems.

(2) Building plans and specifications should provide for adequate insulation, seals, caulking, etc. If needed, additional energy-saving features should be incorporated into standard plans and specifications. Authority to deviate from national standards should be requested, if necessary, to incorporate these energy-saving features.

(3) The primary power distribution system should be of the proper size for the facility requirements.

(4) Provisions should be provided for timed and/or sequenced operation of the HVAC for staffed and unstaffed periods.

d. Preliminary Design Review. After the project engineer has reviewed all background survey and/or investigation data, he/she shall develop initial concepts of the essential elements and alternatives involved on the design and accomplishment stage of a project. Sufficient preliminary sketches, diagrams, cost estimates, and other data shall be prepared for a preliminary design review with the coordination team and all other involved and concerned principals. This review may be held at the regional office, by individual telephone calls, or by telephone conferences. However, in most cases, an on-site review is most beneficial at this stage of a project. Discussions involving plot layouts, equipment configurations, space layouts, and other existing conditions will be more meaningful with a firsthand examination of the on-site conditions. The main objectives of the preliminary design review are to solicit the recommendations and concurrences of the users of methods which will be used as guidelines for the development of the project. Preliminary design reviews shall include some or all of the following factors:

(1) Plot layouts including building/structure locations and orientation, drainage patterns, roadways, parking lots, etc.

(2) Cable routes, including duct bank and manhole locations.

(3) Equipment and console layouts.

(4) Schedules.

- (5) Space arrangements.
- (6) Shutdowns.
- (7) Cutovers.
- (8) Utilities.
- (9) Leased telecommunications services.
- (10) Security.
- (11) Work Access.
- (12) Functional diagrams.

e. Critical Desist Review. When the engineering design of a project is essentially complete, a critical design review shall be held with the coordination team members and all other involved or concerned principals. The reviews shall be accomplished as follows:

(1) Reviews for major projects such as ATCT establishment shall be conducted in the regional office. A review in the regional office is most beneficial and cost effective due to the complexity of major project and the large number of regional office personnel involved. Environmental engineering reviews will include a review of specifications and drawings on a "drawing by drawing" basis. An "engineering package" will also be reviewed for all electronics projects.

(2) Reviews for small- or moderate-sized projects shall be accomplished by forwarding copies of the project specifications and/or drawings (engineering design package) to the Airway Facilities sector, sector field office, AAL-510, M L-460, and the respective Establishment Branch sections. Project drawings, will not normally include standard drawings but will usually be limited to site drawings and site adapted drawings. The engineering design package shall be forwarded to reviewers by speed memo or standard ADP letter, requesting comments and/or concurrence. A minimum of 30 working days shall be allowed for the review. The Airway Facilities sectors shall forward their comments to the Maintenance Branch, M L-460, for review, consolidation, and, as appropriate, for the inclusion of comments. The consolidated comments will be transmitted by AAL-460, within 10 days to the appropriate Establishment Branch engineering section.

(3) The critical review shall be accomplished by on-site reviews if considered appropriate or if time is a factor. Records of the on-site review, with comments and assigned "actions", shall be forwarded to the Airway Facilities sector, with a copy to sector field office, if appropriate, and all involved offices in the regional office.

f. Review By Others. Engineering site drawings, drawings of modifications to airport-owned buildings, electronic equipment installation drawings, and

other project drawings which will be of concern to the airport sponsor, the military, and others should be forwarded to these organizations for review and approval at the critical design review stage.

g. Disposition Of Comments.

(1) General. It is the intention of the review process to virtually eliminate the need for project changes during engineering construction, and installation phase of a project. Therefore, all requests, recommendations, and other comments made throughout the entire planning, briefing, and review process shall be resolved or incorporated on the project requirements. When Washington standard drawings are specified for a project, recommendations for changes submitted by the sectors will not be incorporated into the project unless approval for recommended changes is received from the Washington office.

(2) Changes to the F&E Project coordination and concurrence document. Items which have been resolved during the implementation phase shall not be changed during engineering design without the concurrence of the coordination team.

(3) Resolution of conflicts. Items which cannot be resolved shall be referred to the coordination team chairperson for a decision based on a consensus of the team members. Matters which cannot be resolved by team consensus shall be referred to the involved branches and the division, respectively, for a decision.

