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CITIZENS COMMUNICATIONS NORTHERN ARIZONA GAS DIVISION BUILD-OUT REPORT

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Arizona Build-Out Plan

Status Report and Summary of Accomplishments for the Period 1993 – 2001

Executive Summary

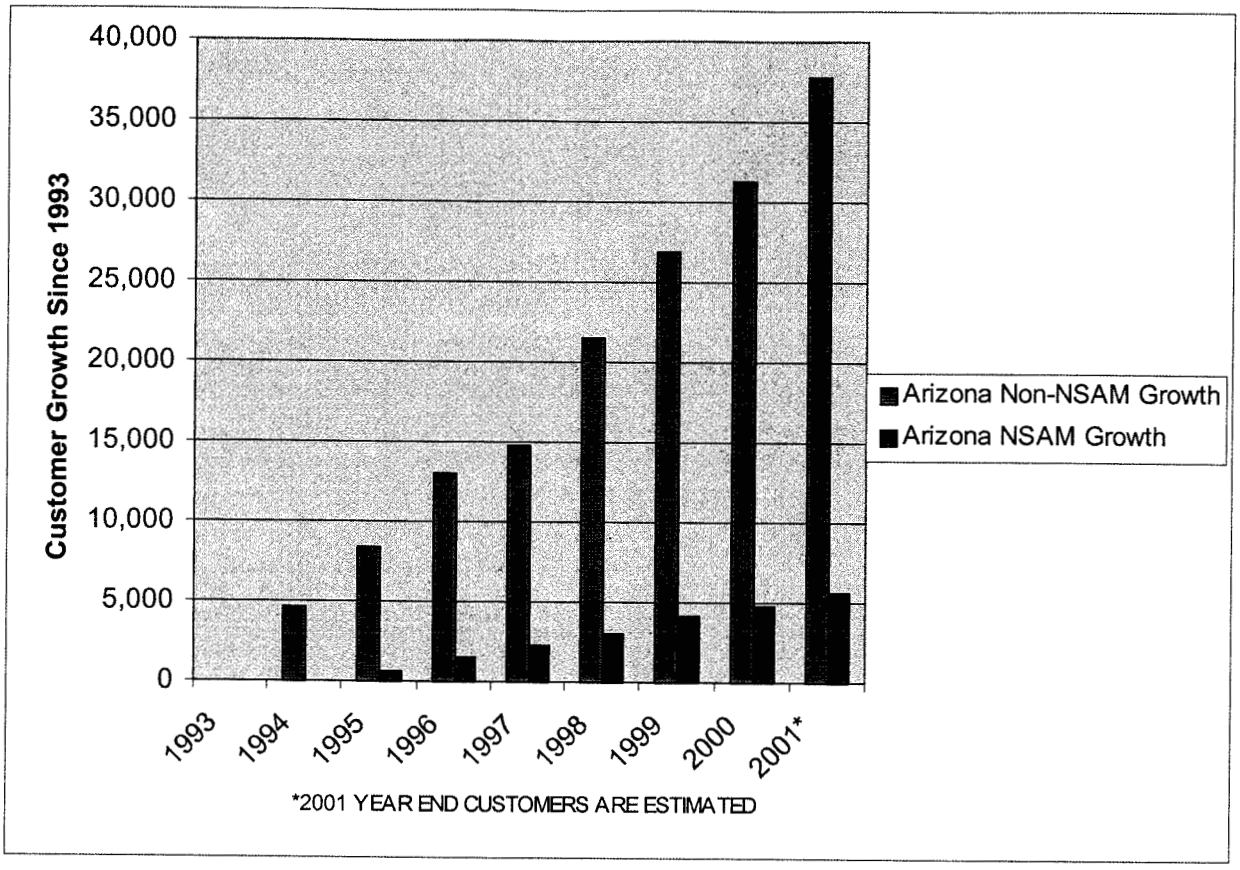
The objective of the Citizens' Arizona Gas Division Build-Out Plan ("ABOP") was two-fold: first, to reinforce certain facilities purchased from Southern Union Gas that did not have adequate capacity to maintain service in all weather conditions; and second, to expand the delivery systems in order to serve a number of communities that desired natural gas service.

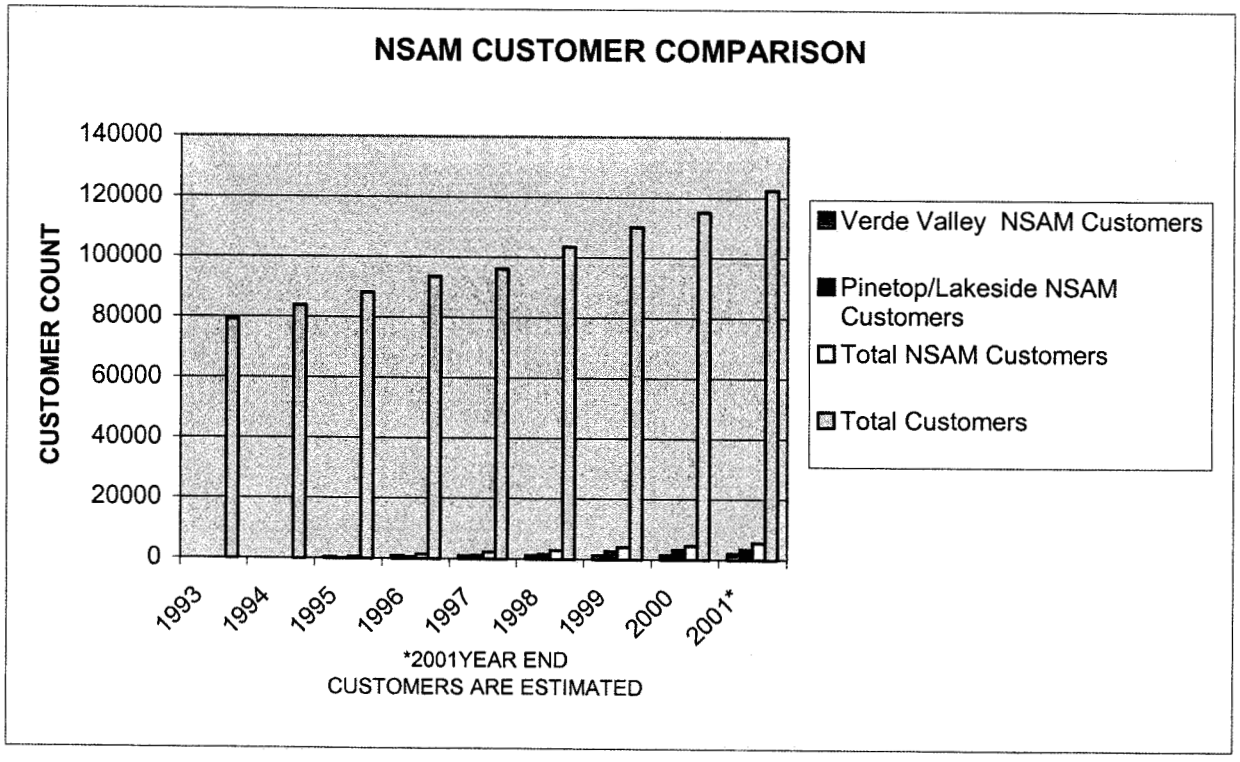
In total, between 1993 and 2001, Citizens has significantly improved system reliability, expanded gas service to nine communities not previously served, and allowed the addition of 5,600 new customers to whom the New Service Area Multiplier ("NSAM") applied and 36,000 new NON-NSAM customers. While Citizens has met the objectives of the ABOP, the time of construction was longer than anticipated in its original plans. The initial planning and permitting stages of the ABOP began in 1993, and the first phases of construction began in 1994. By 1995, it became evident that meeting the original build-out schedule would not be possible. Two significant issues faced Citizens. First, the level of complexity and difficulty in acquiring permits and easements required more time than has been expected. In addition, the level of environmental mitigation measures required by the various federal, state, county, city-permitting agencies, and by private property owners were far greater than originally anticipated. Second, the demand for new natural gas service connections in and around existing Citizens facilities were much greater than what had been forecasted.

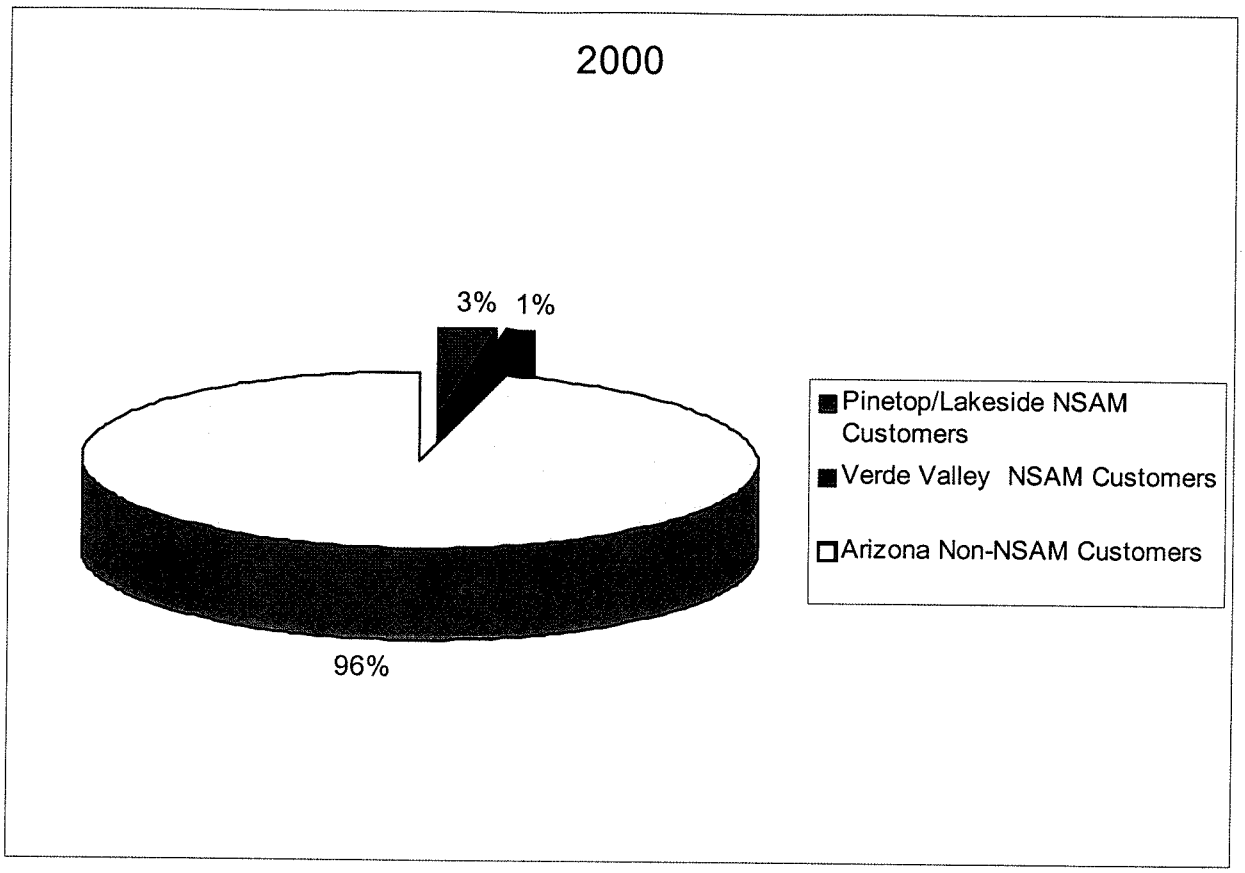
The majority of major supply facilities installed prior to the ABOP were installed in the 1960s, when environmental regulation was not as extensive. Although some of the agencies were interviewed when the Build-Out Plan was prepared, time and effort to comply with the National Environmental Protection Act was significantly understated. Included in this report are summaries of the requirements, with excerpts of the environmental studies supplied as examples in the appendices.

Simultaneous with the development of the implementation strategies to accomplish the Build-Out Plan, potential customers in other "NON-NSAM" areas overwhelmed Citizens and our contractor's work force. For every one NSAM customer added, over six NON-NSAM customers were added during the Build-Out Project (1993-2001). Following are three charts that demonstrate customer growth during this time period.

