

## **Lost Hills Water District Service Area 7N Canal Lining Project**

### **Statement of Work – Section 1**

#### **RELEVANCE AND IMPORTANCE**

The proposed project consists of geomembrane lining approximately 1.1 miles of existing unlined canals in Lost Hills Water District's (LHWD) Service Area 7N. LHWD is located in northwestern Kern County, within the boundaries of Sub-Region 19 as defined by the CALFED Bay-Delta program. The purpose of the proposed project is to prevent seepage losses to saline shallow groundwater. Seepage data collected by the District and analyzed by Provost & Pritchard Engineering Group, Inc. (P&P), indicate that canal lining of Canal 7N would save approximately 95 acre-feet of water per year that is lost to a salt sink. Therefore, this Implementation Project provides a direct benefit to the Bay-Delta system by contributing toward Quantifiable Objective Number 188 for Sub-Region 19, that being to “decrease flows to salt sinks to increase the water supply for beneficial uses”. The water saved gives a savings benefit of \$6,319 per year to the District and costs are estimated to be \$307,200. Figure 1 in Appendix D is a map of the District and shows the location of the proposed project. A photograph of the existing unlined Canal 7N is shown below.



The District has always been concerned with seepage loss from the unlined canals and has quantified the losses by conducting pond seepage tests on these canals over the years. This has resulted in the District lining approximately 4.6 miles of canal in Service Area 2 (assisted with loan support from SWRCB and completed in 1999), approximately 1.4 miles of canal in Service Area 3, approximately 1.9 miles of canal in Service Area 5 (both assisted with funding from 2001 WUE Ag Grants and completed in 2002), and approximately 1.3 miles of canal in Service Area 7S in 2004 (assisted with funding from Sunrise Power Company).

P&P using the District's pond test results prepared annual seepage estimates for Canal 7N. Making the necessary deductions for evaporation losses as estimated from evaporation pan data, these estimates indicate that by lining the first 1.1 miles of the canal, approximately 95 acre-feet of water per year could be saved that is currently lost to the shallow groundwater.

The CALFED Agricultural Water Use Efficiency Program has developed a list of Quantifiable Objectives, which are CALFED's estimates of the practical and cost-effective contribution agricultural water use efficiency can make towards goals related to water supply reliability, water quality, and ecosystem restoration. This project is consistent with one of the Quantifiable Objectives that has been completed for Sub-Region 19, Number 188. The Intended Outcome of Quantifiable Objective Number 188 is to "decrease flows to salt sinks to increase the water supply for beneficial uses". In addition to the water savings benefit, there are indirect or local benefits for drainage and maintenance cost reductions. Seepage water from the canal that currently contributes to the tile drainwater discharged into the evaporation ponds will be reduced. And maintenance costs for weed control will be less after the canal is lined.

The Lost Hills Water District was formed on February 8, 1963, pursuant to Division 13 of the California Water Code, for the purpose of providing irrigation water from the California State Water Project to land within the District. A water supply contract between Lost Hills Water District and Kern County Water Agency (Agency) was executed on November 10, 1966. The Agency is an umbrella organization that is a State Water Contractor and obtains water from the State Water Project for delivery to its member units. After contract execution with the Agency, the District commenced water deliveries in 1968.

The Lost Hills Water District contains approximately 72,183 acres within its boundaries, beginning at the town of Lost Hills, California and extending north and west to the Kings-Kern County Line. The District lies in the northwest portion of Kern County in the San Joaquin Valley, just west of the Kern National Wildlife Refuge. The District is located within Sub-Region 19 as defined by the CALFED program. The California Aqueduct and Interstate 5 bisect the District diagonally. Highway 46 is located at the south end of the District. A map of the District, its service areas, and the alignment of Canal 7N is shown in Figure 1 in Appendix D.

Of the 72,183 acres in the District, 70,314 acres are farmable, although not all this acreage is currently being farmed. Approximately 38,000 acres have been farmed on

an annual basis over the past five years. Historically, the major crop grown within the District has been cotton, followed in acreage by barley, pistachios, almonds, grapes, olives and alfalfa as well as an assortment of vegetable and additional row crops. Growers within Lost Hills Water District utilize all three of the major irrigation system types: furrow, sprinkler and micro irrigation. A survey of the irrigation system types used in 1998 yielded the following results: micro-irrigation 17,640 acres (31%), sprinkler irrigation 23,940 acres (42%) and furrow irrigation 15,925 acres (27%). The annual crop land that is furrow irrigated has on-farm tailwater return systems installed, and all of the collected tailwater is reused on the same field or routed for use on adjacent fields.

A breakdown of the District acreage in 2001 is summarized below. Contract acres are those acres that have a water supply contract with the District. The remaining farmable land within a service area may be farmed, but the land does not have a water supply contract and the water user must bring water in from outside sources or transfer water from other land. Lost Hills Water District primarily supplies agricultural water to growers within its boundaries with a small amount of industrial water delivered annually to oil production and commercial customers. The District supplies no municipal water. The industrial water supplied makes up less than one percent of the District's normal annual water deliveries. All of the water delivered by the District is State Water Project (SWP) water and is delivered to the District through the California Aqueduct. The District's annual entitlement of SWP water is 119,110 acre-feet. In some years, the District is able to purchase supplemental water supplies from the Agency. In many years, Article 21 water and Turnback water has been available for purchase that can be used to supplement the District's contract supply. In other years, the District is water short and needs to purchase supplemental water. Also, the landowners will periodically transfer water into the District to help meet their crop water requirements.

Service Area	Drainage Zone	Total Acres	Contract Acres
1 & 1R		16,492.12	16,325.72
2	1	6,253.13	6,167.48
3	1	4,697.03	4,664.89
4	1 & 2	6,792.61	6,751.23
5	1	6,123.68	2,804.77
5A	1 & 2	695.90	690.19
6 & E6		15,704.43	9,278.00
6A & E6A	1	6,543.91	114.91
7		4,097.86	1,637.72
8		2,913.61	6.73
9		1,869.11	703.66
Total		72,183.39	49,145.30

The Kern County Water Agency prepares Depth to Shallow Groundwater maps each year and includes these maps in their annual Water Supply Report. These maps indicate the extent of shallow groundwater within the KCWA and include the portion of Lost Hills Water District with shallow groundwater conditions. The KCWA groundwater maps coincide with information gathered by LHWD through the District's

shallow groundwater monitoring program. Much of the area east of the Aqueduct has a depth to shallow groundwater of less than 10 feet. Historical observation well data indicate that the shallow groundwater conditions are stable with only slight variations from year to year.

Water management techniques have been utilized within the District since farmed operations began in 1968. In October of 1984, the District adopted its first written water conservation plan. In December 1992, the District adopted a new comprehensive Water Management Plan to fulfill the requirements of the Agricultural Water Management Planning Act of 1986 (AB 1658). The District has recently become a member of the Agricultural Water Management Council (AWMC) and is currently preparing a new water management plan in compliance with the AWMC guidelines. It is expected that the new water management plan will be submitted to the AWMC for endorsement by March 2005. The proposed canal lining project is consistent with the District's Water Management Plan and Item B5 of the Efficient Water Management Practices identified by the AWMC, and is a direct benefit to the Bay-Delta system by contributing toward Quantifiable Objective Number 188, reducing losses to a salt sink and increasing water for beneficial use.

## **Statement of Work – Section 2**

### **TECHNICAL/SCIENTIFIC MERIT, FEASIBILITY**

#### **Methods, Procedures and Facilities**

The proposed project consists of lining an existing unlined canal with geomembrane to reduce seepage losses. Lost Hills Water District has previously lined many of the unlined canals utilizing either concrete or geomembrane, the latter becoming increasingly the method of choice where suitable. Like their most recent project completed in 2004, geomembrane lining is proposed for this project because it has lower construction costs and lower seepage rates as compared with concrete. Studies indicate that geomembrane lining effectively eliminates over 90% of seepage from unlined canals and is one of the Efficient Water Management Practices identified by the Agricultural Water Management Council. According to the Bureau of Reclamation study, *Canal-Lining Demonstration Project, Year 10 Final Report (2002)*, geomembrane lining demonstrated a favorable combination of benefit/cost ratio and pay back period compared with concrete lining. Specifically, the proposed canal lining material will be geomembrane. The geomembrane material used will exhibit exceptional flexibility, strength and durability. Replacing the canals with pipeline would be another method to reduce seepage and would also eliminate evaporation losses. However, because of the size of the canals and the delivery rates required, geomembrane lining is more cost-effective than piping the canals. A photograph of existing geomembrane lined LHWD Canal 7S is shown below.



The District currently owns and operates approximately 16 miles of concrete lined canals, 1 mile of geomembrane lined canal, 42 miles of pipeline, and 47 miles of unlined canals. Much of the District's delivery system is automated with state of the art equipment. Lift pump operation and canal and reservoir water levels can be monitored from the District O&M office through radio telemetry. Check structures and water levels can be adjusted from the office, aiding in operation of the system and virtually eliminating operational spills.

A significant portion of land within the District is affected by saline shallow groundwater. Shallow groundwater in the area is high in salts and some other naturally occurring elements, including Boron and Selenium. Approximately 6,800 acres within the District are currently tile drained and produce subsurface drainwater that is routed to evaporation ponds. The tiled land is primarily located in Service Area 4, although some tiled land is located in the northern area of Service Area 5. The evaporation ponds were installed by private landowners and later acquired by the District. Portions of Service Areas 2, 3, 6 and the remainder of 5 are also subject to some perched water conditions but do not currently have any drainage facilities. All of these areas are within the District's Drainage Service Area Zone of Benefit 1. The tile-drained land is within the District's Drainage Service Area Zone of Benefit 2. The evaporation pond system and the tile-drained areas are shown on Figure 1 in Appendix D.

