APPENDIX C

PLANNING, PROGRAMS AND PROJECT MANAGEMENT

APPENDIX C-1

PLANNING BRANCH SUBPLAN

1. Purpose. This subplan provides the general policy and procedures for the execution of the quality control (QC) activities in the Planning Division of the Detroit District.

2. Applicability. This plan applies to all Project Management activities within the Planning Division, at the Detroit District.

3. References

a. ER 5-1-11, Program and Project Management, dated 17 August 2001

b. ER 10-1-2, U.S. Army Corps of Engineers Division and District Offices, dated 31 October 1999

b. ER 1110-1-12, Quality Management, dated 1 June 1993

c. ER 1110-2-100, Planning Guidance Notebook, dated 15 February 1995

d. CELRDC 5-1-1, Great Lakes and Ohio River Division- Quality Management Plan, dated 10 April 2001.

4. Definitions

a. Program and Project Management Business Process (PMBP). The quality control activities defined in this subplan are part of the overall PMBP process. The PMBP process is defined in ER 5-1-11.

b. Project. Any work (project, products, services, etc) intended to produce a specific outcome or solution to a customer, problem, or need

c. Management Plan (MP). The detailed, specific plan used to manage and control the delivery of a project/product/service from inception to completion. It is applicable to all aspects of activities within the Project Management purview.

d. Project Manager (PM). The project team leader and the single-point-of-contact between the customer and USACE. The PM leads a multi-disciplined project team with responsibility for assuring that the project stays focused on the customer's needs and that all work is integrated and done in accordance with an MP. Each project shall have a single PM to ensure single point accountability for the project.

e. Principal Planner (PP). The Principal Planner is responsible for formulation of the project. This function resides in Planning Branch.

f. Principal Environmental Specialist (PES). The Principal Environmental Specialist is responsible for all environmental review, coordination, and compliance. This function resides in the Environmental Analysis Branch.

g. Project Team (PT). A team of multi-disciplined professionals assembled by the PM responsible for delivering the project within budget, time and quality expectations as defined in the MP. The PM leads the Project Team.

h. Project Review Board (PRB). As required by ER 5-1-11, the PRB consists of PMs, DDE-PM, District Commander and senior functional staff. The PRB meetings shall be held periodically to keep senior management informed of progress, resolve issues and assess performance.

i. Quality Control Plan (QCP). A QCP will be prepared for each project and product and incorporated into the MP as an attachment. A QCP outline is shown as Exhibit C-1-1.

j. Technical Coordinator (TC). The TC is the team member that oversees technical development of a product.

k. 905 (b) Project Evaluation Report. The abbreviated version of the standard Project Reconnaissance Report that provides physical, environmental, and financial justification for preparation of project feasibility reports. The requirements for this report are provided in ER 1105-2-100.

l. Project Management Plan. The Project Management Plan is prepared as a part of the Reconnaissance Phase and outlines in detail the scope, level of detail, costs, responsibilities, and schedule for the preparation of the feasibility study. The requirements for the PMP are outlined in ER 1105-2-208. The PMP is an attachment to the feasibility cost sharing agreement (see below).

m . Feasibility Cost Sharing Agreement (FCSA). The Feasibility Cost Sharing Agreement is a document that outlines the legal and financial obligations of the Corps of Engineers and a project sponsor for the preparation of the project feasibility report. This document is prepared by Planning Branch and reviewed by Office of Counsel and Real Estate Division (work in-kind). The PMP is an attachment to the FCSA and the requirements of the FCSA are provided in ER 1105-2-100.

n. Project Feasibility Report. The project feasibility study is a technical report that documents in detail the Planning, Engineering, Real Estate and Construction processes for formulating, evaluating, and recommending a water resources development project.

This report includes detailed engineering, real estate, planning, and project management work activities that are described in the PMP and cost shared with the project sponsor at a 50%-50% rate. This report includes necessary NEPA documentation in the form of an environmental assessment (EA) or environmental impact statement (EIS), and a PMP. The requirements for the project feasibility report are outlined in ER 1110-2-100.

5. District Quality Control Responsibilities

a. Objectives. The Quality Management Plan provides guidance and policy on the business processes and procedures to be used in executing all work by the Detroit District personnel, Planning, Programs and Project Management Division. It defines the programs and project management processes and imperatives, requires development of MPs for all projects and makes the PRB responsible for oversight of program/project execution. The District shall be responsible for developing and following quality control processes and these business procedures to ensure quality projects from the inception of planning through project physical and financial completion, including operation and maintenance.

b. Management Plan. An MP shall be prepared for every project. The MP can be simple or elaborate depending on the risk, complexity, and cost of the project. The PM has the lead in preparing the MP with proper input from the Project Team and/or functional chiefs, for ensuring it is prepared within 60 days of project initiation, and for updating and maintaining the accuracy and completeness of the MP. The PM is responsible for obtaining PRB approval of the initial MP and PRB approval of all subsequent changes to the MP beyond the delegated PM authorities. Approval of MPs by the District PRB shall assure conformance with ER 5-1-11. All product-specific QCPs will be made part of the MP. Approval of QCPs will be in accordance with the guidance provided in paragraph 3 of Appendix B-3 of CELRDC 5-1-1. For those projects where an A-E is used, the A-E is responsible for preparing QCP(s) for the products developed and providing a copy to the PM for inclusion into the MP. The District would review and concur with the A-E's QCP prior to inclusion into the MP. Outlines for Civil Works and Support For Others management plans are provided as Exhibits C-1-2 and C-1-3, respectively. The District may add, expand, or downscale the information and content contained in the MP depending on the scope and complexity of the project.

c. Division Chief. One responsibility of the Division Chief is to certify that the Division produces quality planning documents.

d. Branch Chief. The primary responsibility of the Branch Chief is to produce quality planning documents. Under the Quality Control/Quality Assurance (QC/QA) process, the Branch Chief is responsible for assembling the specific Independent Technical Review Team (ITRT), and for assuring that the members of those teams are trained in the QC/QA process and have the necessary expertise to conduct quality control reviews in an efficient and timely manner.

e. Environmental Branch Principal Environmental Specialist. Principal Environmental Specialists (PES) in Environmental Branch are responsible for the execution, direction and coordination of work activities to provide environmental review, compliance and coordination. The PES prepares environmental compliance documents and maintains interagency coordination. The PES directs and coordinates activities of other environmental specialists and contractors to complete required support studies including field and laboratory analysis.

f. Project Team. Upon project initiation, PM is responsible for assembling the PT consisting of multi-disciplined professionals who have the responsibility for delivering the project in accordance with the MP. The PM shall lead the PT and is the single-point-of-contact with the customer and USACE. The quality of the project is a shared responsibility between the PM, PT and District functional chiefs. The PM is responsible for the overall project quality with the PT and District functional chiefs responsible for product quality.

g. Planning ITRT Members. Planning Branch members who may serve on an ITRT for planning documents are responsible for assuring that the planning documents being reviewed are in accordance with current Corps of Engineers Water Resources Development laws, regulations, professional practice methods and policies. ITRT members are responsible for maintaining the review schedule agreed upon, providing professional, substantive comments that promote production of better products, and for facilitating resolution of ITRT comments with the functional production team.

h. Project Manager Training. The District has the responsibility to certify and train the project management staff in all aspects of the Project Management Business processes and procedures.

i. Problem Resolution. The PM is responsible for coordinating problem resolution with PT members and with functional chiefs as the situation dictates. Problems or issues not resolvable by the PM shall be submitted to the PRB for resolution action.

j. QC Indicators. Detroit District shall develop QC indicators to identify both strengths and weaknesses in its implementation of the PMBP in accordance with Appendix A of ER 5-1-11. The district may supplement this checklist as needed to achieve full compliance with the CELRD QMP. The District shall use QC indicators as follows:

(1) Self evaluation and continuous improvement including the use of customer surveys
(2) Focus on process weaknesses
(3) Focus on staff functional area weaknesses

6. Information Transfer and Lessons Learned

a. General. Information transfer and distribution of lessons learned among the various District elements is necessary to assure that past mistakes are not repeated and that new and innovative technology is captured and implemented throughout the District.

b. District Responsibilities. District PM staff is responsible for identifying lessons learned, integrating those into their District cultures and assuring that CELRD staff is made aware of valuable information that can be shared with other districts. Detroit District, Planning, Programs and Project Management staff, shall routinely identify and document significant problems that are encountered, as well as successes. Lessons learned information should be provided via stovepipes to the Division Office staff. Information transfer should be via means of standard e-mail. Basic information should include the originator of the observation, the project particulars, the applicability, the problem or successful accomplishment, and a recommended course of action. Likewise, the Detroit District should, to the extent practicable, keep abreast of activities in other districts and incorporate "good" ideas into its culture.