Furthermore, Citizens' Arizona Gas refused to let a preset schedule jeopardize the quality of the facilities being constructed. An example of Citizens' commitment to prudent business practices was the supply pipeline design criteria needed to acquire private easements adjacent to public right-of-ways in areas of potential roadway expansion. It took longer to acquire these easements then originally planned, but having legal prior rights should perpetually protect the facilities, from the risks associated with being located in public right-of-way.


Customer Growth Since 1993
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1993
1994
1995
1996
1997
1998
1999
2000
2001*
Arizona Non-NSAM Growth
Arizona NSAM Growth
*2001 YEAR END CUSTOMERS ARE ESTIMATED


NSAM CUSTOMER COMPARISON
CUSTOMER COUNT
140000
120000
100000
80000
60000
40000
20000
0
1993
1994
1995
1996
1997
1998
1999
2000
2001*
Verde Valley NSAM Customers
Pinetop/Lakeside NSAM Customers
Total NSAM Customers
Total Customers
*2001YEAR END
CUSTOMERS ARE ESTIMATED


2000
3%
1%
96%
Pinetop/Lakeside NSAM Customers
Verde Valley NSAM Customers
Arizona Non-NSAM Customers

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Chapter

1

Historical Background

Arizona Build-Out Plan

Background

In 1991, Citizens Communications Company (formerly know as "Citizens Utilities Company") acquired the Certificates of Convenience and Necessity and natural gas transmission and distribution facilities in Northern Arizona from Southern Union Company. On December 2, 1991, the Arizona Corporation Commission issued Decision No. 57647 approving the asset acquisition and imposing certain restrictions and obligations upon Citizens Communications Company ("Citizens"). These included a requirement that Citizens submit a long-term plan "**of at least five years**" to the Director of the Utilities Division concerning extension of service in the certificated area, and an obligation to extend gas service to areas where "it is economically feasible to do so."

On July 19, 1993, Citizens filed a general rate case application that included an aggressive "1993 – 1997 Build Out Plan." Under the Plan as filed, Citizens proposed to spend approximately $53 million in capital improvements over a five-year period that would ultimately extend service to an additional 20,000 potential customers. The Plan included reinforcement of the existing infrastructure for the then-current customers, as well as the necessary expenditures for pipeline mains and service lines to extend natural gas service to homes and businesses in portions of the Northern Arizona Gas Division's service area that did not have service. At that time, Citizens estimated that the required expenditures would more than double the Company's investment in gas plant facilities in Northern Arizona.

A key proposal of the Citizens' Build Out Plan was a New Service Area Multiple ("NSAM") rate premium to be charged to recover the Company's accelerating plant investments during the estimated five years that the program was expected to require. The NSAM represented a 50% premium above service rates that would be billed to new customers in specified areas where there was not gas service provided. The overriding objective was that the cost causers were to be the cost payers for the cost of the new facilities, minimizing subsidization of new customers by existing customers.

On June 16, 1994, the Arizona Corporation Commission issued Decision No. 57647 approving the Build Out Plan and the 50% NSAM rate premium. The Order stated that the NSAM premium was to remain in effect until new rates went into effect from Citizens' next general rate case or July 1, 1998. The Commission agreed that Citizens' existing gas customers should not subsidize the cost-of-service to new customers in the Build Out areas. To avoid any confusion, an attachment to the Commission Order identified the areas to be assessed the NSAM. These included: Village of Oak Creek, Verde Village, Pinetop-Lakeside, Camp Verde, and Cornville. The Order also made clear that Decision No. 58647 did not mandate a five-year Build Out Program; it required Citizens to submit a program with **at least a five-year term.**

On October 18, 1995, Citizens filed its next general rate case application for the Northern Arizona Gas Division. Included in that application was pre-filed testimony of Mr. Paul Townsley, Citizens' Vice-President and General Manager of the Arizona Energy operations. Mr. Townsley's testimony included a description of the status of the Build Out Program. The time required to obtain construction permits and rights-of-way from the U.S. Forest Service, the State of Arizona, and private landowners, as well as difficulty of installation in the rough and rocky terrain found in the new service areas, proved to be longer and more difficult than

anticipated in the original Build Out Plan that had been prepared two years earlier. As a result, Mr. Townsley testified that while Citizens remained committed to the Plan, such delays required an extension of the completion date to at least 1998.

The 1995 general rate case was finalized with a settlement agreement between Citizens, the Arizona Corporation Commission Staff, the Residential Utility Consumer Office, and the Arizona Community Action Association. On October 29, 1996, the Commission issued Decision No. 59875 approving the settlement agreement. Neither the settlement agreement nor the Commission Order made any reference to the reported status or announced extension of the Build Out Plan. The Decision does require, however, at Line 22 of Page 6 "**that the NSAM established in Decision No. 58664 shall be revisited in the next general rate application filed by Citizens, but in any event shall not continue beyond the completion of the NAGD's Build Out Plan.**" Citizens has not filed a general rate case application for the Northern Arizona Gas Division since that time.

As the Build Out Plan has proceeded, the delays and difficulty experienced in extending service have continued. For these reasons, the Program has extended well beyond the anticipated 1998 completion date projected in the testimony of Mr. Townsley previously described.

At the September 13, 2001, Open Meeting of the Arizona Corporation Commission, during a discussion in connection with a Purchased Gas Adjustor surcharge application by Citizens for its Northern Arizona and Santa Cruz Gas Divisions, the Commissioners made a request from the bench that, within thirty days, Citizens provide an overview and status report on the Build Out Plan. This report is being submitted in response to that request.

Overview of the Expansion Process

The objective of Citizens' Northern Arizona Gas Division Build-Out Plan was two-fold: first, to reinforce certain facilities purchased from Southern Union Company that did not have adequate capacity to maintain service in all weather conditions; and second, to expand the delivery systems to serve a number of communities that desired natural gas service. The following two sections summarize the activities undertaken by Citizens to meet these two objectives.

System Reinforcement

Immediately following the acquisition of the Arizona gas facilities, it was clear that several of Citizens' newly acquired natural gas systems did not have the necessary capacity to maintain service in all weather conditions. Each system and associated sub-systems was analyzed and a reinforcement plan was developed. The purpose and priority of the overall reinforcement plan was to increase the capacity and system reliability so that:

1) Existing customers could be served under all weather and load conditions;

2) System reinforcements would allow Citizens to respond to NON-NSAM customer requests; and

3) Pipelines could be extended from the reinforced facilities to serve communities that currently do not have natural gas service.

New Customer Growth - Facility Expansion

Expanding the gas system into NSAM areas is one component of the overall growth of the company.

Citizens has identified five primary ways that Citizens' acquires new customers. The following is a brief description of each.

1) In-Fill Growth

In-fill growth occurs when a new customer can be added without a mainline extension. This can occur when a landowner does a lot split or when a building is constructed outside of the five-year window on a Contribution-In-Aid-of-Construction type of mainline extension. In-fill growth is attractive due to its relatively low cost and simplicity. However, the random and scattered nature of in-fill development and the need for multiple crew mobilizations, adds somewhat to its cost. If the adjacent main can be tapped outside the roadway prism, the cost to install a service line is normally low. However, the cost and difficulty of the additions rise if a road cut is needed. The occurrence of in-fill growth is normally outside Citizens' control.

2) New Development

Overall, the most economical, and least disruptive type of natural gas expansion is that associated with new development. New development is the process of transforming raw land into lots that are ready for resale and approved for building construction. The process typically requires that the utilities needed to sustain life (i.e. water, sanitary sewer service, and electricity) be provided. Other utilities such as natural gas, telephone, and cable TV are provided on an optional basis by developers. Normally, cost is the most important consideration for developers in their decision to provide natural gas service, and the proximity to existing natural gas facilities is the most important factor in determining overall cost. If one developer elects not to provide natural gas service, the next developer downstream will have to pay a higher amount if service is to be extended.

3) Mainline Extension (existing infrastructure)

This type of customer growth typically occurs when the original developer does not provide natural gas service, but over time, the number and density of potential customers increases to the point that a mainline extension can be made at a reasonable cost. In some situations, the potential customer waits until the mainline extension is economically justified by Citizens' Rules of Service and the extension is made at no cost to the customers. Other mainline extensions may occur where customers pay to extend mainlines.

From Citizens perspective, this type of growth is very expensive, but in the long-run, these main extensions can lead to other new development downstream. Because the scope of these projects tends to be small, typically the potential customers themselves will need to initiate the process.

4) Existing Area/Community NON-NSAM

This is similar to Mainline Extension, but on a larger scale. Typically, civic leaders approach Citizens and make a request on behalf of the community as a whole. Citizens then must take the lead and coordinate the project.

5) Existing Area/Community NSAM

This type of growth is associated with Citizens' obligations under the Build Out Plan and relates to the provision of gas service to communities some distance from Citizens' existing facilities where significant capital investment is required. It has been Citizens experience that the level of complexity, permitting requirements, capital costs, and time required to install this type of growth the most challenging.

Clearly, the NSAM Build Out Plan, while an important component of Citizens growth, is but one piece of a larger customer expansion process.

Implementation Strategy

Citizens developed an initial implementation strategy that established the priority for the reinforcement needs and growth opportunities. Top priority was assigned to high growth communities where existing loads were at or near the capacity of the local facilities. At the beginning of the ABOP, the gas system in Prescott, Citizens' fastest growing community, fit this description and was assigned the highest priority. At the same time, the City of Prescott Valley was proposing to install some major public works infrastructure to support the intense growth that the community was experiencing. This community was made Citizens' second priority.

The next critical reinforcement project was the supply lines that served the Verde Valley, and its three main communities; Sedona, Cottonwood and Clarkdale. Fortunately, El Paso Natural Gas agreed to make system improvements that would help to reinforce the supply to their single Verde Valley delivery point. However, gas supply to Cottonwood and Clarkdale would not benefit from El Paso's expansion until Citizens constructed a supply pipeline capable of utilizing El Paso's higher delivery pressure. Therefore, the Clarkdale to Camp Verde Supply Line Phase 1, which accomplished this interconnection, was scheduled as Citizens' third priority.

So as can be seen, Citizens' top three projects did not produce a single NSAM customer. Of these three significant projects, only the Prescott and Verde Valley reinforcement projects were officially "Arizona Build Out Projects". As the following matrix shows, Citizens prioritized the projects not in the order of greatest profitability, but rather in the priority that would best serve it's customers. What is also seen is because the permitting process took longer for projects involving the US Forest Service, they tended to start later out of necessity.

PRIORITY MATRIX

Project Name	Project Type	Date Permitting Process Started	Date Permits and Easements Obtained	Date Construction Began
Prescott 10" Reinforcement Supply Pipeline	Reinforcement Type 1	1992	1993	1993
Pinetop/Lakeside Supply Pipeline	Growth Type 5	1992	1995	1995
Prescott Valley Distribution Expansion	Growth Type 4	1992	1993	1993
Flagstaff South Side Loop (Kilte to Zuni)	Reinforcement Type 1	1993	1994	1994
Clarkdale to Camp Verde Phase 1	Reinforcement Type 3	1993	1995	1994
Clarkdale to Camp Verde Phase 2	Growth Type 5	1993	2000	2000
Clarkdale to Camp Verde Phase 3	Growth Type 5	1993	2001	2001
Flagstaff N. Highway 89 8" Supply Pipeline	Reinforcement Type 3	1994	1994	1994
Verde Village Distribution Phase 1	Growth Type 5	1994	1994	1994
Flagstaff Lone Tree Loop Reinforcement	Reinforcement Type 1	1994	1994	1994
Red Rock Loop Reinforcement	Reinforcement Type 1	1994	1997	1997
Verde Village Distribution Phase 2	Growth Type 5	1995	1995	1995
Pinetop/Lakeside Distribution Phase 1	Growth Type 5	1995	1995	1995
Pinetop/Lakeside Distribution Phase 2	Growth Type 5	1996	1996	1996
Kachina Village Approach Supply Pipeline	Growth Type 5	1997	1998	1998
Show-Low Reinforcement (Shoens Dam to Show-Low)	Reinforcement Type 3	1997	1998	1998
Pinetop/Lakeside Distribution Phase 3	Growth Type 5	1997	1997	1997

PRIORITY MATRIX

Project Name	*Project Type*	*Date Permitting Process Started*	*Date Permits and Easements Obtained*	*Date Construction Began*
Forest Highlands Distribution	*Growth Type 4*	*1997*	*1998*	*1998*
Kachina Village Distribution	*Growth Type 4*	*1997*	*1998*	*1998*
Pinetop/Lakeside Distribution Phase 4	*Growth Type 5*	*1998*	*1998*	*1998*
Pine Dell Distribution	*Growth Type 4*	*1998*	*1998*	*1998*
Village of Oak Creek Supply	*Growth Type 5*	*1998*	*2000*	*2000*
Timberline Distribution	*Growth Type 4*	*1998*	*1998*	*1998*
Mountainaire Approach Supply Pipeline	*Growth Type 5*	*1999*	*1999*	*1999*
Timberline Approach Supply Pipeline	*Growth Type 5*	*1999*	*1999*	*1999*
Village of Oak Creek Distribution	*Growth Type 5*	*1999*	*2000*	*2000*
Mountainaire Distribution	*Growth Type 4*	*1999*	*1999*	*1999*
Pinetop/Lakeside Distribution Phase 5	*Growth Type 5*	*1999*	*1999*	*1999*
Pinetop/Lakeside Reinforcement	*Growth Type 5*	*2000*	*2000*	*2000*
Town of Camp Verde (Horseshoe Bend) Distribution	*Growth Type 5*	*2000*	*2000*	*2000*
Show-Low Reinforcement	*Reinforcement Type 1*	*2000*	*2000*	*2000*
"Old Town" of Camp Verde Distribution	*Growth Type 5*	*2001*	*2001*	*2001*

Many of the projects were challenging in their own particular way. However, the Red Rock Loop Project was by far the most difficult.

