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How a Small Agency Manages a Mega Pipeline Project – A Success Story

John R. Hollenbeck, P.E. and Thomas C. Trott, P.E.

ABSTRACT

Infrastructure projects designed to meet the growing demands of a water district do not need to be limited in size just because a small public agency manages the district. Case history of the Nacimiento Water Project proves this point.

The Nacimiento Water Project (Project) consists of a sloping multi-port intake facility and pump station, two intermediate pump stations, three storage tanks, control center, and approximately 45 miles of transmission pipeline ranging in diameter from 36-inches to 12-inches, with the goal of delivering 15,750 acre-feet of raw water to communities spread across the county. The $176-million Project is owned, managed, and will be operated by the San Luis Obispo County Flood Control and Water Conservation District (District) located within the central coast of California, and is staffed full-time by only two county employees. Despite limited management resources, the District has produced a pipeline project that will successfully meet the growing water demands of San Luis Obispo County.

This paper discusses the District's undertaking of the Project. Specifically addressed is how the District made this regional Project successful by overcoming existing political obstacles and mending community relationships, recognizing its limitations as a small agency, establishing strategies and setting goals, staffing the Project with an "army" of consultants, attending to the details of design through pipeline optimization and value engineering, and positioning the Project for successful bidding and bond financing.

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Project Background

Nacimiento Reservoir

Nacimiento Reservoir is located entirely within San Luis Obispo County, California (County), just south of the Monterey County border. It was built by Monterey County Flood Control and Water Conservation District (now Monterey County Water Resources Agency) in 1957 for the purposes of abating seawater intrusion in the groundwater aquifers of the Salinas River Valley. The reservoir has a storage capacity of 377,900 acre-feet and is owned and operated by Monterey County Water Resources Agency.

District's Water Rights

In 1959, the District entered into an agreement with Monterey County Flood Control and Water Conservation District to secure rights to 17,500 acre-feet of water per year from Nacimiento Reservoir. At the time of this agreement, the District was merely planning for future water demands and had no feasible means of accessing or distributing this entitlement. The District contemplated and proposed means and methods of utilizing this water entitlement at various times over the following 40 years, but none came to fruition. The County experienced a severe drought in the late 1980's and early 1990's which significantly stressed the primary water supply (mainly groundwater) for both municipalities and agricultural businesses. The District began another series of studies in the mid-1990's to distribute Nacimiento water within the County as a supplemental water supply. This time, the participating water agencies realized the time had come for Nacimiento water to be the next affordable water resource within their water portfolio.

Nacimiento Water Project

The District's Board of Supervisors approved the Final Environmental Impact Report for the Project in January 2004. This approval directed District staff to move forward with executing agreements with local agencies, permitting, designing, financing, constructing and operating the Project.

The Project is a raw water transmission facility created to deliver 15,750 acre-feet of water per year from Nacimiento Reservoir to various communities within the County. The rest of the District's entitlement (1,750 acre-feet) is left in the Reservoir for lakeside use. The Project generally consists of a multi-port intake structure, three pump stations, three storage tanks, 45 miles of pipeline, four turnouts, a control center, and a Supervisory Control and Data Acquisition (SCADA) and Project control system. Its

estimated cost is $176-million, including design, construction, construction management, environmental permitting, and right-of-way. Four initial participants – City of Paso Robles, Templeton Community Services District, Atascadero Mutual Water Company, and City of San Luis Obispo – executed an agreement with the District to fund the design phase of the Project in August 2005, and a fifth new participant, San Luis Obispo County Service Area 10-A, entered into an agreement in October 2006. All agencies are collectively referred to as Participants.

Measures of Success

Project success is measured by the District's ability to attain and maintain the financial support of communities within the County. Without such support, the Project could not exist. In fact, lack of community financial support is the main reason the Project took nearly a half-century to officially commence. If the District could not present and maintain a financially viable Project to the Participants, the Project would not be built, just as it had not been built in the past. The District had to focus its resources on managing the Project's budget to attain success; thus, the District's priority became the details of the Project's design and bidding phases.

Water Delivery Entitlement Contracts and Opt-Out Period

At the onset of the Project, the District presented the Project to various communities in the County. Most communities evaluated the Project seriously, since the District's Nacimiento water rights had become the next feasible water resource for the County; however, all communities had concerns with the Project's preliminary estimated cost of $150-million. Interested communities wanted assurance that the Project's cost estimate was accurate and that they were not binding themselves to an open-ended budget. As a result, an opt-out period was placed in the Participants water delivery entitlement contracts, which gave participants the option of backing out of their contract within 30 days after 50 percent of the estimated construction value of the Project had been bid. In other words, if contractor bids came in too high, the Participants had the option to back out of their commitment to participate in the Project. This strategy provided a level of comfort to the Participants who executed water entitlement contracts with the District. Any Participant who chose to opt-out would forfeit their initial investment during the design phase. The design phase budget was $18.9-million and included environmental permitting, right-of-way, design, initial construction management review, and District administration.