When the District acquired the evaporation pond system from the landowners in 1993, the system was composed of 6 ponds totaling 660 acres. Through drainage reduction efforts, the District has reduced the size of the evaporation pond system in recent years. The District's evaporation pond system is now comprised of four interconnected evaporation ponds. During 2004 only one pond totaling 112 acres was utilized. The amount of drainwater discharged to the evaporation pond system has been reduced from a high of 3,831 acre-feet in 1989 to 685 acre-feet in 2004. The District conducts a monitoring and wildlife hazing program at the pond system to comply with the Regional Water Quality Control Board (RWQCB).

### **Project Plan and Work Schedule**

The proposed Project Plan and Work Schedule with quarterly expenditure projections are included in Appendix D. Final design of the project could begin as soon as funding of project is announced, projected to be in May. Once a contract is executed, projected to be in December 2005, construction would begin once the irrigation season has ended and would be completed prior to the 2006 irrigation season.

### **Preliminary Plans, Specifications, and Certification Statements**

Preliminary Plans, Preliminary Specifications, and Certification Statements are included in Appendix D.

### **Environmental Documentation**

The plan and schedule for compliance with all applicable environmental requirements is as follows: The District has performed a review of the project and concluded that it is Categorical Exempt from CEQA. A draft Notice of Exemption that will be brought to the Board of Directors for approval within a month of notification of project funding is included in Appendix D of this application.

## ***Statement of Work – Section 3***

### ***MONITORING AND ASSESSMENT***

Once construction is completed on the proposed 1.1 mile canal lining project, the water savings will begin as soon as the project is complete and the canal is put back into service. During the construction phase of the project, a daily review of compliance with the plans and specifications will be made. After construction is complete, annual seepage rates will be verified to quantify water losses as specified in the *Monitoring and Verification Protocol on Canal Seepage* published by the Agricultural Water Management Council. A post-project qualified pond test will be conducted on the improved section of canal in November of the first year following construction of the project. This corresponds with the end of the irrigation season which is the most appropriate time to make this assessment. By comparing this data with the pre-project pond tests on the same canal, the annual water savings can be verified and reported. Subsequent annual assessments will be based on either pond tests or published seepage coefficients used in conjunction with canal lining inspections.

A summary of pre-project pond test results for Canal 7N is shown below:

<u>Canal</u>	<u>Length</u>	<u>Seepage (in/hr)</u>	<u>Seepage (AF/day)</u>	<u>Days Use</u>	<u>Annual Seepage (AF/yr)</u>
7N	5,800'	0.232	0.558	170	95

There will be several ways the District will monitor the integrity of the lining and inspection for leaks. First, District staff will receive training in the methods and use of repair equipment during the construction phase of the project. Second, the ditch tender/canal operators will visually inspect the canal during daily operations and deliveries. While driving the canal banks the operators will be responsible for reporting and addressing any problems the liner may have. Third, once a year during the fall (November, at the end of the season), when there are no deliveries and the canal is empty, District staff will do a visual inspection of the liner, and walk the length of the canal to search for any damage to the liner. Liner repairs/replacements will be made as needed to fix problem areas.

The objectives of the Canal Lining Educational Tour will be assessed by administering a survey consisting of a series of questionnaires. (Details of the Canal Lining Educational Tour are presented below in the Outreach section). Participants will complete a baseline questionnaire prior to the tour and then an exit questionnaire at its conclusion. Beyond counting the number of participants and the various organizations they represent, the survey is designed to measure and quantify the increased awareness of the emerging technologies concerning geomembrane canal lining material and methods, as well as, the increased awareness of the California Bay-Delta Program’s Water Use Efficiency Program as a potential source of funding such projects. Then, for two subsequent years, the Educational Tour participants will be polled in a follow-up questionnaire to determine the number of new geomembrane canal lining projects planned or completed in the region and the number of WUE applications submitted to future Proposal Solicitation Packages.

The following is a summary of the Monitoring and Assessment plan with quantifiable indicators for measuring the project’s success in water savings and other Bay-Delta system benefits.

GOAL	INDICATOR TO BE MEASURED
A. Water savings	<ol style="list-style-type: none"> <li>1. Length of canal lined with geomembrane (miles)</li> <li>2. Pre-project annual seepage loss (acre-feet)</li> <li>3. Post-project annual seepage loss (acre-feet)</li> <li>4. Annual water savings with canal lining (acre-feet)</li> </ol>
B. Project sustainability	<ol style="list-style-type: none"> <li>1. Number of hours on-site during construction for review of compliance.</li> <li>2. Number of District Staff trained in maintenance and repair of canal lining</li> <li>3. Number of annual canal lining inspections</li> <li>4. Number of annual canal lining repairs</li> </ol>
C. Outreach	<ol style="list-style-type: none"> <li>1. Number of participants in Canal Lining Educational Tour</li> <li>2. Number of water districts, agencies, organizations participating in Canal Lining Educational Tour</li> <li>3. Educational Tour participants' increased awareness of geomembrane canal lining material and methods (percent)</li> <li>4. Educational Tour participants' increased awareness of California Bay-Delta Program's Water Use Efficiency Program (percent)</li> <li>5. Number of geomembrane canal lining projects planned or completed by participant organizations since the Canal Lining Educational Tour</li> <li>6. Number of new WUE applications submitted by participant organizations in Canal Lining Educational Tour</li> </ol>

## ***Qualifications of the Applicants and Cooperators***

### **Resumes of Project Managers**

The project manager and the contact person for the applicant, Lost Hills Water District, will be the Manager of the District, Phillip D. Nixon. Mr. Nixon will provide project oversight for the canal lining project. Mr. Nixon has been the Manager of the District since 1991 and has overseen numerous construction and maintenance projects within the District that were similar in nature and scope to the proposed project, including the concrete lining of 4.6 miles of canals in Service Area 2 in 1999, 1.4 miles of canals in Service Area 3, 1.9 miles of canals in Service Area 5 in 2002, and 1.3 miles of canal in Service Area 7S in 2004. Several other projects that Mr. Nixon has overseen include: acquiring, upgrading, operating and maintaining the District's evaporation pond system; and participation in energy curtailment and reduction programs through the Independent System Operator and the California Energy Commission.

The District will utilize their consulting engineer, P&P, to design the canal lining project and oversee construction. P&P is the largest civil engineering company based

in the San Joaquin Valley and has provided design and construction management services on numerous canal lining projects throughout the San Joaquin Valley, including previous canals in Lost Hills Water District. The P&P project manager will be Michael Day, who has been with Provost & Pritchard since February 1989. Mr. Day's resume is included in Appendix D.

### **Cooperators**

It is not anticipated that the proposed project would require the involvement of any external cooperators. The District will contract for design services with P&P. A construction contract will be awarded after a competitive bidding process.

### **Previous WUE Projects**

The District has participated in two previous Water Use Efficiency grant projects dealing with canal lining. Funded by WUE Ag Grants applied for in 2001, the District lined approximately 1.4 miles of canal in Service Area 3 and approximately 1.9 miles of canal in Service Area 5. Both of these construction projects were successfully completed in 2002.

### **Disadvantaged Communities**

On the south edge of Lost Hills Water District in Kern County is the community of Lost Hills. The annual median household income for year 2000 was reported as \$31,875 (source: city-data.com). For Kern County overall, the annual median household income was \$35,446 for year 1999 (source: US Census Bureau). The annual median household incomes for both Lost Hills and Kern County are less than 80 percent of the statewide annual median of \$38,000 reported for 2002. While this disadvantaged status for the Lost Hills area is pointed out here for the purposes of scoring this section of the grant application, the Water District is not seeking a reduction in its cost share amount based on this criterion.

## ***Outreach, Community Involvement, and Acceptance***

### **Canal Lining Project Educational Tour**

The emergence of geomembrane canal lining technologies as a proven alternative to traditional practices offers a timely opportunity to incorporate a Canal Lining Educational Tour as part of this project's outreach activities. Depending on specific conditions, geomembrane material and methods can outperform concrete lining and other techniques in terms of construction costs and water savings. This is documented by a handful of pilot-scale projects conducted within the state, and by the Bureau of Reclamation's recently completed long-term study, *Canal-Lining Demonstration Project, Year 10 Final Report* (2002).

Because exposed geomembrane lining is more susceptible to damage than concrete surfaces, certain preventive measures and repair techniques are required. One of the important findings related to exposed geomembrane linings is that irrigation districts need to become more familiar with the material and its maintenance requirements in order to realize the full potential of this alternative. From this arises two important opportunities. First is to ensure Water District staff have adequate training to properly

maintain the geomembrane liner. Second, is to utilize the implementation of this project to conduct a Canal Lining Educational Tour.

The objectives of the Canal Lining Educational Tour are to increase awareness of this innovative technology as a canal lining alternative and to increase awareness of the California Bay-Delta Program's Water Use Efficiency Program as a potential source of funding for such projects. It is anticipated that 20 to 40 representatives from among the region's water districts, water agencies, farming operations, and other stakeholder groups will participate in this learning event. The half-day tour will include distribution of printed materials, technical presentation, question and answer session, visits to District project sites, and survey. It is scheduled to take place during the construction phase of a new project so that participants can observe various aspects of installing the material including panel placement, field seaming, and repair techniques. A nearby geomembrane lined canal that is already built and operational will also be visited.

### **Training and Capacity Building**

The project will be constructed by a qualified contractor after a competitive bidding process. During the construction phase, Water District canal operators will receive training on the material, methods, and equipment required to properly maintain the geomembrane liner. The number of people that will be employed by the contractor and his subcontractors is not known at this time. It is possible that the contractor and associated subcontractors will have apprentices on the job site that will receive training, however, the amount of training that will occur is unknown at this time.