A description of this project (along with the rest of the projects), follows, but to illustrate the effort involved, the following is a chronology of events and the time table necessary to complete the required reports.

1. Dames & Moore Hired – November 1994
2. Start-up and Refine Work Plan - January 1, 1995
3. Public Scoping Meeting – March 7, 1995
4. Alternatives Discussion Meeting with the Forest Service – May 3, 1995
5. Cultural Resources Inventory and Treatment Plan – by Dames & Moore (71 pages)
6. Red Rock Pathways and Citizens Meeting – September 8, 1995
7. Wetlands Delineation Field Study – September 14, 1995
8. Preliminary Draft Assessment – Sedona Pipeline Project – October 1995 by Dames & Moore (151 pages)
9. Forest Service – Sedona Pipeline Project Meeting – November 16, 1995
10. Draft Environmental Assessment Sedona Pipeline Project – December 1, 1995
11. Technical Report For The Sedona Pipeline Project –Visual Resources – December 14, 1995
12. Sedona Pipeline Project - 1996
13. Appraisal Report – Natural Gas Pipeline and Fiber Optics Easement – April 8, 1996
14. Geotechnical Investigation "Horizontal Directional Drilling" – May 24, 1996 by Dames & Moore
15. Geotechnical/Geological Engineering Report – Pipeline Construction – Upper Red Rock Loop Road – Sedona, Arizona – February 6, 1997
16. Sedona Red Rock Loop – Natural Gas Pipeline Project Specifications and Contract Documents – March 10, 1997 by Sunrise Engineering, Inc. (163 pages)

Chapter

2

Development of the Plan

Arizona Build-Out Plan

Design Criteria (Supply Pipelines)

Sizing the Facilities

Citizens' objective was to design facilities that would result in the lowest long-term cost to transport natural gas to communities that needed reinforcement or to communities that were to be served for the first time, while simultaneously meeting or exceeding all required safety standards, codes and laws. Both initial capital construction costs and on-going operating and maintain costs were considered.

The build-out plan, as approved by the Commission, used a forecast period of thirty-years to determine the size of the facilities. Thirty-year growth was projected for all of the communities anticipated to be served. These growth estimates were made after interviewing community planners and civic leaders. Citizens' existing customer usage patterns were analyzed to establish a base load and a variable load per degree-day. Linear regression techniques were used to best fit this data, creating a base load (non-temperature dependent) and an equation to estimate usage dependent on the weather.

Thirty years of historical weather data was obtained from the National Weather Bureau recording site that was in close proximity, or using an Arizona site that was of similar elevation. The most severe weather observed in this time period was used to estimate design degree-day conditions for each community. Peak day data was the smallest volume interval available since peak hour volumes were not tracked.

To convert peak day values to peak-hour, a technique commonly used in the natural gas industry was used as follows: To take into account that the load for a community is not constant, but varies throughout the day, it was assumed that all of the daily consumption occurred in 16 hours rather than 24. Antidotal data i.e. pressure charts, demonstrates that the typical peak-hour occurs in the morning during the hours of 6:00 AM to 8:00 AM. This usage pattern is typical, but the time can vary depending on the demographics of the community served. It is believed, that this peak occurs when individuals (either manually or automatically using a setback timer) turn up their thermostat setting, take showers, dry clothes, and cook breakfast.

With the design peak hourly flow rate established, computerized flow analysis models were used to simulate the network of proposed and/or existing pipelines. A state-of-the-art software package produced by Stoner and Associates was used to optimally size the facilities.

Code Compliance Criteria

All of the "Supply Pipelines" were designed and constructed to meet the transmission pipeline requirements of the "49 C.F.R. Chapter 1, Part 192 – Transportation of Natural and Other Gas by Pipeline: Minimum Safety Standards" by the Arizona Administrative Code. It is Citizens' standard operating procedure to operate systems at the lowest pressure needed to guarantee reliable service to our customers, not exceeding the Maximum Allowable Operating Pressure ("MAOP"). Therefore, these pipelines will operate at distribution pressures for many years, but can be operated at transmission pressure if needed.

If practical, the material was selected in an attempt to maintain stress levels below 20% of the Specified Minimum Yield Strength ("SYMS") in existing or anticipated class 3 or 4 locations. This resulted in the facilities being classified originally, as "Distribution", but if class locations deviate from projected or other operating parameter change, the facilities have the flexibility of being operated at higher stress levels. If this were to occur, the facilities would need to be reclassified as "Transmission," and operated and maintained as such.

The facilities were designed and constructed to meet local jurisdiction requirements, as well as "Citizens' Construction Standards". If contradictions occurred, the more stringent requirement was used. For instance, if the alignment crosses an Arizona Department of Transportation Highway, the requirements of the Federal Highway Uniform Utility Accommodation Plan were satisfied, since it has requirements such as 60" of cover that exceed Citizens' Construction Standards. Furthermore, environmental laws or requirements were strictly adhered to. On occasion, a jurisdiction would attempt to single out Citizens and demanded "betterments." Citizens attempted to level the playing field by returning the construction zone to pre-existing conditions, rather than improving the conditions. This was done to protect ratepayers and stockholders from unnecessary costs.

Route Selection

The general proximity of the supply pipeline routes needed to be reasonably close to existing and anticipated customers desiring service, but at the same time, far enough away from existing and anticipated buildings to minimize the risk of third party damage or other failure.

All known relevant risk factors were taken into consideration. A few examples are the following.

- Scour potential when crossing drainage-ways.
- Erosion stability and slope analysis.
- Ease of construction such as rocky terrain.
- Avoidance of areas where future excavation was anticipated with high frequency (avoided congested corridors or areas subject to future elevation changes due to development).
- Avoidance of potentially sensitive environmental areas as much as possible.
- Installation of facilities where not directly on property lines to minimize the risk of future fences being installed over the pipeline.

Easements

Citizens acquired privately owned easements, to the greatest extent reasonably possible, for supply pipelines. These easements will protect the Company from future relocation costs that could result from "public-work" roadway or drainage projects. Easements were a minimum of twenty feet wide, with addition temporary workspace for both the initial construction and for future maintenance. The easements allow for additional facilities in the future, if needed.

System Reliability

System reliability was a significant consideration when designing supply systems. Multiple supply sources and looped systems providing back-up service were optimal. However, because of the high costs it was impractical to provide back-up support in all cases.

Design Criteria (Distribution)

Sizing the Facilities

Estimating the amount of growth for a community for a thirty-year period is difficult; predicting the specific location in which a community will grow was equally challenging. Typically, communities had zoning ordinances and growth management plans, but these plans were only as good as the underlying assumptions that the planners had made. In addition, land exchanges, zoning changes or variances involved political processes that are hard to predict.

If the facilities were designed to take into account every possible scenario, the facilities would be oversized the majority of time. Therefore, each distribution system is based on load projections for the most likely future land use and density.

The first step was to identify the geographic boundaries of the proposed distribution system. Natural barriers such as rivers, highways, steep terrain, and possibly jurisdiction boundaries were considered. Also, the future extension of the supply line that feeds this distribution system was preliminarily identified. For this identified area, existing potential customers and raw land was analyzed. Using the assumed most probable density projections, the numbers of future customers were estimated. The estimated number of future customers was added to the number of existing potential customers, to complete the "ultimate expected number of customers".

Similar to sizing the supply lines, using the ultimate expected number of customers, peak load flow rates were projected. Typically, the area of study is broken into smaller areas, such as ten-acre blocks, to spread the peak design load over the total study area.

A network of distribution pipelines were assumed and placed down every street in which natural gas service was anticipated. Placing a larger main at the supply source, with increasingly smaller branch mains, similar to the structure of a tree, made a preliminary design. Using the Stoner Network Analysis software, the network was then refined.

Route Selection

Public Right-of-Ways ("ROW") were the first choice when selecting routes for the proposed distribution systems. Back and side lots, Public Utility Easements ("PUE"), were used only when necessary. This was to avoid future fence placement that increased the risk of third party damage. Local restrictions were evaluated because some neighborhoods place restrictions on the construction of fences.

Larger facilities were placed in the larger roadways since facilities are more likely to be extended in the future. Considerations of additional supply points were considered if and when, the supply line serving this distribution area was extended.

If the size of the mains that ran parallel to the supply line were questionable, the main was downsized. If the main ran perpendicular to the supply line, and the size was questionable, the main was upsized. Citizens

designed the supply pipeline with its larger size and/or higher-pressure lines carrying as much of the load as possible.

System Reinforcement-Need Assessment

Customer growth had outpaced system reinforcement projects for many of the final years in which Southern Union Gas operated the property. In some areas, the systems could no longer support customer requests, and in others, the system did not have the capacity to serve existing customers during peak- load conditions.

The highest priority was the major supply pipelines. In general, the facilities that transported the natural gas to the communities were in greater need of reinforcement, as compared to the distribution lines throughout each community.

System Reinforcement-Review SUG Initiatives

In the eastern part of the state, Southern Union Gas had installed a section of 8" pipeline paralleling the existing 4" pipeline from Stone Container (now Abitibbi) towards Taylor. This line, which ended 5 miles west of Taylor, did not have sufficient capacity to serve Show Low. This 6-mile project would suffice for a few years, but the entire 30.5-miles of 4" between Abitibbi and Show Low was undersized for the current load.

In the Flagstaff area, a new source of gas from Transwestern had been secured. Transwestern installed a 4" pipeline tapping its 30" interstate pipeline and extended it to the western edge of Flagstaff. They also installed a City Gate "Measurement Station," at the laterals point of termination.

Southern Union installed pressure regulation equipment at this City Gate and installed an 8" pipeline running south crossing Interstate 40. A District Regulator Station was installed on Kiltie Lane near the Gore facility. This improved capacity problems that had been occurring in the University Heights Subdivision.

Potential New Markets to be Served

The existing numbers of residential dwellings, commercial, municipal, and industrial operations were reviewed in each community of our service territory. A few communities had inquired several times about natural gas service, and some had contacted the Arizona Corporation Commission voicing their desire to have natural gas service. Citizens' "Rules of Service" specifies the footage allowances that potential customers could receive at no cost. These rules were designed to protect existing customers from paying for expansion projects in which existing customers would receive no benefit.

In addition to evaluating the existing development, community planners and civil leaders were interviewed. Projections were made regarding both growth and the density of that growth.

The Vision of Citizens Communications Company

Citizens Communications Company purchased the Southern Union Gas property partly because of the growth potential that existed. Citizens desired to provide the capital to make the necessary system improvements that were needed, and considered the long-term growth potential of Northern Arizona.

The original facilities were installed when natural gas was originally brought to Arizona. These facilities were built primarily to supply the needs of the California markets and these facilities were nearing 45 years old. Even though the facilities were properly maintained and were generally in good condition, some of the pipelines capacities were no longer adequate.