7. Planning-Environmental Processes Requiring Quality Control/Quality Assurance.

The following planning steps and activities are encountered during the formulation of most water resources related projects.

Initial project sponsor contact establishes the first meeting of the planning team with the project sponsor and should set the tone for all future coordination between the parties. The quality of this experience for both the project sponsor and the Corps is controlled through professional training and experience of the Corps representative and pre-meetings between the Corps representative making the contact and the Branch Chief (may include the Division Chief).

The purpose of this pre-meeting will be to outline the Corps' position in the investigation of a particular water resources problem and to establish the potential level of Corps participation in the problem identified by the project sponsor. A trip de-briefing between the Corps representative and the Branch Chief would confirm the type and extent of the problem, the project sponsor's needs and capabilities and the Corps' potential level of involvement.

The quality of the data gathered by the Corps representative at this initial contact is largely dependent upon the experience and training of the Corps' representative(s). As this information will influence further Corps action on a particular problem, the quality of the data collected at this initial meeting is critical. It is imperative that experienced Corps planning personnel, knowledgeable in a range of Corps water resources programs, takes the lead role for these initial project sponsor contact meetings.

Identification of the appropriate civil works program to address a water resources problem occurs as a result of discussions with the project sponsor and internal coordination within Planning Branch. The quality of this determination is influenced by the quality of information gathered by planning personnel on the type of problem encountered. This determination is carried through to the Congressional contacts and further discussions with the project sponsor.

Once the appropriate program is identified, the required reports and planning process are usually specified in ER 1110-2-100. One or more of the following report types may be generated as a result of this critical decision.

- Plan of Study
- Reconnaissance Reports (905(b))
- Project Management Plans
- Feasibility Cost Sharing Agreements
- Feasibility Reports
- Environmental Reconnaissance Reports
- Environmental Assessments
- Draft and Final Environmental Impact Statements
- Re-evaluation Reports
- General Design Memoranda
- Major Rehab Reports
- Section 216 Reports
- Recreation Master Plans
- Public Port Master Plans
- Post Authorization Change Reports
- Planning Assistance to States (Section 22) Reports
- Continuing Authority Program (CAP) Reports
- Cultural Resources Assessment Reports

Initial and interim Congressional contacts generally occur through personal meetings or telephone conversations between Corps personnel and Congressional staff members regarding identified water resources problems. This contact may occur prior to, during or after the initial sponsor contact described above. Subsequent to site visits and meetings with the project sponsor, follow-on Congressional contacts usually concern required project funding and authorizations. The significance of these contacts to the early success of a project and the Corps' organization signifies the need for projecting a professional attitude and capability to congressional staff. Planning staff is involved with the initial meeting in-conjunction with Program Project Management (PPM), which has the prime responsibility to market the program for the Detroit District.

The critical determination of required study funds step in the planning study process follows the identification of the problem, the initial project sponsor contact and a

determination of the applicable project program or mission type. Failure to accurately determine a study type or cost estimate can lead to significant delays in the study process and failure to produce a quality product. In many cases, the needed study funds are specified as a standard amount in the applicable program regulation (Reconnaissance Study - $100,000) or developed through the PMP process. However, in some cases such as Work For Others or Support For Others, this amount must be developed by Planning Branch without limited information and without specific regulatory direction.

The planning processes outlined in ER 1110-2-100 have been standardized through many years of water resources planning. Generally the following work activities are required to formulate and evaluate project alternatives for recommendation.

- Problems and opportunities identification
- Data collection, analysis and forecasting
- Develop planning objectives
- Alternatives formulation
- Alternatives evaluation
- Alternative comparison
- Alternative selection

This process may be shortened or occur at varying levels of detail depending upon the type of study. This process may be altered to accommodate the needs of the project sponsor for a specialized project type not addressed specifically in the ER. The Work for Others and Support For Others programs lend themselves to changes in this process for project sponsors whose planning process may be different than the Corps'.

In most cases, this planning process includes a Plan of Study for certain comprehensive studies, a 905 (b) Project Evaluation Report, the PMP, a Feasibility Cost Sharing Agreement (FCSA), the Feasibility Study itself (with appropriate NEPA documentation), follow-on Re-evaluation reports, major rehabilitation reports, and developmental master plans.

8. Quality Control/Quality Assurance Philosophy. The basic premise behind the development of quality control and quality assurance procedures for Planning Branch, is that the level of quality control and quality assurance activities needed for any project study or document production is measured according to the level of risk associated with the project and the study process itself.

By nature, long-term, multipurpose water resources development projects are risky ventures. They involve the potential expenditure of millions of taxpayer dollars for construction and long-term operation and maintenance to accomplish a purpose or to solve a problem that may be largely unknown at the time of the original study. Studies of water resources projects involve projection of data, forecasting of future conditions, and anticipation of certain future events that are determined many times without sufficient

data. Many times, only the professional skills and experience of the study team and the cooperation of the customer can produce a credible project study that can be successful.

More recently, the advent of project sponsor contributed cost sharing funds for project construction and future O&M adds an element of risk associated with a wide array of state and local government entities. The growing pressures brought to the water resources development process by special interest groups and changing social attitudes about the role of government and our care for the natural environment all add elements of risk to the planning process.

Each of these risk factors must be considered before launching into a multi-year project study that promises nothing in terms of a successful project. The process outlined in this subplan provides a methodology for addressing those risks and outlines procedures for incorporating risk management into the study process.

In conclusion, planning documents, as opposed to other documents and products created in the District, are subjected to intense scrutiny by the general public, other Federal and State agencies and special interest groups as well as Congressional interests through the NEPA process. This type of scrutiny, many times by groups totally hostile to the Corps' flood control or navigation mission, tends to overshadow any self-assessment of quality control or quality assurance that we may institute.

9. Preparation of the Quality Control Plan. Quality Control Plans (QCP) for planning reports will be prepared in two levels. The level-one QCP will address standardized reports and documents such as the 905(b) Project Reconnaissance Report, the PMP and the FCSA. Each of these documents is prepared and reviewed through strict guidelines for content and format. Since the content and format of these documents is essentially the same for each project undertaken, the QCP for these documents will be standardized with QC review by standing ITRTs for each type of document (905(b), PMP, FCSA) regardless of the project type (flood control, navigation, environmental restoration, WFO, etc.) or associated risks (1-5). Standardized checklists for these documents will be used by the standing ITRTs.

Level-two documents include the feasibility study and following detailed studies (see below) of project features. The feasibility study is developed through the preparation of the PMP (reviewed in level one above) and the QCP for the feasibility study is prepared as a part of the PMP document. Additional design feature and master plan documents are identified in the PMP and QCPs for those documents are addressed in the PMP by individual division offices. Figure C-1 portrays this division between level-one and level-two documents.