### **Benefits to Surrounding Area**

The nearest town to the proposed project is the town of Lost Hills, located near Interstate 5 and Highway 46. Lost Hills is a typical community found in western Kern County, having a predominantly Hispanic population that is dependent on the agricultural economy. The proposed project will benefit Lost Hills and the surrounding area in several ways. First, during the construction project, a general contractor and various subcontractors will have workers on the job site for several months, and it is anticipated that there will be an economic benefit from these workers purchasing goods and services in Lost Hills and the surrounding area. Secondly, the proposed project will help the landowners conserve water and reduce drainage impacts, thereby helping to maintain economic viability. Further, the project fosters the local trend by growers shifting to permanent crops from annual crops. Improved water reliability facilitates this conversion. Permanent crops are often higher paying for workers, less subject to seasonal employment, and less affected by drought. There are no known tribal entities in the Lost Hills area, so there is no opportunity to involve and extend the benefits of the project to tribal entities.

### **Notification of Proposal**

Lost Hills Water District has discussed the project with the major landowners in Service Area 7 and they are supportive of the project. In addition, a public meeting was held August 26, 2004 to present the project, discuss it, and receive input from affected parties. Letters supporting the project from affected landowners are included in Appendix D. The District has notified the Kern County Water Agency of

its proposal to geomembrane line canals to reduce losses to salt sinks and increase the beneficial use of the water supply. Kern County Water Agency has submitted a letter of support for the proposal, which is also included in Appendix D.

The results of the canal lining project and the promotion of its application will be shared with all interested parties, including the Kern County Water Agency and its members, and the Agricultural Water Management Council, of which the District is a member by virtue of membership by the Agency. It is anticipated that an article about the project would be written for publication in DWR's Water Conservation News newsletter and other appropriate publications.

## ***Innovation***

### **Geomembrane Canal Lining as an Emerging Technology**

Traditional canal-lining methods are concrete and compacted clay. More recently results of long-term pilot projects conducted in California and elsewhere spanning from the late 1980s to the present demonstrate geomembrane lining to be a cost effective alternative. Geomembrane lining is one of the Efficient Water Management Practices identified by the Agricultural Water Management Council. The emergence of this innovative technology is bolstered by the 2002 Bureau of Reclamation study, *Canal-Lining Demonstration Project, Year 10 Final Report*. In it, geomembrane linings are shown to have low construction costs and high effectiveness in seepage reduction (90%) with service life extending to 20 to 25 years. Geomembrane lining has the advantage of being less expensive than concrete or imported clay, and doesn't require extensive subgrade preparation or large right-of-ways for equipment. At this particular point in the historical trajectory of canal lining developments, the emergence of geomembrane material and methods represents an innovative solution to cost effective water savings for Lost Hills Water District.

### **Monitoring & Assessment Plan Applied to Social Dimensions**

Canal lining projects are typically considered technical and engineering improvements. The way this project is devised, it has a strong social and management component supporting sustainability and outreach. While this in itself is becoming more commonplace in improvement works, what's particularly innovative about this project is its use of a plan to monitor and assess these social dimensions, in addition to its technical ones. Hence, quantifiable indicators were developed to monitor and assess the success of training, maintenance, and outreach. This includes incorporating a written survey as part of the Canal Lining Educational Tour to measure increased awareness of emerging geomembrane technologies and of the WUE Program, and to assess the impact on development of future proposals and projects.

## **Benefits and Costs**

### **Bay-Delta System Benefits**

Lining Canal 7N will save approximately 95 acre-feet of water per year that is lost to a salt sink. Thus, this Project provides a direct benefit to the Bay-Delta system by contributing toward Quantifiable Objective Number 188 for Sub-Region 19, that being to “decrease flows to salt sinks to increase the water supply for beneficial uses”.

The water saved by canal lining also provides an indirect benefit to the Bay-Delta system by reducing dependency on it. Reducing the amount of transfers and supplemental water purchases by the District and the landowners, including Article 21 allows more water to remain in the system for use by the CALFED program or other water users.

### **Local Benefits**

In addition to water conservation, drainage reduction, and maintenance cost reduction elaborated on below, the project also has the following non-quantified benefits to the District: reduction of water and salt loading to the evaporation ponds; reduction of applied herbicides in maintenance activities; and an economic benefit to Lost Hills and the surrounding area as a result of the construction project. Project annual physical benefits are summarized in Table C-5 in Appendix C.

**Water Conservation:** The 95 acre-feet per year of water conserved has an estimated value of approximately \$66.52 per acre-foot, which is the average total cost of District water in Service Area 7N in a “normal” water year. The water conservation benefit to the growers in Service Area 7N is therefore estimated to be \$6,319 per year.

**Drainage Reduction:** The land in Service Area 7N is not tile drained but percolation of water will result in some water reaching lands that have tile drains. Thus the canal lining project will have an indirect impact on drainage discharges to the evaporation ponds. The correlation between canal seepage and tile drain production is not known. However, it can be assumed that a portion of the canal seepage will ultimately be picked up by the tile drain system. For purposes of quantifying a drainage reduction benefit, it is assumed that 25% of the canal seepage becomes tile drain water. Landowners who discharge to the evaporation pond system are charged a drainage fee of \$35/acre-foot by the District. The resulting drainage reduction benefit therefore is estimated to be approximately \$831 per year (95 acre-feet x 25% x \$35/acre-foot).

**Maintenance Cost Reduction:** Review of the District’s maintenance costs have determined that the annual maintenance costs for its lined canals is approximately \$600 per mile less than for unlined canals. This results in a savings of approximately \$660 less maintenance costs per year as a result of the project versus the current unlined canals. The cost savings are primarily a reduction in weed control chemicals and the labor and equipment to apply the chemicals.

**Project Costs and Budget Justification**

A breakdown of the budget is shown below. The total estimated project cost is \$307,200. A detailed preliminary engineer’s cost estimate for the Service Area 7N Canal Lining Project is included in Appendix C. It is based on recent construction projects in the area, primarily the District’s canal lining projects completed in 2002 and 2004. A contingency of 10% has been added to address unforeseen costs. Consultant expenses for engineering design services, environmental compliance, surveying, legal and administrative services, construction staking and construction management are estimated to be approximately 18% of the total construction cost. It is anticipated that the District will contract for all services regarding the project, including design services, construction, and construction management. The project budget is summarized below:

Salaries & Wages	None <sup>1</sup>	\$ 0
Fringe Benefits	None	\$ 0
Travel	None	\$ 0
Supplies & Expendables	None	\$ 0
Services/Consultants	See below	\$ 0
Equipment	None	\$ 0
Other Direct Costs	General Contractor <sup>2</sup> (see preliminary engineer’s cost estimate in Appendix C)	\$ 249,600
	Consultant Costs Engineering, Environmental, Surveying, Legal, Administration, Construction Staking, Construction Management	\$ 44,900
	Educational Tour, Monitoring & Assessment, Report Preparation	\$ 12,700
	<b><u>TOTAL ESTIMATED PROJECT COST</u></b>	<b><u>\$ 307,200</u></b>

<sup>1</sup> The majority of work will be performed by contractors and consultants. Lost Hills Water District personnel involved in the project will provide these services in-kind and will not seek reimbursement for their cost of services.

<sup>2</sup> The general contractor will be selected through a competitive bidding process. Estimated construction quantities and cost estimates are detailed in the preliminary engineer’s cost estimate found in Appendix C.

**Matching Funds Cost-Share**

The total cost of the project is estimated to be \$307,200. Local benefits to the District include a water conservation benefit, a drainage benefit, and a maintenance cost reduction benefit and are estimated to total approximately \$7,810 per year as explained above. The landowners within Service Area 7N desire to see a 10-year payback on any investment they make in the distribution system. Using a 6% discount rate (present worth factor of 7.36), the present worth of \$7,810 per year in benefits over the next ten years is approximately 20% of the total project cost or \$61,440. Therefore the landowners in Service Area 7N, and hence the District, are willing to cost share in the amount of \$61,440. The grant amount requested from the CALFED Agricultural Water Use Efficiency Program is \$245,760.

# 2004 Water Use Efficiency Proposal Solicitation Package

## APPENDIX A: Project Information Form

Applying for:

Urban

Agricultural

1. (Section A) **Urban or Agricultural Water Use Efficiency Implementation Project**

(a) implementation of Urban Best Management Practice, # \_\_\_\_\_

(b) implementation of Agricultural Efficient Water Management Practice, # Item B5

(c) implementation of other projects to meet California Bay-Delta Program objectives, Targeted Benefit # or Quantifiable Objective #, if applicable Quantifiable Objective #188

(d) Specify other: \_\_\_\_\_

2. (Section B) **Urban or Agricultural Research and Development; Feasibility Studies, Pilot, or Demonstration Projects; Training, Education or Public Information; Technical Assistance**

(e) research and development, feasibility studies, pilot, or demonstration projects

(f) training, education or public information programs with statewide application

(g) technical assistance

(h) other

3. Principal applicant  
(Organization or affiliation):

Lost Hills Water District

4. Project Title:

Service Area 4 Canal Lining Project

5. Person authorized to sign and submit proposal and contract:

Name, title Phillip D. Nixon, Manager

Mailing address 3008 Sillect Ave., Suite 205  
Bakersfield, CA 93308-6340

Telephone (661) 633-9022

Fax. (661) 633-9026

E-mail pnixon@lhwd.org

6. Contact person (if different):	Name, title.	Michael Day, P.E.
	Mailing address.	1800 30 <sup>th</sup> Street, Suite 280 Bakersfield, CA 93301-1918
	Telephone	(661) 616-5900
	Fax.	(661) 616-5890
	E-mail	mday@ppeng.com
7. Grant funds requested (dollar amount): <i>(from Table C-1, column VI)</i>		\$559,140
8. Applicant funds pledged (dollar amount):		\$186,380
9. Total project costs (dollar amount): <i>(from Table C-1, column IV, row n)</i>		\$745,520
10. Percent of State share requested (%) <i>(from Table C-1)</i>		75 %
11. Percent of local share as match (%) <i>(from Table C-1)</i>		25 %
12. Is your project locally cost effective? <i>Locally cost effective means that the benefits to an entity (in dollar terms) of implementing a program exceed the costs of that program within the boundaries of that entity.</i> <i>(If yes, provide information that the project in addition to Bay-Delta benefit meets one of the following conditions: broad transferable benefits, overcome implementation barriers, or accelerate implementation.)</i>		<input type="checkbox"/> (a) yes  <input checked="" type="checkbox"/> (b) no

13. Is your project required by regulation, law or contract?  (a) yes  
If no, your project is eligible.  (b) no

If yes, your project may be eligible only if there will be accelerated implementation to fulfill a future requirement and is not currently required.

