

11 ATTACHMENT 8-QUALITY ASSURANCE

For the “AttachmentName” in the naming convention of BMS, use “QA” for this attachment.

Demonstrate that appropriate and well-defined Quality Assurance and Quality Control (QA/QC) measures will be used in each task. The information-gained discussion and QA/QC plan in this section should be consistent and incorporated into the project work plan. QA/QC measures may include, but are not limited to the following:

- Procedural assurances, such as review processes for quality of reports, data, and lab analyses
- An existing or proposed QA/QC plan for field sampling and lab analysis of water quality that ensures high accuracy and precision
- Personnel qualifications that may include professional registrations (such as a California Professional Geologist or Professional Engineer), certifications, and experience of persons performing and overseeing work to be performed
- Standardized methodologies to be used, such as construction standards, health and safety standards, laboratory analysis, or accepted soils classifications methods
- Standardized analyses, such as statistical tests or American Society for Testing and Materials and U.S. Environmental Protection Agency analytical methodologies.
- Quality requirements of material or computational methods, such as use of specific grades of building materials or use of specific, tested, and established models (or software)
- Comparison and calibration of models with actual data to enhance accuracy of modeling results

This application includes appropriate and well-defined quality assurance and control measures. The effort will be to employ qualified professionals to address technical issues within their areas of expertise to obtain the best data and evaluation of that data possible. It is the intention of the District to use regular project team meetings as a management tool to receive updates on project progress, identify tasks that are not proceeding according to the project schedule and why they are not, identify means to address the issues delaying project tasks and document project progress, project management decisions and the status of expenditures versus the project budget.

The entire project will be evaluated through P&P’s standard Quality Control process. This project management policy defines specific requirements and expectations of project managers and other team members in the preparation of quality deliverables. In addition, supplemental tools are included to assist implementation of the expected actions. To ensure the highest quality of information is obtained, the project includes the quality assurances, including, but not limited to, the following:

11.1 General

- Periodic proposed meetings (monthly) will be conducted to verify project findings with District staff and the engineering consultant.
- Progress reports will be provided to DWR for review and comment regarding project status.
- The Final Project Report will be stamped by a Professional Engineer and Professional Geologist.
- All work will be performed under the supervision of, and reviewed accordingly by, a Professional Engineer, Professional Geologist or Certified Hydrogeologist.

11.2 Legal Issues

- The District legal counsel will review and provide comments on the specifications, bidding documents, and permit applications.

11.3 Board of Directors

- The District Board of Directors, comprised of local landowners, will be updated monthly on the project and be given the opportunity to provide comments, suggestions and criticisms.
- The public will be afforded the opportunity to comment on the project at Board meetings, which are open to the public.

11.4 Monitoring Wells

- Well construction will be performed under contract by a licensed and experienced well driller, in accordance with specifications prepared by a licensed engineer or geologist.
- Wells will be constructed by drillers with a C-57 well driller's license.
- Construction of the wells will be overseen by a Professional Engineer or Professional Geologist.
- Survey of the wells will be overseen by a Licensed Land Surveyor.
- Well construction will follow California Well Standards - Bulletin 74-90 (Supplement to Bulletin 74-81) prepared by the California Department of Water Resources.
- Well construction will follow standard well construction procedures (the specifications will be developed as part of the grant funded efforts).
- Soils will be logged by a Professional Geologist according to standard logging procedures.

- OSHA health and safety standards will be required during well construction.

11.5 Technical Review

- All work performed on the study will be reviewed by senior staff before submission to DWR.
- Review comments on a Draft Report, and possibly some interim submittals, will be solicited, and incorporated when merited, from the DWR, the general public, and other pertinent agencies.

11.6 Project Team

Principal staff working on the project have the qualifications and skills to successfully complete the work. All of the team members have experience with groundwater projects in the Pixley Irrigation District. A brief description of the major project team members follows:

11.6.1 Pixley Irrigation District

Dan Vink – *Project Director*

Dan Vink has been the General Manager of the Pixley Irrigation District since 1995. His duties focus on carrying out the direction of and policy adopted by the District's Board of Directors, including managing District staff, consultants, and grant programs. Mr. Vink manages both Pixley ID and also Lower Tule River ID and the staff for both districts. He is also Board President of the California Farm Water Coalition.