The initiation of the level one QCP begins with the identification of the customers needs and requirements in the preparation of the 905(b) report. This initial contact (see Section 7) sets the basic framework for the QCP as the project type, physical scope and extent of

Corps involvement are shaped with the customer. These factors will be tempered by constraints of program funding and authority. This early scoping process indicates the basic format of the quality control plan. Once the appropriate project type and reporting sequence are identified, the standardized work tasks are scheduled for the 905(b) study. This sequence identifies the applicable policies, laws, regulations, and basic technical criteria for use by the project team and the standing ITRTs.

a. Level-One Documents. The QCP process for level one documents is outlined below:

Each of the level one documents will be initiated in Planning Branch. Corps of Engineers regulations and guidelines strictly control the content and format of each of these documents. Although various projects will exhibit varying levels of risk, the standardization of these reports normalizes the risk level among the project types.

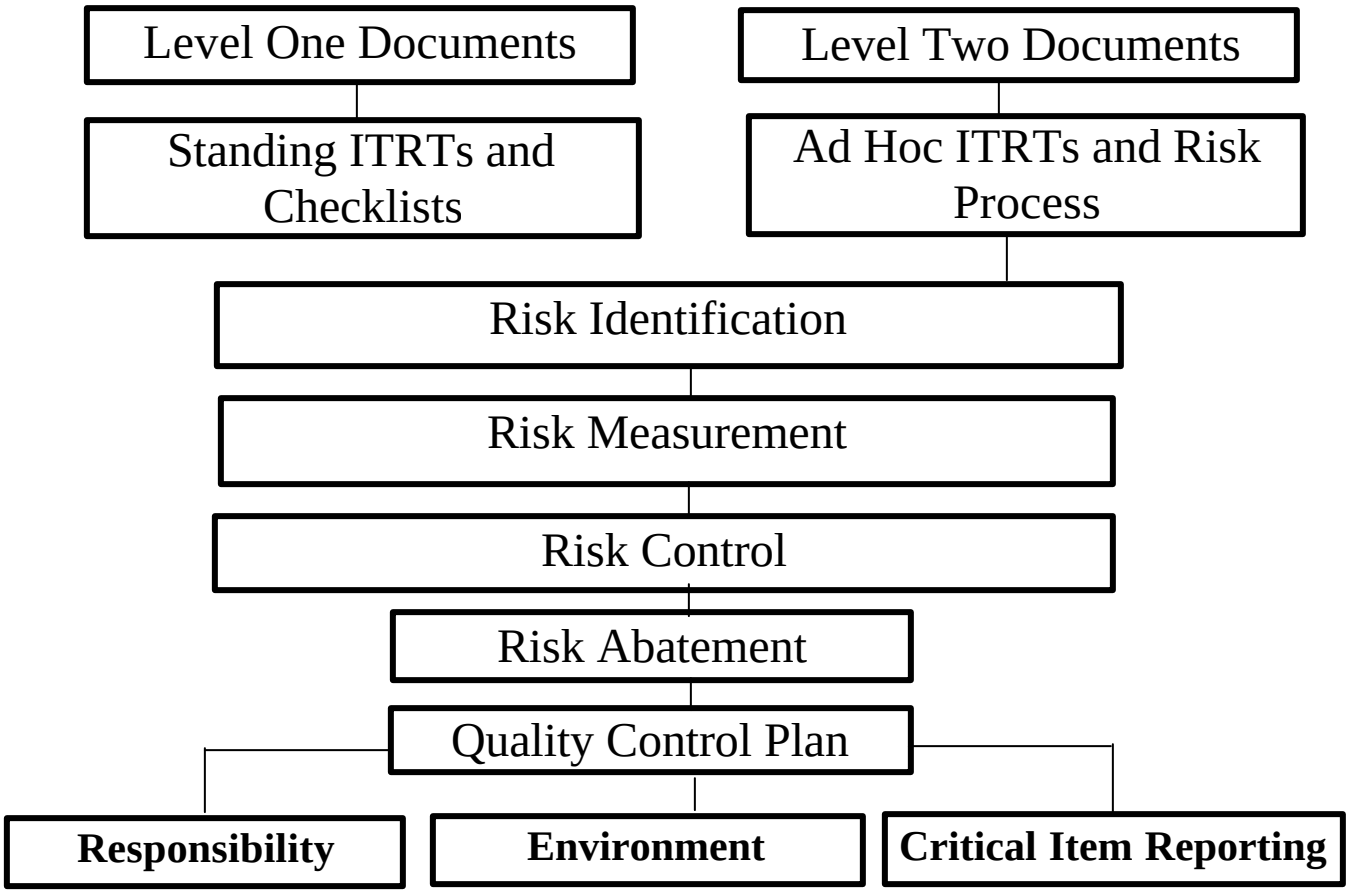

Figure C-1. *Level One and Level Two Documents*

On the onset of a study, an ITRTs composed of Planning Branch, Office of Counsel, Engineering and Real Estate personnel will be established with responsibility for the review of the document. One alternate will be appointed for each member on the ITRT. This team will be composed of individuals who have knowledge of the report/document requirements and experience in their preparation and use.

The Principal Planner – Principal Environmental Specialist will prepare a standard review checklist for level one documents that will assure conformance with the regulations. Copies of these checklists will be distributed to all ITRT members or A-E contractor, if applicable.

Review of the documents by the ITRT will be restricted to one week (7 days). The ITRT shall meet as a team to discuss the documents and to coordinate the individual team member comments on the document. Hand-marked (or electronically marked-up) copies of the draft documents will be returned to the responsible employee for correction and preparation of the final document.

Upon completion of the final document, the responsible employee shall provide to the ITRT members one copy of the corrected document (paper or electronic format) showing the resolution of the review team comments. This corrected document shall be maintained in the District files until completion or deauthorization of the project.

b. Level Two Documents. The second level of QCP for planning documents will be targeted at documents having variable levels of risk, project type, document type, and/or water resources program. Resolution of most civil works water resources development problems will fall into one or more study types (flood control, navigation, environmental restoration, etc.) and normally will be evaluated through the standard two-phase planning model of reconnaissance and feasibility level studies. These studies are regulated as to content, format and level of detail through Corps regulations. Normally this QCP will be individually developed during the Project Management Plan (PMP) preparation and is part of the PMP document. The QCP prepared at this planning stage will apply to the production of a specific feasibility report. The following steps will be taken in the development of the feasibility level QCP:

Development of the feasibility study QCP depends upon two primary features of the PMP document. The first feature is the work tasks identified to complete the feasibility study. The work tasks dictate the human and material resources needed to accomplish the work. Those resources can include combinations of the following:

- In-house labor
- Other Corps Districts
- Other Federal and State agencies
- MIPRs

- Coordination acts
- Project sponsors
- In-kind work
- Consultants
- A-E Contractors
- Technical experts
- Laboratories
- Technical support offices
- Academic staff

Each of these resources indicates a different level of quality control needed, as well as the division of both quality control and quality assurance needed for the project.

The second feature of the PMP key to the preparation of the QCP is the study schedule. The feasibility study schedule identifies each of the work tasks, the start and ending dates of each task and the duration of each task. Based on this schedule, the time and duration of necessary QC reviews of the study documents in draft and final stages could be developed for the QCP. In addition to identifying the work tasks and schedule for the feasibility study, the PMP identifies the cost of the work tasks and the administrative costs for completing and coordinating the study. Although the cost data does not directly effect the development of the QCP, the magnitude of the study cost does indicate the level of risk associated with the study effort. As shown below, that level of risk plays a key role in the development of the QCP.

The development of the QCP for all level-two documents in Planning will conform to the following process based upon identified project, technical and policy risks. Figure C-2 graphically portrays the Quality Process. The exhibits identified in the following diagrams and text are included at the end of the subplan.