*Provide a description of the regulation, law or contract and an explanation of why the project is not currently required.*

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14. Duration of project (month/year to month/year): June 2005 to Mar 2006
15. State Assembly District where the project is to be conducted: Thirty (30)
16. State Senate District where the project is to be conducted: Sixteen (16)
17. Congressional district(s) where the project is to be conducted: Twenty (20)
18. County where the project is to be conducted: Kern County
19. Location of project (longitude and latitude) 35°37', 119°56'
20. How many service connections in your service area (urban)? NA
21. How many acre-feet of water per year does your agency serve? 119, 100 AF

22. Type of applicant (select one):
- (a) City
  - (b) County
  - (c) City and County
  - (d) Joint Powers Authority
  - (e) Public Water District
  - (f) Tribe
  - (g) Non Profit Organization
  - (h) University, College
  - (i) State Agency
  - (j) Federal Agency

(k) Other

(i) Investor-Owned Utility

(ii) Incorporated Mutual Water Co.

(iii) Specify \_\_\_\_\_

23. Is applicant a disadvantaged community? If 'yes' include annual median household income.

(Provide supporting documentation.)

(a) yes, \$31,875 median household income

(b) no

(c) other. Note that the Water District is not seeking a reduction in its cost share based on this criterion.

**2004 Water Use Efficiency Proposal Solicitation Package  
APPENDIX B: Signature Page**

By signing below, the official declares the following:

The truthfulness of all representations in the proposal;

The individual signing the form has the legal authority to submit the proposal on behalf of the applicant;

There is no pending litigation that may impact the financial condition of the applicant or its ability to complete the proposed project;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant;

The applicant will comply with all terms and conditions identified in this PSP if selected for funding; and

The applicant has legal authority to enter into a contract with the State.

Phillip D Nixon  
Signature

Phillip D Nixon, Manager  
Name and title

1-6-05  
Date

**APPENDIX C  
COST AND BENEFIT TABLES  
Lost Hill Water District, Service Area 7N Canal Lining Project**

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY  
Section A projects must complete Life of Investment, column VII and Capital Recovery Factor Column VIII. Do not use 0.

**Table C-1: Project Costs (Budget) in Dollars**

Category (I)	Project Costs \$ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency \$ (IV)	Applicant Share \$ (V)	State Share Grant \$ (VI)	Life of Investment (years) (VII)	Capital Recovery Factor (VIII)	Annualized Costs \$ (IX)
Administration <sup>1</sup>								
Salaries, wages	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
Fringe benefits	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
Supplies	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
Equipment	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
Consulting services	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
Travel	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
Other	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(a) Total Administration Costs	\$0		\$0	\$0	\$0			\$0
(b) Planning/Design/Engineering Equipment	\$26,532	10	\$29,185	\$5,837	\$23,348	25	0.0782	\$2,282
(c) Purchases/Rentals/Rebates/Vouchers	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(d) Materials/Installation/Implementation	\$226,909	10	\$249,600	\$49,920	\$199,680	25	0.0782	\$19,519
(e) Implementation Verification	\$4,082	10	\$4,490	\$898	\$3,592	25	0.0782	\$351
(f) Project Legal/License Fees	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(g) Structures	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(h) Land Purchase/Easement Environmental	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(i) Compliance/Mitigation/Enhancement	\$4,082	10	\$4,490	\$898	\$3,592	25	0.0782	\$351
(j) Construction	\$6,123	10	\$6,735	\$1,347	\$5,388	25	0.0782	\$527
(k) Canal Lining Educational Tour	\$1,636	10	\$1,800	\$360	\$1,440	25	0.0782	\$141
(l) Monitoring and Assessment	\$2,909	10	\$3,200	\$640	\$2,560	25	0.0782	\$250
(m) Report Preparation	\$7,000	10	\$7,700	\$1,540	\$6,160	25	0.0782	\$602
(n) TOTAL	\$278,273		\$307,200	\$61,440	\$245,760			\$24,023
(o) Cost Share -Percentage				20	80			

**Applicant:** Lost Hill Water District, Service Area 7N Canal Lining Project

**THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY**

**Table C-2: Annual Operations and Maintenance Costs**

Operations (1)	Maintenance (II)	Other (III)	Total (IV) (I + II + III)
\$0	\$0	\$0	\$0

(1) Include annual O & M administration costs here.

**Table C-3: Total Annual Project Costs**

Annual Project Costs (1)	Annual O&M Costs (2)	Total Annual Project Costs
(I)	(II)	(III) (I + II)
\$24,023	\$0	\$24,023

(1) From Table C-1, row (n) column (IX)

(2) From Table C-2, column (IV)

Applicant: **Lost Hill Water District, Service Area 7N Canal Lining Project**

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table C-5 Project Annual Physical Benefits (Quantitative and Qualitative Description of Benefits)

		Qualitative Description - Required of all applicants <sup>1</sup>		Quantitative Benefits - where data are available <sup>2</sup>
	Description of physical benefits (in-stream flow and timing, water quantity and water quality) for:	Time pattern and Location of Benefit	Duration of Benefits	State Why Project Bay Delta benefit is Direct <sup>3</sup> Indirect <sup>4</sup> or Both
Bay Delta	There are water quantity benefits to the Bay-Delta system by (1) contributing toward a Quantifiable Objective to "decrease flows to salt sinks to increase the water supply for beneficial uses" and by (2) reducing dependency on it.	Approximately eight months of canal operation per year during irrigation season saving State Water Project water delivered to the District through the California Aqueduct.	25 Years	The Project provides both a direct and an indirect benefit. (1) Its direct benefit is contributing toward Quantifiable Objective Number 188 for Sub-Region 19, that being to "decrease flows to salt sinks to increase the water supply for beneficial uses". (2) The water saved by canal lining also provides an indirect benefit to the Bay-Delta system by reducing dependency on it. Reducing the amount of transfers and supplemental water purchases by the District and the landowners, including more water to remain in the system for use by the CALFED program or other water users.

<p><b>Local</b></p>	<p>(1) There is a drainage benefit from reducing seepage water from the canal that currently contributes to the tile drainwater discharged into the evaporation ponds. (2) There is a maintenance benefit from reducing weed control for the lined canal. Further benefits include (3) reduction of salt loading to the evaporation ponds and (4) reduction of applied herbicides in maintenance activities.</p>	<p>Approximately eight months of canal operation per year during irrigation season in the vicinity of the canal.</p>	<p>25 Years</p>	<p><b>Not applicable.</b></p>	<p>There is a drainage reduction of 24 AF/yr, and a maintenance reduction savings of \$660/yr</p>
---------------------	--	--	-----------------	-------------------------------	---

<sup>1</sup> The qualitative benefits should be provided in a narrative description. Use additional sheet.

<sup>2</sup> Direct benefits are project outcomes that contribute to a CALFED objective within the Bay-Delta system during the life of the project.

<sup>3</sup> Indirect benefits are project outcomes that help to reduce dependency on the Bay-Delta system. Indirect benefits may be realized over time.

<sup>4</sup> The project benefits that can be quantified (i.e. volume of water saved or mass of constituents reduced) should be provided.

**Applicant:**

**Lost Hill Water District, Service Area 7N Canal Lining Project**

**THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY**

**Table C-6 Project Annual Local Monetary Benefits**

ANNUAL LOCAL BENEFITS	ANNUAL QUANTITY	UNIT OF MEASUREMENT	ANNUAL MONETARY BENEFITS
(a) Avoided Water Supply Costs (Current or Future Source)	95 AF	\$66.52/AF	\$6,319
(b) Avoided Energy Costs	0		\$0
(c) Avoided Waste Water Treatment Costs	0		\$0
(d) Avoided Labor Costs	0		\$0
(e) Other-Drainage Reduction	24 AF	\$35/AF	\$831
(e) Other-Maintenance Reduction	1.1 miles	\$600/mile	
<b>(f) Total [(a) + (b) + (c) + (d) + (e) ]</b>			<b>\$7,810</b>

**Table C-7 Project Local Monetary Benefits and Project Costs**

(a) Total Annual Monetary Benefits [(Table C-6, row (f))	\$7,810
(b) Total Annual Project Costs (Table C-3, column III)	\$24,023

**Table C-8 Applicant's Cost Share and Description**

Applicant's cost share %: (from Table C-1, row o, column V)	<b>20</b>
<p>The total cost of the project is estimated to be \$307,200. Local benefits to the District include a water conservation benefit, a drainage benefit and a maintenance cost reduction benefit and are estimated to total approximately \$7,810 per year as shown in Table C-6 above. The landowners within Service Area 7N desire to see a 10-year payback on any investment they make in the distribution system. Using a 6% discount rate (present worth factor of 7.36), the present worth of \$7,810 per year in benefits over the next ten years is approximately 20% of the total project cost or \$61,440. Therefore the landowners in Service Area 7N, and hence the District, are willing to cost share in the amount of \$61,440.</p>	