(4) Engineering change Proposal (ECP). Engineering change proposal which may have major impacts on project costs and project scheduling shall be submitted to the Environmental Section, AAL-451, or the Electronics Section, AAL-452, on AL Form 6000-10, Engineering Change Proposal. A sample form is shown at Figure 4-3.

407. PROJECT ACTIVITY REPORTING. Engineering design and project activity, will be forwarded to the Establishment Branch, AAL-450, on a report titled "F&E Weekly Project Status Report." These reports shall be submitted on a weekly basis to provide updates on F&E project activity.

408. WORK ORDERS, BID SOLICITATIONS, NEGOTIATIONS, AND CONTRACTS.

a. General. This paragraph provides a general description of how project construction and/or installation work is to be accomplished through work orders, bid solicitations, or negotiated contracts. Appropriate directives should be consulted for detailed procedures and guidance.

b. Work Orders. Most electronic equipment installation work and some environmental construction work is accomplished by work orders issued to agency F&E field personnel. The work performed by F&E field personnel is supplemented by the procurement of material and services through impress fund procedures or the use of the Standard Form 44 purchase order. General instructions for preparation of a work order are described an paragraph 405(c) herein. Instructions for the use of the SF-44 and Imprest fund are captained on Order

AL 6000., Electronic Installation Handbook, and Order AL 6000., Environmental Engineering Handbook.

c. Solicitation and Negotiation.

(1) General. When construction contract costs exceed the cost imitations of the SF-44 and the impress fund, a formal bid solicitation and/or negotiation procurement procedure must be used as required under Federal Acquisition Regulations (FARs). These procedures are outlined in DOT Order 4443.1A, Combatting Construction Inflation and Meeting Future Construction Needs. Questions regarding these procurement procedures should be referred to the Logistics Division, AAL-50.

(2) Contract Requests. Request for solicitation of construction contracts shall be submitted to AAL-55 on Form DOT F 4200.1, Procurement Request. DOT Order 4443.1, Combatting Construction Inflation and Meeting Future Construction Needs, provides instructions for the preparation of construction contract procurement requests along with a typical sample copy.

(3) Final Review of Project Work Orders, IFB's, RFQ's, or SBA Proposals. Copies of the IFB, RFQ, SBA proposals, or work orders for electronic installation or environmental construction projects shall be furnished to the Airway Facilities sector, sector field office, AAL-460, and all other involved or concerned offices at least 2 weeks prior to the date work is scheduled to begin. Copies shall include all pertinent drawings, specifications, and other significant documents. A review of these documents should reflect little need for change, if the required review and coordination process has been effective to this point. Any required changes will be promptly reported, in writing, to the Establishment Branch, AAL-450, with justification to avoid project advertisement delays, negotiation delays, or costly changes in work being accomplished under work orders issued to F&E field personnel.

409. TRANSFER OF RESPONSIBILITY. Direct responsibility for projects accomplished by regional office personnel shall be transferred from the engineering sections to the environmental construction and electronic installation units when contracts have been awarded or work orders have been issued. The Establishment Branch manager shall coordinate with, and obtain the concurrence of, the appropriate sector managers on all projects assigned to the sectors for accomplishment.

410. QUALITY CONTROL.

a. Responsibilities.

(1) The Establishment Branch Manager, AAL-450, shall implement quality control procedures and ensure that quality assurance feedback is provided for all project engineering activity.

(2) The Evaluation Staff, AAL-405, shall establish criteria for the quality control of engineering activities and provide feedback from quality assurance samplings to the establishment engineering branches.

b. Procedures.

(1) Each engineering project shall be reviewed and compared against established quality control criteria. Any deviation from agency standards or quality control criteria at any point on the project shall be corrected before proceeding to the next step of the engineering phase.

(2) Each completed engineering package shall be reviewed for compliance with project plans and scope before the start of project accomplishment. All discrepancies shall be corrected before proceeding to the accomplishment phase.

(3) The branch managers shall work with the Evaluation Staff, AAL-405, to provide quality assurance data from randomly chosen projects.

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