The Identification of Risk Elements process identifies several key factors in the project study process that will determine the level of quality control needed to produce a quality planning product. Those factors include the following:

- Policy Elements
  - Project regulations
  - Directed legislation
  - Special interests
  - Economic policy
  - Risk climate

- Technical Elements
  - Project size
  - Project complexity

  - Project uniqueness
  - Inherent uncertainties
  - Organizational experience

- Project Elements
  - Project cost
  - Production schedule
  - Political sensitivity
  - Customer certainty
  - Review schedule

Descriptions of each of these factors are included in Exhibit C-1-4 of the subplan and the basic format of the assessment worksheet (Table C-1-4-1) is included for general use.

Each of the above factors will be assessed within ten levels to determine the critical nature of each factor to the success of the project and the study process. Although this determination is subjective in nature, guidelines for this determination have been developed which help to define the critical nature of these factors for each project situation. The summation of the numerical scores for each of the 15 factors provides an indication of the risk sensitivity of a project and the level of quality control review needed to produce a quality planning product. Examples of Table C-1-4-1 (Level of Risk Worksheet) and Table C-1-4-2 (Overall Level of Risk) are included at the end of this subplan.

There are a number of methods for controlling risk in the planning process. Those methods include the following:

- Risk Avoidance. Ignore known risks and proceed with the process or just "Run-the-risk" and let the results stand
- Risk Transfer. Let someone else (Contractor) assume the risk
- Risk Sharing. Partnering with the project sponsor thus allowing the partner to assume part of the risk
- Risk Reduction. Obtain more information or test the project elements before completion
- Risk Insurance. Insure project features and cost estimates
- Risk Agreements. Produce planning products through strict contractual arrangements
- Risk Acceptance. Incorporate contingencies into the project features and cost estimates
- Risk Containment. Incorporate risks into the project planning process and manage the risks through quality control processes.

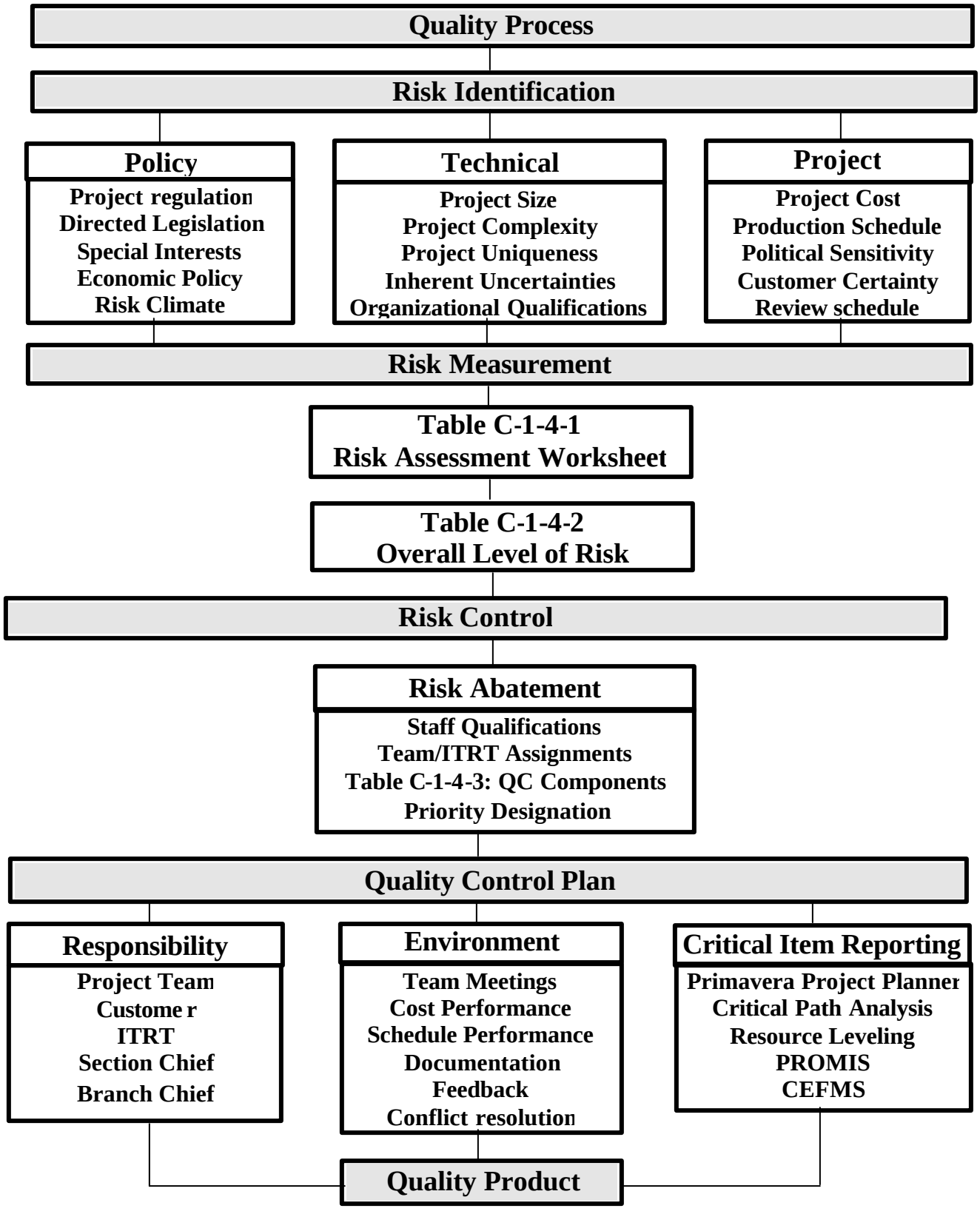

Figure C-2. *Risk Element Identification Process*

A combination of all of these methods can be used through the project development process to provide a comprehensive risk management plan, but for a planning document, this is impractical and uneconomical. The most efficient method for planning documents is to contain the risks and incorporate them into the planning process through a series of quality control procedures.

Risks can be abated by alleviating or mitigating the effects of known or unknown uncertainties by assigning or contracting with highly qualified personnel for study management and production. Generally, the higher the risk level for production of a specific project or study document, the greater the level of skill, knowledge and experience needed by the personnel if those risks are to be lessened.

Having determined the overall level of risk for a project and planning document, an appropriate principal planner and study team can be selected that best matches the level of risk indicated. This personnel selection can be more finely tailored by comparing the specific levels of risk in the three major categories (Policy, Technical, Project) to the knowledge, skills and experience of available staff. When in-house skills, knowledge and experience are lacking, potential need for contracted work is indicated.

Likewise, this process provides direction for the selection of the ITRT, as the level of risks identified in the process indicate the need for certain knowledge, skills and experience in the ITRT to review processes and documents produced.

Risk management responsibility can be best termed as who is responsible for developing and executing the QCP based upon the perceived risks. Generally, the principal planner with the functional team will produce the QCP document as they prepare the PMP. The identification of the work activities, the numbers of reviews required, the level of in-house staff involvement needed and needs for external or expert review can be determined based upon the overall level of risk identified.

The composition of the ITRT indicated by this process provides a systematic method for identifying those individuals and disciplines needed to implement Quality Control and Quality Assurance. The QCP must identify the specific individuals in the District who will bring the necessary knowledge, skills and experience to the quality control process.

In addition to identifying the personnel needed for the QC reviews, the QCP will display a comprehensive review schedule that allows for a seamless review of project components during the report preparation process and a labor cost for the review process.

For Planning to institutionalize quality control as an integral part of the planning process, planning management and the project teams will create and support a quality control environment. Key items within that environment are personnel training and reviews of project requirements, team meetings, cost performance, schedule performance, documentation, feedback, management intervention and conflict resolution.