**APPENDIX C**  
**Preliminary Engineer's Cost Estimate**  
**Lost Hills Water District**  
**Service Area 7N Canal Lining Project Construction**

Item No.	Work or Material	Estimated Quantity	Unit	Unit Price	Amount
1	Move-in, mobilization, bonds & insurance, worker protection, miscellaneous facilities and operations	Lump Sum	LS	\$7,500	\$7,500
2	Transition from Turnout #7 to Canal 7N	Lump Sum	LS	\$10,000	\$10,000
3	Canal 7N Preparation	5,800	LF	\$5.50	\$31,900
4	Canal 7N HDPE Lining	290,000	SF	\$0.55	\$159,500
5	Transition 7N turnout	1	EA	\$4,000	\$4,000
6	42" culvert/end of HDPE lining	1	EA	\$4,000	\$4,000
7		4	EA	\$2,500	\$10,000
	Contingency			10%	\$22,700
<b>CONSTRUCTION SUBTOTAL:</b>					<b>\$249,600</b>
Engineering, environmental, surveying, legal, admin., construction staking, construction management				18%	\$44,900
<b>PRELIMINARY COST ESTIMATE:</b>					<b>\$294,500</b>



**APPENDIX C**

**Preliminary Engineer's Cost Estimate**

**Lost Hills Water District  
Service Area 7N Canal Lining Project Educational Tour**

Item No.	Work or Material	Estimated Quantity	Unit	Unit Price	Amount
1	Printed material (educational material, invitations, postage, webpage, presentation materials)	Lump Sum	LS	\$250	\$250
2	Labor - Admin	16	HR	\$45.00	\$720
3	Labor - Engineer - prep tour materials	8	HR	\$85.00	\$680
4	Labor - Engineer - conduct tour	8	HR	\$85.00	\$680
5	Labor - Principle - conduct tour	5	HR	\$150	\$750
6	Mileage	100	MI	\$0.45	\$45
7	Food, Refreshments	Lump Sum	LS	\$200	\$200
	Contingency			10%	\$300
SUBTOTAL:					\$3,600
50% cost reduction by combining tour with SA 7A Canal Lining Project tour					\$1,800
<b>PRELIMINARY COST ESTIMATE:</b>					<b>\$1,800</b>



**APPENDIX C**

**Preliminary Engineer's Cost Estimate**

**Lost Hills Water District  
Service Area 7N Canal Lining Project Monitoring & Assessment**

Item No.	Work or Material	Estimated Quantity	Unit	Unit Price	Amount
1	Construction review for compliance	Included in construction costs			
2	Post-project bi-annual inspection of lining	Provided by Water District in-kind			
3	Post-project annual pond test for seepage verification	1	EA	\$2,200	\$2,200
4	Annual follow-up questionnaires of Educational Tour participants	2	EA	\$350.00	\$700
	Contingency			10%	\$300
SUBTOTAL:					\$3,200
<b>PRELIMINARY COST ESTIMATE:</b>					<b>\$3,200</b>



**Preliminary Engineer's Cost Estimate**

**Lost Hills Water District  
Service Area 7N Canal Lining Project Report Preparation**

Item No.	Work or Material	Estimated Quantity	Unit	Unit Price	Amount
1	Post-project annual report to DWR - year 1	1	EA	\$3,000.00	\$3,000
2	Post-project annual report to DWR - years 2 to 5	4	EA	\$1,000.00	\$4,000
	Contingency			10%	\$700
SUBTOTAL:					\$7,700
<b>PRELIMINARY COST ESTIMATE:</b>					<b>\$7,700</b>

