10/10/03
Final

FEASIBILITY STUDY

FOR

NEW CACHE LA POUDRE IRRIGATING COMPANY RESERVOIRS AND PIPELINE

PREPARED FOR

NEW CACHE LA POUDRE
IRRIGATING COMPANY
P.O. BOX 104
LUCERNE, COLORADO
80646

PROJECT NO. 02.071

OCTOBER 2003

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FEASIBILITY STUDY

FOR

NEW CACHE LA POUDRE IRRIGATING COMPANY RESERVOIRS AND PIPELINE

Sponsored by

New Cache La Poudre Irrigating Company
and The Colorado Water Conservation Board

October 2003

Executive Summary

The New Cache La Poudre Irrigating Company (NCLPIC) manages water in the Greeley Number 2 Ditch to provide for its shareholders. The NCLPIC experiences operational inefficiencies throughout the system that amount to approximately 2000 ac-ft per year. The NCLPIC plans to construct a 300 ac-ft equalizer reservoir near Barnesville, Colorado to minimize the operational inefficiencies and to better serve the shareholders near the end of the system. In addition, the NCLPIC has filed an application with the Water Court for rights to draw and store 2200 ac-ft of water in two additional reservoirs near Barnesville. The overall project will require the construction of three reservoirs, a pumping station, and a pipeline. The construction is feasible at the proposed site based on the engineering issues analyzed. The estimated total project cost including interest is $13.4 million which translates to $179 per share per year. Based on a project delivery of 4500 ac-ft per year (2500 ac-ft from new storage and 2000 ac-ft from efficiency improvements), the total cost per ac-ft is approximately $2,978. The average annual cost per ac-ft is approximately $99. Based on the net revenues from irrigated crops in the service area, the benefit to cost ratio for the project is approximately 5.3.

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INTRODUCTION

The New Cache La Poudre Irrigating Company (NCLPIC) manages water in the Greeley Number 2 Ditch to provide for its shareholders. The NCLPIC diverts water directly from the Cache La Poudre River near Timnath, Colorado to feed the ditch. The amount of water available at each location in the ditch depends on river levels and runoff from rainstorms as well as demand from upstream users. Consequently, the ditch level fluctuates throughout the irrigation season making it difficult and inefficient to serve all of the users, particularly those near the end of the system. In order to overcome fluctuations in the ditch, NCLPIC must run more water than would otherwise be necessary to ensure that users at the end of the system are not shorted. In addition, some users irrigate with water pumped from groundwater supplies which depletes groundwater flows and impacts the amount of water available in the river. In order to continue pumping, these users must cover their depletions with groundwater augmentation. The Company is also approximately 10,000 ac-ft short of their current annual demand due to operational losses and the transfer of Colorado Big Thompson water out of the system. The intent of the proposed project is to construct three reservoirs near Barnesville, Colorado to equalize ditch flows, improve system efficiency, augment groundwater supplies, and provide storage to meet excess demand.

PROJECT SPONSOR

General

The New Cache La Poudre Irrigating Company was incorporated as a Mutual Ditch Company under the laws of the State of Colorado on February 21, 1898. Currently, the NCLPIC manages 2500 shares of stock held by approximately 300 users. The NCLPIC sets annual assessments to be paid by its shareholders. It has the authority to refuse water deliveries to shareholders who are delinquent in paying assessments, and can sell delinquent shares to cover delinquent assessments. The NCLPIC has the power of eminent domain and has the authority to enter into contractual arrangements. It does not have the authority to levy taxes and is not affected by the Tabor Amendment. The Articles of Incorporation and By-laws for the NCLPIC are included in Appendix A.

Service Area

The NCLPIC currently provides irrigation water to service approximately 35,000 acres in Larimer and Weld counties. The service area is located immediately north of the Cache La Poudre and South Platte rivers between Windsor, Colorado and Barnesville, Colorado. Water is diverted from the Cache La Poudre River by the New Cache Diversion Structure located near Timnath, Colorado to feed the Greeley Canal No. 2. The canal system consists of approximately 50 miles of ditch extending from the river to approximately 11 miles east of Highway 85. All of the water rights that feed the canal system are owned and managed by the New Cache La Poudre Irrigating Company;

however, the canal system itself is owned and managed by three separate companies. The New Cache La Poudre Irrigating Company owns and manages approximately 25 miles of ditch from Timnath, Colorado to a location approximately ¾ mile north of the intersection of Weld County Road 43 and Highway 392 at which point the ditch forks with the New Cache ditch heading south and the North Side Lateral heading east. From there, the North Side Lateral Company owns and manages approximately 12 miles of ditch extending to near Gill, Colorado. The North Side Extension Company owns and manages approximately 11 miles of ditch from near Gill to a location approximately one mile east and ½ mile south of the intersection of Weld County Road 63 and Weld County Road 68. A service area map is shown in Figure 1.

Land Use

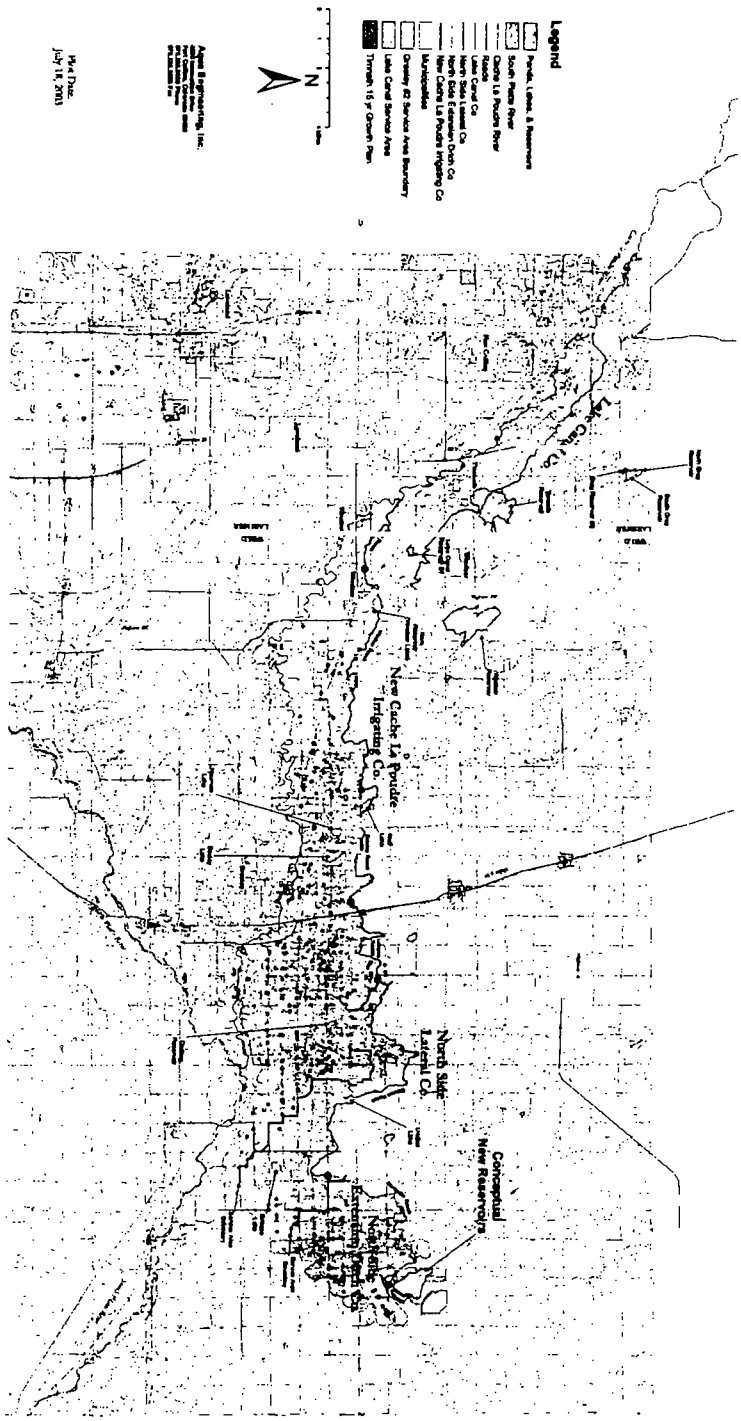
The surface soil types within the service area are predominantly sandy and clayey loams. The land is level to moderately sloping and suitable for a wide range of agricultural use when irrigated. Without irrigation, the land will support only dry land grasses. Currently, most of the land within the service area is used for agricultural purposes. The most recent survey of cropping patterns by shareholders was conducted in 1992. Table 1 below shows the estimated distribution of crops within the system and the total value of irrigated crops.

Table 1 – Crop Distribution and Value

Crops	Percentage of Total Area	Estimated Acres in Production	Net Operating Profit Per Acre[1]	Total Value of Irrigated Crops
Corn	40.2	14,070	$ 283.00	$ 3,981,810.00
Carrots	7.7	2,695	$ 2,200.00	$ 5,929,000.00
Beans	14.6	5,110	$ 274.00	$ 1,400,140.00
Alfalfa Hay	14.1	4,935	$ 299.00	$ 1,475,565.00
Barley	0.7	245	$ 179.00	$ 43,855.00
Sorghum	0.3	105	$ 150.00	$ 15,750.00
Onions	9.1	3,185	$ 1,982.00	$ 6,312,670.00
Sugar Beets	7.2	2,520	$ 247.00	$ 622,440.00
Miscellaneous	6.1	2,135	$ 200.00	$ 427,000.00
Total	100	35,000		$ 20,208,230.00

1. Calculated as Gross Receipts – Operating Costs (not including property and machinery costs). Values for Carrots, Sorghum, and Miscellaneous from CSU-DARE Information Report, I-R 90-1, July 1990. All others from CSU Agriculture and Business Management Crop Enterprise Budgets, 2001

Additional information on the primary soil types within the service area is contained in Appendix C.



DRAWN:	PROJ. #: 02.071	SCALE:	SERVICE AREA MAP
APPVD:	DATE: JULY 2003	N.T.S.	FIGURE 1

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Water Rights

The Company holds direct flow water rights for a total of 650 cfs from the Cache La Poudre River. The total amount was allocated in 5 decrees with appropriation dates ranging from October, 25 1870 to May 24, 1977. The Company has filed with the District Court, Water Division No. 1 for 2500 acre-feet of storage rights for the reservoirs considered in this feasibility study. A copy of the Company's current water rights application is contained in Appendix B. A summary of the Company's existing water rights is in Table 2.

Table 2 – Existing Water Rights

Priority	Date	Amount
37	October 25, 1870	110 cfs
44	September 15, 1871	170 cfs
72	November 10, 1874	184 cfs
83	September 15, 1877	121 cfs
Case No. W-8059-75	May 24, 1977	65 cfs
	Total	650 cfs

PROJECT DESCRIPTION AND ALTERNATIVES

Purpose

The purposes of the project are to provide water storage to equalize ditch flows, to improve the efficiency and reliability of the New Cache La Poudre Irrigating Company's system, to augment groundwater supplies to compensate for water pumped from the wells, and to provide storage to meet excess demand in order to benefit the shareholders and other water users in the Cache La Poudre and South Platte river basins.

Alternatives

1. No action. (Approximately $300,000 per year)
2. Purchase storage shares in Glade Reservoir or other large storage development project. (Approximately $1300/ac-ft.)
3. Construct equalizer, pipeline, and storage and augmentation reservoirs. ($ 9,542,000)

Alternative 1

The no action alternative leaves the system as it is and consequently does not address the NCLPIC's needs. It does not provide an equalizer to increase system efficiency. It does not provide groundwater augmentation. It does not provide storage to compensate for shortages in the system. Currently, the NCLPIC's supply is approximately 10,000 ac-ft short of demand based on rental water requests. If the NCLPIC follows the no action alternative, it will incur

ongoing, unquantified costs associated with the inefficiencies throughout the system in addition to rental water fees of approximately $300,000 per year (at current rental rates) to meet the demands of its shareholders.

Alternative 2

Plans by the Northern Colorado Water Conservancy District (NCWCD) for development of Glade Reservoir north of Fort Collins provide a potential solution to the problem of lack of storage within the system. The Company could purchase shares in the reservoir to use for storage. Current projections by the NCWCD for storage in Glade Reservoir are approximately $1300/ac-ft. This option is attractive for overcoming the problem of lack of storage; however, it does not address the operational efficiency issues of the ditch or the need for groundwater augmentation. Additionally, Glade Reservoir would not be available until 2012 at the earliest so this alternative does not address the Company's immediate needs.

Alternative 3

This alternative consists of constructing three reservoirs, a pipeline, and a pumping station near Barnesville, Colorado. One reservoir would be used as an equalizer to balance flows in the ditch to help overcome operational inefficiencies. The other two reservoirs would be filled during the winter with water pumped from the ditch through the pipeline. These reservoirs would be used for storage and/or groundwater augmentation.

SELECTED ALTERNATIVE

Alternative 3 was selected because it is the most feasible alternative for meeting the Company's needs for equalizing ditch flows, improving efficiency throughout the distribution system, recharging depleted groundwater supplies, and for providing storage. Specific requirements of the selected alternative are described below:

1. Construct Barnesville Equalizer, an approximately 300 acre-foot equalizer reservoir located directly adjacent to the North Side Extension. This reservoir would serve to stabilize ditch flows downstream and would act as a sedimentation basin for water pumped to storage. The reservoir would include an approximately 5-foot high earthen dam with emergency spillway.
2. Construct Cornish Plains Reservoir, an approximately 1600 acre-foot storage/augmentation reservoir.
3. Construct Drury Reservoir, an approximately 600 acre-foot storage/augmentation reservoir.
4. Construct the Barnesville Diversion Structure to divert water from the ditch to the Barnesville Equalizer. The concrete structure would include a

check gate to divert ditch flows and an overflow spillway to attenuate surges in the ditch due to storm events.

5. Construct the Jack Wells Pumping Station, a pumping station designed to transfer water from the Barnesville Equalizer into the North Side Extension, Cornish Plains Reservoir, or Drury Reservoir.
6. Construct a pipeline to carry water from the Jack Wells Pumping Station to the North Side Extension, Cornish Plains Reservoir, or Drury Reservoir. The pipeline would consist of a 36-inch line from Barnesville to the North Side Extension and Cornish Plains Reservoir and a 24-inch line from Cornish Plains Reservoir to Drury Reservoir.

Smith Geotechnical Engineering Consultants has conducted feasibility-level design work for the proposed dams, pumping station, and pipeline and HRS has conducted design work for the augmentation plan and water rights requirements. The site description for the selected alternative including evaluation of engineering issues is summarized in the following section.