11.6.2 Provost & Pritchard Consulting Group – Monitoring Wells

Herb Simmons, PE – *Project Manager and Lead Engineer*

Herb Simmons is a groundwater and water resources engineer with over 25 years of experience. Mr. Simmons obtained a Bachelor of Science degree in Environmental Resources Engineering from Humboldt State University, and a Master of Science in Civil Engineering at California State University, Fresno. A registered civil engineer in California (#47854), his professional background includes water well design and construction oversight, hydrogeological studies, groundwater and surface water investigations, groundwater management and recharge, planning, design and construction oversight of water distribution systems, water district engineering, floodwater studies and control. His responsibilities include project planning and management, funding acquisition, design and administration of water distribution

system improvements, preparation of irrigation/water district groundwater management plans, and preparation of environmental documents.

Linda Sloan, PG, CHG - Field Geologist

Ms. Sloan has over 10 years experience as a geologist with considerable time spent in the field. She has worked on numerous groundwater projects involving subsurface investigations, monitoring wells, and production wells. She also has extensive experience with groundwater level and groundwater quality monitoring, reporting, and data assessment. Ms. Sloan oversaw the construction of monitoring wells in the neighboring James Irrigation District and is familiar with the local geology. Ms. Sloan has a BS and MS in Geology, and is a Professional Geologist (No. 8299) and Certified Hydrogeologist (No. 930) in California.

11.6.3 AMEC – Numeric Modeling

David Bean, PG, CHG, will be the Principal in Charge and lead modeler for the project. He will assure that the necessary AMEC resources are provided to complete this project in a timely and cost effective manner. Mr. Bean has 28 years of experience evaluating groundwater resources on a local, regional, and basin scale throughout California and North America. He has utilized field data to develop conceptual hydrogeologic models, prepared detailed water budgets, and estimated yields of wells and aquifers. Many of the studies used analytical and numerical 3-dimensional groundwater flow and contaminant transport models (GWFLOW, MODFLOW, MT3DMS, etc.) to evaluate the fate and transport of chemicals in groundwater. He has also used particle tracking models (MODPATH, Path3D) to optimize the zone-of-capture of remediation wells and evaluate the influence of extraction wells, municipal well fields, and agricultural supply wells on the migration of contaminants in groundwater. Mr. Bean has experience in aquifer testing and data analysis, database design and management, statistical data analysis, report preparation, and regulatory agency interaction.

Philip Ross, PG, will be the Technical Reviewer for the project. He will assure that the project is conducted in a technically sound and defensible manner. Mr. Ross has served in senior technical and management capacities on a multitude of groundwater and surface water projects. His 37 years of professional experience provide substantial expertise in surface and groundwater hydrology, water resources evaluation and development, groundwater modeling, hydrogeochemical evaluation, waste discharge permitting, and groundwater monitoring system design and installation. His duties have included project management, client consultation, regulatory agency interaction, report

preparation, supervision of drilling, well installation, groundwater sampling, aquifer testing, surface water measurement and sampling, and data interpretation.

Gary Kramer, PG, will be the assistant modeler for the project. Mr. Kramer has more than 20 years of experience in engineering projects that involve soil and groundwater assessment and remediation and the characterization and development of groundwater resources. He has conducted investigation and remediation projects in California, Nevada, and Utah. He has coordinated investigative site activities that involved drilling soil borings; monitoring well installation, development, and sampling; statistical analysis; and geophysical investigations. Mr. Kramer is experienced in soil logging, hydrogeology, evaluation of groundwater geochemistry, and statistical analysis of groundwater data.