Citizens' now owned some of the facilities that needed reinforcement, but El Paso Natural Gas owned some of the cross-country lateral pipelines that served the growing communities. Reinforcing El Paso's systems would also be needed.

Chapter

3

System Reinforcement

Arizona Build-Out Plan

System Reinforcement-Prescott Area

El Paso Natural Gas had installed a 6" pipeline extending 30 miles south of its interstate pipeline in the 1950's. Growth within the city limits of Chino Valley and Prescott occurred rapidly, and the development occurred in close proximity to this 6" line.

Potential customers building homes and commercial property near El Paso's pipeline wanted service. But the process of the customer applying to Citizens, and then in turn, Citizens applying to El Paso, was cumbersome, time consuming, and costly. Citizens felt that if they purchased this line, it would be in the best interest of its customers.

In 1992, Citizens formally approached El Paso Natural Gas to inquire about purchasing this pipeline along with several others. El Paso Natural Gas could reduce the miles of pipeline that it was responsible to maintain, and was agreeable to the concept, but El Paso wanted to maintain control of the facilities located within ten miles of their interstate pipeline (Transwestern's Pipeline generally follows El Paso's pipeline, thus the possibility of by-pass).

Citizens was agreeable to this partial purchase, since it only wanted the pipeline in the vicinity of the growth, and did not desire to maintain any more miles of pipe than was required to meet this goal. Valve Number 1 at Mile Post 10 was negotiated as the best location to meet all objectives.

But a change in ownership of the 6" pipeline does not address the problem of capacity. Since the Prescott National Forest bounds the City of Prescott on the South and West, the growth was occurring to the East and North. Citizens acquisition of El Paso's pipeline that extended north of Prescott meant a new supply pipeline approaching Prescott from the east was needed.

El Paso has two pipeline corridors crossing Arizona, one in the northern part of the State, and another in the southern region. The flow direction is generally east to west, on the northern pipeline, coming from the San Juan Basin and headed towards California. El Paso owns two pipelines connecting the southern and northern pipelines. One is near the California border, but one runs somewhat along the Interstate 17 corridor. This line is routed to Phoenix and is called the Maricopa Pipeline.

Citizens serves Prescott, Black Canyon City, the Verde Valley, Chino Valley, Prescott Valley, and several small communities off of this 20" pipeline. The remaining Citizens' customers are fed from the northern pipelines, except for the Bagdad Copper Mine.

For these reasons, it made sense to install a new City Gate Station off of El Paso's Maricopa Pipeline. Prescott could be fed from two directions. In addition, this tap location would allow for a route that would approach Prescott from the east. Even if leapfrog development occurred, Citizens would be poised to serve this growth.

Flow calculations were performed and Citizens recommended a 10" pipeline. Based on projected growth rates, this pipe size would be sufficient for thirty years. Citizens filed a new tap request with El Paso in 1993.

System Reinforcement-Verde Valley

The entire Verde Valley, which included Clarkdale, Cottonwood, Jerome, Sedona, and various portions of Yavapai County, is fed from a single city gate station, called the "Sedona City Gate Station", although it is physically located closer to Clarkdale. El Paso installed a 4" pipeline in 1959 to serve the Phoenix Cement Plant in Clarkdale. [A historic note: this was the source of cement to build the Glen Canyon Dam in the 1960's.]

In the 1970's, the 4" line to the Phoenix Cement Plant ran out of capacity, and El Paso Natural Gas Company paralleled part of their 4" pipeline with 4.5 miles of 6" pipe. This reinforcement was effective until 1994, at which time Citizens' customer growth again exceeded El Paso's ability to maintain contract pressure.

Negotiations began with El Paso to resolve this problem. In addition to the capacity problem, both El Paso and Citizens desired to have the location of the City Gate Station relocated and for Citizens to purchase the segment of the 4" pipeline that was located inside the cement plant's fenced facility.

The Verde Valley negotiations were conducted simultaneously with the Prescott negotiations, and the outcome was that El Paso would install a 10" pipeline paralleling the portion of the lateral pipeline that had not already been paralleled by the 6" pipeline.

Citizens has two 4" pipelines downstream of this City Gate Station. One goes west cross county and feeds Sedona, and one heads south and feeds Clarkdale, Jerome, and the greater Cottonwood area. The 4" pipeline that feeds Sedona has a 750 psig MAOP, whereas the pipeline to the South has a 175 psig MAOP.

The 4" pipeline that feeds Sedona is the one exception to the general statement that Citizens' distribution systems have more capacity when compared to the supply lines that feed the communities. When the distribution system was originally designed, the ultimate size of Sedona was underestimated. The typical main size was 1-1/4" or 2". Other difficulties include the terrain and unique development practices. The natural terrain of Sedona has drainage-ways running perpendicular to Highway 179 and 89A, which are roughly a mile apart. The majority of development occurred in such a manner that resulted in pocket subdivisions between the drainage-ways.

The structures to cross the drainage-ways were expensive, and detracted from the natural beauty of the landscape. Following the development of the road system, Citizens' distribution system resulted in a number of one-way mains, all feeding from the mains along the highway. Other utilities ended up in similar situations, making the highway corridor very congested. Therefore, Citizens had the need to reinforce its distribution system in Sedona.

Citizens also owned a 4" supply pipeline downstream of the Sedona City Gate Station. Although, that pipeline is much shorter than the one that feeds Sedona, it's capacity could not support additional customers because of the lower MAOP. Furthermore, the growth was occurring south of Cottonwood, which is at the tail end of the Citizens' Cottonwood Distribution System.

An example of this development is the Verde Village Subdivision, Units 1-8. These subdivisions were developed in the 1970's without natural gas service. Over the years, in fill growth had occurred so that by 1995, the majority of lots had been built on. These residents wanted natural gas service, but Citizens' existing infrastructure could not support it.

A new higher pressure and larger pipeline was needed from the City Gate Station to the south side of Cottonwood.

System Reinforcement-Show Low Area

With the 6 miles of 8" pipeline that Southern Union Gas installed, Show-Low did not have an immediate capacity problem, although it was known that the 4" segment would not be sufficient to keep up with this growth in the long term. In addition, the community of Pinetop-Lakeside had wanted natural gas service for years and was becoming increasingly impatient. Pinetop-Lakeside is located 7 miles South of Show Low, and if service were provided, it would accelerate the need for system reinforcement.

The community of Pinetop-Lakeside, with its high amount of heating degree-days and its rapidly gowing community, was extremely persistent in its requests for natural gas service.

Chapter

4

Purchase of El Paso Facilities

Arizona Build-Out Plan

Facilities Purchased Near Prescott and Clarkdale

As discussed in Chapter 3, to reinforce the pipelines to both Prescott and the Verde Valley, Citizens and El Paso Natural Gas owned portions of the supply lines that needed reinforcement. El Paso Natural Gas submitted a request to the Federal Energy Regulatory Commission ("FERC") to sell these lines to Citizens. After reviewing the request, it was approved by FERC. The acquisitions were completed in 1994, after Citizens' had performed its due diligence.

Reinforcement of El Paso's System

El Paso Natural Gas initiated the permit process to request permission to construct the 10" pipeline paralleling the existing 4" line. Since the route is in a very remote and isolated area (north of Clarkdale towards Chino Valley), the general public did not have much concern. In the areas outside the Prescott National Forest, El Paso Natural Gas possessed easements that included rights allowing additional pipelines to be installed.

The necessary permits and approvals were obtained, and construction was completed in 1995.

Chapter

5

Prescott 10" Supply Line

Arizona Build-Out Plan

Design Criteria

This pipeline was built to increase supply capacity to the Prescott systems, as well as provide natural gas to new subdivisions located to the east of the current Prescott systems. This supply line was tapped into the existing El Paso transmission line located south of Prescott Valley.

Citizens' Engineering Department, through the use of gas flow analysis software, performed calculations in order to correctly size the pipe that would be needed for this project. After performing various calculations, it was decided that the project would consist of a 10" pipeline that would be constructed and tied into the existing 6" pipeline that fed Prescott. The new pipeline was designed with a MAOP of 500 psig.

Citizens' Engineering Department reviewed the Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, in order to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took these specifications into account when designing this pipeline.

Route Selection and the Permitting Process

The route for this system improvement project required Yavapai County permits, City of Prescott permits, State Highway Department permits, State Land permits and several private property easements. Arizona Engineering Company provided surveying, staking, and property ownership records research.

The originally proposed route traversed more than a mile across the Yavapai Indian Reservation. After extensive negotiation, a route for the pipeline across the Reservation was agreed upon. However, an agreement for compensation could not be reached, so an alternate route around the Reservation had to be found.

Environmental Concerns

During survey and inspection of the proposed route a fire ring was discovered. The age and origin of the circle of rocks with charred wood in the center could not be determined, so a decision was made to route the pipeline around the possible historic site.

Easement Acquisition

Arizona Engineering provided the legal descriptions for the private easements. Citizens' Arizona Gas personnel in Prescott negotiated the terms of the private easements.

Approximately four miles of the route was undeveloped land belonging to two different subdivision developers. Each development company had several partners, some residing out of state. Both companies

had concerns for the future development of their property, which resulted in the pipeline being routed adjacent to property lines and existing utility corridors. The number of people involved and the extent of their concerns resulted in protracted negotiations. For example, in one case a mile of the pipeline route ran across a ranch that was in a family trust. Several family members were involved in decision making for the family trust. This resulted in numerous meetings and protracted negotiation.

Engineering Services-Final Design

Sunrise Engineering, Inc. provided drawings and specifications for construction of the pipeline. Sunrise Engineering, Inc. inspected the installation of the pipeline and provided as-built drawings and records upon completion of the project.

The Bidding Process

A bid package including specifications, and contract documents were prepared by Sunrise Engineering, Inc. Invitations to bid were sent to pre-qualified contractors. A mandatory pre-bid tour was held on December 13, 1993.

Sunrise Engineering, Inc. also provided bid packets, held pre-bid meetings and evaluated the bids. Northern Pipeline Construction Company was selected to construct and install the pipeline and facilities, after the bids were privately opened and reviewed on Monday, December 27, 1993.

Project Management and Inspection

Sunrise Engineering, Inc. was given the tasks of project management and inspection.

Construction

A 10" high-pressure supply pipeline was installed from El Paso Natural Gas Company's transmission line south of Prescott Valley to north central Prescott. At this point, it was connected to a 6" line that Citizens purchased from El Paso Natural Gas Company. This configuration created a looped system, providing a two way feed to both Prescott and Chino Valley, which greatly enhanced the reliability of gas service to both cities. The addition of the 10" main provided a very significant increase in gas service capacity to Prescott and Chino Valley, allowing for the continuing residential, commercial and industrial growth of the area.

The project was started in 1993 and was completed in 1994. Upon completion, 62,800 feet of 10" pipe had been installed and three district regulator stations built. The regulator stations provided a gas source for a new subdivision and enhanced gas deliverability in several existing systems.