Site Description

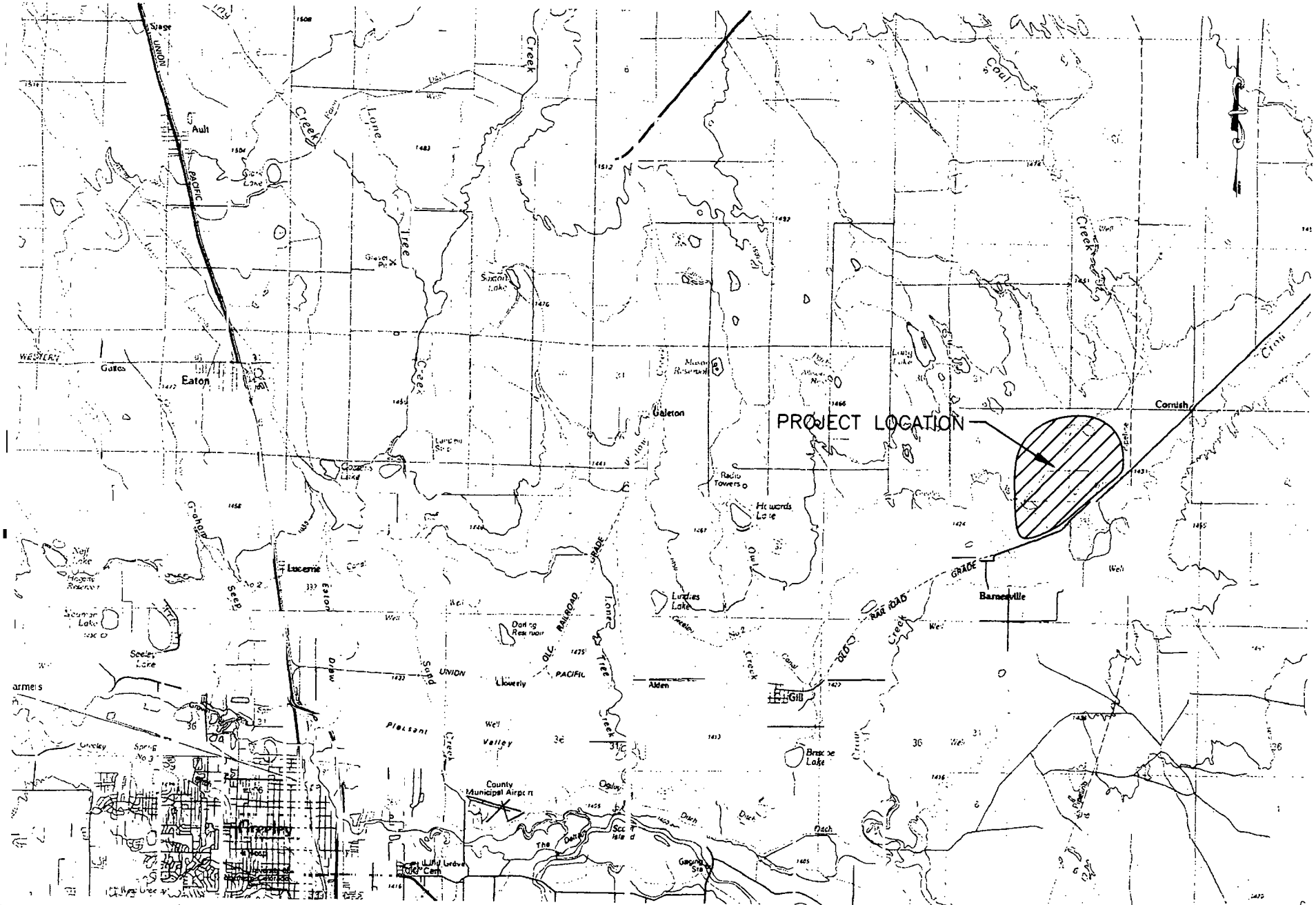
The site is located in Sections 4, 5, 8, 9, and 17 of Township 6 North, Range 63 West of the 6th Principle Meridian. Figure 2 shows a site location map. The site slopes generally to the southeast and consists of gently rolling pastureland. Existing landforms on the site are the result of erosion and consist of remnants of alluvial deposits of clay and sand that cover residual sandstone and shale. A site map for the proposed reservoirs is shown in Figure 3.

Drury Reservoir

Drury Reservoir will be located on the north side of the North Side Extension and will be filled with water pumped from Barnesville Equalizer. Drury Reservoir will require two dams. The main dam along the south side will be approximately 4630 feet long and will have a maximum height of approximately 15 feet and an 18 foot crest width. The east dam will be approximately 2425 feet long and will have a maximum height of approximately seven feet and an 18-foot crest width. A cutoff trench will be necessary beneath the main dam to reduce seepage along the foundation. A toe drain and a blanket drain will be constructed on the downstream side of the main dam to control seepage that comes through the dam. The reservoir will be designed to store up to 600 ac-ft of water. Typical details for Drury Reservoir are shown in Figure 4.

Cornish Plains Reservoir

Cornish Plains Reservoir will be located on the north side of the North Side Extension and will be filled with water pumped from Barnesville Equalizer or with water released from Drury Reservoir. The Cornish Plains Reservoir dam will be approximately 3240 feet long and will have a maximum height of approximately



DRAWN: DWM	PROJ. #: 02.071	SCALE:	**SITE LOCATION**
APPVD: DHS	DATE: JULY 2003	N.T.S	**FIGURE 2**

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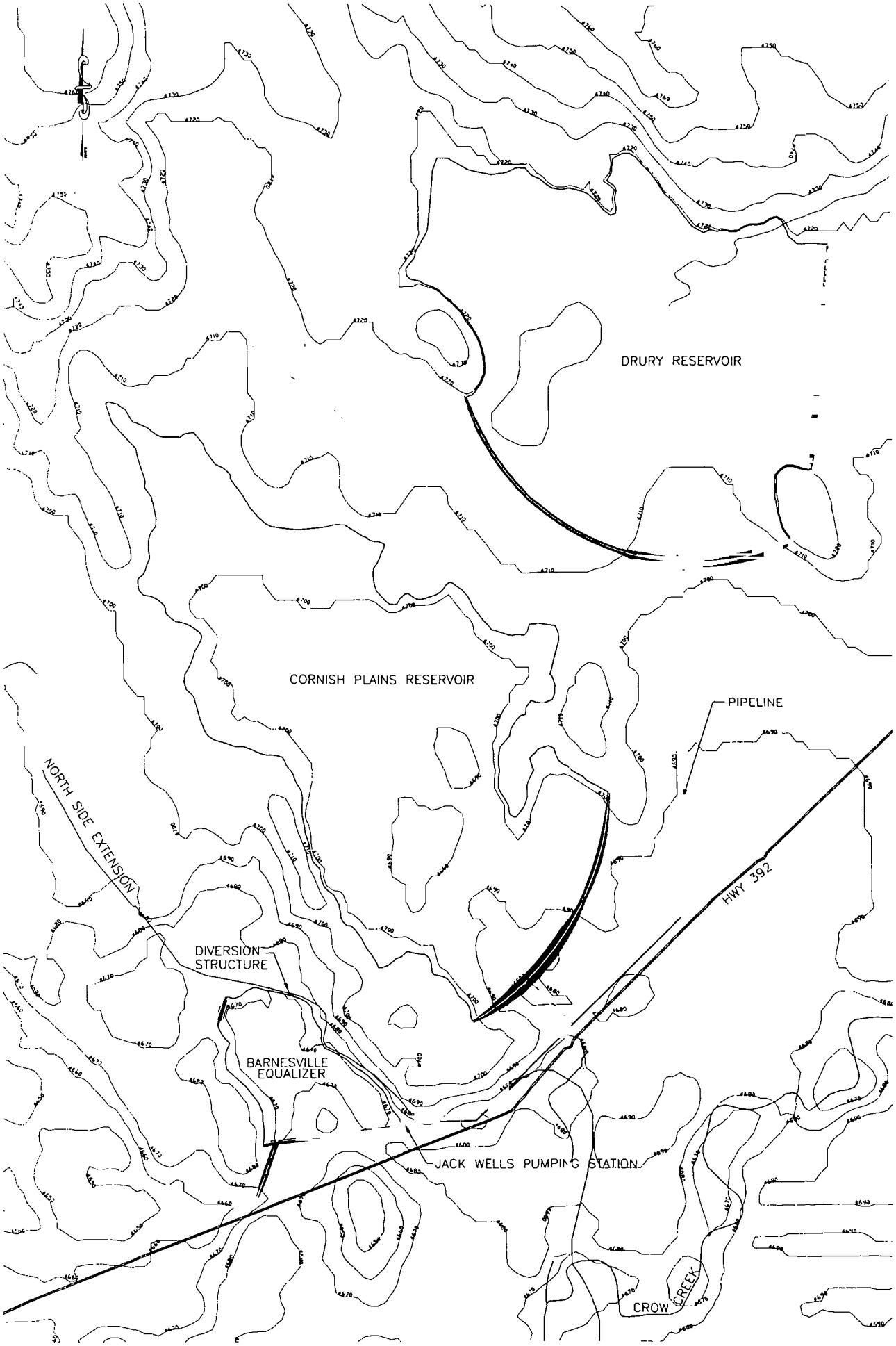

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SITE PLAN
FIGURE 3

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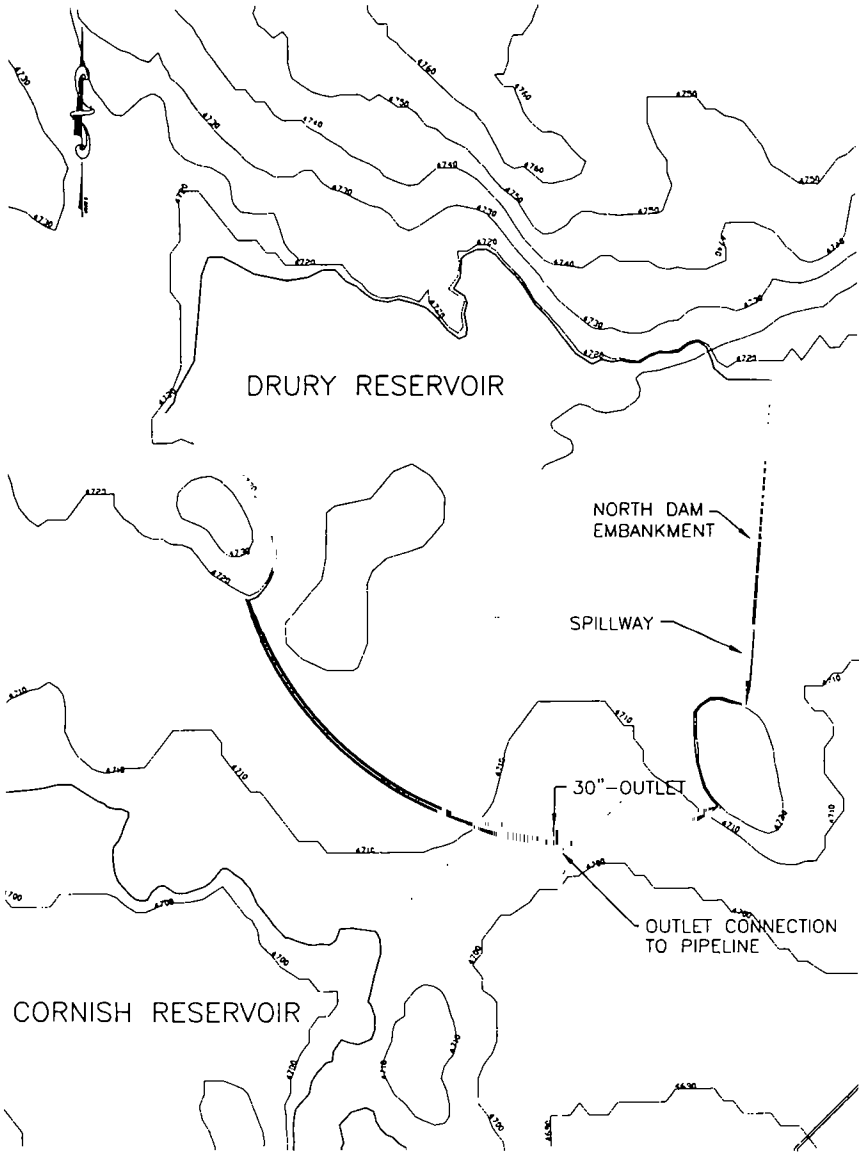
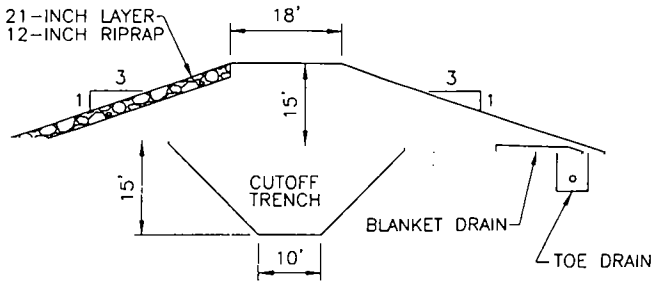
ENGINEERING CONSULTANTS



SITE PLAN

SCALE: 1"=1000'

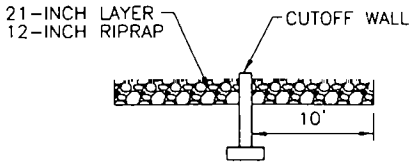


TYPICAL SECTION

SCALE: 1"=20'

DAM CHARACTERISTICTS

TOP OF DAM ELEVATION	4719 FT
MAXIMUM EMBANKMENT HEIGHT	15 FT
SPILLWAY ELEVATION	4714 FT
SPILLWAY LENGTH	430 FT
MAXIMUM STORAGE	600 AC-FT
OUTLET SIZE	30-INCH
OUTLET LENGTH	170 FT



SPILLWAY SECTION

N.T.S.

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DRURY RESERVOIR
FIGURE 4

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APPVD. DHS | DATE: JULY 2003

25 feet and an 18-foot crest width. A cutoff trench will be constructed beneath the dam to reduce seepage along the foundation. A toe drain and a blanket drain will be constructed on the downstream side of the dam. Because the dam is being constructed in a natural depression, the drain outfall pipe will have to extend approximately 4000 feet toward Barnesville Reservoir in order to allow gravity flow out of the drains. The reservoir will be designed to store up to 1600 ac-ft of water. Typical details for Cornish Plains Reservoir are shown in Figure 5.