This environment will stress cooperation, accountability, no-fault reviews, professionalism, and teamwork. Maintaining this environment will be the responsibility of planning management and the project teams.

The success of any project team or study team is based upon its ability to produce a quality product, on time and within or under the estimated budget. Within the Detroit District, there are several computerized systems and a review board that assist principal planners, functional chiefs, and administrative personnel in tracking the advance of projects and studies. Each of these systems and board provide an up-to-date look at the progress of study activities and project feature construction based upon expenditure of study or construction funds (labor and contracts) and percent of completion estimates.

The computerized systems include PROMIS (Project Management Information System), CEFMS (Corps of Engineers Financial Management System), and Primavera Project Planner. These three systems are integrated and allow principal planners, and project/study team members to determine the progress of their projects or studies with respect to the schedule and expenditure of funds. These systems also allow the teams to assess problem areas in the schedule that may affect product quality or effect the quality control or quality assurance process. (PROMIS will be replaced with Primavera (P2) in the near future)

The Project Review Board (PRB) convenes at least once each month to review the progress of each study and construction project that is reported to headquarters. The board also assists project and study teams to resolve issues that may effect product quality and customer satisfaction. The board injects a measure of product accountability to the study and project teams in terms of schedule and cost management. Critical quality control reviews and quality assurance audits identified in the project or study schedules are addressed in the PRB meetings.

10. Quality Control Plan Format. The format of the quality control plan will vary for each type of planning document prepared. However, a number of standard items will be included in each plan. Those items are listed below:

- List of study work tasks from the PMP
- List of study products (decision documents, appendices)
- Identification of in-house or contractor generated work items, and products
- Risk analysis worksheets and overall risk assessment
- Identification of the study technical team
- Identification of the ITRT members and leader
- Planning document review checklist (if applicable)
- Copy of the technical team certification signature page
- Copy of the ITRT certification signature page
- Identification of the Quality Assurance Team leader.

This document will be included with the PMP for each feasibility study initiated within Planning Branch or as a part of a cooperating district's PMP or prepared for another Federal or State agencies study. Copies of the QCP will be provided to the ITRT, study team, and the customer. As the quality control reviews occur, the review comments, responses, and comment resolutions will be added to the QCP as appendices.

11. Quality Indicators. The measurement of quality in planning documents is as difficult as determining the level of risks associated with a study or a project. In some cases, the quality of the planning study or planning document is overshadowed by the urgency of the project solution or the strength of the project's supporters or critics. The obvious failures to address one or more significant problems or project area characteristics are simple to identify through the QC process and through public review.

However, there are certain events that can occur both during and after the completion of a project study or a planning document that may indicate whether or not the document or study was a quality product. Those events can include:

- Study cost overruns
- Re-negotiation of the FCSA
- Modifications of the PMP
- Uncomplimentary policy review comments from HQ
- Distressed or dissatisfied project sponsor
- Significant project modifications during the PED phase
- Significant project construction cost overruns
- Major increases in study time schedule
- Substantial numbers of negative comments to the recommended alternative by project area residents
- Substantial numbers of negative Congressional letters
- Lack of a qualified project sponsor
- Failure to recommend a project alternative which is supported by the Administration's Water Resources Development policies
- Inability of the project sponsor to fund the recommended alternative
- EIS is referred to CEQ
- Interest group files civil suit against project
- Project recommended for implementation is unsupported by the project sponsor or the Congressional interests.

Many consider that a negative finding in the 905(b) report is an indicator of poor report quality. However, a negative finding may indicate that no feasible alternative exists to solve the problem, that project economics do not support further study, that potential environmental impacts associated with the recommended alternative do not support further studies or that the best project does not meet the project sponsor's expectations. If completed correctly, a negative finding in the 905(b) is a good result, since it defers the unwise expenditure of taxpayer dollars on an unwise feasibility study.

Each of these "negative" events can be an indicator that some element of the planning process or planning document/product was flawed or was not pursued to its fullest extent. Many times, as a result of limited time or funding constraints, all of the needed data is not collected, agency coordination is not fully accomplished, or public involvement does not reach every group or individual. In some cases, all of the required steps are followed, the planning document is a quality product and some of those events above still occur.

By measuring the presence or absence of these events both during and after the study process, an indication of product quality can be addressed. Therefore, the following quality indicators can be expressed for planning studies and planning products:

- The 905(b) and feasibility study are completed within budgeted funds.
- The 905(b) report, PMP and FCSA are completed within 12 months of funds allocation.
- The feasibility study is completed within the original schedule accounting for changes in scope or funding constraints.
- No modifications of the FCSA occur during the feasibility study.
- There are no modifications to the PMP during the feasibility study.
- The project sponsor identified during the 905(b) report proves to be fully qualified and financially capable of sharing the costs of the feasibility study.
- No major modifications to the recommended feasibility level alternative during the PED phase
- A satisfied project sponsor
- Lack of significant negative public comment on the selected alternative
- Lack of negative Congressional responses
- Feasibility study recommends an alternative which meets Administrative guidelines for water resources projects.
- Project sponsor is capable of funding the recommended alternative and executes the PCA.
- Project EIS is not referred to CEQ.
- Limited significant special interest group opposition to the recommended alternative.
- Lack of significant negative comments from HQ review.

Each of these 15 quality indicators should be carefully considered when evaluating a planning document or study result. In some cases an otherwise quality planning study and document can produce a very unpopular alternative that would be highly controversial and experience a number of negative responses. The circumstances surrounding the preparation of the study and the political and social environment in which the study is prepared are factors that may not be resolvable during the study period.

12. <u>Quality Assurance Plan Development</u>. The development of a Quality Assurance Plan is largely dependent upon the division of work between in-house labor and contracted work. Quality assurance on the in-house quality control efforts of standing

and *ad hoc* ITRTs reviewing planning products will be the responsibility of the Chief, Planning Branch.

The identification of work division will occur in both level one and level two documents. The intimate nature of level one documents, where such close coordination occurs between the Corps and the customer, will limit the amount of contracted work for the 905(b) report, the PMP and the FCSA. In some cases, work supporting the 905(b) report may be contracted out, thereby requiring quality assurance by the principal planner and the team. However, most of the work identified for completion by consultants, performed by other Corps Districts or other Federal and State agencies or the project sponsor (in-kind work) will be identified for the feasibility study in the PMP.

Once identified in the PMP and the QCP, the various needs for quality assurance audits will be coordinated with the standing and *ad hoc* ITRTs and study teams. Copies of the individual QCPs will be provided to the Quality Assurance Team leader for review prior to the initiation of the study. Quality assurance audits may occur following the completion of each study QC review or through a bi-annually scheduled Division-wide Quality Assurance Audit.

Quality Assurance audits will concentrate on the QC review process (in-house generated as well as contractor generated work tasks), the review/commenting process (in terms of effectiveness, timeliness, and professionalism), study team responses (timeliness, effectiveness, resolution) and the resolution of comments (timeliness, low-level solutions) between the study team and the ITRT. The results of the audit will be documented for the ITRT's and study team's use. The final obligation of the quality assurance team will be to certify the QC process for a particular study and to verify that quality assurance on contracted work items and products was performed by the study team as needed. This certification will be reviewed and approved by the Chief, Planning Branch.

One of the benefits of the quality assurance process is to make adjustments in the quality control plan development process and the quality control review process. As the branch's quality control environment matures, the flow of quality improvement information among the teams will increase, leading to better products and improved QC processes. To this end, the results of quality assurance audits will be distributed among the principal planner and teams throughout planning branch to facilitate improvements in the preparation of future QCPs and QC reviews and to hasten that maturation process.