Threshold of Financial Pain

With the opt-out period in place and a preliminary budget of $150-million, the District's first Project objective was to find out the limits of the Participants' "threshold of financial pain" (see Figure 1). In other words, the District understood the

Figure 1. Threshold of Financial Pain

challenge that a project of this magnitude could be designed, permitted, managed, and completed within a budget of $150-million and needed to know the upper Project cost limit that the Participants would allow before they would decide to opt-out of their water delivery entitlement contracts.

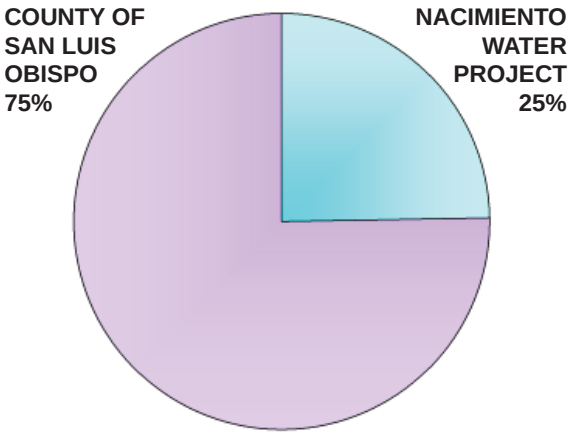
Discussion with the Participants led to a vague conclusion of an upper Project cost limit of $200-million. As long as the District could keep Project costs below $200-million, or within the "threshold of financial pain," the District believed that none of the Participants would opt-out and the Project would move forward to construction. The success of the Project hinged on the District's ability to manage the Project's budget within this threshold of financial pain.

Preliminary Project Planning

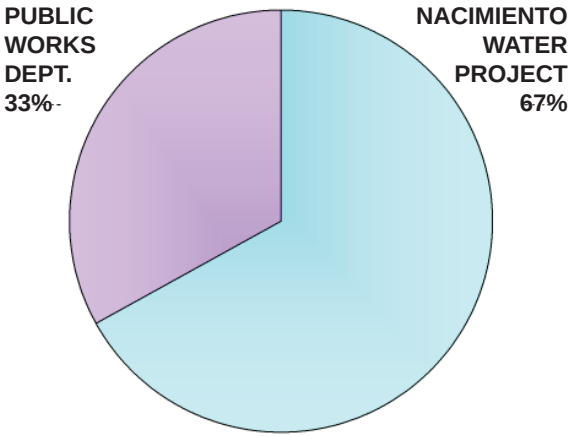
Recognizing the Limitations of the District

The District is a pseudo government organization created by California State legislation in 1945. It is governed by the same County Board of Supervisors acting on behalf of the District and supported by the County's Public Works Department (Public Works). Full-time staff members do not exist at the District. Staff support for the District comes from Public Works' engineering and accounting divisions and from the County Counsel office. Public Works is not staffed to support such a large one-time endeavor such as this Project. The magnitude of Project cost alone is nearly six times greater than any past District project and nearly five times greater than any past County project.

Figure 2 illustrates the financial magnitude of the Project (design and construction phases) compared to the annual internal budgets of the County. The Project makes up 25 percent of the entire annual County budget, including budgets for departments such as public works, sheriff, assessor, public health, regional transit, schools, courts and others. It makes up 67 percent of the annual Public Works budget, including budgets for divisions such as transportation, maintenance, design, utilities, development services, and others. Since the District manages the Project, the financial magnitude of the Project is most accurately conveyed as 85 percent of the District's entire annual budget. Public works realized early-on that the mega Project would have to be staffed and managed differently than



ANNUAL COUNTY BUDGET PERCENTAGE



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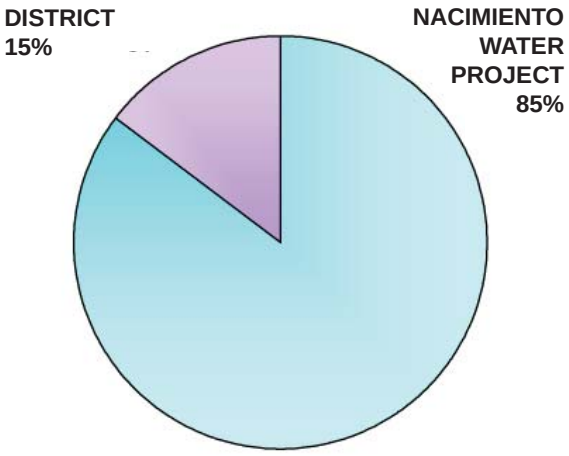

ANNUAL DISTRICT BUDGET PERCENTAGE

Figure 2.
Project's Internal Financial Comparison

their other capital improvement projects.