Barnesville Equalizer

Barnesville Equalizer would be located in a natural depression on the south side of the North Side Extension that will be filled by gravity flow of water diverted from the ditch. Barnesville Equalizer will require a dam along the south side and a dam along the west side. The total length of the dams will be approximately 1230 feet and the maximum embankment height will be approximately 5 feet. An 18-foot crest width will be used to allow vehicles to travel easily along the top of the dam. The reservoir will be designed to store up to 300 ac-ft of water. Inlet flow to Barnesville Equalizer will be from a ditch diversion structure constructed in the North Side Extension. The concrete diversion structure will be comprised of a silt trap, two Obermeyer Gates, and an overflow spillway. The Obermeyer Gates will be used to check flow in the ditch and to control flow into Barnesville Equalizer. Both gates will have automatic controls for regulating flow in the ditch and into the reservoir. The overflow spillway will serve to catch and control surges in the ditch caused by localized storms. Typical details for the Barnesville Equalizer are shown in Figure 6. The proposed ditch diversion structure is shown in Figure 7.

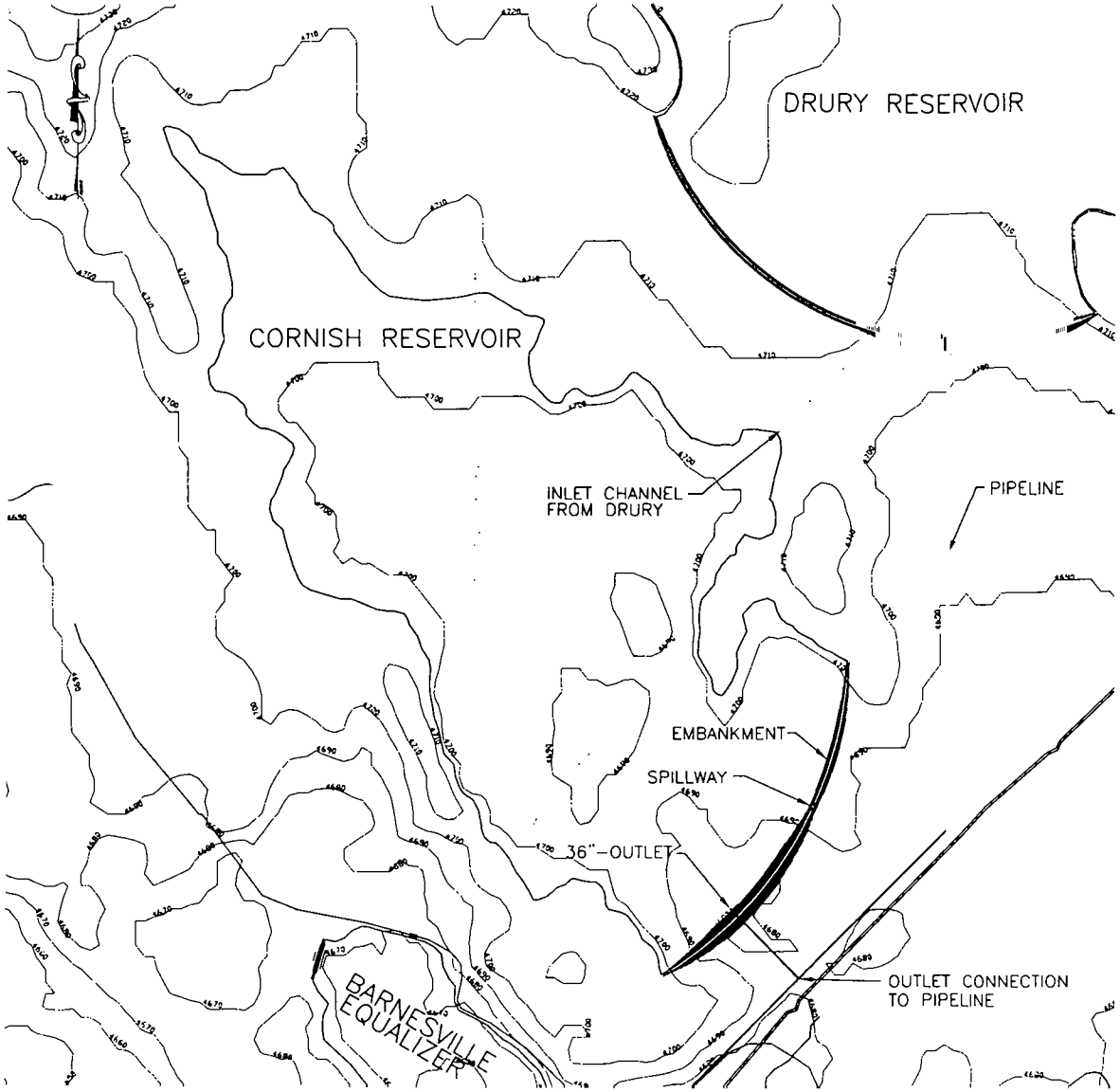
Geotechnical Evaluation

Reservoir Sites

The soils on the site consist of fine sand overburden underlain by a layer of well-graded sand and gravel. Bedrock at the Barnesville Equalizer site consists of shale. At the Drury and Cornish Plains sites, the bedrock consists of sandstone.

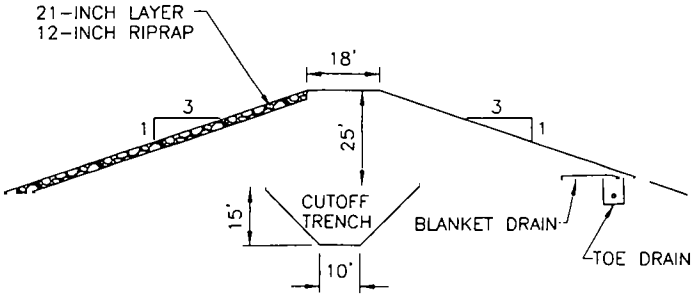
The soil survey of Weld County by the Soil Conservation Service indicates that the reservoir basins are dominated by Heldt Clay Loam. Renohill Clay Loam appears on the north and south abutments with Longmont Clay also in the south abutment area. Kim Loam emerges on the western edge of the basin.

The soils encountered on the site are predominantly fine sand and sand with gravel. BH-2/PZ at the Drury Reservoir site showed clay from the surface to approximately seven feet below grade where the material transitioned to sand with gravel. In all of the other borings on the proposed sites, overburden sand and sand with gravel were encountered from the surface to depths ranging from approximately twenty to thirty-two feet. At the Barnesville Equalizer site, shale



SITE PLAN

SCALE: 1"=1000'

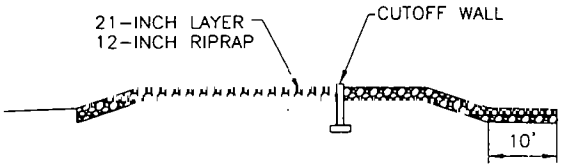


TYPICAL SECTION

SCALE: 1"=30'

DAM CHARACTERISTICTS

TOP OF DAM ELEVATION	4703 FT
MAXIMUM EMBANKMENT HEIGHT	25 FT
SPILLWAY ELEVATION	4698 FT
SPILLWAY LENGTH	15 FT
MAXIMUM STORAGE	1600 AC-FT
OUTLET SIZE	36-INCH
OUTLET LENGTH	815 FT



SPILLWAY SECTION

SCALE: N.T.S.

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CORNISH RESERVOIR
FIGURE 5

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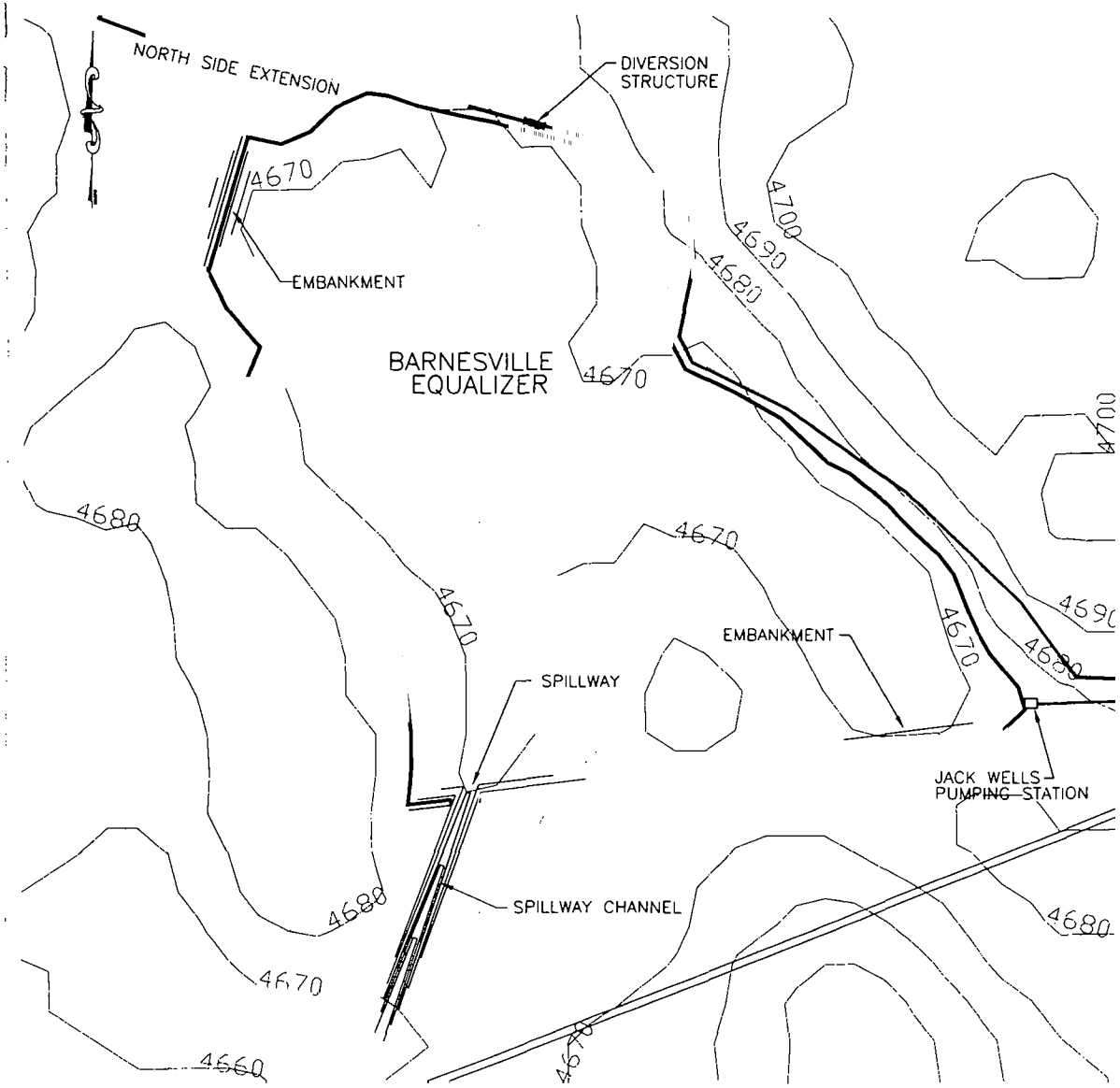
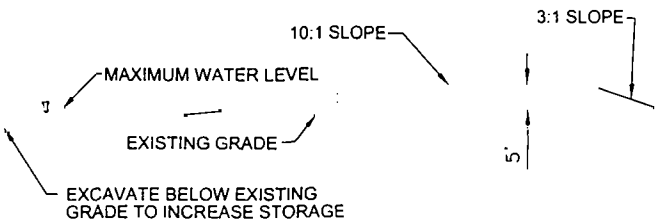


SITE PLAN

SCALE: N.T.S.

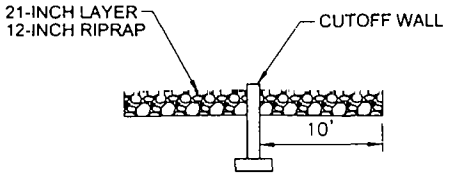


TYPICAL SECTION

SCALE: N.T.S.

DAM CHARACTERISTICTS

TOP OF DAM ELEVATION	4673 FT
MAXIMUM EMBANKMENT HEIGHT	5 FT
SPILLWAY ELEVATION	4668 FT
SPILLWAY LENGTH	10 FT
MAXIMUM STORAGE	300 AC-FT
OUTLET SIZE	N/A
OUTLET LENGTH	N/A



SPILLWAY SECTION

SCALE: N.T.S.

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BARNESVILLE EQUALIZER
FIGURE 6

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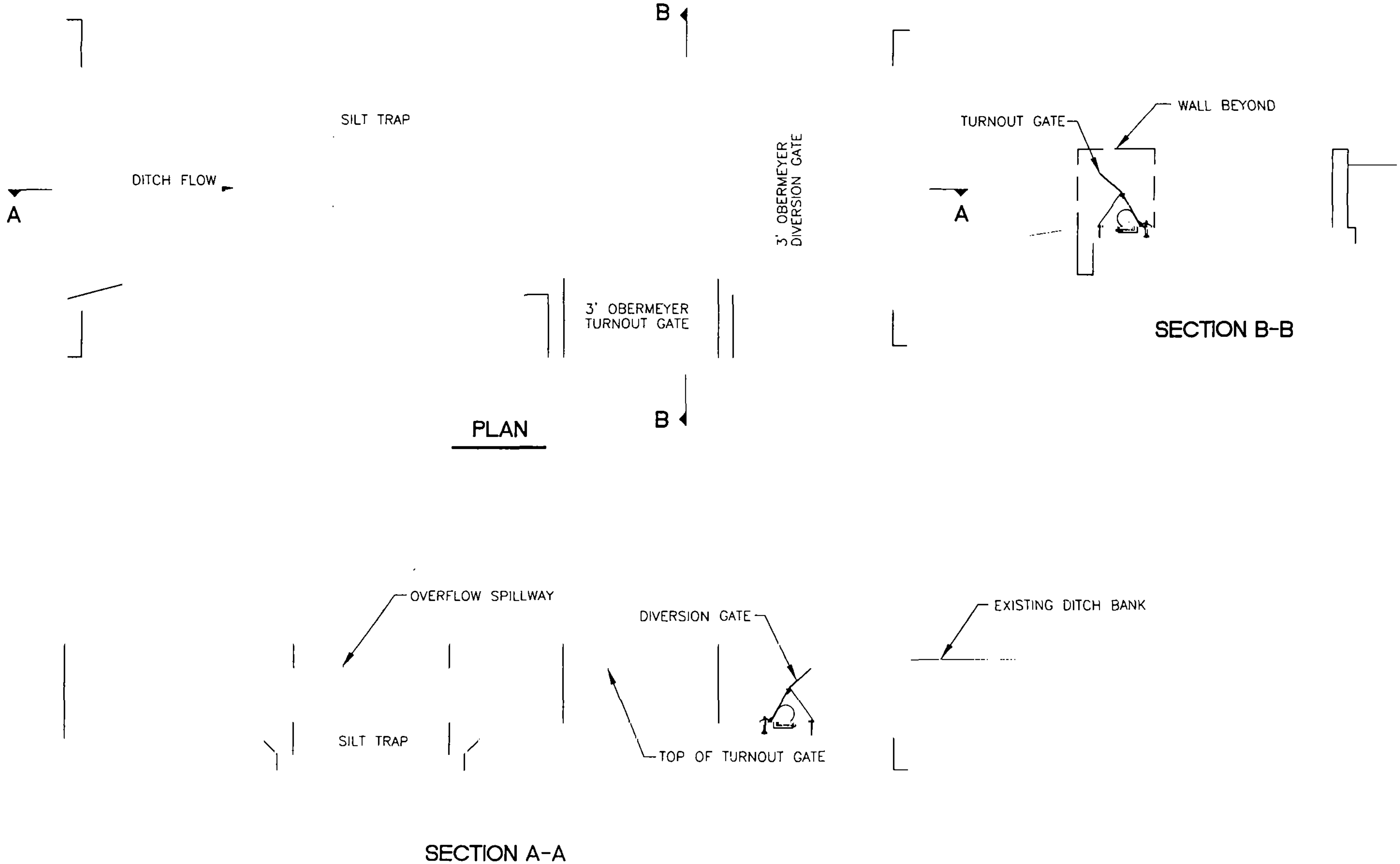