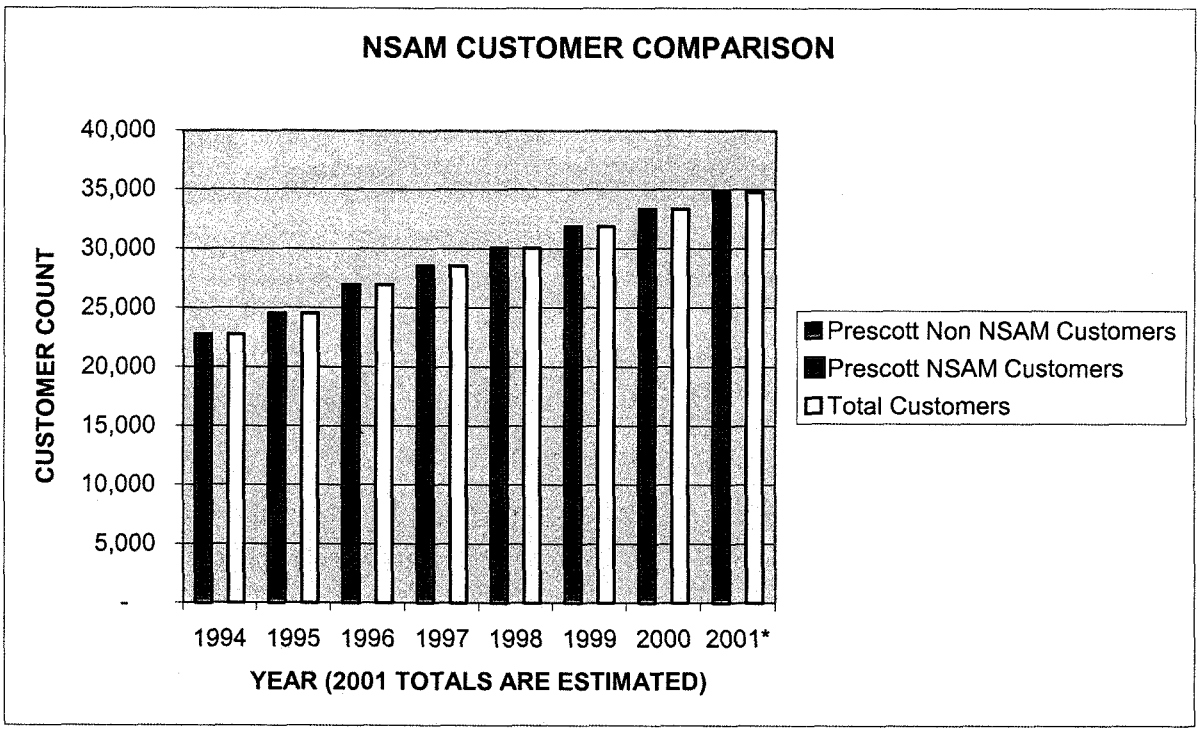
Citizens' Arizona Gas provided the pipe, fittings, valves, and regulators. Northern Pipeline cleared the right-of-way, provided the trench, welded the pipe and fittings, padded the trench, lowered the pipe into the trench, provided shading material over the pipe, backfilled the trench, restored the vegetation and provided erosion control. They also fabricated all of the above ground facilities. All welds were x-rayed and upon completion, the entire pipeline was hydrostatically tested.

Operation of Facilities

When the facilities were completed, the pipeline was purged and placed into service as part of the Prescott System 1D. This system is currently operated at 350 psig and has an MAOP of 500 psig.

NSAM Customer Growth

Customers								
	1994	1995	1996	1997	1998	1999	2000	2001*
Prescott Non NSAM Customers	22,749	24,552	26,964	28,568	30,083	31,881	33,359	34,793
Prescott NSAM Customers	0	0	0	0	0	0	0	0
Total Customers	22,749	24,552	26,964	28,568	30,083	31,881	33,359	34,793
* 2001 TOTALS ARE ESTIMATED								



Chapter

6

Clarkdale to Camp Verde Phase 1

Arizona Build-Out Plan

Design Criteria

Citizens' built this supply line beginning at the existing Sedona City Gate, located north of Clarkdale, south to the Fir Avenue Regulator station. This pipeline would provide a supply for the proposed Horseshoe Bend, Camp Verde, and the Village of Oak Creek areas. This supply line would also provide a "back feed" to the Sedona systems, if needed, by extending the pipeline from the Village of Oak Creek, north to Sedona. Ultimately, a regional loop will be created, with this segment as an important part.

Citizens' Engineering Department, through the use of gas flow analysis software, performed calculations in order to correctly size the pipe that would be needed for this project. After performing various calculations, it was decided that the project would consist of a 10" pipeline brought south from the Sedona City Gate Station. The pipeline was designed with a MAOP of 720 psig.

Citizens' Engineering Department reviewed the Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, to assure that all construction practices and procedures needed for this project were covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications while designing this pipeline. Finally, Citizens' Engineering Department required that the testing of the pipeline be performed under the written direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

Arizona Engineers was hired to develop a preliminary route for the entire Clarkdale to Camp Verde Supply Pipeline (Phases 1,2, and 3), along with the Supply Pipeline to the Village of Oak Creek.

The permitting process began on March 25, 1993, with a meeting with representatives of the Prescott National Forest. Even though, Phase 1 did not include any Forest Service Land, Citizens needed to know where the Forest Service would allow the Company to enter.

After the preliminary route was determined, Sunrise Engineering, Inc. determined the final alignment and obtained the permits from ADOT, the City of Cottonwood, and Yavapai County.

Environmental Concerns

Citizens' contracted SWCA, Inc. – Environmental Consultants ("SWCA"), located in Flagstaff, for all environmental studies. These studies included an Environmental Assessment, Scoping Document, Erosion Control and Landscaping Plan, Biological Assessment and Evaluation, and an Archeological Survey.

Easement Acquisition

Arizona Engineering provided the legal descriptions for the private easements. Citizens' Arizona Gas personnel in Prescott negotiated the terms of the private easements. Twenty-three private easements were obtained for this project.

Engineering Services-Final Design

Sunrise Engineering, Inc. supplied all engineering design and developed construction drawings and contract specifications.

The Bidding Process

Sunrise Engineering, Inc. developed the bid specifications and contract document. Invitations to bid were sent to Citizens' list of prequalified bidders. The pre-bid tour was held on October 31, 1994, and the bids were due on November 7, 1994. After reviewing the bids, the contract was awarded to Northern Pipeline Company.

Project Management and Inspection

Sunrise Engineering, Inc. was given the tasks of project management and inspection.

Operation of Facilities

When the facilities were completed, the pipeline was purged and placed into service as part of the Cottonwood System 7. This system is currently operated at 380 psig, and has a current MAOP of 570 psig.

Chapter

7

Verde Villages Phase 1

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, in order to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 55 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses would allow for a more efficient usage of the pipeline in the system design, and help in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project would be carbon steel, and a high density, 3408 polyethylene. This material selection would allow for the strength and durability that was needed,throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account, these specifications while designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

The system was designed to reinforce the existing Cottonwood System 2, by providing a second source of gas.

Route Selection and the Permitting Process

With the exception of the short pipeline segment downstream of the Fir District Regulator to Fir Street, the scope of the project was within Verde Village Units 6 and 7, which are platted subdivisions. These subdivisions lie in Yavapai County, just south of the City of Cottonwood's Municipal Boundary Line. Citizens utilized its existing franchise with Yavapai County to obtain the legal right to install gas facilities in the Public Road Right-of-Ways ("ROWS"). Permitting requirements in the Yavapai County ROW's required Citizens to compensate Yavapai County inspectors for all overtime. Yavapai County inspectors normally worked four ten-hour days, while Citizens' construction activity was on a 5-day work schedule. Yavapai County Utility Construction Permits were obtained in December 1994.

Easement Acquisition

Acquisition of only one private easement was necessary for the supply line that feeds this distribution system.

Engineering Services-Final Design

Citizens' personnel conducted the engineering, design, and construction drawing preparation with in-house staff.

The Bidding Process

A bid package including specifications, constriction documents, and final construction drawings were prepared in-house. Invitations to bid were sent to pre-qualified contractors. A pre-bid tour was held on November 21, 1994.

Citizens received five bids. The bids were evaluated, and the project was awarded to Northern Pipeline. The notice to proceed was issued on December 9, 1994, and the duration of the project was 90 days. Due to customer demand, five additional streets were added to the project, which extended the duration of the project. In addition, rain played a contributing factor to the project duration and 21 additional workdays were required to complete the project. The final completion date became May 9, 1995.

Project Management and Inspection

Sunrise Engineering, Inc. was contracted to assist Citizens' local operating personnel by providing inspection services. In addition, Yavapai County provided inspectors to monitor earth work done in county ROWS.

Operation of Facilities

All newly installed facilities were installed and tested for a 60 psig MAOP, however, the new facilities were tied into existing distribution systems with a 55 psig MAOP. The net result was a 55 psig MAOP system.

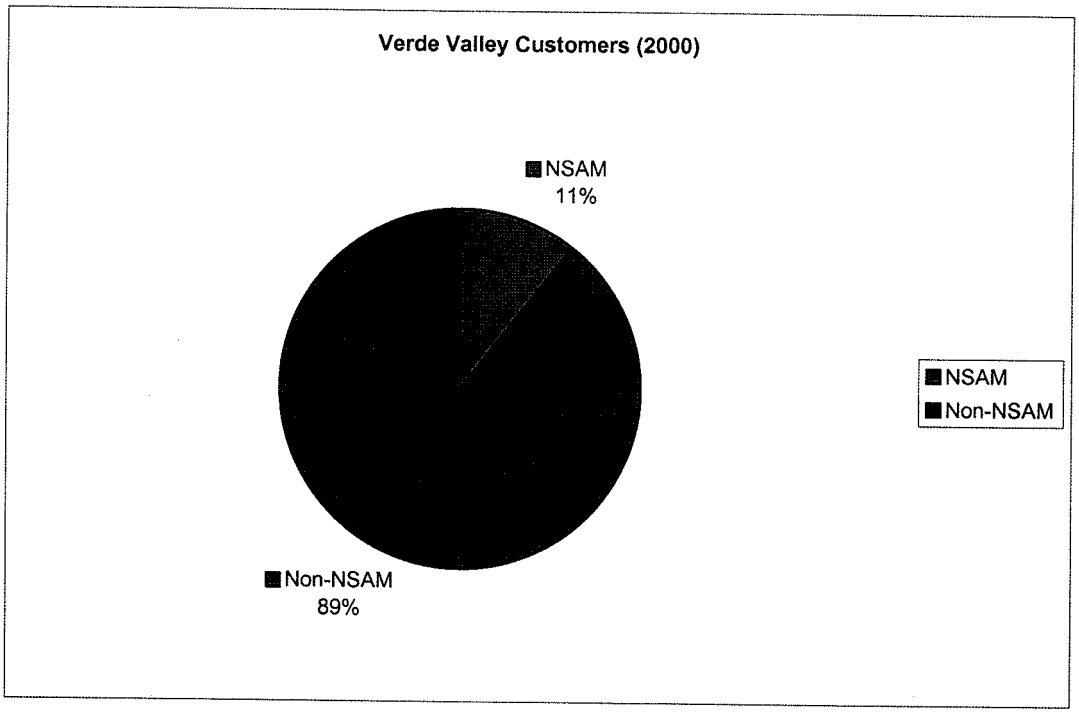
The scope of Phase 1 included 47,000 feet of 2" PE pipe, 22,500 feet of 4" PE pipe, and 5,000 feet of 6" steel pipe. The 6" steel piping was installed for future growth.

As each milestone (approximately 1000-foot segments) was completed and tested, the facilities were purged and place into service. As described in the design criteria, a portion of the distribution facilities also served to reinforce the Cottonwood System 2.

NSAM Customer Growth

Customers at the End of Each Period
Cottonwood & Sedona Offices

Year	Total	NSAM	Non-NSAM
1994	9,264	10	9,254
1995	10,119	454	9,665
1996	11,173	945	10,228
1997	11,869	1,111	10,758
1998	12,633	1,233	11,400
1999	13,281	1,340	11,941
2000	13,824	1,463	12,361
Aug 2001	14,835	2,081	12,754



Chapter

8

Verde Village Phase 2

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, to decide how the distribution system should be designed. Citizens' Engineering Department determined that a MAOP of 55 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses would allow for a more efficient usage of the pipeline in the system design, and help in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project would be a high density, 3408 polyethylene. This material selection allowed for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures and standards were also taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications, when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems would be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

The system was designed to reinforce the existing Cottonwood System 2, by providing a second source of gas.

Route Selection and the Permitting Process

The scope of the project was within the following platted subdivisions: Verde Village Unit 1, 2, 4, 5, and 8. These subdivisions lie in Yavapai County just south of the City of Cottonwood's Municipal Boundary Line. Citizens utilized its existing franchise with Yavapai County to obtain the legal right to install gas facilities in the Public Road Right-of-Ways. A bore under Highway 260 was necessary and an ADOT permit was required, which led to special installation requirements.

Easement Acquisition

No private easements were required.

Engineering Services-Final Design

Citizens' personnel conducted the engineering, design, and construction drawing preparation in-house.

The Bidding Process

A bid package including specifications, constriction documents, and final construction drawings were prepared in-house. Invitations to bid were sent to pre-qualified contractors. A pre-bid tour was held on May 9, 1995.

Bids were privately opened and reviewed on May 16, 1995, and Citizens received fourteen bids. The bids were evaluated, and the project was awarded to Northern Pipeline. The notice to proceed was issued on June 12, 1995, and the duration of the project was 180 days.