Organization

Figure 3 illustrates the Project's organization and more detailed discussion of each component follows.

Nacimiento Project Commission. The first step in setting up a successful project organization structure is to establish a governing body that will guide the development of the project. District projects are normally governed by its Board of Supervisors; however, in order to maintain the comfort level of the Participants throughout the Project and to minimize the chances of opt-out, the District established a governing body that represented both the District and the Participants – the Nacimiento Water Commission (Commission). The Commission's membership consists of one commissioner representing each of the four initial Participants and a member from the District's Board of Supervisors. Duties of the Commission include review and approval of all substantive matters pertaining to construction and operation of the Project, including the annual budget. Any action required by the District's Board of Supervisors was first presented to the Commission for their support.

Nacimiento Project Manager. As Public Works began to strategize about establishing a successful Project organization structure, it immediately recognized the need for an experienced, full-time project manager that could effectively guide the Project into

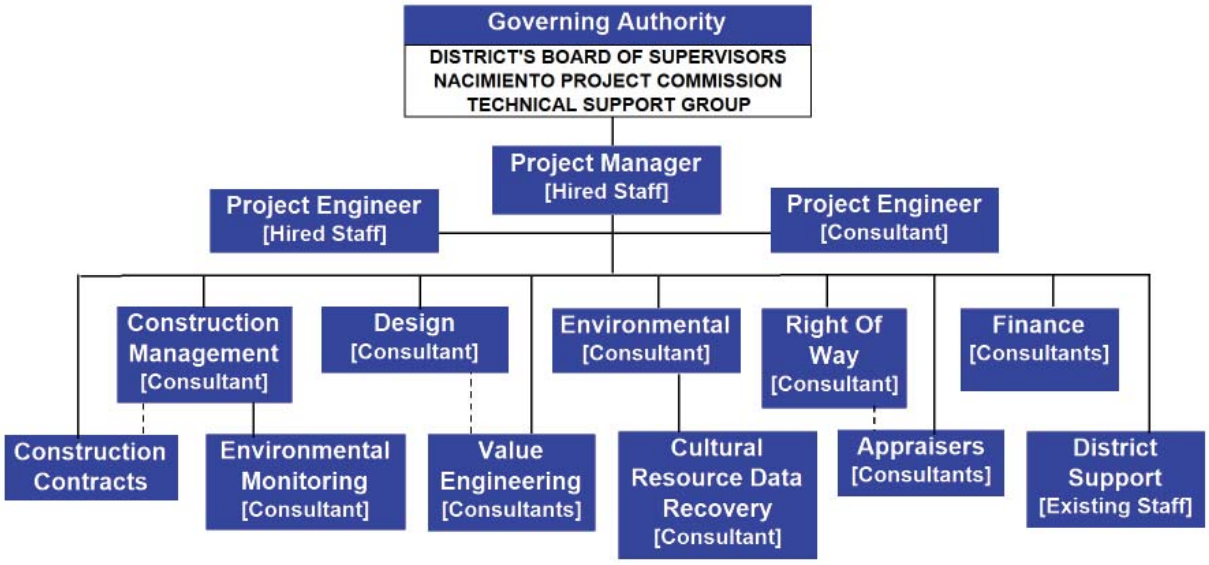

Figure 3. Project Organization Chart

completion while maintaining control of the budget. Public Works recommended to the Commission and the District's Board of Supervisors that the project manager be a contract employee position to assure that the duties being performed would not encounter conflicts with other clients or projects, which can occur when consulting forces are utilized to manage projects. The District, through an ordinance, added the Nacimiento Project Manager to the unclassified civil service system. The District advertised the position seeking an experienced registered civil engineer, or closely related field, and hired the project manager in April 2005. The successful candidate had 20-years experience leading design and managing hydraulic structure projects, and significant experience writing reports and making verbal presentations.

Technical Support Group. Led by the Nacimiento Project Manager, this Project established a Technical Support Group (TSG) that met monthly to review technical Project issues and to propose and prepare policy matters to be presented to the Commission. The TSG was supplemented by senior members of the engineering design team and a hired consultant serving as project engineer. The TSG provided valuable input to decisions made throughout the Project, and served as a link between the District and Commission.