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DIVERSION STRUCTURE
FIGURE 7

SCALE: 1"=2'

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bedrock was encountered below the sand with gravel layer. At the Drury and Cornish Plains sites, sandstone bedrock was encountered below the sand and gravel layer. The fine sands exhibit low to medium permeability (4.0×10^{-5} to 9.0×10^{-5} cm/s) and can be used to construct dam embankments. The clay material encountered at the Drury Reservoir site exhibits low permeability (1.4×10^{-6} cm/s) and could be used to construct less permeable cores and cutoff trenches for the dams. The sand and gravel layer encountered above the bedrock is a mix of well-graded sand and gravel. Because of the fine sand in this layer, it exhibits only medium permeability (1.4×10^{-4} cm/s). It is possible that near-surface gravel layers exist within the proposed reservoir sites that were not encountered in the borings. If gravel layers exist at or near the surface, they will need to be cut off to prevent excessive seepage from the reservoirs; or, if desired, they could be used to facilitate groundwater augmentation.

Dam Embankments

Materials suitable for the construction of dams are available on site. The dams would consist of fine sand embankments with clay cores or upstream blankets and clay cutoff trenches along the foundation.

Slope Stability

Slope stability analyses were conducted for the maximum cross-section of Cornish Reservoir. This cross-section is the most critical section for the three dams considered in the project. Therefore, the slope stability results can be conservatively applied to all of the dams. Slopes of 3 (horizontal):1 (vertical) were used on the upstream and downstream faces. Based on laboratory testing of materials sampled from the site, 35 degrees was used as the design value for the angle of internal friction (phi), and 50 pounds per square foot (psf) was used for the cohesion. A unit weight of 120 pounds per cubic foot (pcf) was used for the soil weight. Figures 8 -10 show the results of the analyses for steady-state, sudden reservoir draw down, and seismic conditions. For the conditions analyzed, 3:1 slopes on the upstream and downstream faces meet the State Engineer Office's (SEO's) requirements for dam safety. Table 3 summarizes the results of the stability analyses.

Table 3 – Slope Stability Analysis Summary

Condition	Required Factor of Safety	Actual Factor of Safety
Steady State	1.5	1.8
Sudden Draw Down	1.2	1.6
Seismic	1.0	1.3

Figure 8 - New Cache Feasibility Study
Steady State Conditions

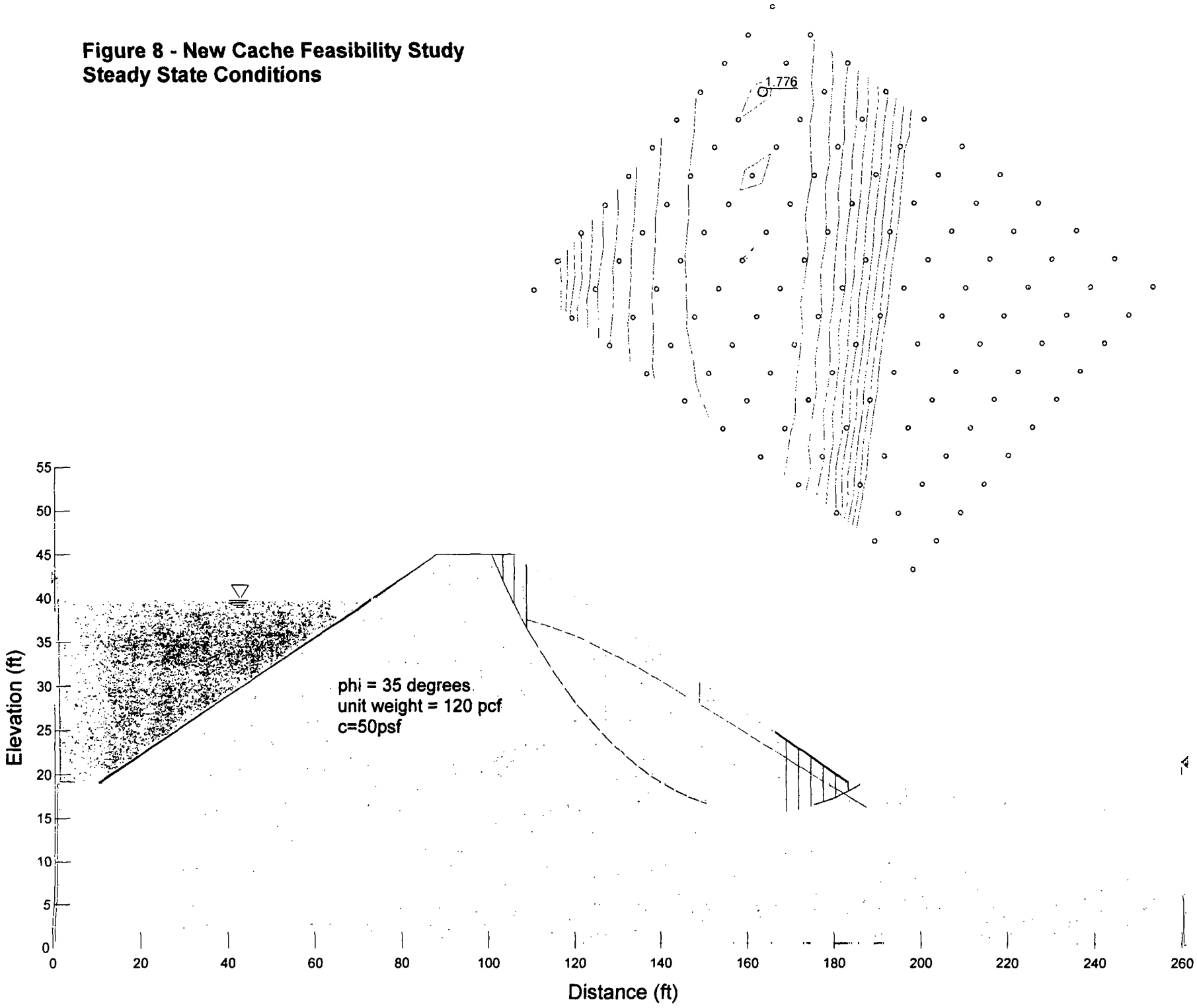


Figure 9 - New Cache Feasibility Study
10' Rapid Draw Down

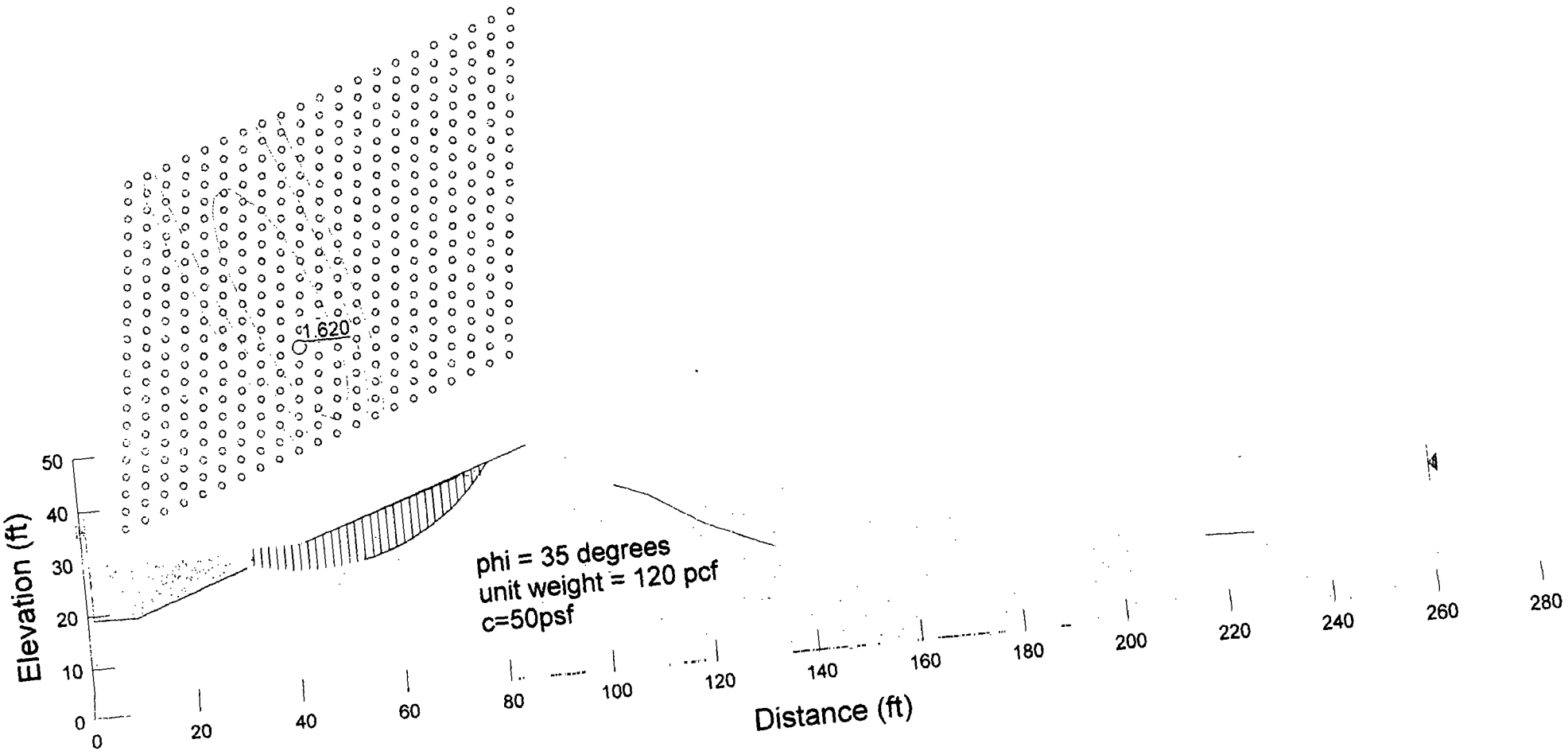
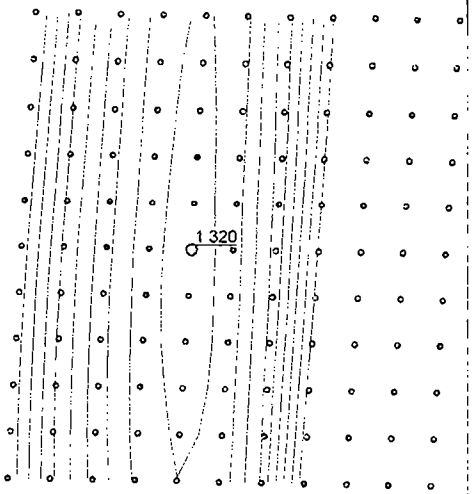
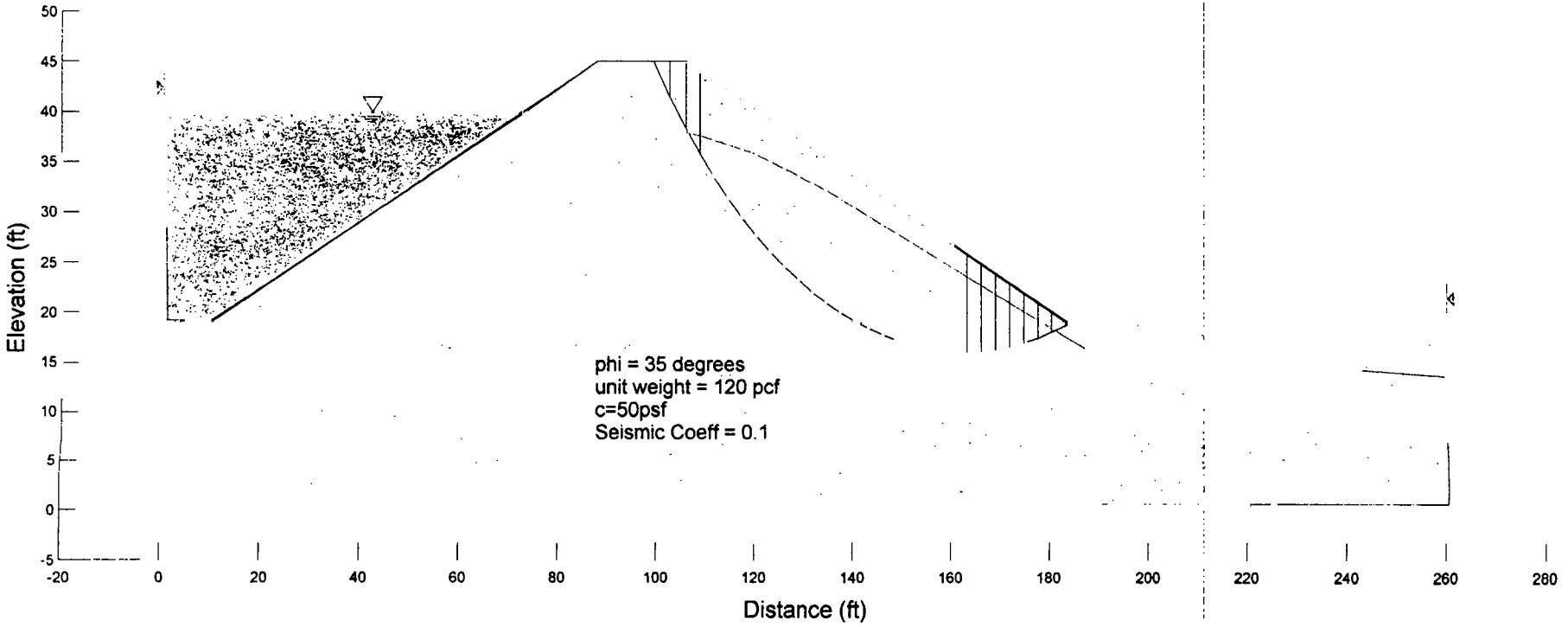


Figure 10 - New Cache Feasibility Study
Seismic Conditions





Seepage

Seepage analyses were conducted for a representative cross-section from Drury Reservoir. The cross-section extends across the reservoir bottom and upstream of the high end of the reservoir and downstream of the dam. The cross-section represents a 1-foot wide strip of the reservoir. Results from the analyses were multiplied by the 4000-foot width of the reservoir to determine the total amount of seepage from the reservoir.