Diana Babshoff will provide geographic information systems (GIS) and database services for the project. Ms. Babshoff's experience includes creating maps, figures, and visualizations for geotechnical and environmental projects. She has successfully applied her GIS knowledge to the production of deliverables for projects including environmental sampling and water resources using ESRI's ArcView GIS. Her GIS experience includes: data acquisition, georeferencing of maps and images, projections, data queries, and data posting. She most recently has added computer aided drafting (CAD) to her work experience, applying CAD knowledge to the production of environmental engineering drawings. Her database skills include: data entry, query development, data import/export, data formatting and data quality assurance/quality control using Microsoft Access. She has 7 years of experience in data compilation and management, project administration, and reporting for projects involving surface water, groundwater, and geotechnical data.

Provost & Pritchard Consulting Group

Policy:	Quality Control
Effective:	August 15, 2008
Applies To:	All employees
Approved By/Date:	Dale Melville (signature on file)

Purpose:

To maintain Provost & Pritchard's vision to be the PREMIER regional engineering firm in Central California. The word "premier" evokes "the best." Our vision is not to be the largest or the quickest; our vision is to be Premier. We have the vision to be Premier in the eyes of clients, reviewing and regulatory entities, the engineering community and ourselves. Our process and products must reflect this vision.

Provost & Pritchard's core values include Quality, Teamwork, and Accountability. As with most values or concepts, specific actions are required of each and every one of us if we are to live out these values. We have an obligation to provide ourselves with clear expectations of these actions and behaviors and the tools to carry them out.

Policy:

This document and its companion Project Management Policy serve to remind us why careful project management and quality control are critical to achievement of our vision. This document defines specific requirements and expectations of project managers and other team members in the preparation of quality deliverables, whether those are plans, reports, maps, or surveys. In addition, supplemental tools are included to assist implementation of the expected actions.

Some individual preferences may not square with the items identified herein. There may be some perception of "lost" freedom. However, our obligations to our clients, our staff and our corporate image compel implementation of these measures. This will be an evolving process, with feedback requested from all those affected.

This document consists of an introduction including the reasons to implement quality control requirements, an outline of company-wide quality control requirements, and attachments to assist project managers and divisions with implementation. We expect the procedures outlined herein to be followed throughout the firm.

Procedures:

I. Quality Control Philosophy

This policy sets forth the Company's views on quality control, and the general expectations for each member of the project team. The successful implementation of a quality control process is the responsibility of all team members. The process may vary slightly for each Division depending on type of work performed. It is the responsibility of each PPM-Q to further define how the

quality control process will be carried out in a manner that is appropriate for the various disciplines that we practice, in a manner that is consistent with the remainder of the company.

II. Quality Control Benefits

Any new policy adopted by the Company should come with benefits, or we shouldn't adopt the policy. This Quality Control Policy is no exception, and the benefits are many. Some of the more important benefits include:

- Maintain Core Values at P&P – Quality, Teamwork, and Accountability.
- Assure Project Success – the right product on schedule and within budget
- Assure Client Success – Improve our project understanding
- Reduce Corporate Liability – reduce claims for error or omission
- Maintain Corporate Reputation – we want to be known as “Premier”
- Provide Consistency – a Corporate Image; a standardized approach
- Enhance Efficiency – reduce “reinventing the wheel”
- Improve Profitability – “Growing the Pie”
- Fulfill Training Responsibilities – Developing each other's potential
- Increase Employee Job Satisfaction – our goal is that everyone is involved in putting out the best possible product

If guidelines and expectations are not defined: (1) any success or failure of the project most likely will be by accident, (2) the Company will fail in its obligation to train staff to manage projects consistently across divisions and locations, (3) products provided by Provost & Pritchard will not be consistent and may not be appropriate, (4) the Company will fail to train staff to generate quality products, and (5) project managers would have a de facto excuse to not perform expected tasks or apply basic quality control measures.

To aid managers and staff in their jobs, P&P has developed checklists, and guidelines, to implement many of these items.