EXHIBIT C-1-1

QUALITY CONTROL PLAN OUTLINE

1. **Purpose.** Brief statement of purpose for the QCP

2. Applicability. Statement regarding the applicability of the plan. (For large projects, this plan may be applicable to only the first product. Changes to the plan to accommodate additional products may be added as an addendum to the basic plan. If the project includes special investigations or studies such as sediment sampling and analysis, HTRW investigations and property audits, these products should be covered by separate abbreviated QCPs attached as addendums to the plan.)

3. References. List additional publications that define the Quality Control process for this project, form a part of the plan by reference, or contain additional quality requirements that will be followed such as the District QMP.

4. **General.** A short brief description of the product

5. Project Risks. List and describe the risks inherent to the project/product. Risk factors will determine the appropriate level of effort required for QC.

6. Technical Criteria Statement. A statement that indicates criteria, standards, codes, etc. that will be used for the formulation of the product. Do not list specific codes for each discipline but list by generic type. (For example: Project will be designed IAW Corps of Engineer criteria contained in engineering regulations, manuals, and ETLs. Corps of Engineer CEGS/CWGS guide specifications shall be used for contract P&S.)

7. **Product Delivery Team**

a. Name and discipline

b. Special instructions/responsibilities, if any, that differ from the generic descriptions in the referenced QMP

c. Name and discipline of consultants or individuals at centers of expertise that will be used as extensions of the design team

8. **Independent Technical Review Team**

a. Name and discipline

b. Special instructions/responsibilities, if any, that differ from the generic descriptions in the referenced QMP

c. Name and discipline of consultants or individuals at centers of expertise that will be used as extensions of the ITR team

9. Special Considerations. A list of any crucial project features that should be given special consideration. Reference to any District checklists that will be used for the independent review.

10. Quality Assurance. A statement indicating who is responsible for QA oversight

11. Customer Involvement. A statement defining the expected customer involvement in the project formulation and/or review. List contacts by name, if known; by office, if not known.

12. Review Schedule. List intermediate review milestones to define the level of in-progress review that will be conducted. If specific milestones cannot be identified, provide a narrative description of the degree of seamless interaction (in-progress review) that is expected to be accomplished.

(The Construction Quality Control Plan will be prepared by the Construction Contractor and will be made part of this MP. The Construction Quality Control Plan will be made up of a QA and a QC plan.)

EXHIBIT C-1-2

CIVIL WORKS MANAGEMENT PLAN OUTLINE

Sponsor/District

1. Introduction & Purpose

2. Project Quality Expectations (Jointly with sponsor, develop a common understanding and agreement)

3. Scope

4. Financing Strategy – Fed/Non-Fed requirements and funding stream (including credits)

5. Acquisition Strategy (A-E, Sponsor, In-house, Construction/Operations)

6. Schedule and Cost

7. Federal/Sponsor Management Plan Agreement

8. Attachments

   a. Project Delivery Team – Roles and Responsibilities (External and Internal)

   b. Network Analysis Schedule and Critical Assumptions

   c. Product QCPs (if applicable)

   d. Change Management (How and when changes required in scope, schedule, or cost are to be handled)

EXHIBIT C-1-3

SUPPORT FOR OTHERS MANAGEMENT PLAN OUTLINE

a. Purpose. All Support For Others (SFO) effort should have a Management Plan (MP) commensurate with the level of work requested by the customer. The MP will help assure that the level of detail is achieved and the Corps' team understands the customer's priorities. As a minimum, the MP should include:

- Abbreviated Scope of Work: The abbreviated scope-of-work should include a brief narrative of the work to be performed, associated schedule and cost estimate.

- Project Quality Expectations: A brief narrative of the customer's objective and the product to be delivered by the Corps' team.

- Quality Control Plans: A brief narrative of quality control measures, including review points (milestones), customer feedback/surveys and any other criteria established by the customer.

- Critical Assumptions: Assumptions critical to Corps' scope of work are to be documented. Examples include: Who will assure National Environmental Policy Act (NEPA) compliance? Who will acquire ROW? Is a public involvement plan required and, if so, who will develop one? How often are billings and status reports required?

- Project Schedule: The schedule for major deliverables and project completion.

- Project Cost Estimate: Work breakdown and associated cost estimate.

- Corps' Project Team: The Corps' team assigned to the project by name and field of expertise. The Corps' team may be comprised of personnel within a single district or may be a multi-district team. A construction representative should be included on all projects that will lead to construction.

- Customer Support Team: The customer's team, if known, or the primary customer POC.

- Acquisition Strategy: A brief description of how the work will be accomplished – i.e., in-house or contract; identification of contract types being considered – i.e., PRAC, TERC, IDIP, etc; and identification of contracts from other districts if applicable – i.e., Omaha District's Rapid Response Contract.

- Change Management: This section will address how and when changes required in scope, schedule or cost are to be handled.

b. Customer Survey Questionnaire. Customer feedback is an integral part of all programs. A customer questionnaire is an excellent way to obtain this feedback. A sample draft generic question is below. Either a similar generic questionnaire or a questionnaire developed in cooperation with the customer may be used.

Sample SFO Customer Survey

CUSTOMER: _____

RATING PERIOD: _____

	Unsatisfactory	Marginal	Satisfactory	N/A
1. Response to inquires/concerns.				
2. Timeliness of responses, reporting, etc.				
3. Early identification of issues.				
4. Adherence to cost & schedule.				
5. Other areas (Please identify).				

EXHIBIT C-1-4

INDEPENDENT TECHNICAL REVIEW RISK MANAGEMENT

1. Introduction. The level of detail of a quality process is highly dependent on the overall level of perceived risk involved in the project. Likewise, project success is highly dependent on how this perceived risk is managed. Therefore, the quality process begins with a detailed analysis of project risk (identification and measurement) and culminates with the formulation of a comprehensive risk control or risk management plan that addresses specific risks deemed critical. This plan is referred to as the Quality Control Plan (QCP). The project manager is responsible for initiating a quality process and ultimately incorporating the QCP into the Project Management Plan (PMP). Figure C-1-4-1, Quality Process Model, illustrates the quality process to be used when preparing a feasibility study, and is further described in this reference.

2. Risk Identification. Many classic decision making and management models begin with problem recognition and identification. Any given project, regardless of composition, is said to have three primary areas containing uncertainty or risk: policy, technical, and project. These areas of risk contain various drivers, reflected in Figure C-1-4-2, which increase or decrease the perceived overall level of uncertainty, based on relative experience and expectations. By observing a project in terms of these areas of risk and related drivers, key personnel can identify problem areas that may impede project success. In order to produce consistent and unbiased evaluations of a project's risk, clear, logical, and objective definitions for each driver are essential. These definitions, and a relationship of how each driver relates generically to the level of quality control, are established below.

a. Policy

(1) Project Regulation. Many of our projects, processes and services are highly regulated by state and federal policy, yet several are virtually unregulated. The higher the degree of regulation, the greater the requirement for QC to ensure compliance with governing regulations.

(2) Directed Legislation. Projects that are command directed or dictated through some form of legislation require a greater degree of QC emphasis than those received through non-legislative channels due to the level of interest (echelons above the District) in a particular project.

(3) Special Interest. Socially sensitive projects have the potential to damage the Corps' image and create poor public opinion or perception. Other projects involve acts that threaten life and limb or create health risks. These activities require a greater degree of QC in order to prohibit the loss of critical resources and the formation of negative perceptions.