## **APPENDIX D**

Figure 1 – Map of Water District and Canal Lining Project

Proposed Project Plan and Work Schedule

Preliminary Plans

Preliminary Specifications

Draft Notice of Exemption to CEQA

Certification of Statements

Support Letter From KCWA

Support Letters From Growers in Service Area

Michael Day Resume

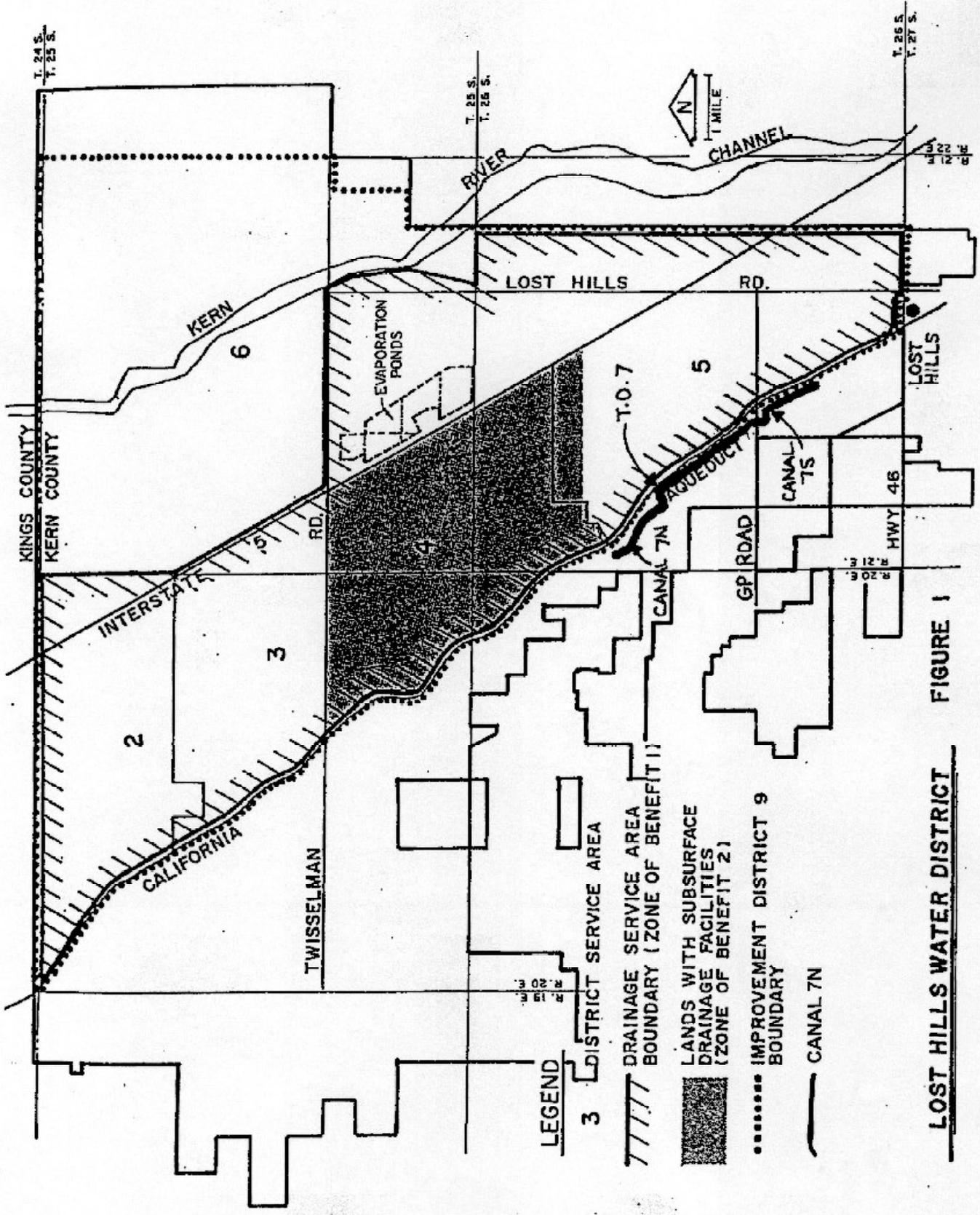


FIGURE 1

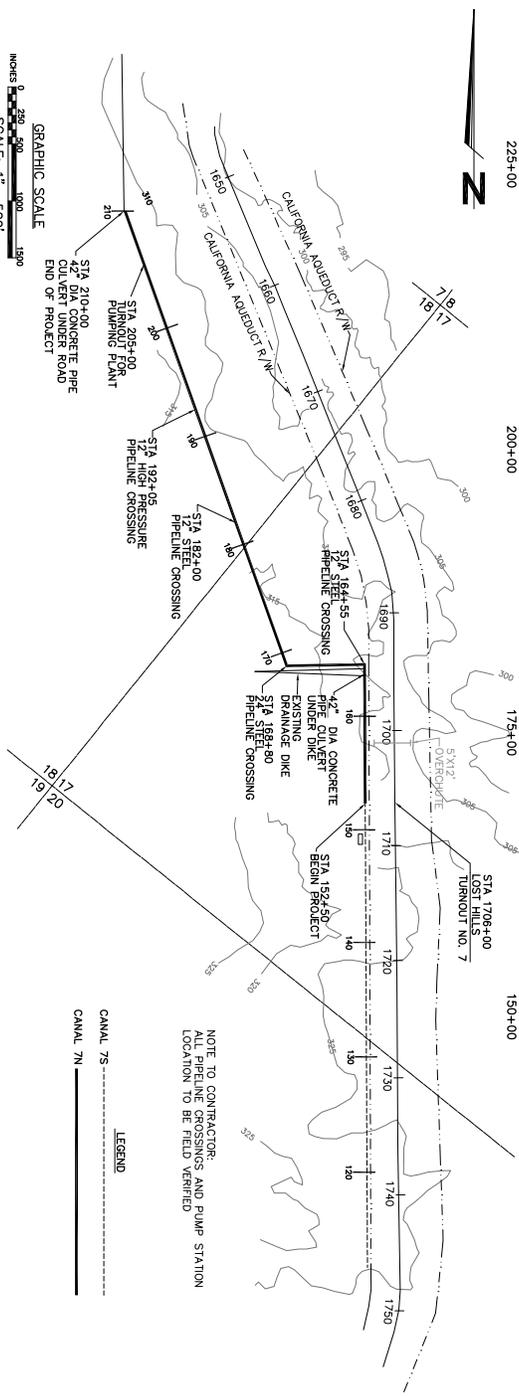
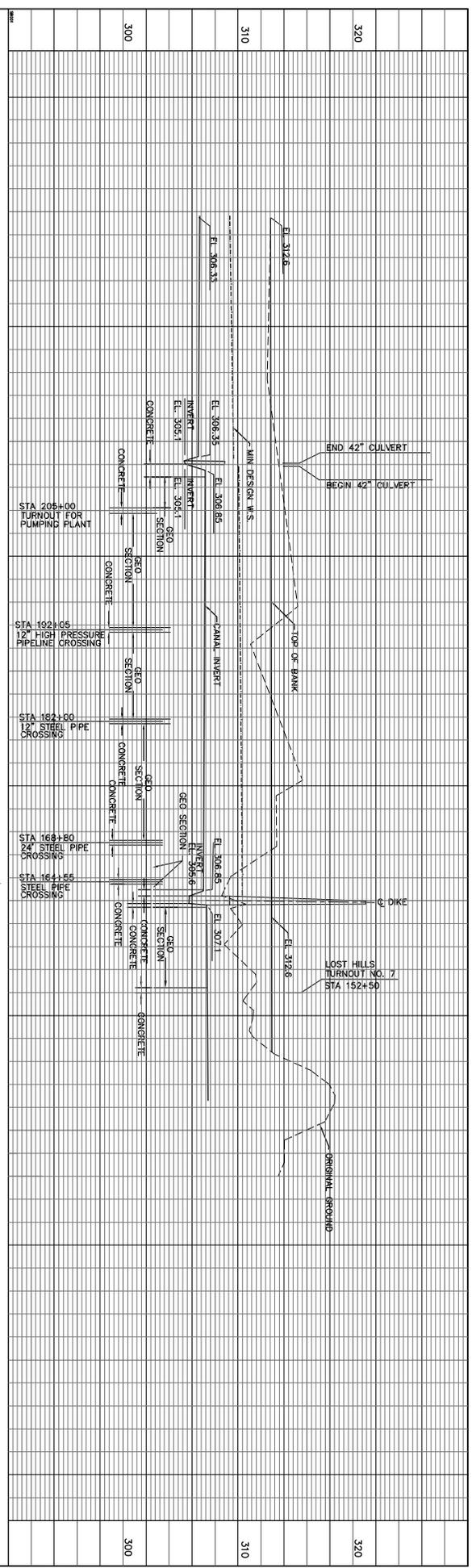
LOST HILLS WATER DISTRICT

LEGEND

- 3 DISTRICT SERVICE AREA
- ////// DRAINAGE SERVICE AREA BOUNDARY (ZONE OF BENEFIT 1)
- ▨ LANDS WITH SUBSURFACE DRAINAGE FACILITIES (ZONE OF BENEFIT 2)
- ..... IMPROVEMENT DISTRICT 9 BOUNDARY
- CANAL 7N







**GRAPHIC SCALE**  
SCALE: 1" = 500'

0 250 500 1000 1500  
FOOT

**LEGEND**

CANAL 75" ———

NOTE TO CONTRACTOR:  
ALL PIPELINE CROSSINGS AND PUMP STATION  
LOCATION TO BE FIELD VERIFIED

**LOST HILLS WATER DISTRICT**  
3008 SULLYPT AVE, SUITE 205  
BAKERSFIELD CA 93306-6340  
PHONE: (805) 833-8022  
FAX: (805) 833-3022

NO.	REVISION	DATE	BY

**DESIGN ENGINEER:** MARE DAY  
**C.E. LICENSE NO.:** 30,424

**SCALE:** AS SHOWN  
**DRAWN BY:** CMC  
**CHECKED BY:** \_\_\_\_\_

**DRAFT NOT FOR CONSTRUCTION**

LOST HILLS WATER DISTRICT  
CANAL Lining AREA 7  
CANAL Lining PROJECT  
FROM STA. 152+50 TO STA. 210+00  
**PLAN AND PROFILE**

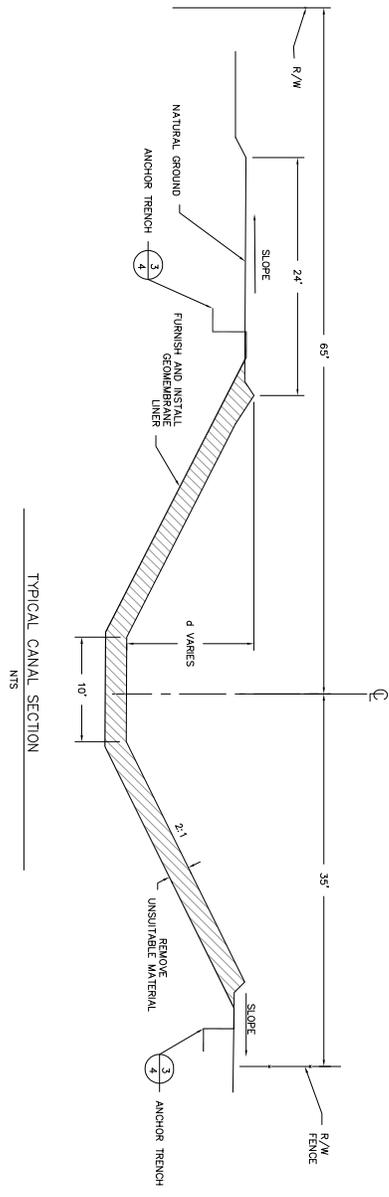
**DATE SHOWN:** \_\_\_\_\_

Job No. 1056401  
Draw. No. 2050016  
Scale: 1/7/05

2 of 4 SHEETS

1-800-227-2600

Call Two Working Days  
Before You Dig!  
1-800-227-2600



DRAFT NOT FOR CONSTRUCTION

**LOST HILLS WATER DISTRICT**  
3008 SULLYPT AVE, SUITE 205  
BAKERSFIELD CA 93306-6340  
PHONE: (805) 833-8022  
FAX: (805) 833-8029

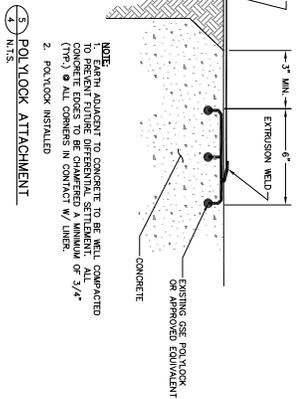
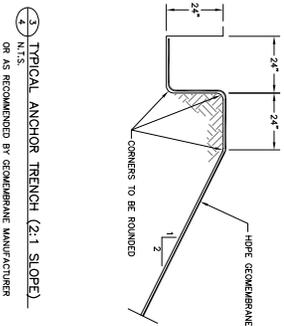
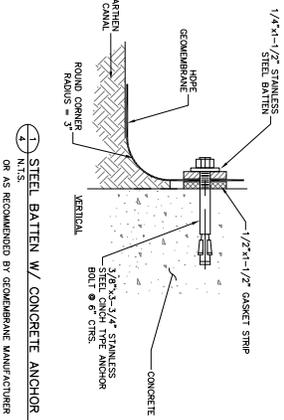
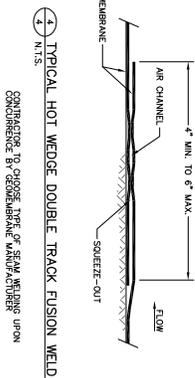
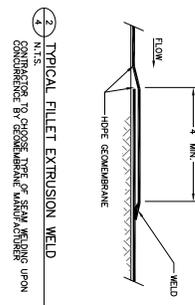
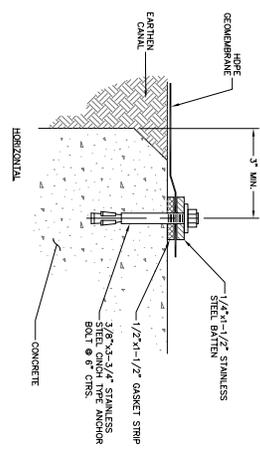
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		DRAWN BY: CMC
		CHECKED BY:
NO.	REVISION	DATE
		BY

LOST HILLS WATER DISTRICT  
SERVICE AREA 7  
CANAL LINING PROJECT  
TYPICAL CANAL CROSS SECTION  
JOB NO. 1056481  
DATE: 1/7/05  
3 OF 4 SHEETS



Call Two Working Days  
Before You Dig!



**DRAFT NOT FOR CONSTRUCTION**

**LOST HILLS WATER DISTRICT**  
3008 SULLYPT AVE, SUITE 205  
BAKERSFIELD, CA 93306-6340  
PHONE: (805) 833-8022  
FAX: (805) 833-8020

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DESIGN ENGINEER: MURE DAY	C.E. LICENSE NO. 39,494	SCALE: AS SHOWN
NO.	REVISION	DRAWN BY: CMC
		CHECKED BY:
		DATE:
		BY:

LOST HILLS WATER DISTRICT  
SERVICE AREA 7  
CANAL LINING PROJECT  
GEOMEMBRANE LINING  
ANCHOR AND WELD DETAILS

Job No. 10560401  
Draw. No. 20050020  
Date: 1/7/05  
4 of 4 SHEETS



## **PRELIMINARY SPECIFICATIONS**

### **SECTION 1 – SCOPE OF WORK**

#### **1-1 WORK TO BE DONE**

The Work consists, in general, of furnishing and installing 290,000 square feet of geomembrane canal lining with attachment to intermittent concrete sections also to be constructed. The work shall include furnishing all labor, materials, methods or processes, implements, tools, machinery, and incidentals, except as otherwise specified, which are required to construct the Work as shown, complete in place and ready for use, as required by the Contract Documents.