Checklists and Guidelines Attached to this Policy:

1. Matrix for Feasibility Study Report Review
2. Matrix for Technical Review
3. Product Review Checklist for Studies and Reports
4. Product Review Checklist for Design Projects
5. Cover Sheet Checklist
6. Detail Sheet Checklist
7. Grading and Drainage Plan Checklist
8. Layout Sheet Checklist
9. Plan/Profile Checklist
10. Work Flow Diagrams for report and design projects

There are now many other examples of work plans, and other tools that may be used in the process. The examples are accessed through the Dashboard.

III. Project Quality Control Process Requirements

Submitting deliverables to meet a deadline without internal review is not acceptable. All members of the team are empowered to hold each other accountable for maintaining high standards through quality control processes and effective project management.

Design and report writing (“creating” the work product) and production processes each need quality control, and the distinction between the two must be understood by all. Design includes setting the project scope, decisions about materials, sizes, slopes, capacities and similar subjects. Production includes the illustration of the design in accordance with Company and agency drafting requirements, keyboarding (typing), producing graphics and reproduction. Many times, the same staff will be involved in both the design and production portions of a project, and the tasks may overlap significantly. Both the design and production aspects of the project must be subject to quality control.

Matrices for Technical Review of Design Projects and for Feasibility Study Report Review have been prepared. The matrices identify the stages of the project, items to be considered, responsible parties, and participants in the process.

Specifics of Quality Control include:

- A. Proper Pre-Project Work by the Project Manager (PM), Project Engineer (PE), CAD Manager (CADM), Survey Manager (SM), and outside agencies and consultants.
- B. Proper project communication among managers and the project team.
- C. Utilization of P&P standard forms and templates (available on the network).
- D. Appropriate review of the project and work product with a designated Product Reviewer (PR). At a minimum, reviews should be held at the following points:
 1. Project Kick-Off Meeting, to assure that all team members understand the project, design requirements, work product, schedules, and budgets. Reports, memos, and correspondence shall be in P&P standard form using the templates available on the network.
 2. Prior to the initiation of studies or reports, the Product Reviewer and an appropriate administrative staff member should be consulted to assist with selecting the appropriate report setup for the new document or the most applicable recent example. In addition, studies and reports should begin with a detailed outline, Table of Contents, list of likely tables and figures, list of available data sources and list of methods for evaluation.
 3. Concept plan “cartoon set” review on design projects for discussion with project team, client, and reviewing agency. This set should contain only enough detail to evaluate design concept and illustrate the basic information needed in the deliverables. The extent of this

set will vary greatly with the complexity of the project. For simple site designs, it may be a single sheet showing a drainage concept and schematic routing of project utilities. For a community development, it will need to be a larger set, adequate to evaluate the interplay of the grading, roads, utilities, drainage, and other improvements. Review shall include validity of the design assumptions and methods, connections to surrounding infrastructures of all kinds, implementation of design standards, and the satisfaction of the owner and reviewing agency. This may take multiple meetings and revisions of the concept plan set to reach agreement. The PM should confirm any meetings and the various agreements in writing for the client and the reviewing agency, and put a copy of the approved concept plans in the project folder along with the confirming correspondence. This will help to reduce confusion later in the project and provide justifying documentation if change orders are needed.

4. The design plan set, study or report begins with approved criteria and calculation review, team organization, and verification of compliance with agency and client direction. Peer review by the PR for purposes of checking criteria, calculations, and product requirements is initiated at this stage. (Emphasize in 2008)
5. A Basis of Design should be prepared and signed prior to submittal of deliverables. This may include any requirements of client or agency signoff (dependent upon project). The Basis of Design requires a wet stamp by the Engineer in Responsible Charge prior to expenditure of 30% of the budget. Project conditions of approval shall be included in the report. (Emphasize in 2008)
6. Internal review of the first plan or report submittal (prior to client or agency submittal) is required to assure compliance with work product requirements and design concept. It will not be acceptable to deliver a just-completed job to an agency or client without internal review.
 - a) Materials provided the PR shall include project scope, criteria, signed calculations, the Basis of Design and contract specific deliverables.
 - b) For studies and reports, review shall include both a technical and grammatical/formatting review of the document. The technical review would include validating report assumptions, spot checking calculations and estimates, and determining if the report and analyses provide answers to the questions posed.
 - c) The PM shall allow for this review in the schedule and budget.
 - d) Completed agency checklists should be included in the review. The PR shall sign and date the review and indicate the completion of tasks on the Project Status Report.