Project Management and Inspection

CDI Inc. was contracted to assist Citizens' local operating personnel by providing inspection services. In addition, Yavapai County provided inspectors to monitor the work done in county ROWS.

Construction

The scope of Phase 2 included 85,700 feet of 2" PE pipe and 29,500 feet of 4" PE pipe. There was one auger bore under Highway 260 at Western Drive.

Construction occurred in the summer time when temperatures affected the asphalt surface. The condition of the original streets was poor and melting of the road surface occurred. Yavapai implemented additional construction requirements that included the daily sanding of local streets and daily sweeping of these same streets. After Citizens' contractor completed sweeping the streets, the County also required daily washing of the streets via water truck to remove any remaining sand debris. The closest water supply was 10 miles away. The turn-around time for a single filling of the water truck was one hour. The washing of the streets required three fillings of the water truck daily. Construction was delayed because only a limited number of construction vehicles were allowed on the streets at the same time. Approximately 1,500 tons of sand was required to complete the sanding of the roads for this project.

Operation of Facilities

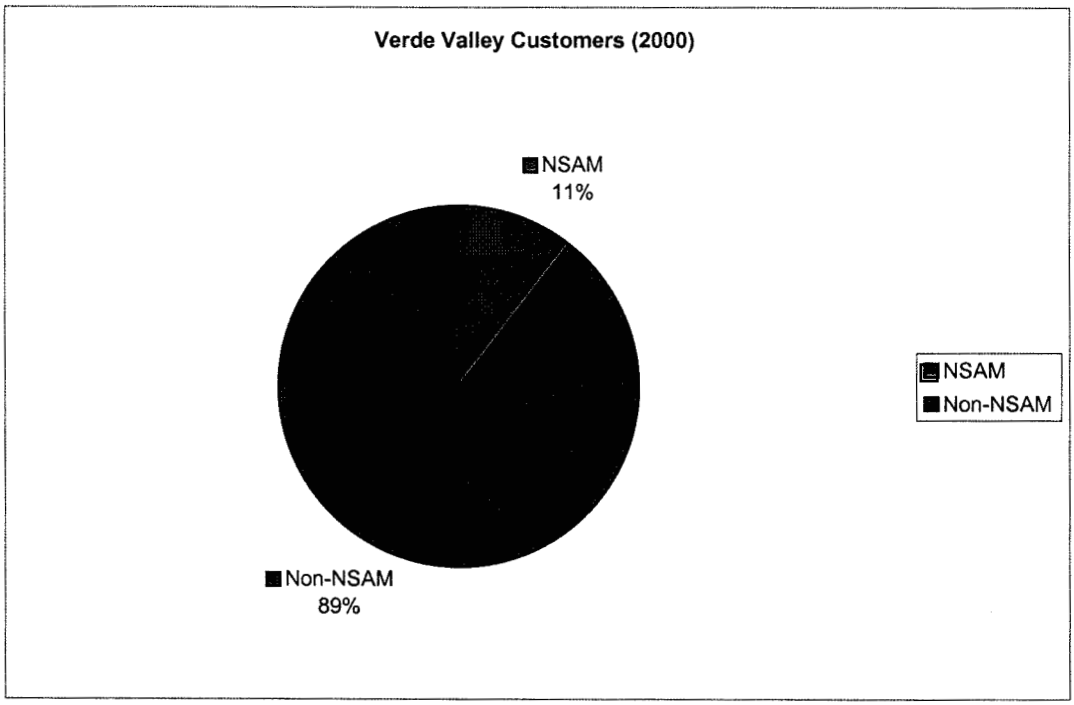
As each milestone (approximately 1,000 foot segments) was completed, and tested, the facilities were purged and place into service. As described in the design criteria, a portion of the distribution facilities also served to reinforce the Cottonwood System 2. This system has a MAOP of 55 psig, and was operated at 52 psig.

All newly installed facilities were installed and tested for a 60 psig MAOP, however, the new facilities were tied into existing distribution systems with a 55 psig MAOP, therefore the net result was a 55 psig MAOP system.

NSAM Customer Growth

Customers at the End of Each Period
Cottonwood & Sedona Offices

Year	Total	NSAM	Non-NSAM
1994	9,264	10	9,254
1995	10,119	454	9,665
1996	11,173	945	10,228
1997	11,869	1,111	10,758
1998	12,633	1,233	11,400
1999	13,281	1,340	11,941
2000	13,824	1,463	12,361
Aug 2001	14,835	2,081	12,754



Chapter

9

Flagstaff N. Highway 89 8" Supply Line

Arizona Build-Out Plan

Design Criteria

The Transwestern Pipelines, in the vicinity of Flagstaff, run in a westerly direction approximately three miles north of Flagstaff, and two miles north of the El Paso Natural Gas Pipelines. Southern Union Gas had negotiated with Transwestern to install a lateral pipeline to the west side of Flagstaff. (Note: Southern Union Gas also negotiated that Transwestern install a lateral pipeline on the south side of Kingman.)

In order for Citizens to improve the reliability of several Flagstaff distribution systems on the eastern side of Flagstaff, a new City Gate Station was needed in that part of town. In addition, this delivery point would ultimately serve potential customers in the westerly part of Doney Park, Timberline, and Fernwood. These primarily residential areas lie north of Flagstaff city limits in Coconino County.

Citizens requested Transwestern to estimate the costs of installing a tap, electronic metering equipment, heater, pressure regulation equipment, over-pressure protection, and odorization equipment. After reviewing Transwestern's estimate, Citizens believed that it could construct the facility at a lower cost. Negotiations were made so that Citizens would purchase and install all equipment to Transwestern's specifications, with the exception of the tap and inlet valve, which Transwestern installed.

Even though scattered development had occurred from the location of the Transwestern Pipeline to the fully developed portions of Flagstaff, because of the distance and flow volumes needed, it was determined that the proposed pipeline would be more economical if it was designed as a "Supply Pipeline" rather than a "Distribution Pipeline", and an 8" steel pipeline with a 500 psig MAOP was specified.

Because existing development was occurring on both sides of the highway, it was also determined that frequent highway crossings should be installed with this project. Due to the width of highway, and the natural terrain, large auger boring equipment was required. The mobilization costs are high when each of these bores are made one at a time in response to individual requests. In addition, this would minimize the need for pipelines to be installed on both sides of the highway in the future.

Route Selection and the Permitting Process

Sunrise Engineering, Inc. selected the route and applied for and obtained Forest Service, City of Flagstaff, and A.D.O.T permits.

Easement Acquisition

Since Highway 89A had been recently widened along this segment, and due to the width of the Arizona Department of Transportation Right-of-Way, it was determined that a private right-of-way was not necessary.

Engineering Services-Final Design

Sunrise Engineering, Inc. designed the project, producing construction drawings and final as-builds.

The Bidding Process

A bid package including specifications, constriction documents, and final construction drawings were prepared by Sunrise Engineering, Inc. Invitations to bid were sent to pre-qualified contractors. A pre-bid tour was held on July 8, 1994.

Bids were privately opened and reviewed on July 15, 1994. The bids were evaluated, and the project was awarded to Park Acres Construction Company, a Utah company. The notice of award was issued on July 15, 1994, and the duration of the project was 55 days.

Construction

The project began August 22, 1994, with the installation of 25,513 feet of 8", 4", and 2" steel from Transwestern's crossing of Highway 89 and extended into Flagstaff's Peaks Regulator Station. The pipeline was installed near a fiber optic line that wandered back and forth, consuming most of the available workspace, which slowed the pace of construction. Another difficulty was that a portion of the pipe was delivered with a coating that did not meet Citizens specifications. Getting the coating corrected also slowed the project. Upon completion of this line, Citizens could take the majority of supply from Transwestern. There were seven regulator stations constructed off this line. The project was completed December 2, 1994.

Project Management and Inspection

Sunrise Engineering, Inc. performed the project management and construction inspection.

Operation of Facilities

The construction of this new facility created a system named "Flagstaff 24A", which operated at 350 psig.

NSAM Customer Growth

Because Flagstaff and its surrounding environs were not addressed in the ACC Order, no NSAM customers were derived.

Chapter

10

Flagstaff South Loop Line (Kilte to Zuni)

Arizona Build-Out Plan

Design Criteria

As previously mentioned, the Transwestern Pipeline, in the vicinity of Flagstaff, runs in a westerly direction approximately three miles north of Flagstaff, and two miles north of the El Paso Natural Gas Pipelines. Southern Union Gas had negotiated with Transwestern to install a lateral and a City Gate Station on the westerly side of Flagstaff.

In order for Citizens to improve the reliability of several Flagstaff distribution systems on the western part of Flagstaff, Citizens needed to extend its 8" supply pipeline further south. In addition, this pipeline would ultimately serve potential customers in Pine Del, Forest Highlands, Kachina Village, Mountainaire, and possibly Munds Park. These primarily residential areas lie south of Flagstaff city limits in Coconino County.

Route Selection and the Permitting Process

Arizona Engineering was hired to determine the best route, and secure all necessary permits. Permits were needed from ADOT, State Land, and USFS.

Arizona Engineering subcontracted with SWCA, Inc. to analyze the environmental effects of the project, because a portion of the route was in the Coconino National Forest.

Easement Acquisition

Arizona Engineering contacted owners and negotiated easements with Ponderosa Trails, Northern Arizona University, CFA Transfer III Limited Partnership, private owners, as well as others.

Engineering Services-Final Design

Arizona Engineering subcontracted portions of the Engineering work to Huitt-Zollar, Inc. Arizona Engineering surveyed all land features and developed the alignment and Huitt-Zollar completed the design by specifying all natural gas related facilities.

The Bidding Process

Arizona Engineers and Huitt-Zollar prepared a bid package including specifications, construction documents, and final construction drawings. Invitations to bid were sent to pre-qualified contractors. A mandatory pre-bid tour was held on October 7, 1994.

Bids were due on October 14, 1994. The bids were evaluated, and the project was awarded to Piute Contractors, Inc., a Colorado company, on October 19, 1994. The notice to proceed was issued on October 31, 1994, and the duration of the project was 45 days.

Construction

Construction began with the installation of 26,490 feet of 8", 6" & 4" steel pipe from the Kilte Lane Regulator Station and extended to the Zuni Regulator Station. The pipeline was auger bored under I-17 and Lake Mary Road. The project was completed December 1994.

Project Management and Inspection

Arizona Engineers provided project management and inspection services. Non-destructive weld testing (X-ray) testing was completed on 100% of the welds.

Operation of Facilities

Upon completion and successful testing of this pipeline, the facility was purged and placed into service extending the Flagstaff System 22 to the southern end of town. This system initially was operated at 350 psig. This system is normally fed entirely from the Transwestern City Gate No. 4 supply point, but supplies from El Paso Natural Gas can be back-fed into this system.

NSAM Customer Growth

Because Flagstaff was not addressed in the ACC Order, no NSAM customers were derived, although this line was later extended to serve several other communities.

Chapter

11

Flagstaff Lone Tree Loop

Arizona Build-Out Plan

Design Criteria

In order to improve system reinforcement and system reliability, the two Flagstaff pipelines needed to be tied together. On the northern and eastern portion of Flagstaff, a 172 MAOP system feeds the majority of "district regulators," which feed the customers in that part of town.

On the west side, the new Transwestern Supply point fed the customers on the western side of town. The two pipelines needed to be tied together with a minimum of 6" pipe.

An existing steel 6" line extended the majority of the way, and the most economical method of tying these two systems together was to up-rate this line. Three blocks of new pipe was needed to parallel a segment that was four inches.

Route Selection and the Permitting Process

Citizens' personnel were responsible for the route selection, permitting, and up-rating of the existing 6" line. The new segment of 6" steel pipeline was routed in an alley from the Franklin District Regulator to the Rio de Flag "Creek", where it was tied into the existing 6" line.

Permits from the City of Flagstaff were obtained.

Easement Acquisition

After researching the proposed route, it was determined that all work would take place in the City of Flagstaff Right-of-Way. Portions of the route needed to be field staked to verify proper placement of the facilities.

Engineering Services-Final Design

All engineering services and final construction drawings were prepared in-house by Citizens' personnel.