Army of Consultants. The management and leadership structure was completed with the hiring of the Nacimiento Project Manager, and the next step was to assemble the remaining organization, informally known as the "army of consultants." The professional services needed to complete the organization is all available within Public Works;

however, as can be seen in Figure 2, this single Project accounts for 67-percent of the Public Works entire annual budget. Public Works staff are essentially fully allocated to their normal duties and could only provide part-time support; therefore, a team of consultants were hired to provide the following services:

- Management – Project Engineer (half-time) and student interns (part-time)
- Financial Services
- Right-of-Way Acquisition
- Right-of-Way Support (legal, appraisals)
- Engineering
- Environmental Permitting and Compliance
- Construction Management

Consultants working close with the District leadership are an efficient and effective extension of the District's limited staff.

Design Phase

Budget Management through Smart Design

Pipe Downsizing. Throughout the design phase, the District continually evaluated the Project's design in search of ways to save cost and avoid Participant opt-out. As a result, the District discovered ideas that may not have been identified otherwise. One example of this is pipe downsizing. The original Project design contemplated delivery of all reserve capacity (water not yet entitled to any Participant) to the south end of the 45-mile pipeline. Research revealed that there was a much higher probability that a large portion of the reserve capacity would be distributed to communities along the northern stretches of the pipeline. This knowledge initiated the redesign of the Project so that pipe diameter decreased as it proceeded south, saving the Project an estimated $9-million.

Value Engineering. The District assembled a value engineering team to evaluate the Project's design with the purpose of identifying design changes that could save the Project money. The team consisted of engineers, hand-picked by the Nacimimiento Project Manager, possessing experience in hydraulic projects similar to the Project. In order to discover and implement cost-saving design ideas without adding significant cost and time to the design, the District decided that the value engineering team would best serve its purpose at the 30 percent design submittal. The District also instructed its design team to prepare a preliminary design report to communicate design details and strategies to the value engineering team in an effective manner. These District actions helped maximize the success of the value engineering process.

Both the value engineering team and the design team participated in the value engineering session. The session cost the District nearly $66,000 and resulted in the generation of multiple cost-saving design suggestions. Fifty-two individual proposals were formulated during the value engineering session and, of those, four were implemented into the final

design, producing an estimated capital savings between $12- and $15-million.

Positioning the Project for the Most Favorable Bids

Contractor Outreach and Workshops. The District recognized that it could minimize Project costs by ensuring that a high number of contractors bid on the Project (the greater the competition, the lower the bids). To do this, the District developed and conducted a contractor outreach strategy during the Project's design phase. As the first step of this strategy, the District developed a list of general contractors located in the western United States that have performed work similar to that proposed by the Project. Each contractor was contacted and informed of the Project to determine which contractors expressed interest in the Project.

After contacting each contractor, the District held three contractor workshops to outreach to contractors before the District made an official call for bids. These workshops introduced all interested contractors to the Project with the purpose of building and maintaining contractor interest and, thus, increasing the number of contractors that would bid on the Project. In order to maximize contractor attendance, the District made workshop participation available via the internet. The workshops gave contractors an opportunity to provide input and feedback on the Project prior to the completion of design and specifications, allowing the District to implement contractor suggestions that would position the District to receive favorable Project bids.

Front-End Specifications. Bid prices for construction make up the majority of a project's budget. Because costs of construction and materials carry the most weight in these prices, agencies often overlook the price impacts created by the contractual front-end specifications. The amount of risk that the front-end specifications place on the contractor and the lack of clarity within them can also negatively impact bid prices with the contractor adding significant contingency monies to their bid; thus, the District spent significant amounts of time writing the front-end specifications in a manner that would keep bid prices low and ultimately enable the District to attain opt-out success.

Specifically, the District focused on writing the front-end specifications so that the District equitably shared risk with contractors in areas that most agencies tend to shed risk onto the contractor. For example, the District took ownership of differing site conditions, provided allowances for utility conflicts and hazardous materials, and offered a value engineering incentive to share the savings of contractor cost reduction proposals. The District also focused on providing clear requirements and procedures in the front-end specifications, including change order procedures, contractor obligations, and payment procedures. By sharing risk and minimizing vague or unstated requirements and procedures, the District succeeded in minimizing contingencies

within the bids.