Two analyses were conducted to approximate the amount of seepage out of the reservoir. The first analysis used permeability ranges determined from the soils sampled from the site. This analysis assumes that the entire reservoir bottom consists of materials similar to those sampled in the geotechnical investigation. In reality, the reservoir bottom could be highly variable. Based on this model, if all of the materials under the reservoir were similar to those encountered in the borings, approximately 0.02 to 0.2 ac-ft/day would seep into the ground. The second analysis used higher material permeabilities and assumed that a coarse sand and gravel layer exists 10 feet below the surface. Based on this seepage model, approximately 1.3 ac-ft/day would seep into the ground. If undiscovered gravel layers exist at shallow depths in the reservoir, the seepage rates through the gravel could be significantly higher than those modeled. The results of the seepage analysis are summarized in Table 4 and are shown in Figures 11 and 12.

Table 4 – Seepage Analysis Summary

	Permeability	
Depth	**As Encountered in Field**	**With High Permeability Layer**
0' - 10'	Fine Sand – 10^{-4} to 10^{-5} cm/s	Fine Sand – 10^{-3} to 10^{-4} cm/s
10' - 20'	Fine Sand w/Gravel – 10^{-4} to 10^{-5} cm/s	Coarse Sand w/Gravel – 10^{-2} cm/s
20' - 30'	Coarse Sand – 10^{-3} to 10^{-4} cm/s	Coarse Sand w/Gravel – 10^{-2} cm/s
Total Seepage	0.02 to 0.2 ac-ft/day	1.3 ac-ft/day

Geotechnical Evaluation Summary

Based on subsurface investigation, testing, and analysis, the site appears suitable for the construction of the proposed reservoirs. The on-site materials appear adequate for the construction of dams. A complete report of the geotechnical investigation is contained in Appendix C.

Geologic Evaluation

A preliminary geologic assessment was made for the proposed sites using the Geologic Map of Colorado compiled by Ogden Tweto. The Laramie Formation consisting of shale, claystone, and sandstone of the Upper Cretaceous Age is the primary geologic formation in the area. Surface layers contain some Eolian Deposits of the Quaternary Age including silt and Peorian Loess. Based on a

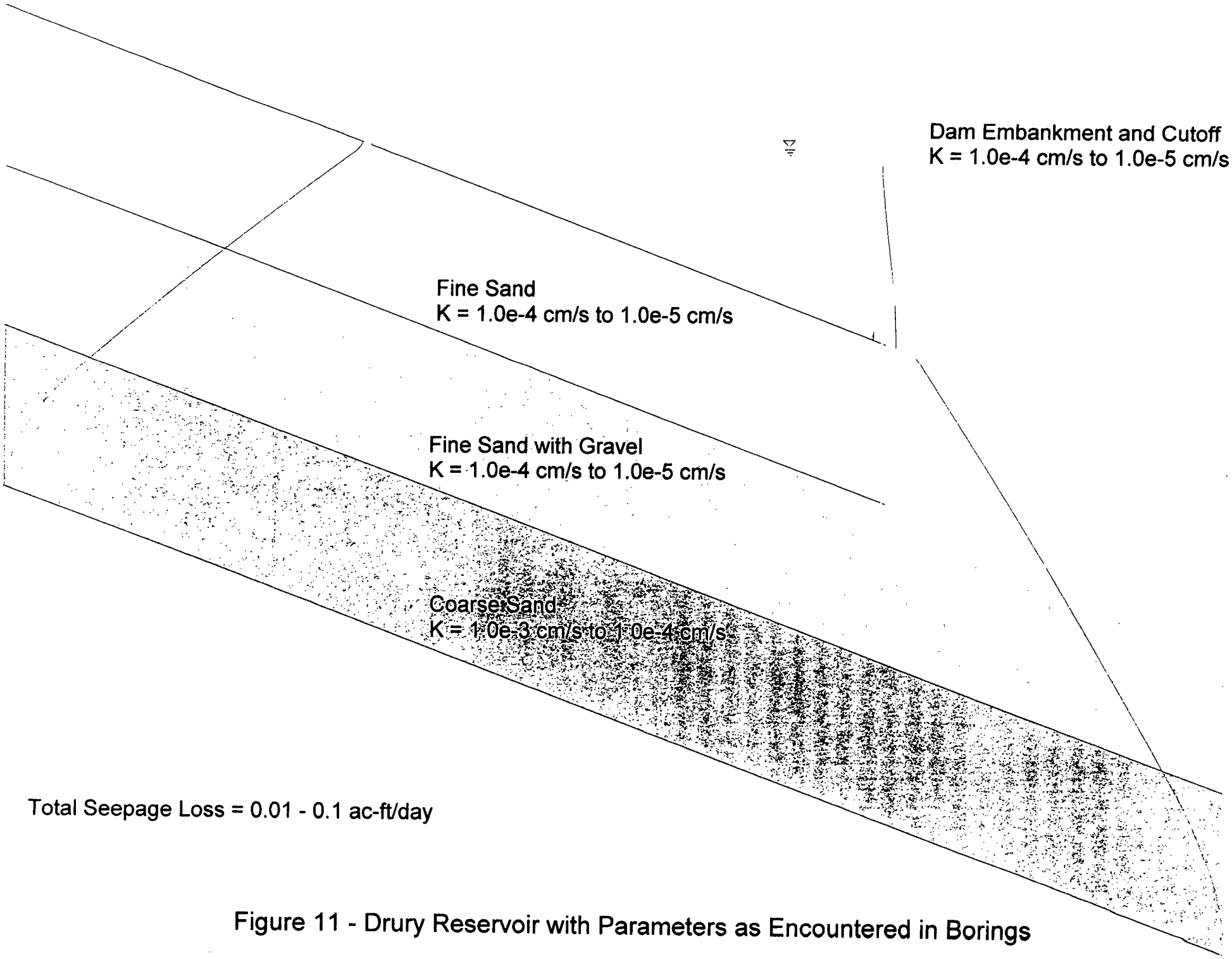


Figure 11 - Drury Reservoir with Parameters as Encountered in Borings

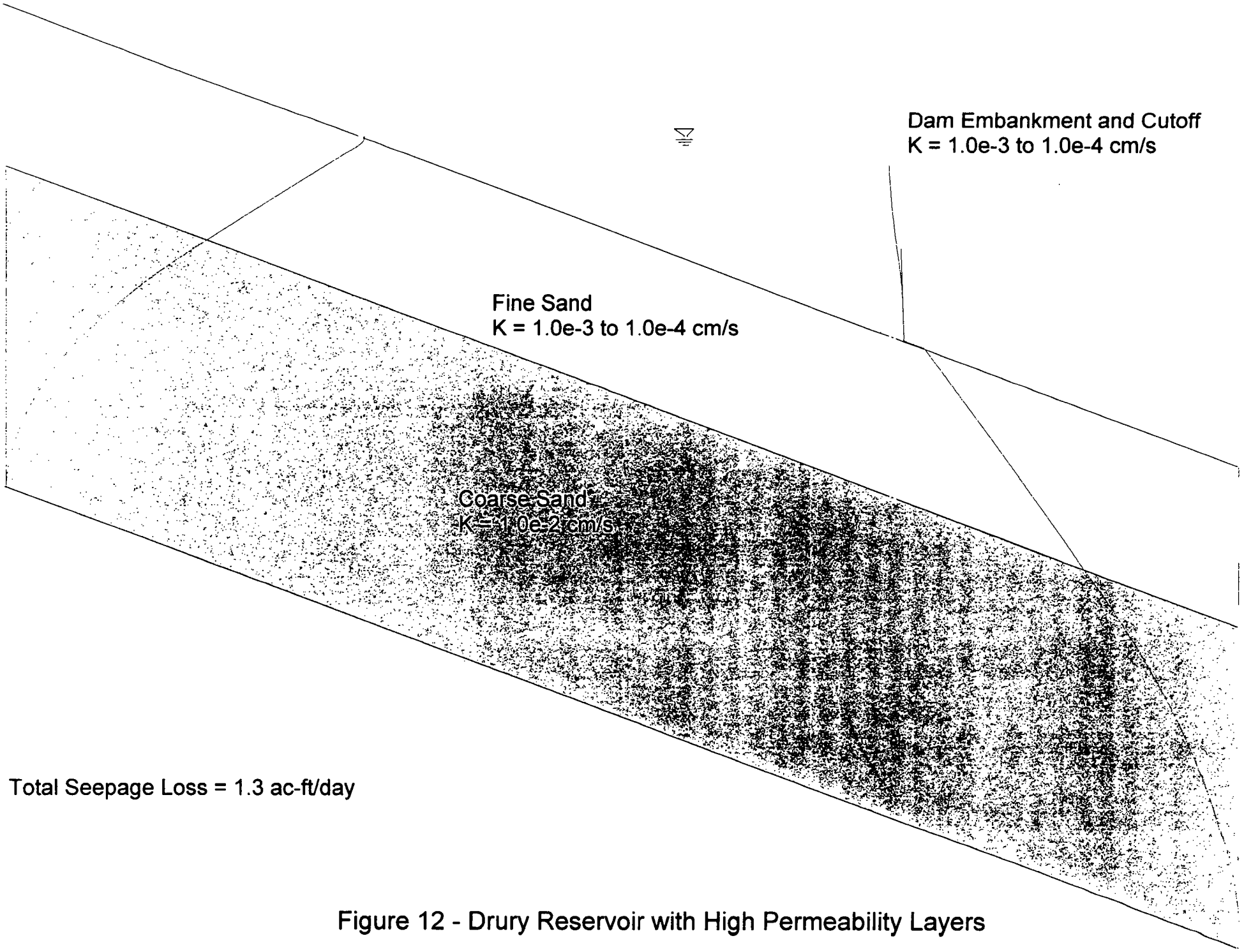


Figure 12 - Drury Reservoir with High Permeability Layers

cursory map study, no physical features exist that would complicate the construction of a dam.

Mineral Resources

Northeastern Colorado contains various economical mineral resources including petroleum, natural gas, uranium, gravel and crushed-rock aggregate, and limestone. Gravel and crushed-rock aggregates are currently mined from various localities in Northern Colorado, but only small amounts exist on this site. Currently there are no mineral resources being extracted from this site and it does not appear that the site contains sufficient resources to be mined economically.

Hydrologic Evaluation

Dam Classification

Detailed dam classification studies for the proposed reservoirs are beyond the scope of this feasibility study. Based on conservative assumptions, Drury Reservoir can be classified as a Class II, Small dam, Cornish Plains Reservoir can be classified as a Class II, Intermediate dam, and Barnesville Equalizer can be classified as a Class III, Small dam.

Hydrologic Modeling

Preliminary hydrologic modeling was conducted using HEC-HMS from the U.S. Army Corps of Engineers. A runoff coefficient, K_n, of 0.06 was assumed for the basins based on topographic and land-use conditions. Uniform infiltration rates were determined for the soil conditions in the basins as determined from Soil Conservation Service Maps. Infiltration rates of 0.16 in/hr and 0.22 in/hr were used for the Drury Reservoir and Cornish Reservoir basins respectively. Because the Barnesville Equalizer basin is so small, no infiltration was used in the model. Synthetic unit hydrographs were determined based on the USBR's Flood Hydrology Manual. Spillway discharge was modeled as a trapezoidal weir with 6:1 side slopes and a weir coefficient of 2.63. Results of the hydrologic studies are summarized below. Complete details and results of the hydrologic modeling are contained in Appendix D.

Drury Reservoir

The Drury Reservoir Dam can conservatively be classified as a Class II, Small dam. The required design storm for a Class II, Small dam is 50% of the Probable Maximum Precipitation (PMP). The required spillway length for Drury Reservoir based on the design storm would make the project unfeasible. However, due to the large size of the drainage basin, small reservoir size, and remote location, an incremental damage analysis should allow the reservoir to be designed for the

100-yr storm which would reduce the required spillway length substantially. If the Drury Reservoir spillway were designed for the 100-yr storm, and the dam failed, the Company would be liable for the incremental damage, but the project would be more economically feasible. This feasibility study assumes that an incremental damage analysis will be conducted and accepted by the State Engineer's Office for Drury Reservoir. Therefore, the preliminary design and cost estimates contained in this study are based on a 100-yr storm for Drury Reservoir. The required spillway length for the 100-yr design storm is 430 feet.

The spillway used for the cost estimate consists of a concrete cutoff wall with riprap extending approximately 10 feet beyond the toe of the dam. The spillway cutoff wall has a trapezoidal cross-section with a 430-foot base width and 6(horizontal):1(vertical) side slopes. Results of the preliminary hydrologic modeling for Drury Reservoir are summarized in Table 5.

Table 5 - Drury Reservoir Hydrologic Modeling Summary

	Kn = 0.06	
Dam Classification →	**Class II, Small**	**Class II, Small**
Design Storm	50% PMP	100-yr storm[1]
Peak Inflow	47,890 cfs	11,512 cfs
Total Inflow	24,335 ac-ft	4,586 ac-ft
Peak Outflow	47,890 cfs	8,968 cfs
Peak Stage	4,718'[2]	4,718'[2]
Required Spillway Length	2,250'	430'

1. Assumes Incremental Damage Analysis is accepted by SEO.
2. Peak stage elevation is one foot below the top of dam elevation in accordance with SEO requirements.

Cornish Plains Reservoir

The Cornish Plains Reservoir Dam can conservatively be classified as a Class II, Intermediate dam. The required design storm for a Class II, Intermediate dam is 50% of the PMP. Because the Cornish Reservoir basin is small, the reservoir would only require a 15-foot wide spillway to pass the 50% PMP storm. The spillway used for the cost estimate consists of a concrete cutoff wall with riprap extending approximately 10 feet beyond the toe of the dam. The spillway cutoff wall has a trapezoidal cross-section with a 15-foot base width and 6(horizontal):1(vertical) side slopes. Results of the preliminary hydrologic modeling for Cornish Plains Reservoir are summarized in Table 6.

