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**AIRPORT BENCH
WATER SUPPLY PROJECT**

**PHASE II REPORT
EXECUTIVE SUMMARY**

NOVEMBER 8, 1990



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AIRPORT BENCH WATER SUPPLY PROJECT

LEVEL II STUDY

PHASE II REPORT - EXECUTIVE SUMMARY

FUNDED BY: WYOMING WATER DEVELOPMENT COMMISSION

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DATE: NOVEMBER 8, 1990

JOB NUMBER: 90032

A. INTRODUCTION

1. Background. The Airport Bench Water and Sewer District extends from the South Big Horn County Airport west along U.S. Highway 14, 16 and 20 for approximately four miles. Figure 1 shows the approximate district boundary and the proposed water delivery system.

The well water available in the Airport Bench Service Area is reported to be of very poor quality, frequently causing problems with water-using appliances. Most families haul all or part of their water from Greybull.

2. Potential Users.

- a. Residential. Thirteen residential users are included within the District boundary.
- b. Wyoming Highway Department Rest Area. The Wyoming Highway Department is planning construction of a new rest area near the Airport in early 1991. The rest area will initially receive its water supply from the existing 2-inch line serving the Airport. Highway Department personnel have indicated that if a system is installed to serve the Airport Bench area, they will connect to the new system when water is available.

- c. Big Horn County. Big Horn County is currently facing budgetary problems due to declining tax revenues. A member of the Big Horn County Airport Board has indicated that the County is probably not interested in providing additional capacity to the Airport if that would involve capital expenditures on their part.

B. CONCEPTUAL DESIGN

1. System Description. The proposed water delivery system connects to Greybull's water distribution system at a point west of the Burlington Northern railroad tracks. A 12-inch water main was extended into this area by the Town to provide water for industrial development. This 12-inch diameter water main has pressures ranging from 65 psi to 85 psi as reported by the Town of Greybull.

A booster pump will be required to deliver water at sufficient pressures to serve the Airport Bench area and deliver water into storage. A pipeline will extend from the point of connection, parallel to the existing 2-inch line serving the Airport, to the vicinity of the Airport. The pipeline will then continue west on the north side of the Highway to the west end of the service area, then north to the location of the storage tank.

2. **System Capacity.** The system was sized to simultaneously meet the following demands:
- a. **Residential.** Based on the population projections in the Phase I Study, the system was designed to serve 21 residential users. A demand of four gallons per minute (gpm), per residential connection, was provided.
 - b. **WHD Rest Area.** A peak demand of 15 gpm was used for the Rest Area. Highway Department personnel have indicated that during peak days as much as 20,000 gallons could be used at the rest area. A rate of flow of 15 gpm would provide 21,600 gallons over a twenty-four hour period. The Highway Department plans to install a 10,000 gallon buried tank at the rest area and a pumping system to supply peak demands in excess of 15 gpm.
 - c. **Reserve Capacity.** As proposed, the system has 100 gpm of reserve capacity which could be used to provide service to other users or supply additional water to the Rest Area.
3. **Pump Station.** A pump station including the following components will be installed at the point of connection to the Greybull system:

- Duplex 6 HP Booster Pumps
- Meter
- Telemetry Controls
- Double Check Valve

4. Storage. Storage capacity of 20,000 gallons will be provided by a buried fiberglass tank or tanks.

Water level sensing equipment and signal transmission equipment will be located at the storage tank to start and stop the booster pumps in response to water surface elevations.

5. Service Connections. Service connections will be installed to deliver water from the pipeline to each user's property line. Service connections are not eligible for Wyoming Water Development Commission funding.

C. COST ESTIMATE

The Construction Cost Index (CCI) as published weekly in Engineering News Record was used as the basis to project estimated costs forward to October, 1991.

The pipe best suited for this type of project is high density polyethylene (HDPE) or poly vinyl chloride (PVC). The raw materials for these types of pipes are derived from petroleum or natural gas. Pipe suppliers we have contacted expect PVC and HDPE price increases to range between 5% and 10% over the next year. For this estimate, it was assumed that pipe costs would increase by 10% over current quotations.

Figure 2 includes the cost estimate summary.