The Bidding Process

Since the project involved up-rating a segment of the existing system, it was decided to construct a majority of this project in-house with Citizens' personnel. A portion of the project was awarded to Pacific Industrial Pipeline Inc. under the terms of an existing blanket contract.

Construction

The project began November 7, 1994, with the installation, and/or up-rating of 3350 feet of 6" steel from McConnell Drive and extending it to Franklin Street Regulator Station. The project was completed December 17, 1994.

Project Management and Inspection

Citizens' personnel performed project management and inspection in-house.

Operation of Facilities

After testing and purging, this pipeline was placed into service as part of System 2 and was operated at 170 psig.

NSAM Customer Growth

Because Flagstaff was not addressed in the ACC Order, no NSAM customers were derived.

Chapter

12

Pinetop/Lakeside Supply Line and Accompanying Distribution.

Arizona Build-Out Plan

Design Criteria

Route Selection and the Permitting Process

The services of Arizona Engineers were obtained to lead the effort of route selection and permitting the project within the Apache-Sitgreaves National Forest. Arizona Engineers subcontracted with SWCA for environmental analysis. Arizona Engineers began working on the project in June of 1993. The Forest Service Permit was obtained in 1995. The public scoping started with two public open-houses, held on July 22, 1993.

The Forest Service mandated that the pipeline route be coordinated with a proposed future roadway. The Arizona Department of Highways worked with Navajo County and the Apache-Sitgreaves National Forest to evaluate the rerouting of State Route 260. In the end, to mitigate concerns of the general public, a proposed roadway alignment was approved, but it was designated as a county road, and not as State Route 260. This coordination greatly complicated the process, forcing the project to be delayed.

Environmental Concerns

SWCA led the effort for all environmental studies. These studies included an Environmental Assessment, Public Scoping Document, and an Archeological Survey. Since the route was through Goshawk habitat, field studies were required for two years to determine if any breeding nests were near the route. Fortunately none were found, but an endangered fish was found to exist in a particular area of Billy Creek. The alignment had to be modified over a nearby culvert, so that no disturbance to the creek would occur.

Easement Acquisition

Private easements were needed on the north end of the project. Arizona Engineers negotiated easements on behalf of Citizens, but when Arizona Engineers were unable to secure all of the needed easements, Citizens' personnel finalized the easements needed to cross parcels owned by Navajo County.

Franchise Negotiation

Since a small segment of the route needed to be installed in the City of Pinetop-Lakeside Right-of-Way, a franchise was needed. The franchise would obviously be needed later when the distribution system was installed. The process started on June 19, 1992, and was completed March 20, 1995.

Citizens' 25-year franchise with Navajo County expired on December 21, 1994. Since a small segment of the route needed to be installed in Navajo County Right-of-Way, the terms for the new franchise needed to be negotiated. The process started in 1993, and was completed June 1995.

Engineering Services-Final Design

Arizona Engineers surveyed in the route and provided field staking, Northern Technical Services provided engineering services and prepared the final construction drawing.

The Bidding Process

Northern Technical Services, Inc. prepared a bid package including specifications, and contract documents. Invitations to bid were sent to seven pre-qualified contractors. A mandatory pre-bid tour was held on June 6, 1995.

Bids were due on June 13, 1995, and Citizens received six bids. The bids were evaluated, and the project was awarded to Piute Contractors, Inc., a Colorado company, on October 19, 1994. The notice to proceed was issued on June 29, 1995, and the duration of the project was 75 days.

Construction

Construction of the Pinetop/Lakeside Regulator station was started on July 5, 1995. This station was needed to cut the pressure from the supply pipeline to the serving pressure of the Pinetop/Lakeside distribution. The project was completed September 18, 1995.

Show Low to Pinetop/Lakeside 8" Steel

The Pinetop/Lakeside supply line was started on June 29, 1995, with the installation of 42,300 feet of 8" steel pipe from Show Low City Gate #1 to the new Pinetop/Lakeside Regulator Station. Piute Contractors, Inc. was the successful bidder and constructed the pipeline. The Malapai rock encountered along this route created an enormous challenge for trenching, in some instances rock trenchers ran 24 hours a day to meet deadline requirements. The project was completed on September 29, 1995.

Porter Mountain 4" PE

This "distribution" project was installed with the Show Low to Lakeside 8" Transmission main. 7950 feet of 4" PE main was installed in Porter Mountain Road, from the Pinetop/Lakeside Regulator Station to Juniper Drive. Citizens engineered the project. The pipe was installed within Navajo County ROW. Piute was the successful bidder and constructed the pipeline. The project was completed September 12, 1995.

Operation of Facilities

After construction was completed, the pipeline was tied into the Show Low System 5 and operated at 400 psig. This was a temporary feed into this pipeline until the proposed pipeline segment from Shoens Dam to Show Low was completed in 1998. At that time, the Pinetop-Lakeside 8" became a part of Show Low System 7, and was operated at El Paso's pipeline pressure which ranged from 600 to 880 psig.

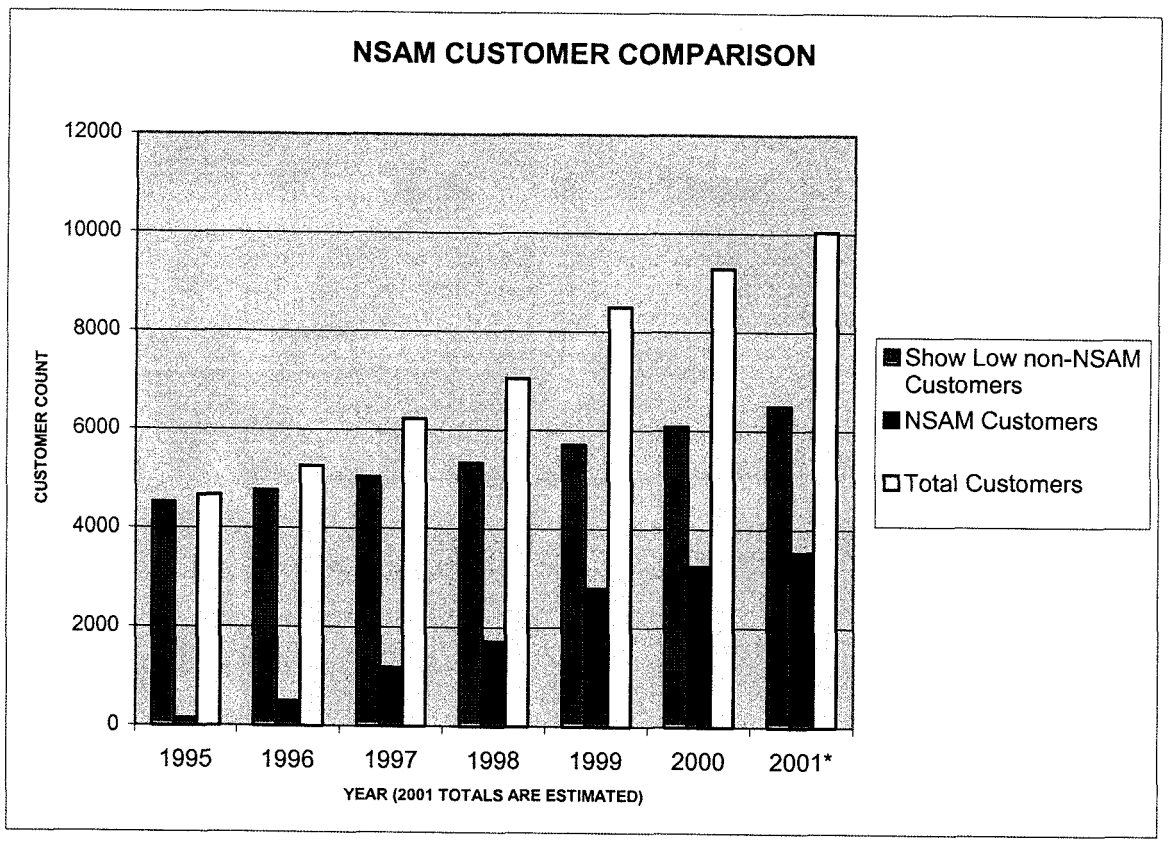
NSAM Customer Growth

Since this project was primarily a supply line, only a few customers are being fed from the facilities installed. The few are fed off the incidental distribution mains that are described above. Since Pinetop-Lakeside NSAM customers are not tracked according to project, the exact number is not known.

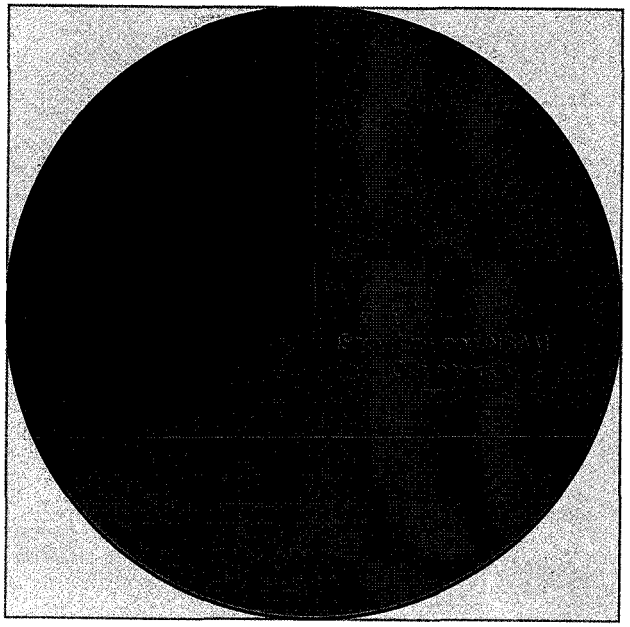
NSAM BUILD-OUT TOTALS
SHOW LOW OFFICE

Customers at End of Year

	1995	1996	1997	1998	1999	2000	2001*
Show Low Customers	4517	4763	5045	5336	5711	6085	6498
NSAM Customers	148	497	1,184	1,714	2,795	3,250	3,542
Total Customers	4,665	5,260	6,229	7,050	8,506	9,290	10,040
* 2001 TOTALS ARE ESTIMATED							



NSAM CUSTOMER COMPARISON FOR 2000



Chapter

13

Pinetop-Lakeside Distribution Phase 1

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department were able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, in order to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 6" steel feeder, the 4" backbone lines, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project would be a high density, 3408 polyethylene, as well as carbon steel piping. This material selection would allow for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications, when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

The services of Arizona Engineers were obtained to lead the effort of route selection and permitting the project within the Apache-Sitgreaves National Forest, A.D.O.T., and the Town of Pinetop/Lakeside.

Easement Acquisition

Two easements were needed for this project. One easement was required from the Blue Ridge School District and the other from Safeway.

Engineering Services-Final Design

Arizona Engineering engineered the project and created the final construction plans.

The Bidding Process

Citizens' personnel led the bidding process. A bid package was prepared including specifications and contract documents. Invitations to bid were sent to pre-qualified contractors. A mandatory pre-bid tour was held on May 18, 1995.

Bids were due on May 25, 1995, and Citizens received six bids. The bids were evaluated, and the project was awarded to the Tempest Company, Inc., a Utah company. The notice to proceed was issued on May 28, 1995, and the duration of the project was 120 days.

Construction

The Pinetop/Lakeside build-out began June 20, 1995, with the installation of 14,574 feet of 6 steel, 23,826 feet of 4" PE and 27,211 feet of 2" PE, from new Pinetop/Lakeside Regulator Station to the intersection of White Mountain Boulevard and Creel Drive. This project also included Woodland Road to Apache and Woodland Lake Road at Timber Lane.

This was an extremely challenging project due to the solid malapai rock that was encountered and was trenched through. This same rock posed additional challenges when two casings were auger bored underneath White Mountain Blvd. The project was completed September 28,1995.

Pinetop/Lakeside has several small utility providers. For example, the community has a total of five different water companies. These small utilities had difficulties in accurately locating their facilities, which slowed the project down.

Project Management and Inspection

Local Citizens' personnel performed the project management. CDI was chosen to conduct field inspections of new gas mains and services being installed. Local Citizens' personnel also conducted field inspections and quality assurance of the CDI inspectors.