#### **1-2 PROJECT SITE MAINTENANCE**

Throughout all phases of construction, including suspension of work, and until final acceptance of the project, the Contractor shall keep the work site clean and free from rubbish and debris. Materials and equipment shall be removed from the site as soon as they are no longer necessary; and upon completion of the work and before final inspection. Compensation for any necessary work required for site maintenance shall be considered as included in the prices paid for the various bid items and no additional compensation will be made therefore.

#### **1-3 MATERIALS AND EQUIPMENT**

All installed materials and equipment shall be new and of the specified quality, and equal to the samples found to be acceptable by the Engineer, if samples have been submitted. The Work shall be completed in a thorough, workmanlike manner. It shall be the duty of the Contractor to call the Engineer's attention to apparent errors or omissions and request instruction before proceeding with the Work. The Engineer may, by appropriate instructions, correct said apparent errors and omissions, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.

#### **1-4 OBSERVATION OF PERFORMANCE TESTS**

Where the Specifications require the presence of Engineer during testing, initial tests shall be observed or witnessed by Engineer. Contractor shall reimburse owner for all costs of subsequent visits by Engineer to witness or observe incomplete tests, re-testing, or subsequent tests.

#### **1-5 EQUIPMENT WARRANTY**

A written manufacturer's warranty shall be provided for equipment supplied under this contract. The warranty shall be for a minimum of one (1) year after the date of filing of the Notice of Completion. Unless otherwise agreed in writing by Owner, this date shall correspond to the Notice of Completion. The warranty shall cover all defects or failures of materials, design, or workmanship that occurs as the result of normal operation and service.

## SECTION 2 – EXPLANATION OF BID ITEMS

### 2-1 GENERAL

The Contract payment for the specified items of work as set forth in the Bid Schedule shall be full compensation for furnishing all labor, materials, methods or processes, implements, tools, equipment and incidentals and for doing all work involved as required by the provisions of the Contract Documents for a complete in place and operational system. Unless otherwise specified, quantities of work shall be determined from measurements or dimensions in a horizontal plane. All measurements shall be made in accordance with United States Standard Measures. All materials shall be measured on the basis of in place quantities paid for the units listed in the bid schedule.

### 2-2 BID ITEMS

**Bid Item 1** - Mobilization, Bonds, Insurance, Misc. Facilities & Operations: The lump sum payment shall include the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits, licenses, and fees required during the performance of the work. In addition, the lump sum payment shall include the cost for dust control; traffic control; maintaining drainage; protection and support of existing facilities; Storm Water Pollution Prevention Plan (SWPPP) requirements, pot holing and locating existing utilities; general project clean up; and all costs for miscellaneous work shown and described in the Contract documents, not included in other bid items.

**Bid Item 2** – Clearing and Grubbing: The unit price paid for clearing and grubbing will be paid on a Lump Sum basis, and shall include the cost of all work involved in clearing and grubbing within borrow areas, canal cross section areas, and transporting unsuitable material to a site to be approved by Owner.

**Bid Item 3** – Clean and Reshape Existing Canal: The unit price per linear foot to clean and reshape an existing canal to the grades shown on the Plans shall include trimming, excavation, removal of unsuitable material, and shall include full compensation for furnishing all labor, tools and equipment for doing all work involved as detailed in the Plans and Specifications. All material from cleaning and reshaping canal shall be moved to a site to be approved by the Water District and Owner.

**Bid Item 4** – Install Geomembrane Canal Lining: The unit price per square foot shall include furnishing and installing geomembrane canal lining in a water-tight condition, including attachment to concrete structures, and shall include full compensation for furnishing all labor, tools, material and equipment for doing all work involved as detailed in the Plans and Specifications.

**Bid Item 5** – Concrete Lined Transition Sections and Short Canal End Sections: The unit price per square foot for concrete lined transition and short canal end sections shall include compacting subgrade, furnishing, installing, finishing and curing concrete lining on the interior side slope, and bottom of the canal; including transition sections for turnouts, pipe crossings, and short canal end sections, as shown on the Plans. All costs for equipment, labor, materials (concrete, admixtures, reinforcement, GSE Polylock or equal, curing compound, etc.), and tools required to complete the

installation shall be included. Included in this bid item shall be a minimum 2-foot overexcavation under the concrete lining with compaction of backfill in 6-inch lifts to 90% relative compaction.

### **SECTION 3 - TECHNICAL SPECIFICATIONS**

#### **3-1 EARTHWORK**

The Owner or his representative (soil quality assurance inspector) shall inspect the subgrade preparation. Weak or compressible areas which cannot be satisfactorily compacted should be removed and replaced with properly compacted fill. All surfaces to be lined shall be smooth, free of all foreign and organic material, sharp objects, or debris of any kind. The subgrade shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Standing water or excessive moisture shall not be allowed. The anchor trench shall be excavated to the line, grade, and width shown on the plans, prior to liner system placement. Slightly rounded corners shall be provided in the trench to avoid sharp bends in the geomembrane. The anchor trench shall be backfilled by the Contractor. Trench backfill material shall be placed and compacted 90% relative compaction as specified in ASTM D-1557. Care shall be taken when backfilling the trenches to prevent any damage to the geomembrane. If damage occurs, it shall be repaired prior to backfilling.

#### **3-2 CONCRETE LINED TRANSITION AND SHORT CANAL END SECTIONS**

Concrete canal lining shall include all work to trim and prepare the final interior embankment slope and canal bottom, place concrete liner with a six (6) inch thick floor and four (4) inch thick sideslopes, finish the concrete surface, install grooved joints and apply curing compound as shown on the Plans and as detailed in these Specifications. The concrete must be placed by a qualified applicator.

All materials shall conform to ACI specifications 506, 506R, 506.2 or as specified in these specifications. Concrete shall be mixed and applied by the wet-mix process and shall consist of Type V or approved sulfate resistant equivalent cement, fine aggregate with a minimum of 20% pea gravel, synthetic fibers, and water, and shall contain not less than 610 pounds of portland cement per cubic yard. The maximum size of pea gravel shall be such that 100 percent passes the ½ inch screen and at least 90 percent passes the 3/8 inch sreen. The mix shall have a minimum slump of 2 inches. Normal weight aggregate for wet-mix process shall conform to ASTM C33. All admixtures must be approved by the Engineer prior to the start of work.

Prior to placement of concrete canal lining, the Contractor shall trim, finish and moisten all foundation surfaces upon which concrete lining is to be placed to provide a firm foundation for the lining. Any low spots or depressions shall be brought to grade by placing additional concrete in such a manner that the finished surface will be reasonably smooth and uniform for the type of work involved. The final surface shall have a coarse broom finish and loose areas of concrete shall be removed and replaced by the Contractor at his expense.

Longitudinal (vertical) grooved joints shall be placed in the concrete lining at 10-foot centers. A transverse (horizontal) grooved joint shall be placed in the concrete lining

6 inches off the bottom of the canal. All grooves shall be made along straight lines and shall be maintained to the required slope and dimensions during any subsequent finishing operations until the concrete has hardened. Grooves shall be made in such a manner that spalling or tearing of adjacent concrete is avoided. The Contractor shall install an HDPE concrete embedment strip, GSE PolyLock or approved equivalent, into the concrete liner above the cutoff wall as indicated on the Plans. The HDPE embedment strip will be used by the contractor to secure the geomembrane liner to the concrete lining.

### **3-3 GEOMEMBRANE LINER**

The Contractor shall provide all labor, materials, equipment and perform all operations necessary to install canal lining “leak free” as specified, shown on the drawings, or as directed. Included is all laying, seaming, seam testing, excavation of anchor trenches, backfill and recompaction of anchor trenches, and attachment of lining to existing concrete structures and attachment of lining to proposed concrete lining. Also included are any materials, equipment, and labor not specifically mentioned necessary to install the lining “leak-free”.

The geomembrane shall be HDPE, 40 mils thick, and textured on one side or equivalent. The geomembrane shall be manufactured in the United States, and meet or exceed the Geosynthetic Research Institute’s (GRI) GM13 specification. Gasket material shall be neoprene, closed cell medium, 1/4-inch thick, 2 inches wide with adhesive on one side, or other compatible gasket materials as required. Metal battens or banding and hardware shall be stainless steel. Water cut-off mastic shall be Neoprene Flashing Cement as supplied by Poly-Flex, Inc., or as required. Sealant shall be General Electric Silicone, RTV 103, or equivalent.

The rolls shall be deployed using a spreader bar assembly attached to a loader bucket or by other methods approved by the Engineer. Adequate loading (e.g., sand bags or similar items that will not damage the geomembrane) shall be placed to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels). Geomembrane deployment shall proceed between ambient temperatures of 32° F and 104° F. Placement can proceed below 32° F only after it has been verified by the inspector that the material can be seamed according to the manufacturer's specifications. Geomembrane placement shall not be done during any precipitation, in the presence of excessive moisture (e.g., fog, rain, dew) or in the presence of excessive winds, as determined by the installation supervisor.

Approved field seaming processes are fusion and extrusion welding. On side slopes, seams shall be oriented in the general direction of maximum slope, i.e., oriented down, not across the slope. In corners and odd-shaped geometric locations, the number of field seams shall be minimized. Field test seams shall be conducted on the liner to verify that seaming conditions are satisfactory. Test seams shall be conducted at the beginning of each seaming period and at least once every 4 hours, for each seaming apparatus and personnel used that day. The Contractor shall non-destructively test all field seams over their full length.

Vacuum box testing equipment for testing extrusion seams shall be comprised of the following: A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly, a vacuum gauge, and a soapy solution in a plastic bucket with a mop. All seams and non-seam areas of the geomembrane shall be inspected by the inspector for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection. Each suspect location in seam and non-seam areas shall be non-destructively tested as appropriate in the presence of the inspector. Each location that fails the non-destructive testing shall be marked by the inspector, and repaired accordingly.