Comments from the PR shall always be incorporated or discussed to a conclusion acceptable to both the designer and reviewer. Under no circumstances may the PM simply choose to disregard comments from internal reviewers. If differences cannot be resolved, the PPM-Q or VP shall be consulted. The PM will have to exercise their own judgment when it comes to incorporating comments from external reviewers; there are times when doing so may not be in the interest of the client or the project.

IV. Other Quality Control Principles and Tips

Other quality control steps during project progress will include other members of the project team. The principle is that Quality is a key responsibility of the entire team. Nothing in this policy should be construed to mean that quality is solely the responsibility of the Product Reviewer or PPM-Q.”

- A. As the project team works on production drawings, the technical staff (PE, EIT, CAD technicians, administrative personnel) shall cross-check one-another’s work to help reduce the incidence of “typographical” and “mistake” errors. Once this phase begins, the design concept should be solid and the chance for major errors or change of direction is limited. Relying on the reviewing agency or client to catch errors is not acceptable.
- B. Standard specification templates shall be employed to the greatest extent practical on each project, while still meeting client and reviewing agency requirements.
- C. CAD and GIS Requirements:
 - 1. Complete the CAD Project Set-up Form, and GIS Project Checklist if applicable.
 - 2. Follow-up with CAD Manager and GIS staff to verify that the project was set-up per original intent. (Base maps are in; file structure, initial sheet set-up.)
 - 3. Follow-up with CAD Manager when first sheet is completed to check that project objectives are being met (prior to 30%).
- D. Plan checks by the team shall utilize the standard P&P checklist of what to include in typical plan sheets or reports (examples attached). If the reviewing agency has its own checklist, it shall be utilized in addition to the P&P list, and conflicting requirements shall be decided in favor of the agency list.
- E. When consultants are part of the project team, the PM or his designee shall review the consultant’s work for general conformance with the project requirements, recognizing that in most cases the reason we are employing a consultant is because our staff does not have expertise in the consultant’s field. However, overall project responsibility remains with the Company, and it is the responsibility of the PM to satisfy himself that the consultant’s work fits as an appropriate part of the overall project deliverables. Any questions should be directed back to the consultant, with changes required as needed until that outcome is achieved.

- F. Constructability Review is encouraged for all design projects leading to construction. Projects involving unique structures, deep excavations, or other unusual work shall be subject to a Constructability Review prior to the first agency submittal. This will be a review of the plans by the PR, survey staff, or other experienced construction reviewer, with the goal of identifying difficult or unusual construction demanded by the plans, and identifying simpler or less expensive solutions if appropriate. The need for a Constructability Review shall be discussed at the Project Kick-Off meeting, but the PM is free to add the requirement later in the project should it become desirable.
 - G. Survey review must assure that the project can be staked. Plans with an automated grade-setting function will reduce redundant data entry and potential errors. Plan sets are to be reviewed by the Survey Manager prior to finalization to assure adequate staking information and control is provided.
 - H. The title block of plans, shall when practical, be used to document specific reviews (dates, names, etc).
- V. Implementation Process and Expectations
- Expectations for PPM-Qs in communicating and implementing this policy include:
- A. Hold monthly or bi-monthly quality forums with Division staff.
 - B. Hold more frequent discussions (weekly to monthly) with Division team leaders (Resource Group Leaders and Project Managers) to ensure the proper implementation and continuation of the Company's quality control philosophy and the Division's specific process.
 - C. Meet monthly with the Vice-President to review initial quality control implementation methods, to ensure the managed implementation of this policy for quality control.
 - D. Develop a process for managing and monitoring successful implementation and ongoing compliance, in the form of key project milestone tracking for project management on all projects.