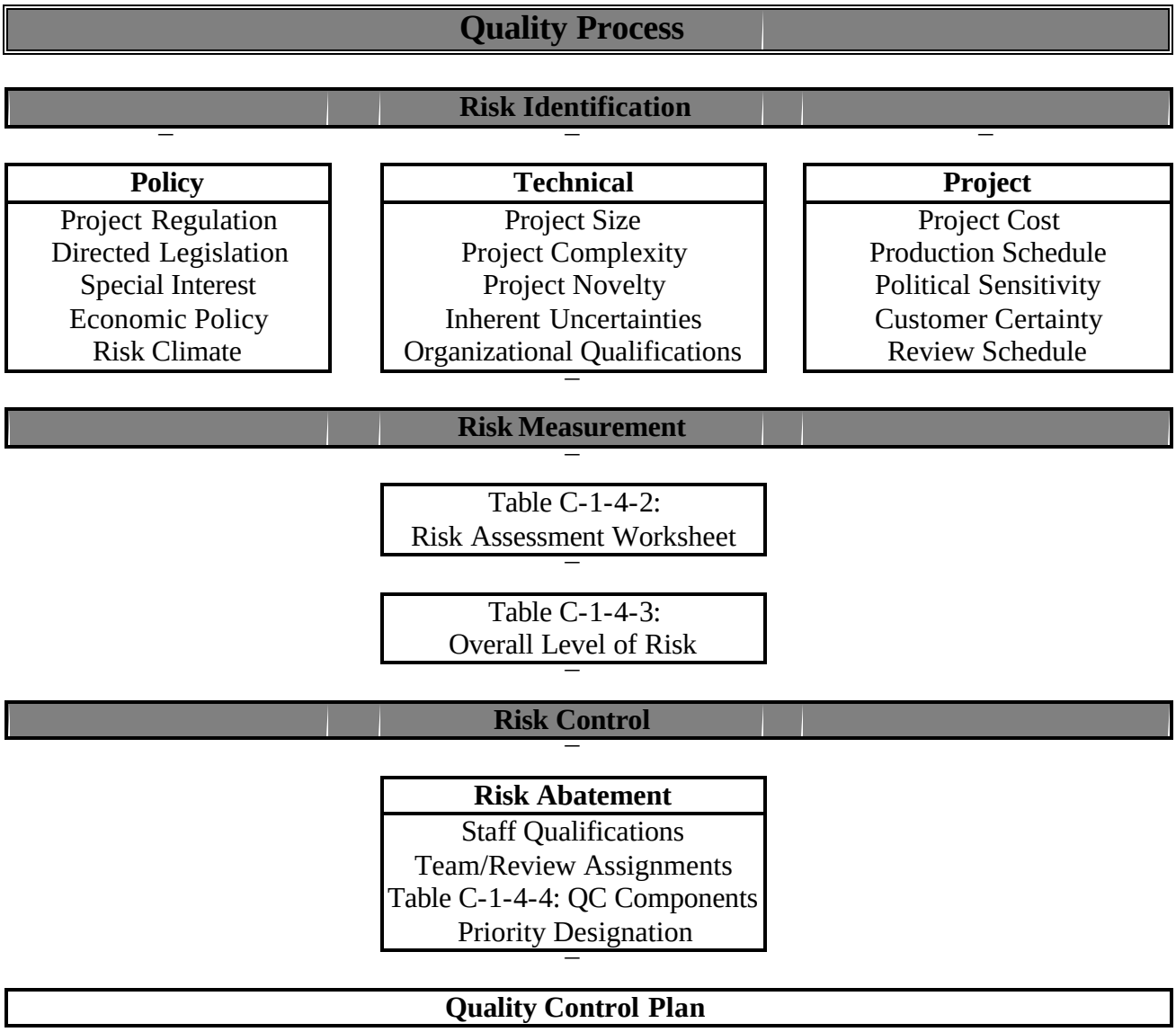

Figure C-1-4-1. *Quality Process Model*

Risk Identification		
Policy	**Technical**	**Project**
Project Regulation	Project Size	Project Cost
Directed Legislation	Project Complexity	Production Schedule
Special Interest	Project Novelty	Political Sensitivity
Economic Policy	Inherent Uncertainty	Customer Certainty
Risk Climate	Organizational Qualification	Review Schedule

Figure C-1-4-2. *Risk Identification Areas and Drivers*

(4) Economic Policy. This driver incorporates those aspects of project funding such as the time value of money, inflation, fund availability, cost sharing, contingencies, and fund sources. The higher the degree of uncertainty regarding project funding, the greater the need for QC.

(5) Risk Climate. Various leaders and stakeholders take different approaches to project risk. For those stakeholders that exude risk averse behavior (conservative, don't take chances with schedules or resources) a higher degree of QC is needed to ensure projects are on track, within constraints. Risk prone behavior (maverick, allows for a degree of risk taking and independence) requires less QC. Everyone has an acceptable level of risk or a threshold level below which risk is acceptable.

a. Technical

(1) Project Size. A large project might require more QC involvement than a small project. The risk of being wrong can have significantly greater impacts than with small projects. Large is relative, but considers the overall scope of the operation and its potential impact and consequence on the whole organization. Size can also refer to coordination requirements, the number of alternative methods, or various other measurements.

(2) Project Complexity. A more complex project requires a greater degree of QC than a less complex project. Project complexity considers technology involved, level of detail, and coordination and integration efforts of various functional elements and external agencies. Complexity can also include the degree of difficulty of the task at hand and the methods employed to accomplish the task.

(3) Project Novelty. If a project is routine, systems are probably in place to ensure quality. A novel project, however, or one that has not been attempted or has a low frequency of occurrence, requires more QC than one that is routine.

(4) Inherent Uncertainty. Many projects have inherent uncertainty in empirical quantities. These uncertainties stem from linguistic imprecision, general disagreement, statistical randomness and variability, approximation, and subjective judgment. A project with a higher degree of inherent uncertainty requires more QC than one that has known input and output variables.

(5) Organizational Qualifications. Does your project organization possess the skills, qualifications and experience needed to accomplish the mission? Are subject matter experts and consultants needed to ensure quality within the production phase? Is the expertise available in-house or out-of-house, and how does out-of-house effect your capabilities? The less qualified the organization, the greater the requirement for QC.

b. Project

(1) Project Cost. The greater the project cost, the greater the requirement for QC. Factors such as contingencies and allowances or tolerances should be considered when assessing project cost risk.

(2) Production Schedule. The less flexible a project schedule, the greater the requirement for QC. Production schedules are often impacted by weather and productivity. Productivity can be impacted by resource constraints and competing priorities. These factors should be considered when assessing schedule flexibility.

(3) Political Sensitivity. The greater the degree of political sensitivity, the greater the requirement for QC. Political agency leverage can effect project and program priorities and resources, thus there is a greater requirement for QC involvement.

(4) Customer Certainty of Goals. The less certain a customer is with regard to project goals and objectives, the greater the requirement for QC. Also, projects with multiple customers require a greater degree of QC. Thus, a project with multiple objectives and decision makers requires more QC.

(5) Review Schedule. The less flexible the project review schedule, the greater the requirement for QC. Review schedules must be commensurate with the level of project complexity, project size and other factors. QC resources must compete with project resources for time, and QC personnel often will be members of other production teams. These conflicts must be considered when identifying review schedule risk.

3. Risk Measurement. The second component of a comprehensive risk management and quality process program is risk measurement. In order to measure risk, or determine a level of overall project risk, the drivers defined above are quantified using relative numerical values, one through ten. The less risky a driver, the lower the assigned risk value, and conversely, the more risky a driver, the higher the assigned risk value.

Thus, when summed, a project with a higher total of relative values has more risk than one with a lower total. A worksheet (Table C-1-4-1) assists key personnel during the initial or conceptual stages of the feasibility study with the quantification process.