Financing Strategy

The Project utilizes a 30-year term financing debt to fund the design and construction phases. Each Participant resolved to reimburse their design phase investment if they did not opt-out. The District hired a financial advisor, bond counsel, and bond underwriter to structure a taxable and non-taxable revenue bond sale to finance the total Project costs and finance costs[1]. Bonds were sold about two weeks after the opt-out date passed.

The rating of the District was judged on the lower rating of the individual agencies; however, the debt was secured through a bond insurance program which results in a AAA bond rating.

Partial funding through grant programs was explored and applications filed, but the Project was not selected through any state or federal programs.

Bidding Phase

Bid Sequencing Strategy

Five construction contracts combine to form the construction framework for the Project. These contracts are:

- Contract 1 – Intake
- Contract 2 – Facilities
- Contract 3 – Pipeline North (22 miles)
- Contract 4 – Pipeline Central (11 miles)
- Contract 5 – Pipeline South (12 miles)

The call for bids went out for Contracts 1, 3, 4, and 5 on May 22, 2007, and the call for bids for Contract 2 was issued on June 12, 2007. The bid strategy focused on the monetary sizing of the bid package and the bid opening time for the three pipeline packages. The time increment between the bid opening days for these packages was one-week, with Contract 3 bidding first, then Contract 4, followed by Contract 5. The strategy predicted that a large construction firm may win Contract 3, and then may likely be successful on the other two pipeline contracts since their mobilization to the County would already be funded. The unsuccessful bidders from Contract 3 would recognize this advantage and would seek more innovative ways to bid the work. The results were that all three pipeline contracts were awarded to three different contractors. Contractor interest was high, with nine bidders on both Contracts 3 and 4 (not all the same bidders), and seven on Contract 5.

The bidding strategy saved the District millions of dollars relative to the estimated bid values.

Opt-Out Success

As bid opening dates drew near, the Project's estimated cost neared $200-

[1] One of the Participating agencies is a taxable mutual water company, while the others are non-taxable governmental agencies.

million, bordering the upper limits of the Participant's "threshold of financial pain." The District expected construction costs, the last unknown variable in total Project costs, to come in at a value of $140.5-million; however, because of the District's preliminary planning, design phase management, and bidding phase strategies, construction bids came in at a total value of $123.8-million (12-percent less than the projected value). These bid prices lowered the total Project cost to $176-million, which is well within the "threshold of financial pain." As a result, none of the Participants decided to opt-out, allowing the District to conquer a feat that it had tried to overcome for nearly 50 years – a successful Project that would deliver its Nacimiento Reservoir water entitlement to the County's communities for future generations.

Conclusions

Several lessons towards a receipt for success have been learned through the implementation of this Project as of February 2008, and they are:

- The small water agency should recognize early that an experienced and full-time project manager should be employed by the agency to lead the endeavor from the beginning (very early in the design phase) through construction and start-up.
- The agency should be prepared to compensate the project manager an appropriate salary that reflects the project manager's past experiences and value brought to the agency.
- Assemble a technical support group consisting of members from the participating stakeholders and the engineering firm. The group will form the nucleus of decision making and policy development
- Hire an engineering firm with a hands-on project manager who is supported by a technically competent and well organized project engineer. These two people are crucial for technical success of a small agency. Be sure this duo has a long and successful working relationship. The engineering consultant should become a trusted advisor that will guide the agency through major decisions throughout the project.
- Track project budget at milestones during the design, for example, at the beginning, 30-, 50-, 75-, and near 100-percent design levels.
- Keep the governing authority updated on the budget trends.
- Conduct value engineering review early in the design process, such as at the 30-percent design milestone.
- Put together a complete financial team to serve as your advisor on debt financing. Their judgment on a bond sale date can benefit an agency with a lower debt interest rate.
- Securing right-of-way on private and public lands can be challenging. A firm with experience in both areas is critical when the project crosses private, state and federal lands.

- State and federal environmental permits require a long lead-time. Hire a firm with the experience in all aspects of these permits, and who can shepherd the permits through the regulatory agencies.
- Hire the construction management firm to participate in constructability review of the design at the near 50-percent design level. The investment in this early review can result in improved design, cost savings, and reduced contingencies carried by the contractors.
- Hire the environmental monitoring firm directly to control the quality of the selected firm, then assign that service to the construction management firm.
- Work with the designer, construction management firm, and legal counsel, to thoroughly review and edit the construction contract's bidding, contracting, and general requirements to be equitable among all parties.
- Conduct contractor outreach far in advance of the bidding. Increasing the interest in public works bidding creates a competitive bidding environment for the agency.
- Review the timing of the project's bid relative to other mega projects bidding in the geographical region. Avoid bidding on the same day, or even week, of those similar projects.

NOTES