Table 6 - Cornish Plains Reservoir Hydrologic Modeling Summary

Dam Classification →	**Class II, Intermediate**
Design Storm	50% PMP
Peak Inflow	8409 cfs
Total Inflow	1545 ac-ft
Peak Outflow	494 cfs
Peak Stage	4702'[1]
Required Spillway Length	15'

1. Peak stage elevation is one foot below the top of dam elevation in accordance with SEO requirements.

Barnesville Equalizer

The Barnesville Equalizer dam can conservatively be classified as a Class III, Small dam for which the required design storm is the 100-yr storm. Based on the hydrologic analysis, Barnesville Equalizer can store up to 3.5 times the design storm without overtopping. Because it can store the design storm, Barnesville Equalizer does not require a spillway. However, in order to ensure that the maximum storage elevation is maintained at the decreed elevation, a 10-foot wide overflow spillway and spillway channel are recommended. The spillway used for the cost estimate consists of a 10-foot wide trapezoidal concrete cutoff wall with 6(horizontal):1(vertical) side slopes with riprap extending 10 feet beyond the cutoff wall. The channel consists of an approximately 5-foot deep, 10-foot wide trapezoidal earth-lined channel. Results of the preliminary hydrologic modeling for Barnesville Equalizer are summarized in Table 7.

Table 7 - Barnesville Equalizer Hydrologic Modeling Summary

Dam Classification →	**Class III, Small**
Design Storm	100-yr
Peak Inflow	880 cfs
Total Inflow	67 ac-ft
Peak Outflow	0 cfs
Peak Stage	4670.3'[1]
Required Spillway Length	0'

1. Entire design storm inflow is stored in 0.3'.

Evaporation and Rainfall

The average annual evaporation at the site is approximately 38 inches and the average annual rainfall is approximately 16 inches. The detailed hydrologic modeling required to accurately predict the amount of runoff that will enter the reservoirs throughout the year is beyond the scope of this study. In order to obtain an upper bound for the amount of net loss due to evaporation, only rainfall directly on the reservoirs was considered. Thus, ignoring runoff from the basins, the net loss for each reservoir is 22 inches per year. If all of the reservoirs are kept full throughout the year, there would be a maximum net loss of approximately 859 ac-ft per year from the three reservoirs together.

North Side Lateral and North Side Extension Operational Study

Smith Geotechnical conducted an operational study of the North Side Lateral and North Side Extension in order to determine the size of equalizer reservoir necessary to improve system efficiency. The study compared water deliveries to water demand for the section of the ditch system downstream of Turnout 31 over a 6 year period from 1995 through 2000. The study showed that in five out of the six years the total amount of water available downstream of Turnout 31 during the season exceeded the total demand downstream of Turnout 31, but that on several occasions the peak demands exceeded the available flow in the ditch. In

addition, over the 6 year study period the average annual excess delivered downstream of Turnout 31 ranged from approximately 900 ac-ft to approximately 3500 ac-ft with an average of approximately 2000 ac-ft downstream of Turnout 31. These excesses were due to operational inefficiencies, and inaccuracies. The shortages during peak demands can be mitigated by the use of an equalizer reservoir. The operational study showed that a 453 ac-ft reservoir would have been necessary to overcome all of the shortages experienced during the study period, but that a 91 ac-ft reservoir would have provided sufficient additional water to meet the peak demand in five out of the six years during the study period. In addition, with an equalizer reservoir, the operational difficulties that caused the excess deliveries downstream of Turnout 31 could have been minimized resulting in efficiency improvements ranging from 900 to 3500 ac-ft per year. Based on the results of the study, the NCLPIC decided to proceed with plans to construct an equalizer reservoir. A 300 ac-ft reservoir was selected for the Barnesville Equalizer due to physical constraints at the site.

Groundwater Augmentation Plan

Currently, several NCLPIC shareholders pump from groundwater supplies to irrigate their land. In addition, many wells formerly covered under GASP no longer have groundwater augmentation plans. Without augmentation plans, it will be illegal for these users to operate their wells. HRS Water Consultants, Inc. is currently developing a groundwater augmentation plan for NCLPIC shareholders and other subscribing well users in the area. The plan should be completed and submitted to Water Court by the end of December 2003. Subsequently, a short-term substitute plan can be utilized to allow well users to continue operating their wells while the long-term plan is reviewed by the Water Court. Drury Reservoir, Cornish Plains Reservoir, and Barnesville Equalizer will be included in the augmentation plan.

Outlet Works

Drury Reservoir

Drury Reservoir requires a 30-inch diameter outlet pipe to meet the State Engineer's requirement of lowering the reservoir five feet from full capacity in five days. The outlet pipe will be configured to direct flow into either an energy dissipation structure or into the pipeline. The flow will be controlled with gate valves near the end of the outlet pipe. The outlet pipe will have a sluice gate on the upstream end. In order to facilitate connection to the pipeline and control valves, a concrete-encased ductile iron pipe is recommended. Ductile iron pipe is a pressure pipe and can therefore be used as a gravity flow outlet and as a pressurized inlet.

Cornish Plains Reservoir

Based on the available topographic information and a visual inspection of the site, Cornish Plains Reservoir appears to be located in a depression and there does not appear to be a good location near the toe of the dam to discharge the outlet. Consequently, the Cornish Plains Reservoir outlet will be configured to discharge through the pipeline into Barnesville Equalizer or the North Side Extension ditch. Because of the length of the outlet pipe and the low head difference between Cornish Plains Reservoir and Barnesville Reservoir, a 36-inch diameter outlet pipe is necessary to meet the State Engineer's requirement of lowering the reservoir five feet in five days. A concrete-encased ductile iron pipe is recommended for the section of the outlet pipe that passes through the dam. Downstream of the toe of the dam, a gravel-bedded ductile iron pipe is recommended. Following more extensive topographic surveying during the design phase it may be possible to find an alternative outlet configuration that would allow the use of a 30-inch diameter outlet pipe in lieu of the 36-inch diameter pipe.

Barnesville Reservoir

Barnesville Reservoir will be constructed in an existing depression. The storage capacity will be increased by excavating below the existing grade. The maximum storage elevation will be at or below the elevation of the natural boundary of the basin. The embankment merely provides freeboard. Because the reservoir is so deep in the ground, it is impossible to provide a gravity-flow outlet that will drain the reservoir. The only outlet from the reservoir will be a pumped outlet that can discharge through the pipeline into Drury Reservoir, Cornish Plains Reservoir, or the North Side Extension. The pumped outlet will have capacity sufficient to draw the reservoir down five feet in five days to comply with the State Engineer's requirements; however, the use of a pumped outlet will require the State Engineer's approval because their regulations require a gravity-flow outlet.

Jack Wells Pumping Station and Pipeline

Jack Wells Pumping Station

A pumping station will be required to pump water from Barnesville Equalizer to Cornish Plains and Drury Reservoirs or into the canal. Approximately 240 hp is required to obtain a flow rate of 20 cfs from Barnesville to Drury through a 24-inch diameter pipe. For pumps with 80% efficiency approximately 300 hp of pumping power will be required. Figures 13 and 14 show two pump configuration options considered. Both options would require similar intake structures, control systems, and power requirements. Both configurations could provide 20 cfs to Drury Reservoir or approximately 50 cfs to Cornish Plains Reservoir. At 20 cfs, Drury Reservoir would be completely filled from empty in approximately 15 days. At 50 cfs, Cornish Plains Reservoir would be completely filled from empty in

approximately 16 days. Option 1 is the low cost option for the 20 cfs flow requirement. Option 2 provides redundancy in the pump system. If a pump were to fail, the other pump could still operate. The costs associated with these options are shown in Table 8. The New Cache La Poudre Irrigating Company selected Option 2 in order to best meet the needs of its shareholders. The costs shown are for estimating purposes. The pump configuration would be further optimized to meet the specific operational needs of the NCLPIC during the design phase.

Table 8 – Cost Estimates for Pump Configuration Options

Option 1 - (1) 300 hp Pump

Efficiency =	88%		
Max. Capacity to Drury Reservoir =	9800	gpm	
=	22	cfs	

	Type	Qty	Unit Price	Total Price
Pumps	Floway 27FKH	1	$39,700.00	$ 39,700.00
Fittings	30" Butterfly Valve	1	$7,400.00	$ 7,400.00
	30" Check Valve	1	$14,285.00	$ 14,285.00
			Total Cost	**$ 61,385.00**

Option 2 - (2) 150 hp Pumps

Efficiency =	86%			
Max. Capacity to Drury Reservoir =	9160	gpm		
=	20	cfs		

	Item	Qty	Unit Price	Total Price
Pumps	Floway 19FKH	2	$22,300.00	$ 44,600.00
	14" Butterfly Valve	2	$1,500.00	$ 3,000.00
Fittings	30"x14" Tee	2	$3,550.00	$ 7,100.00
	30" Check Valve	1	$14,285.00	$ 14,285.00
			Total Cost	**$ 68,985.00**

Note: Costs shown are for pumps and fittings required to connect to the pipeline.
They do not include pipe or fitting costs associated with the rest of the pipeline.

In order to operate the pumps, 3-phase power would be required at the site. Xcel Energy is the power utility at the site. Existing power is available along Highway 392. Approximately 500 feet of new power line ($10/ft) and a 500 KVA transformer ($15,000) would be required at the site. Xcel offers a construction

credit for new service installation if the line is activated within 60 days of installation. The credit is a function of total hp required. For a 300 hp service, the credit would approximately cover the cost of the installation. Monthly service rates are based on Xcel's Secondary General Rate which contains both a monthly demand fee and usage fee. Currently the demand fee is approximately $12.55 per kw and the usage fee is $0.017 per kwh. The demand fee is charged each billing cycle that the pumps are operated regardless of how much total power is used. At the current rates, it would cost approximately $5550 to operate the pumps continuously for one monthly billing cycle ($2810 for demand, and $2740 for usage). The power requirement is the same for both pump configuration options considered.

Pipeline

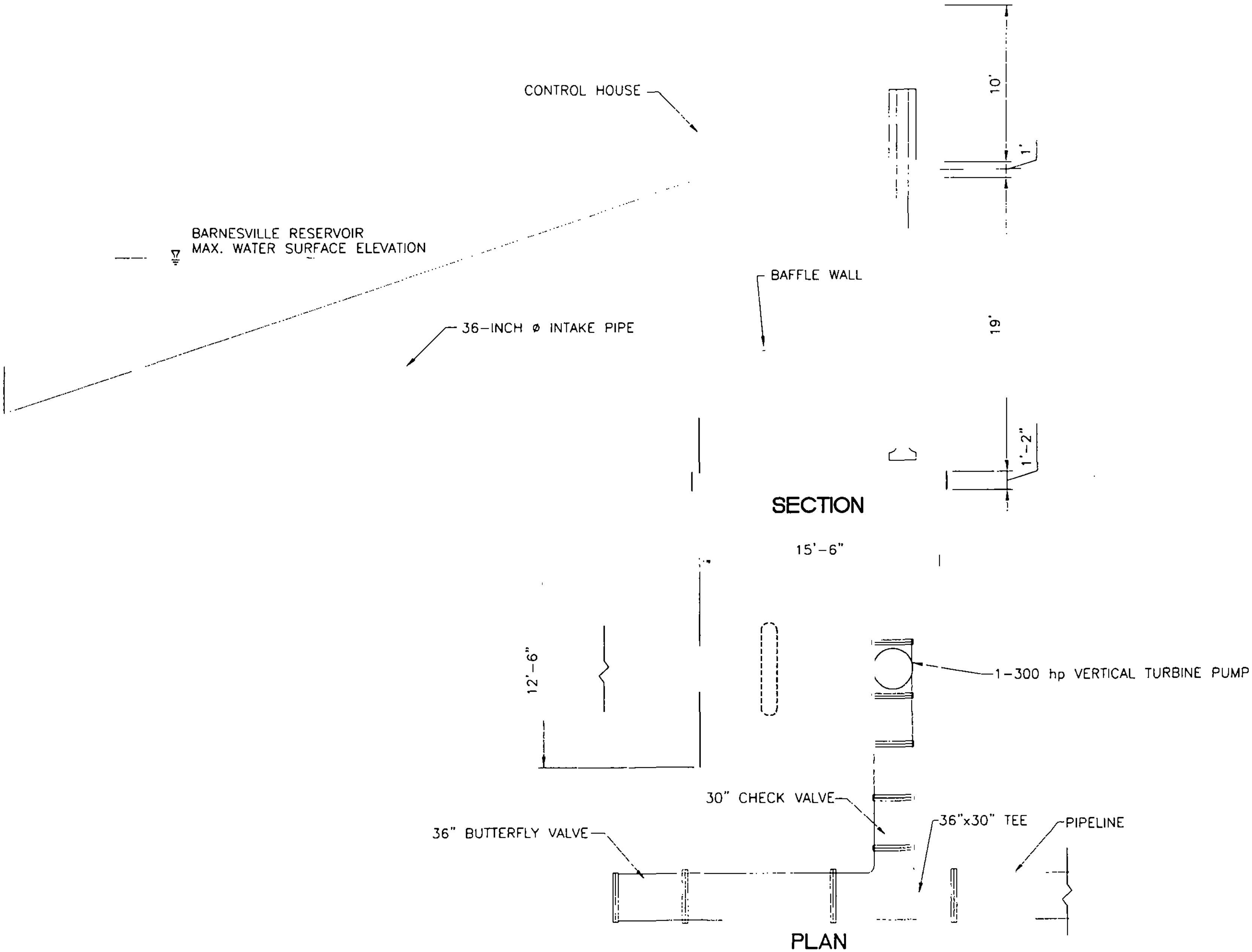
Figure 15 shows the proposed configuration of the pipeline. The proposed pipeline consists of approximately 2450 feet of 36-inch diameter ductile iron pipe and approximately 5870 feet of 30-inch diameter ductile iron pipe. The 36-inch diameter pipe is required because the Cornish Plains Reservoir outlet discharges through the pipeline and must have enough capacity to lower the reservoir in accordance with the State Engineer's requirements. If the Cornish Plains Reservoir outlet does not have to discharge through the pipeline, the entire pipeline could be 30-inch diameter ductile iron pipe. Table 9 shows pipe capacities for gravity flow from Drury Reservoir and Cornish Reservoir. The maximum flow values are for conditions with Barnesville near empty and Cornish or Drury near full. The average values are for conditions with all reservoirs approximately ½ full.