D. MONTHLY USER COSTS

The user cost consists of debt service; operation, maintenance, and replacement (OM&R); and water costs.

1. Debt Service. Two funding plans are presented.
 - a. Plan 1 assumes that Farmers Home Administration will grant 75% of the total project cost and WWDC will fund the balance with a combination of loan and grant funding. The amount of the WWDC loan will be set so the minimum debt service requirements can be met.
 - b. Plan 2 assumes that WWDC will grant 67% of eligible project costs and loan an amount that would meet debt service requirements. FmHA would fund the balance of the project with grants.

The FmHA requires that a bond issue be passed for their loans. The overhead for a bond issue would be excessive when compared to the amount of the loan proposed. Therefore, FmHA loans are not considered in the Funding Plans.

Details of the funding plans are included in Figure 2.

This study assumed that the Highway Department would require a capacity of 15 gallons per minute for the Rest Area. Using the method detailed in the Phase I Report on Page 17, a multiplier of 1.7 is calculated for a service connection with 15 gpm capacity. Since there are thirteen potential residential users on the system, the total number of users for debt service and OM&R calculations is 13 plus 1.7 or 14.7 users.

2. OM&R. A monthly OM&R requirement of \$450.00 was used.
3. Water Costs. The Town of Greybull may treat the Airport Bench System as a single user under their rate schedule. An analysis of this rate schedule and an estimate of the total monthly usage indicates that a flat rate of approximately \$1.75 per 1,000 gallons will have to be charged to the individual users on the Airport Bench System.

E. ECONOMIC ANALYSIS

1. Ability to Pay.

The project sponsor indicates that the maximum monthly water bill that the residential users could afford to pay is approximately \$50.00.

For comparison, the rate structures for two existing Rural Water Districts are shown below:

District	Tap Fee	Minimum Monthly Charge	Gallons of Water Included in Monthly Minimum	Additional Water Charge \$/1000 Gallons
Lucerne	\$1,000	\$45.00	6000 gal.	\$2.20
North End Water Users	\$2,250	\$20.00	2000 gal.	\$0.75

For a monthly usage of 8,000 gallons of water, the monthly bill would be as follows:

Lucerne - \$49.40

North End - \$24.50

2. Benefit Cost Analysis. Potential benefits can be grouped into three classifications.

a. Avoided expenses:	Estimated Monthly Cost
Water Well Pump O&M	\$ 2.00- \$4.00
Frequent Appliance Replacement Costs	\$ 2.50-\$ 8.00
Water Softeners	\$ 2.00-\$10.00
Reverse Osmosis Units	\$ 4.00- \$8.00
Water Hauling Costs	\$10.00-\$40.00
Bottled Water	\$10.00-\$40.00

For new home construction, the avoided expense of drilling a water well can be significant. Current water well drilling costs range between \$20.00 and \$25.00 per foot with completion costs ranging between \$1,500.00 and \$2,000.00.

b. Added Value. The availability of treated water can increase rural property values an estimated 10% to 15%. In addition, many lending institutions will not finance the purchase of rural homes if the water supply does not meet certain minimum standards.

c. Other Benefits:

Potential for Enhanced Economic Development

Improved Quality of Life

F. OPERATING PLAN

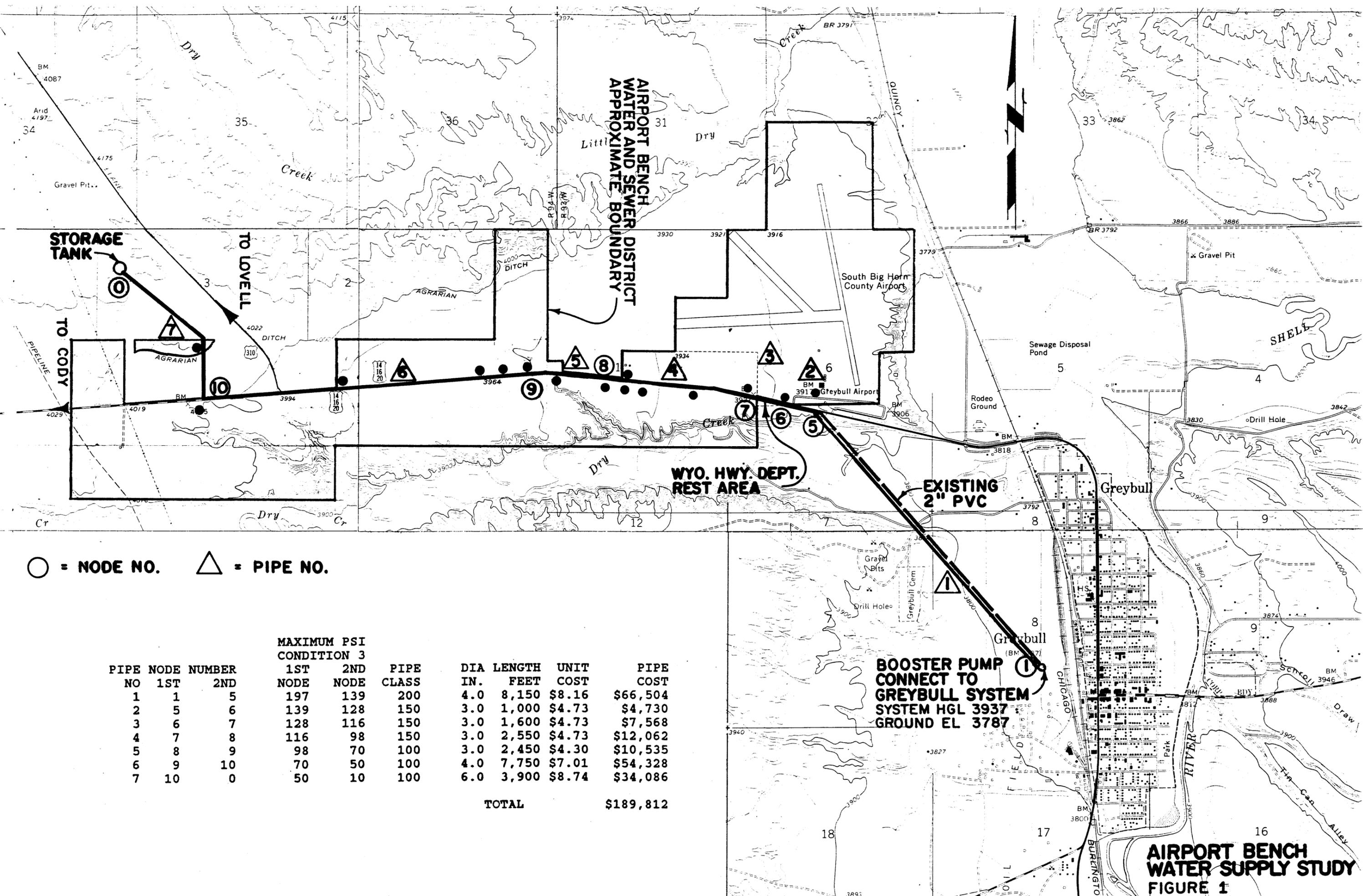
1. Initial System Configuration. As defined in the conceptual design, water will be pumped from the Town of Greybull into the delivery system. During times of pump operation, excess water above that required to meet system demands will flow into storage. Level controls located at the storage tanks will stop the pumps when the storage tanks are full by means of a signal transmitted from the storage tanks to the pump station. Storage tanks will be allowed to drop to a predetermined level, which will be adjustable, before the pump is re-started. During periods of peak demand on the system, the water requirements will be met by water flowing from storage into the system as well as water pumped into the system from Greybull.

2. Future Growth. In addition to a delivery of 15 gpm to the rest area, the system has been sized to deliver up to 4 gallons per minute for an additional eight residences or a total of 21 residences and has approximately 100 gallons per minute reserve capacity. Therefore, additional connections to the proposed system could be accommodated. Expansion of the system to the west would require booster pumping at the west end of the system because of increasing ground surface elevations.

G. PERMITTING

Several permits, rights-of-way, and contracts will be required to construct this project. Most of these permits should be secured by the Water and Sewer District prior to bidding the project due to the long lead time in obtaining some of the permits.