Policy

Driver	Assessment											Score
	Degree										Degree	
Project Regulation	Low	1	2	3	4	5	6	7	8	9	10	High	
Directed Legislation	Low	1	2	3	4	5	6	7	8	9	10	High	
Special Interests	Low	1	2	3	4	5	6	7	8	9	10	High	
Economic Policy	Certain	1	2	3	4	5	6	7	8	9	10	Uncertain	
Risk Climate	Low	1	2	3	4	5	6	7	8	9	10	High	
												SUB-TOTAL		

Technical

Driver	Assessment											Score
	Degree										Degree	
Project Size	Small	1	2	3	4	5	6	7	8	9	10	Large	
Project Complexity	Low	1	2	3	4	5	6	7	8	9	10	High	
Project Novelty	Routine	1	2	3	4	5	6	7	8	9	10	Novel	
Inherent Uncertainty	Low	1	2	3	4	5	6	7	8	9	10	High	
Org. Qualifications	High	1	2	3	4	5	6	7	8	9	10	Low	
												SUB-TOTAL		

Project

Driver	Assessment											Score
	Degree										Degree	
Project Cost	Low	1	2	3	4	5	6	7	8	9	10	High	
Production Schedule	Flexible	1	2	3	4	5	6	7	8	9	10	Inflexible	
Political Sensitivity	Low	1	2	3	4	5	6	7	8	9	10	High	
Customer Certainty	High	1	2	3	4	5	6	7	8	9	10	Low	
Review Schedule	Flexible	1	2	3	4	5	6	7	8	9	10	Inflexible	
												SUB-TOTAL		

TOTAL SCORE

Table C-1-4-1. *Overall Level of Risk Worksheet*

After summing the worksheet, and obtaining an overall score, Table C-1-4-2, Overall Level of Risk and QC Involvement, is used to determine a recommended level of QC involvement throughout the feasibility study process. Obtaining the overall level of risk and QC involvement, those that will be responsible for designing and executing the Quality Control Plan, or managing the overall risk, can be identified. This is the first step in controlling risk and quality in a project.

Total Score	Level
15-30	1
31-60	2
61-90	3
91-120	4
121-150	5

Table C-1-4-2. *Overall Level of Risk and QC Involvement*

4. Risk Control. The final component of the Quality Control Process and risk management program is to design a Quality Control Plan that controls the perceived risks. There are several ways to control risk or deal with the fear of risk and its consequences. Some of these techniques are to avoid the risk (run the risk, ignore risks), transfer risk (sub it out), share the risk (Partnering), reduce the risk (obtain more information), insure against the risk (insurance), guard against risk (form strict contracts), accept the risk (inflate your estimate), or contain the risk (incorporate the risk). For a feasibility study, a risk containment approach is recommended. Risk containment actions include abating the risk as much as possible, identifying risk management responsibility, instilling a strong quality control environment, and establishing a critical item reporting system. These four activities form the basis of a Quality Control Plan, and are addressed in the succeeding paragraphs.

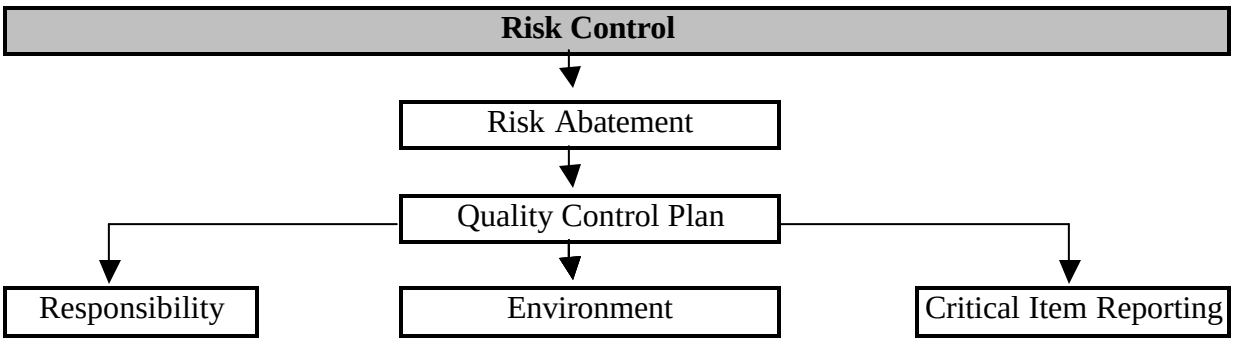

Figure C-1-4-3. *Risk and Quality Control Plan Model*

a. Risk Abatement. Risk abatement is the act of alleviating or mitigating the effects of known or unknown uncertainties through assigning or hiring highly qualified personnel to produce the study. Simply stated, an overall risk level 5 project requires study team staffing of employees with level 5 qualifications. Having completed the Overall Level of Risk Worksheet in Table C-1-4-1, and determined the feasibility study's overall level of risk from Table C-1-4-2, the assigned principal planner, can recommend to the District leadership, through the Planning Branch Chief, a level of staffing for a particular project from the project's conception. This level is tailorable based on the specific areas of increased risk as defined by the risk drivers on the Overall Level of Risk Worksheet. For example, if a particular study is perceived to contain a great deal of uncertainty with regard to technical aspects, the study team may require an experienced design engineer. A relatively new principal planner could be assigned a low policy and regulation risk feasibility study, and so on. Additionally, as information and data become clearer, adjustments to the risk worksheet can be made to justify study team staff changes, if necessary. Other important services this process provides is the clear ability to prioritize assignments, to assess employee workloads, to provide critical evaluation input, and to distribute new projects. An employee who currently is engaged on multiple level 5 projects is probably not a candidate for a new high-risk project, unless his or her work is redistributed.

By identifying and quantifying the perceived risks, and recognizing the potential for "things to go wrong," much of the uncertainty can be mitigated by putting the right people on the job. This process can also assist in forming a quality control review team, based on the same principal discussed earlier. If it can be determined when and where to use the "A" team for production, it can similarly be determined when and where to use a highly qualified quality control review team. Explained in further detail in the next section, once the overall level of risk is determined, and the study team is formed based on this value, the Quality Control Plan components can be identified using experience and Table C-1-4-3, Recommended QC Component Matrix, as a guide.

a. Risk Management Responsibility. This concept is synonymous with identifying who is responsible for developing and executing the Quality Control Plan, based on the perceived risks. Entering Table C-1-4-2 with the risk worksheet score calculated in Table C-1-4-1, an overall level of risk and QC involvement, one through five, is obtained. A project with an overall risk/QC level of involvement one is considered less risky than a project with an overall risk/QC level of involvement five. Consequently, projects with an overall risk/QC level five require a greater degree of quality control than projects with an overall risk/QC level one. This overall level of risk/QC involvement directly corresponds with a level of QC involvement obtained from Table C-1-4-3, Recommended QC Component Matrix.

This level of involvement matrix recommends components of the quality control process, or those responsible for developing and executing the Quality Control Plan. Based on a project's specific needs, a QC component package can be tailored using these, or other, recommendations. This matrix, however, allows the principal planner, to quickly assess, based on risk, what QC components to consider for the project, early in the project's development.

Level of Involvement	QC Components	QA Components
1	-Project Team -Co-Worker	-Customer -Supervisor -LRD Review
2	-Project Team -Supervisor -Team Leader -Section Chief	-Customer -Branch Chief -LRD Review -HQUSACE Review
3	-Project Team -Customer -Section/Branch Chief -Independent Review Team	-Customer -Division Chief -LRD Review -HQUSACE Review
4	-Project Team -Customer -Section/Branch Chief -Independent Review Team -Field Experts	-Customer -Division Chief -LRD Review -HQUSACE Review -District PRB -Office of Counsel
5	-Project Team -Customer -Section/Branch Chief -Independent Review Team -Field Experts -Consultants -Laboratories	-Customer -Division Chief -LRD Review -HQUSACE Review -District PRB -Office of Counsel -Public Affairs

Table C-1-4-3. *Recommended QC Component Matrix*