Table 9 – Pipeline Gravity-Flow Discharge from Drury and Cornish Reservoirs

Discharge Conditions	24-inch	30-inch	36-inch
Maximum Flow Drury to Barnesville	17 cfs	31 cfs	50 cfs
Average Flow Drury to Barnesville	16 cfs	25 cfs	28 cfs
Maximum Flow Cornish to Barnesville	---	36 cfs	58 cfs
Average Flow Cornish to Barnesville	---	22 cfs	26 cfs

PERMITTING

The NCLPIC recently purchased all of the property that would be inundated by the proposed reservoirs except for affected land in the southwest quarter of Section 5, T6N, R63W of the 6th Principle Meridian. The Company plans to purchase that land following approval of funding for the project. If significant obstacles to obtaining the property are encountered, the Company could invoke the power of eminent domain to obtain the property. A copy of the Deed-of-Trust for the land currently owned is contained in Appendix E.



Smith Geotechnical ENGINEERING CONSULTANTS

PUMPING STATION - OPT. 1
FIGURE 13

SCALE: 1"=1/2'

DRAWN: DWM | PROJ. #: 02.071
APPVD: DHS | DATE: JULY 2003

A visual inspection for environmental issues was conducted on the site. Most of the site is currently used for agriculture and there is no indication of prairie dog or burrowing owl activity on site. The site does not fall on the Preble's Meadow Jumping Mouse Critical Habitat Map, however, the low area at the proposed Barnesville Equalizer site may be potential habitat and should be evaluated by a qualified environmental expert early in the design phase to determine if trapping studies or other measures are necessary.

Based on the current scope of work, the reservoir development would not require an Army Corps of Engineers 404 Permit. A copy of the Corps of Engineers jurisdictional determination letter is contained in Appendix E.

IMPLEMENTATION SCHEDULE

The NCLPIC plans to conduct construction in phases starting with the Barnesville Equalizer. A proposed implementation schedule is in Table 10.

Table 10 – Implementation Schedule

Item	Date Complete
Feasibility Study Submitted to CWCB	November, 2003
Feasibility Study Reviewed and Funding Approved by CWCB	January, 2004
Start Design - Barnesville	December, 2003
Complete Design – Barnesville	May, 2004
Start Design – Cornish Plains	February, 2005
Start Construction - Barnesville	November, 2004
Complete Design – Cornish Plains	July, 2005
Start Design – Drury	February, 2006
Complete Construction – Barnesville	April, 2005
Start Construction – Cornish Plains	March, 2006
Complete Design – Drury	July, 2006
Complete Construction – Cornish Plains	March, 2007
Start Construction – Drury	March, 2007
Complete Construction – Drury	March, 2008

INSTITUTIONAL CONSIDERATIONS

Entities that are or may be involved in assessment, design, and construction of the project are listed below.

New Cache La Poudre Irrigating Company – Owner.
Smith Geotechnical Engineering Consultants – Civil engineer, dam design, construction engineer.
HRS Water Consultants, Inc. – Water rights and groundwater engineer.
Aqua Engineering, Inc. – Irrigation Engineering including SCADA instrumentation and monitoring.
Bill Brown - Attorney
Colorado Water Conservation Board (CWCB) – Financing and construction.
Weld County – Development review and approval.

COST ESTIMATE

The cost estimate is for the layout and configuration presented in this report. Dam embankment and storage volumes are based on Barnesville and Cornish, Colorado USGS topographic maps. Unit prices are based on 2003 prices obtained from suppliers, contractors, and Smith Geotechnical project experience. The cost estimate is in 2003 dollars and no adjustment has been done for possible inflation. The total estimated project cost of approximately $9,542,000 was broken into four segments as outlined below.

1. Drury Reservoir.
2. Cornish Plains Reservoir.
3. Barnesville Reservoir including the ditch diversion structure.
4. Pipeline and Jack Wells Pumping Station.

The cost estimate is summarized in Tables 11-15.

Table 11 - Cost Estimate Summary

Item	Cost
Drury Reservoir	$2,217,000
Cornish Plains Reservoir	$2,350,000
Barnesville Reservoir	$922,000
Jack Wells Pumping Station and Pipeline	$1,632,000
Property Acquisition	$2,421,000
Total Project Cost	**$9,542,000**

Table 12 - Drury Reservoir Cost Estimate

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1.	Mobilization, Insurance, Bonds	1	L.S.	$47,824.50	$47,825
2.	Stripping	15	Acre	$1,800.00	$27,000
3.	Dewatering/Erosion Control	1	L.S.	$2,000.00	$2,000
4.	Dam				
	a. Cutoff Trench Excavation/Borrow	15000	C.Y.	$1.00	$15,000
	b. Cutoff Trench Fill	14300	C.Y.	$2.00	$28,600
	c. Embankment Borrow	110000	C.Y.	$1.00	$110,000
	d. Embankment Fill	100000	C.Y.	$2.50	$250,000
	e. Riprap (Entire U/S Face)	19000	TONS	$32.00	$608,000
	i. Supply			$21.00	
	ii. Place			$11.00	
	f. Riprap Bedding (Entire U/S Face)	5500	TONS	$26.00	$143,000
	i. Supply			$16.00	
	ii. Place			$10.00	
	g. Road Gravel	3200	TONS	$16.00	$51,200
	i. Supply			$10.00	
	ii. Place			$6.00	
	h. Toe Drain	2000	L.F.	$20.00	$40,000
	i. Blanket Drain Sand	2700	TONS	$12.50	$33,750
	i. Supply			$10.50	
	ii. Place			$2.00	
	j. Blanket Drain Gravel	700	TONS	$15.00	$10,500
	i. Supply			$13.00	
	ii. Place			$2.00	
5.	Spillway - 430'				
	a. Cutoff Wall	160	C.Y.	$500.00	$80,000
	b. Riprap	1000	TONS	$32.00	$32,000
	c. Bedding	350	TONS	$26.00	$9,100
6.	Outlet Works				
	a. Pipe - 30" Ductile - Concrete Encased	170	L.F.	$400.00	$68,000
	b. U.S. Structure and Grade Beam	1	L.S.	$35,000.00	$35,000
	c. Sloped Gate+Operator	1	L.S.	$20,000.00	$20,000
7.	Seeding	13	Acres	$2,000.00	$26,000
8.	Environmental Assessment	1	L.S.	$5,000.00	$5,000
				TOTAL CONSTRUCTION COST	$1,641,975
				15% FOR CONTINGENCY	$246,296
				20% FOR ENGINEERING/LEGAL/SURVEYING	$328,395
				TOTAL	$2,217,000
				COST/Acre-Foot	$3,695

Table 13 - Cornish Reservoir Cost Estimate

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1.	Mobilization, Insurance, Bonds	1	L.S.	$50,690.25	$50,690
2.	Stripping	20	Acre	$1,800.00	$36,000
3.	Dewatering/Erosion Control	1	L.S.	$2,000.00	$2,000
4.	Dam				
	a. Cutoff Trench Excavation/Borrow	20000	C.Y.	$2.00	$40,000
	b. Cutoff Trench Fill	18000	C.Y.	$2.00	$36,000
	c. Embankment Borrow	129000	C.Y.	$1.50	$193,500
	d. Embankment Fill	126000	C.Y.	$2.50	$315,000
	e. Riprap (Entire U/S Face)	16000	TONS	$32.00	$512,000
	i. Supply			$21.00	
	ii. Place			$11.00	
	f. Riprap Bedding (Entire U/S Face)	4500	TONS	$26.00	$117,000
	i. Supply			$16.00	
	ii. Place			$10.00	
	g. Road Gravel	1700	TONS	$16.00	$27,200
	i. Supply			$10.00	
	ii. Place			$6.00	
	h. Toe Drain	2595	L.F.	$20.00	$51,900
	i. Toe Drain Outfall Pipe	4000	L.F.	$10.00	$40,000
	j. Blanket Drain Sand	3600	TONS	$12.50	$45,000
	i. Supply			$10.50	
	ii. Place			$2.00	
	k. Blanket Drain Gravel	1000	TONS	$15.00	$15,000
	i. Supply			$13.00	
	ii. Place			$2.00	
5.	Spillway - 15'				
	a. Cutoff Wall	30	C.Y.	$500.00	$15,000
	b. Riprap	500	TONS	$32.00	$16,000
	c. Bedding	200	TONS	$26.00	$5,200
	d. Channel Excavation	1000	C.Y.	$2.00	$2,000
6.	Outlet Works				
	a. Pipe - 36" Ductile - Concrete Encased	155	L.F.	$425.00	$65,875
	b. Pipe - 36" Ductile - Gravel Bedding	660	L.F.	$150.00	$99,000
	c. U.S. Structure and Grade Beam	1	L.S.	$35,000.00	$35,000
7.	Seeding	8	Acres	$2,000.00	$16,000
8.	Environmental Assessment	1	L.S.	$5,000.00	$5,000
				TOTAL CONSTRUCTION COST	$1,740,365
				15% FOR CONTINGENCY	$261,055
				20% FOR ENGINEERING/LEGAL/SURVEYING	$348,073
				TOTAL	$2,350,000
				COST/Acre-Foot	$1,469

Table 14 - Barnesville Equalizer Cost Estimate

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1.	Mobilization, Insurance, Bonds	1	L.S.	$19,891.20	$19,891
2.	Stripping	2	Acre	$1,800.00	$3,600
3.	Dewatering/Erosion Control	1	L.S.	$2,000.00	$2,000
4.	Dam				
	a. Excavation	467500	C.Y.	$1.00	$467,500
	b. Embankment Borrow	4400	C.Y.	$1.00	$4,400
	c. Embankment Fill	4000	C.Y.	$2.00	$8,000
	d. Road Gravel	500	TONS	$16.00	$8,000
	i. Supply			$10.00	
	ii. Place			$6.00	
5.	Spillway - 10'				
	a. Cutoff Wall	20	C.Y.	$500.00	$10,000
	b. Riprap	60	TONS	$32.00	$1,920
	c. Bedding	20	TONS	$26.00	$520
	d. Spillway Channel	5000	C.Y.	$2.00	$10,000
6.	Diversion Structure				
	a. Obermeyer Gates + Installation	1	L.S.	$60,000.00	$60,000
	i. Supply (2) 3'x11.5' gates w/controls			$55,000.00	
	ii. Install			$5,000.00	
	b. Concrete	50	C.Y.	$500.00	$25,000
	c. Excavation	400	C.Y.	$6.00	$2,400
	d. Backfill	400	C.Y.	$8.00	$3,200
7.	Silt Walls	1	L.S.	$50,000.00	$50,000
8.	Seeding	2	Acres	$2,000.00	$4,000
9.	Environmental Assessment	1	L.S.	$2,500.00	$2,500
				TOTAL CONSTRUCTION COST	$682,931
				15% FOR CONTINGENCY	$102,440
				20% FOR ENGINEERING/LEGAL/SURVEYING	$136,586
				TOTAL	$922,000
				COST/Acre-Foot	$3,073

Table 15 - Jack Wells Pumping Station and Pipeline Cost Estimate

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1.	Mobilization, Insurance, Bonds	1	L.S.	$35,198.04	$35,198
2.	Stripping	2	Acre	$1,800.00	$3,600
3.	Dewatering/Erosion Control	1	L.S.	$2,000.00	$2,000
4.	Pipeline				
	a. 36-inch Ductile Iron Pipe	2450	L.F.	$150.00	$367,500
	i. Supply			$70.00	
	ii. Install			$80.00	
	b. 24-inch PVC Pipe	5880	L.F.	$75.00	$441,000
	i. Supply			$32.50	
	ii. Install			$42.50	
	c. 36-inch Gate Valve	1	EA.	$37,000.00	$37,000
	d. 24-inch Gate Valve	2	EA.	$14,000.00	$28,000
	e. 36-inch Butterfly Valve	1	EA.	$9,100.00	$9,100
	f. 30-inch Butterfly Valve	2	EA.	$7,400.00	$14,800
	g. 36"x36" Tee	1	EA.	$6,240.00	$6,240
	h. 36"x30" Tee	2	EA.	$6,900.00	$13,800
	i. 30"x30" Tee	1	EA.	$4,102.00	$4,102
	j. 36" 45 deg. Bend	1	EA.	$3,616.00	$3,616
	k. 24" 45 deg. Bend	1	EA.	$1,308.00	$1,308
	l. 36" - 24" Reducer	1	EA.	$2,714.00	$2,714
	m. Valve Box	6	EA.	$90.00	$540
	n. Fitting Installation/Overhead - 15%	1	L.S.	$18,183.00	$18,183
5.	Pump Station				
	a. Concrete	75	C.Y.	$500.00	$37,500
	b. Intake Pipe	48	L.F.	$110.00	$5,280
	i. Supply			$50.00	
	ii. Install			$60.00	
	c. Other Building Components	1	L.S.	$2,000.00	$2,000
	d. Pump	2	EA.	$22,300.00	$44,600
	e. Controls	1	L.S.	$50,000.00	$50,000
	f. Fittings				
	i. 30"x14" Tee	2	EA.	$3,550.00	$7,100
	ii. 30" Check Valve	1	EA.	$14,285.00	$14,285
	iii. 14" Butterfly Valve	2	EA.	$1,500.00	$3,000
	g. Excavation	3000	C.Y.	$6.00	$18,000
	h. Backfill	3000	C.Y.	$8.00	$24,000
	i. Power Install. - Offset by Const. Credit			$0.00	$0
7.	Seeding	3	Acres	$2,000.00	$6,000
8.	Surveying	1	L.S.	$6,000.00	$6,000
9.	Subsurface Investigation	1	L.S.	$2,000.00	$2,000
				TOTAL CONSTRUCTION COST	$1,208,466
				15% FOR CONTINGENCY	$181,270
				20% FOR ENGINEERING/LEGAL/SURVEYING	$241,693
				TOTAL	$1,632,000

FUND REQUIREMENT SCHEDULE

The New Cache La Poudre Irrigating Company is seeking funding through the Colorado Water Conservation Board "*Construction Fund*" to finance $7.2 million of the project. The NCLPIC will fund the remaining amount with a private loan, their cash reserves, and through an increase in their assessments.

The expected fund requirement schedule for the project, with an estimated project total cost of $9,542,000 is as shown below. The loan amount from the CWCB will be $7.2 million and the portion from the NCLPIC will be $932,351. The schedule of when the funds will be needed is based on design starting in 2004, construction starting in 2004 and being completed in 2008 in accordance with the implementation schedule outlined above in Table 10.

The Fund Requirement Schedule shows the funds required by the NCLPIC and the CWCB to complete the project. In 2004, funds will be required for engineering, surveying, subsurface investigations, environmental assessment, and land acquisition. In 2004 through 2006, funds will be required for engineering, construction, and inspection. In 2007, funds will be required for construction and inspection. From 2008 through 2012, the payment required from the NCLPIC is the sum of the annual payments for the CWCB loan and the Cornish Plains Loan. In 2013, the amount includes the CWCB annual payment and the payoff amount for the Cornish Plains Loan. From 2013 through 2037, the payment required from the CWCB is the annual payment for the CWCB Loan.