1. Wyoming Department of Environmental Quality, Water Quality Division (WQD).
2. Wyoming State Engineer.
3. U.S. Army Corp of Engineers.
4. Wyoming Highway Department.
5. Big Horn County, road crossing permit.
6. Bureau of Land Management (BLM).
7. Private Right-of-Way.
8. Town of Greybull, contract for water delivery.



○ = NODE NO. △ = PIPE NO.

PIPE NO	NODE 1ST	NODE 2ND	MAXIMUM PSI CONDITION 3		PIPE CLASS	DIA IN.	LENGTH FEET	UNIT COST	PIPE COST
			1ST NODE	2ND NODE					
1	1	5	197	139	200	4.0	8,150	\$8.16	\$66,504
2	5	6	139	128	150	3.0	1,000	\$4.73	\$4,730
3	6	7	128	116	150	3.0	1,600	\$4.73	\$7,568
4	7	8	116	98	150	3.0	2,550	\$4.73	\$12,062
5	8	9	98	70	100	3.0	2,450	\$4.30	\$10,535
6	9	10	70	50	100	4.0	7,750	\$7.01	\$54,328
7	10	0	50	10	100	6.0	3,900	\$8.74	\$34,086
TOTAL									\$189,812

**BOOSTER PUMP
CONNECT TO
GREYBULL SYSTEM
SYSTEM HGL 3937
GROUND EL 3787**

**AIRPORT BENCH
WATER SUPPLY STUDY
FIGURE 1**

FIGURE 2

AIRPORT BENCH WATER SUPPLY PROJECT

COST ESTIMATE SUMMARY

ELIGIBLE
FOR WWDC
FUNDING

1. PIPE	\$189,812	\$189,812
2. HIGHWAY CROSSINGS	\$18,000	\$18,000
3. VALVES	\$2,600	\$2,600
4. FLUSHING HYDRANTS	\$2,100	\$2,100
5. AIR RELEASE VALVES	\$9,120	\$9,120
6. BOOSTER PUMP STATION - 6 HORSEPOWER	\$52,000	\$52,000
7. STORAGE - 20000 GALLONS	\$25,000	\$25,000
8. SERVICE CONNECTIONS	\$36,710	
TOTAL OF ITEMS	\$335,342	\$298,632
CONTINGENCY 15%	\$50,301	\$44,795
ESTIMATED CONSTRUCTION COST - OCT 1991	\$385,643	\$343,427
DESIGN PHASE ENGINEERING 13%	\$50,134	\$44,645
CONSTRUCTION PHASE ENGINEERING 10%	\$38,564	\$34,343
LEGAL, ADMINISTRATIVE, & MISC 3%	\$11,569	\$10,303
PERMITS 3%	\$11,569	\$10,303
TOTAL PROJECT	\$497,480	\$443,021

ESTIMATED MONTHLY COSTS FOR RESIDENTIAL USERS
ASSUMING HIGHWAY DEPARTMENT PARTICIPATION

FUNDING PLAN 1

TOTAL PROJECT COST OCT 1991	\$497,480			
WWDC ELIGIBLE COSTS	\$443,021			
WWDC GRANT PERCENT	25	\$110,755		
WWDC LOAN 4% 20 YEARS		\$13,615		
FMHA GRANT PERCENT	75	\$373,110		
FMHA LOAN 6% 30 YEARS				
MONTHLY O,M,&R	450			
NUMBER OF USERS	14.7			
			WATER	
			COST	TOTAL
	DEBT		8000	MONTHLY
	SERVICE	O,M,&R	GAL/MO	COST
	\$5.68	\$30.61	\$14.00	\$50.29

FUNDING PLAN 2

TOTAL PROJECT COST OCT 1991	\$497,480			
WWDC ELIGIBLE COSTS	\$443,021			
WWDC GRANT PERCENT	67	\$296,824		
WWDC LOAN 4% 20 YEARS		\$13,603		
FMHA GRANT PERCENT	\$37.60	\$187,052		
FMHA LOAN 6% 30 YEARS				
MONTHLY O,M,&R	450			
NUMBER OF USERS	14.7			
			WATER	
			COST	TOTAL
	DEBT		8000	MONTHLY
	SERVICE	O,M,&R	GAL/MO	COST
	\$5.67	\$30.61	\$14.00	\$50.29