The Contractor shall retain all ownership and responsibility for the geomembrane until acceptance by the Owner. Final acceptance is when all of the following conditions are met: 1) Installation is finished, 2) Verification of the adequacy of all field seams and repairs, including associated testing, is complete.

**LOST HILLS WATER DISTRICT**

**NOTICE OF EXEMPTION**

**TO:** Clerk of the Board of Supervisors  
County of Kern  
1115 Truxtun Avenue  
Bakersfield, CA 93301

**FROM:** Lost Hills Water District  
3008 Sillect Avenue, Suite 205  
Bakersfield, CA 93308

**Project Title:** Canal 7-N Lining Project

**Project Location – Specific:** Service Area 7 North of Lost Hills Water District

**Project Location – City:** Not applicable

**Project Location – County:** Kern

**Description of Nature, Purpose and Beneficiaries of Project:**

Lost Hills Water District will line about one mile of the existing 7-N canal with 40 mil polyethylene material.

**Name of Public Agency Approving Project:** Lost Hills Water District

**Name of Person or Agency Carrying Out Project:** Lost Hills Water District

**Exempt Status:** (Check One)

Ministerial

Declared Emergency

Emergency Project

Categorical exemption. State type and section number: Replacement or reconstruction of existing facilities; 14 Cal. Adm. Code section 15302(c)

**Reasons why project is exempt:** Replacement or reconstruction of existing utility systems or facilities involving negligible or no expansion of capacity.

Phillip D. Nixon (661) 633-9022

Contact Person Area Code Telephone

**If filed by applicant:**

1. Attach certified document of exemption finding.

2. Has a notice of exemption been filed by the public agency approved the project:

Yes \_\_\_\_\_ No \_\_\_\_\_

**Date:** \_\_\_\_\_

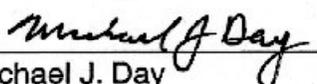
\_\_\_\_\_  
Phillip D. Nixon, Manager

Exempt7-N

## CERTIFICATION OF STATEMENTS

### Engineering Feasibility Certification

I, Michael J. Day, a California registered civil engineer, have reviewed the information presented in support of this application. Based on this information, and any other knowledge I have regarding the proposed project, I find that it can be designed, constructed, and operated to accomplish the purpose for which it is planned.

  
Michael J. Day  
RCE No. 39,494 (Expires 12-31-05)



DATE SIGNED: 1/7/05



WATDIST/LHWD

January 10, 2005

Directors:

Fred L. Starrh  
Division 1

Terry Rogers  
Vice President  
Division 2

Peter Frick  
Division 3

Michael Radon  
Division 4

Adrienne J. Mathews  
Division 5

Lawrence P. Gallagher  
Division 6

Gene A. Lundquist  
President  
Division 7

Thomas N. Clark  
General Manager

John F. Stovall  
General Counsel

California Department of Water Resources  
ATTN: Debra Gonzales  
Office of Water Use Efficiency  
P.O. Box 942836  
Sacramento, CA 94236-0001

RE: Lost Hills Water District Service Areas 4 and 7 Canal Lining Water Use Efficiency Projects

Dear Debra,

Lost Hills Water District, a Member Unit of the Kern County Water Agency, has discussed with the Agency its intention to apply for two grants under the California Bay-Delta Program's Water Use Efficiency Program. These projects will decrease losses to an area of shallow saline groundwater, and hence meet one of CALFED's Quantifiable Objectives for the Kern County area.

The Agency certainly supports these types of projects, which increase the usable water supply for beneficial uses. To the extent practical, the Agency will consider partnering with Lost Hills Water District on these projects with in-kind staff services.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Clark", written over a horizontal line.

Thomas N. Clark  
General Manager

661/634-1400

Mailing Address  
P.O. Box 58  
Bakersfield, CA 93302-0058

Street Address  
3200 Rio Mirada Dr.  
Bakersfield, CA 93308

**LOST HILLS WATER DISTRICT**

3008 SILLECT AVENUE, SUITE 205  
BAKERSFIELD, CALIFORNIA 93308-6240  
TELEPHONE: (805) 833-8022  
FAX: (805) 833-8028

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Manager/Secretary  
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Legal Counsel  
IVAN M. THOR  
Treasurer-Tax Collector  
Assessor

January 6, 2005

To: DWR Water Use Efficiency Program

c/o Phillip D. Nixon, Manager  
Lost Hills Water District  
3008 Sillect Avenue, Suite 205  
Bakersfield, CA 93308-6240

RE: Lost Hills Water District Service Area 7 Canal Lining Project

This letter is being written to support Lost Hills Water District's plan to line the Service Area 7N canal with a geomembrane lining, and to apply for a grant through the DWR Water Use Efficiency Program to help fund the project. By lining the canal, land that we farm in the area will benefit from the water saved and from the reduction in contribution to salty shallow groundwater.

We encourage the District to pursue this water use efficiency project and seek grant funding. Without grant funding, this project would not be economically feasible to the District and its water users.

Thank you,



L.W. Johnson  
Chevron U.S.A., Inc.

Regular Meeting Fourth Thursday of Each Month at 9:00 a.m.

# LOST HILLS WATER DISTRICT

3008 SILLIACK AVENUE, SUITE 205  
BAKERSFIELD, CALIFORNIA 93308-6240  
TELEPHONE: (805) 833-9022  
FAX: (805) 833-6026

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Assessor

January 6, 2005

To: DWR Water Use Efficiency Program

c/o Phillip D. Nixon, Manager  
Lost Hills Water District  
3008 Silliac Avenue, Suite 205  
Bakersfield, CA 93308-6240

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Thank you.

  
Phillip D. Nixon  
Sandridge Partners

Regular Meeting Fourth Thursday of Each Month at 8:00 a.m.

# LOST HILLS WATER DISTRICT

3008 SILLECT AVENUE, SUITE 205  
BAKERSFIELD, CALIFORNIA 93308-6240  
TELEPHONE: (861) 633-9022  
FAX: (861) 633-6028

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January 6, 2005

To: DWR Water Use Efficiency Program

c/o Phillip D. Nixon, Manager  
Lost Hills Water District  
3008 Sillect Avenue, Suite 205  
Bakersfield, CA 93308-6240

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We encourage the District to pursue this water use efficiency project and seek grant funding. Without grant funding, this project would not be economically feasible to the District and its water users.

Thank you,

  
Phillip D. Nixon  
Manager Farms

Mr. Day is a Senior energy and water resources engineer with twenty-two years of experience. He has an extensive background in investigations, planning, and design of irrigation and drainage facilities for water agencies and farms. Mr. Day's areas of expertise include irrigation system design and evaluation, groundwater and surface water investigations, surface and subsurface drainage systems design. He also has several years of experience in energy consulting for large energy users including farms and water agencies. Mr. Day has managed Provost & Pritchard's Bakersfield office since September 2000.

**Aq-Water Related Sample Projects:**

- ◆ **Kern Water Bank Authority River Area Pump Station and Pipeline Project, Bakersfield CA** - Responsible principal for design, bidding assistance, and construction management of a 3 mile long 60" diameter profile-wall HDPE pipeline with pump station (dual 50 cfs pumps), connections to well pipelines, 3 turnouts to recharge ponds, and a connection to the Cross Valley Canal with associated gates and water control structures.
- ◆ **Arvin-Edison Water Storage District's Groundwater Management Plan, Arvin, CA** Project manager who oversaw the preparation of a Groundwater Management Plan pursuant to AB-3030, which also complied with SB-1938 and Department of Water Resources Guidelines for the 126,000 acre District.
- ◆ **Lost Hills Water District SA-1 Reservoir Expansion Project, Lost Hills, CA** – Project manager for the feasibility study, AB-970 grant application, design and construction management of a 50 acre-foot reservoir expansion to facilitate shifting peak-period electricity use to off-peak hours. The project involved extensive earthwork in difficult subsurface conditions, bentonite lining of the bottom, and shotcrete slope protection along the sides. In addition pipelines and reinforced concrete structures were built to connect the new reservoir to an existing reservoir.
- ◆ **Lost Hills Water District SA-2 Canal Lining Project, Lost Hills, CA** – Primary contact person, and P&P staff supervisor on the design and construction management of a six-mile long canal lining project. Existing earth canals were replaced with slip-form concrete lining. Existing transition and turnout structures were upgraded or replaced.
- ◆ **Lost Hills Water District SA-3 Canal Lining Project, Lost Hills, CA**- Oversaw the design and construction of a project to replace an existing earthen canal with slip-formed concrete line canal (1 mile long) with 4' bottom width, 6' deep and ¼ mile of 42" reinforced concrete pipe. The project also included several water control structures.

- ◆ **Lost Hills Water District SA-5 Canal Project, Lost Hills, CA** – Oversaw construction management of a project to replace 2 miles of existing earthen canals with slip-formed concrete lined canal ( 4' bottom width by 6' deep). Project included construction of several transitions to existing structures.
- ◆ **Lost Hills Water District – Lost Hills, CA** - Prepared subsurface interceptor drainage system plans and specifications for surrounding Lost Hills Water District's evaporation ponds.

**Subsurface Drainage Related Experience:**

- ◆ **Lost Hills Water District – Lost Hills, CA** - Prepared subsurface interceptor drainage system plans and specifications for surrounding Lost Hills Water District's evaporation ponds.
- ◆ **North Fork Interceptor Project, Riverdale, CA** – Oversaw the design and construction management of approximately 8 miles of subsurface interceptor drains to protect agricultural lands from seepage below the levee of the North Fork of the Kings River.

B.S. Civil Engineering, California State University, Fresno

Civil Engineer, California, #39494

Treasurer, Past-President, and Past-Secretary - Kern Chapter of Civil Engineers and Land Surveyors of California (CELSOC)