Table 16 - Fund Requirement Schedule

Year	Total Funds Required	CWCB Loan	Cornish Plains Livestock Loan	NCLPIC Share
2003	$1,468,000	$0	$1,409,000	$59,000
2004	$1,000,000	$850,000	$0	$150,000
2005	$2,330,000	$1,990,000	$0	$340,000
2006	$2,450,000	$2,100,000	$0	$350,000
2007	$2,640,000	$2,260,000	$0	$380,000
2008-2012	$467,000	$0	$0	$467,000
2013	$1,310,000	$0	$0	$1,310,000
2013-2037	$344,000	$0	$0	$344,000
Totals		$7,200,000		$13,400,000

FINANCIAL ANALYSIS

The NCLPIC proposes to apply for a loan amount of $7.2 million from the Colorado Water Conservation Board (CWCB) with a 30 year repayment period

and an interest rate of 2.5%. The remaining portion of the total project cost of $9,542,000 will be funded by the NCLPIC and by a loan obtained through Cornish Plains Livestock, LLLP. The NCLPIC will have to provide $932,351 for its share of the project cost which will be disbursed in 2004 through 2007 during design and construction.

Table 17 provides a summary of the project costs, loan amounts, loan payments, and cost per acre-foot (ac-ft) of water.

Table 17 - Financial Summary

Estimated Project Cost	$9,542,000
CWCB Loan Amount	$7,200,000
Loan Interest Rate	2.50%
Loan Duration	30
CWCB Interest	$3,120,000
Cornish Plains Livestock Loan	$1,409,000
Cornish Plains Livestock Interest Rate	6.00%
Cornish Plains Loan Duration (20 yr. amort. w/ Balloon at 10 yrs.)	10
Cornish Plains Interest	$724,000
Total Interest	$3,844,000
Total Project Cost Including Interest	$13,400,000
Annual CWCB Loan Payment	$344,000
Annual Cornish Plains Loan Payment	$123,000
Total Annual Payment	$467,000
Number of Shareholders	300
Number of Shares of Stock	2499.69
Total Cost Per Share of Stock	$5,361
Total Cost Per Share Per Year	$179
Current Assessment Per Share	$110
Future Assessment Per Share	$257
Total Storage in Ac-Ft	2500
Average Annual Efficiency Increase in Ac-Ft	2000
Total Cost Per Ac-Ft	$2,978
Annual Cost Per Ac-Ft	$99

Financial Plan

Based on their 2002 financial statement, the NCLPIC had cash revenues of $64,078.34 in excess of cash expenses. Their annual depreciation was $43,044.22 leaving a net income of $21,034.12. As of May 31, 2003, the NCLPIC balance sheet lists current assets of $115,059.33, total assets of $3,558,072.31, and retained earnings of $873,164.79.

In order to fund the entire project, the NCLPIC would have to raise their assessments to approximately $257 per share by 2008 if no other operational cost increases are incurred and no other revenues are applied to the project.

Credit Worthiness

Based on their May 31, 2003 balance sheet, included in Appendix F, the NCLPIC had total short term liabilities of $702,595.69, long term liabilities of $1,744,648.88 and total capital of $1,110,827.74. Table 18 shows a summary of their current obligations on May 31, 2003. The current obligations to Colorado Community Bank of Greeley and Cornish Plains Livestock, LLLP are for the property purchased for this project. The NCLPIC plans to pay off the Colorado Community obligation with funds from the new CWCB loan.

Table 18 - Current Obligations

Lender	Outstanding Amount	End of Term
Colorado Community Bank of Greeley	$702,595.69	2006
Cornish Plains Livestock, LLLP	$1,409,000.00	2013
CWCB	$335,648.88	2017
Total =	$2,447,244.57	

Alternative Financing

A portion of the property acquisition cost has been funded by a loan from the Cornish Plains Livestock, LLLP. Other sources of financing for the remaining portion of the project have been considered; however, the down payment required for such financing has made other options unfeasible.

OPINION OF FEASIBILITY

The project is feasible from an engineering perspective. The land is suitable for construction of the proposed reservoirs, pumping station, and pipeline. The soils encountered on site are suitable for construction of the dams required for the reservoir.

The long term benefit to the NCLPIC is appreciable. Greater efficiency in the system will be obtained particularly near the end of the canal system leading to gains of approximately 2000 ac-ft per year. Groundwater augmentation will be achieved to offset depletion by NCLPIC shareholders and other water users in the area. The project will also develop water that is not currently allocated elsewhere by storing water during "free-river" conditions in the fall, winter, and spring.

The current net revenue from all crops produced in the service area is approximately $20,000,000 each year and the ditch delivers approximately 37,500 ac-ft of water to users in its service area. Therefore, the value of the water based on the value of crops produced is approximately $533 per ac-ft per year.

For the 2500 ac-ft of new storage and the 2000 ac-ft of efficiency improvements, the cost for the project is approximately $99 per ac-ft per year giving a benefit-cost ratio of $533/$99 = 5.3.

Based on engineering and financial analysis, the project is deemed feasible.

COLLATERAL

The NCLPIC can offer the following collateral for the CWCB loan.

1. A pledge of assessment revenues.
2. The physical assets of the project itself including the means to operate and deliver water to the project.

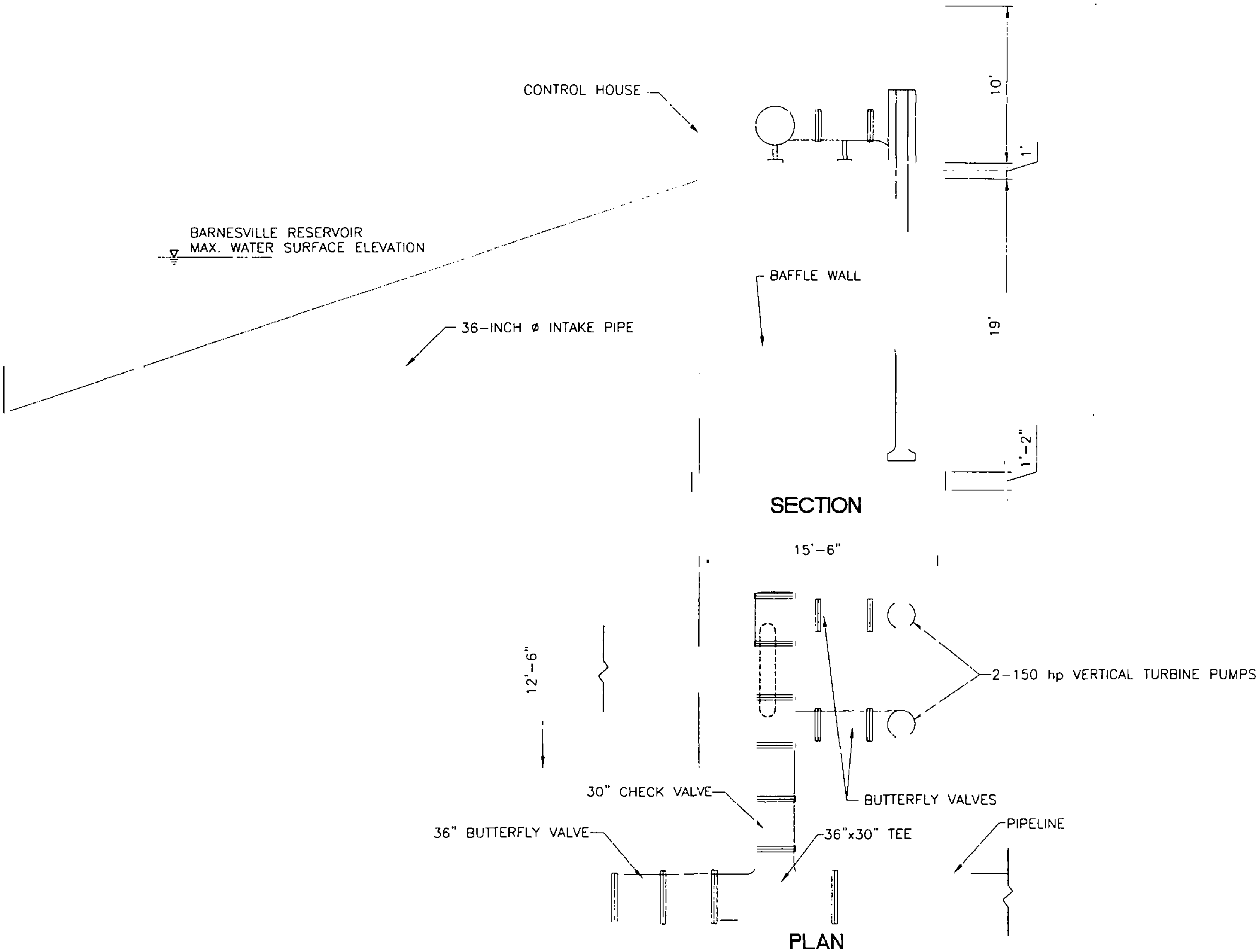
SOCIAL AND PHYSICAL IMPACTS

Reservoirs provide desirable land for development and could potentially provide recreational areas for use by adjacent property owners or for public use. Currently, no plan for development around the reservoirs is in place. However, the NCLPIC is currently involved in Colorado State University's dual use study that considers using water from the ditch system for residential or industrial developments. Such use could provide additional income for the NCLPIC and would be beneficial for developers.

The primary physical impact would be the inundation of approximately 800 acres of land. Currently, most of the affected land is used for irrigated crops and pasture. Seepage through the dam would be expected to have physical impact to the flow in Crow Creek and to raise the local groundwater level. This would be a benefit to groundwater conditions and will be addressed fully in the HRS Water Consultants, Inc. augmentation plan. There are no existing structures immediately downstream of the dam that would be expected to be affected by these physical impacts.

CONCLUSIONS

1. The project is feasible from both engineering and financial perspectives.
2. The NCLPIC will have to increase assessments to approximately $257 per share per year by 2008 in order to fund the project.
3. Based on the net revenues from irrigated crops in the service area, the benefit to cost ratio for the project is approximately 5.3.



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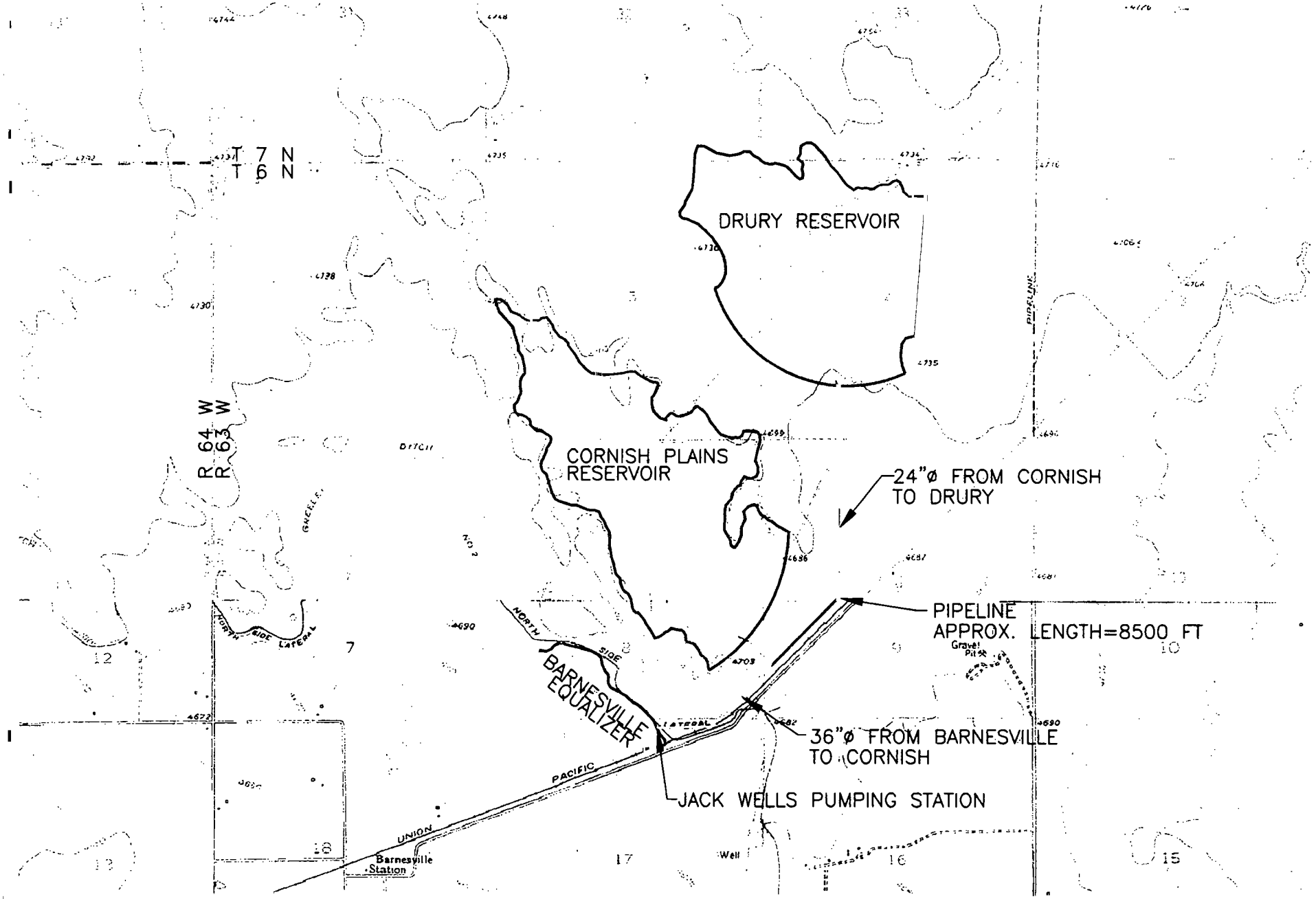
PUMPING STATION - OPT. 2
FIGURE 14

SCALE: 1"=1/2'

PROJ. #: 02.071 | DATE: JULY 2003

DRAWN: DWM | APPVD: DHS



DRAWN: DWM	PROJ. #: 02.071	SCALE:	**PIPELINE**
APPVD: DHS	DATE: JULY 2003	N.T.S	**FIGURE 15**

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APPENDIX A

Articles of Incorporation
By-Laws

APPENDIX B

Water Rights Application

APPENDIX C

SCS Soils Information
Geotechnical Report

APPENDIX D
Hydrology

APPENDIX E

Property Ownership
Permitting

APPENDIX F

Financial Information

APPENDIX G

Loan Application