Operation of Facilities

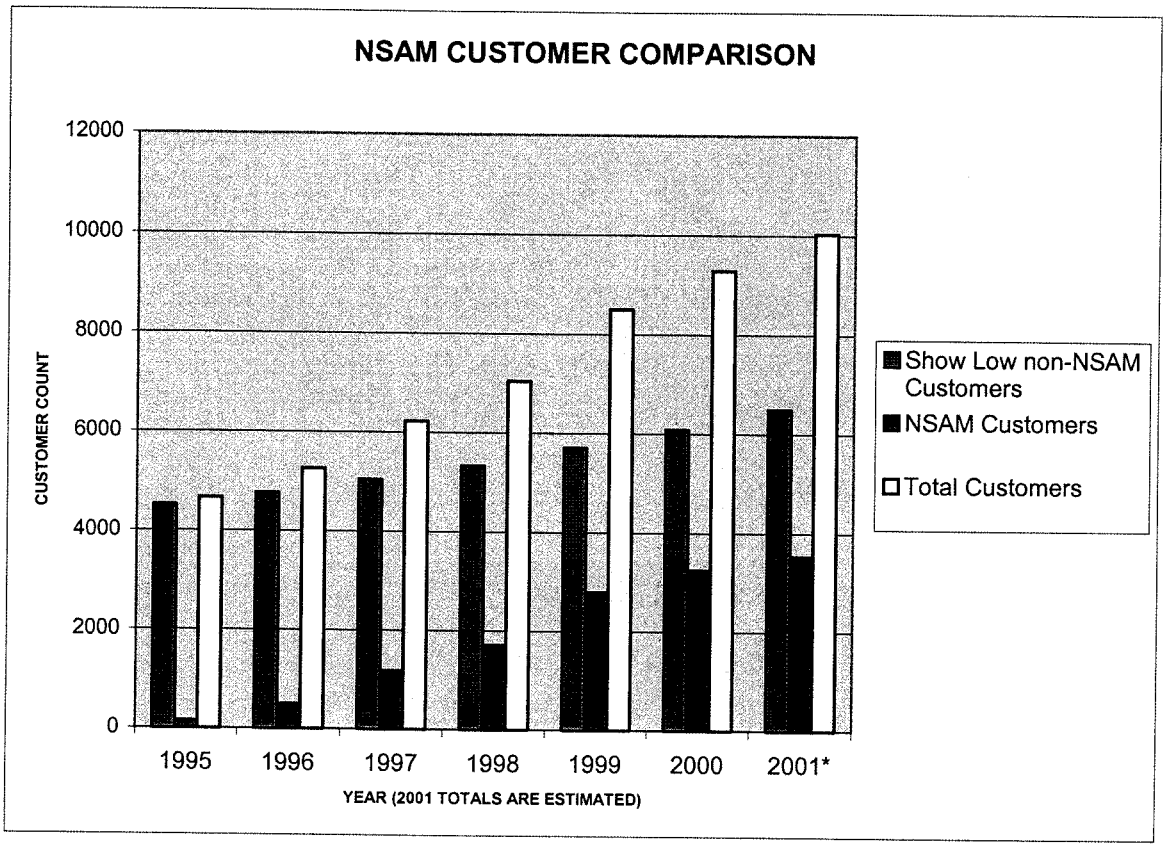
The facilities were placed into service in Show Low System 9.

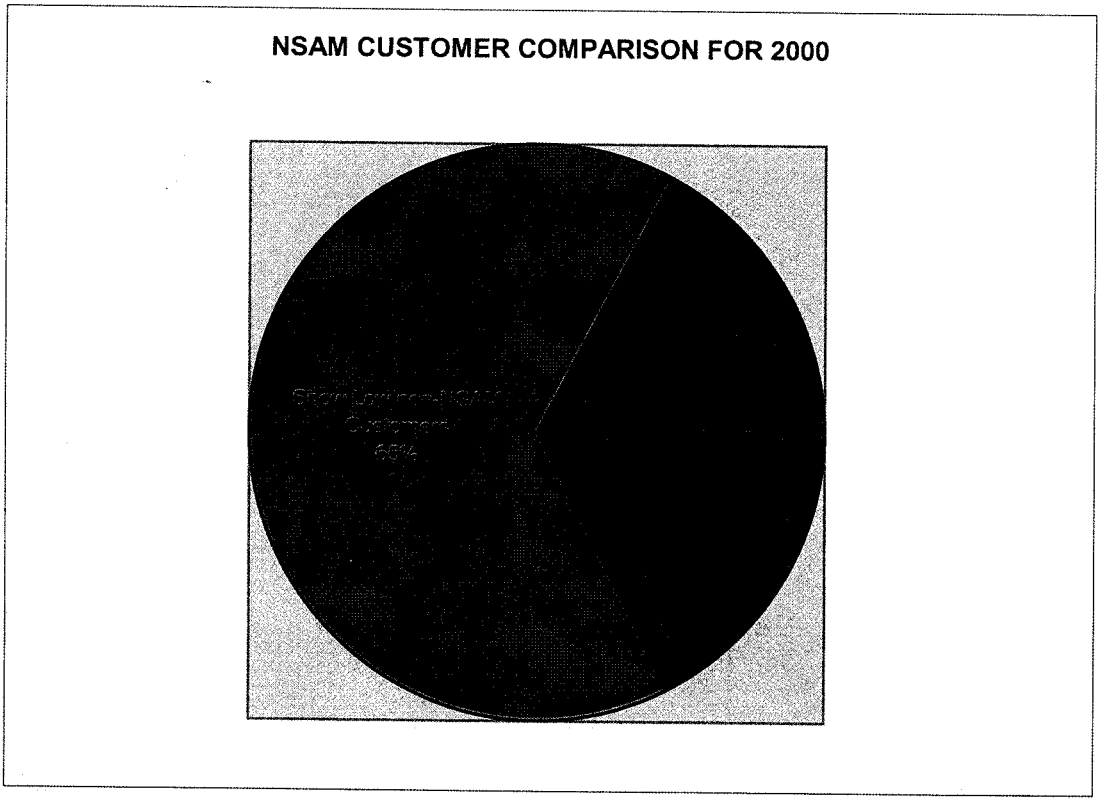
NSAM Customer Growth

NSAM BUILD-OUT TOTALS

SHOW LOW

	Customers						
	1995	1996	1997	1998	1999	2000	2001*
Show Low Customers	4517	4763	5045	5336	5711	6085	6498
NSAM Customers	148	497	1,184	1,714	2,795	3,250	3,542
Total Customers	4,665	5,260	6,229	7,050	8,506	9,290	10,040
* 2001 TOTALS ARE ESTIMATED							


NSAM CUSTOMER COMPARISON
12000
10000
8000
6000
4000
2000
0
CUSTOMER COUNT
1995
1996
1997
1998
1999
2000
2001*
YEAR (2001 TOTALS ARE ESTIMATED)
Show Low non-NSAM Customers
NSAM Customers
Total Customers


NSAM CUSTOMER COMPARISON FOR 2000

Chapter

14

Pinetop-Lakeside Distribution Phase 2

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, in order to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project would be a high density, 3408 polyethylene. This material selection allowed for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account, these specifications, when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems would be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

Sunrise Engineering, Inc. and Citizens worked together for route selection and permitting for the project. Permits were obtained from ADOT, USFS, Navajo County, and the town of Pinetop/Lakeside.

A portion of the project was inside the corporate limits of Pinetop/Lakeside, and the construction requirements were reasonable. Navajo County Jurisdiction demanded "betterment," and attempts to negotiate were made.

Easement Acquisition

Easements needed for this job were negotiated with four separate land owners.

Engineering Services-Final Design

Sunrise Engineering, Inc. created portions of the final construction drawings, but the majority of the final construction drawings were produced in-house by Citizens' staff.

The Bidding Process

Two bid packages were prepared. The first was a larger package, but when the bids were tabulated, the cost was less than anticipated. Therefore a second, smaller package was prepared and bid a few weeks after the first.

The first bid package (Phase 2) included specifications and contract documents. Invitations to bid were sent to pre-qualified contractors. A mandatory pre-bid tour was held on April 16, 1996. Bids were due on April 26, 1996. The bids were evaluated and the project was awarded to Arizona Pipeline Company. The notice to proceed was issued on May 13, 1996, and the duration of the project was 150 days.

The second smaller bid package (Phases A-D) was bid and awarded to Pacific Industrial Pipeline Company ("PIPCO") on May 28, 1996. The duration was also 150 days.

Construction

The Pinetop/Lakeside build-out continued on February 8, 1996, with the installation of 35,166 feet of 4" PE and 71,125 feet of 2" PE. Sunrise Engineering, Inc. and Citizens Utilities Company engineered this project. Northern Pipeline Construction, Pacific Industrial Pipeline, and Arizona Pipeline constructed the pipeline. Subdivisions piped were Pinetop Estates, Pinetop Hills, Old Town Pinetop on the east side of White Mountain Boulevard, Summer Haven, Woodland Park, Moonridge, Meadow, and Porter Creek Estates. In addition, main extensions were completed in West White Mountain Boulevard from Lakeview Lane to Valley Lane and Church Lane from Johnson Lane to Burke Lane. These projects were completed December 19, 1996.

Project Management and Inspection

Local Citizens' personnel performed the project management. CDI was chosen to conduct field inspections of new gas mains and services being installed. Local Citizens' personnel also conducted field inspections and quality assurance of the CDI inspectors. In addition, Navajo County inspectors made periodic earthwork inspections inside county right of ways.

Operation of Facilities

As each milestone (approximately 1000 feet of main and associated services) was completed, the facilities were purged and placed into service in Show Low System 9. This system has an MAOP of 60 psig and is being operated at 58 psig.

Chapter

15

Pinetop-Lakeside Distribution Phase 3

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project would be a high density, 3408 polyethylene. This material selection allowed for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account, these specifications, when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

Sunrise Engineering, Inc. and Citizens worked together for route selection and permitting for the project. Permits were obtained from ADOT, USFS, Navajo County, and the town of Pinetop/Lakeside.

Easement Acquisition

Easements were acquired for ADOT, Navajo County, and the Town of Pinetop/Lakeside.

Engineering Services-Final Design

Final design and plans were prepared by Citizens' Utilities Company Engineering Department.

The Bidding Process

A bid package prepared included specifications and contract documents. Invitations to bid were sent to pre-qualified contractors. The bids were evaluated, and the project was awarded to Northern Pipeline Construction and Henkels and McCoy.

Construction

The Pinetop/Lakeside build-out continued on March 11, 1997, with the installation of 12,554 feet of 4" PE and 46,053 feet of 2" PE. Subdivisions piped included: Blue Spruce, White Mountain Club Village, White Mountain Club Estates, Pinecone Park, Apache Cove, Mogollon Rim Estates, Peterson Meadow, Ponderosa Park, Hidden Pines, Rainbow Lake Pines, and Mountain View. In addition, main extensions were completed in Vallery Lane, Graham Drive, and Rainbow Lake Drive. These projects were completed November 21,1997.

Project Management and Inspection

Citizens' personnel provided the project management and inspection for this project.

Operation of Facilities

After construction, the facilities were placed into service as part of the Show Low System 9, and were operated at 55 psig. The pressure on this system was raised in 1998 to accommodate the additional customers that were being added to the system.

Chapter

16

Pinetop-Lakeside Distribution Phase 4

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project would be a high density, 3408 polyethylene. This material selection allowed for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

Permits were obtained from ADOT, Navajo County, the Town of Pinetop/Lakeside for the following subdivisions: Peterson Meadows, West Lane, Woodland Hills, and Quality Hills. In addition, main extensions were completed from Pinelake Road to Latigo Way (to serve the Pinetop Country Club), PTCC (west of the old Apache railroad tracks), north of Palomino, from railroad tracks to the end of Mark Twain), Sierra Pines Loop, Pinetop/Lakeside Commerce Center, Peterson Road, Cedar Ave, and East Wildwood.

In addition, a permit was obtained from Arizona Fish and Game Department. Extensive work to coordinate the project with ADOT and the Fish and Game Department was required.

Easement Acquisition

No private easements were needed for this job.

Engineering Services-Final Design

Citizens designed and permitted all of the distribution facilities, with the exception of the segment along ADOT's Highway 260. Because there were various discussions about the widening of Highway 260, and

because a portion of the route crossed a parcel owned by the Arizona Fish and Game Department, Citizens hired a prominent local engineering firm (Matkin-Murphy Engineering) to secure the permits for this segment.

Matkin-Murphy Engineering was unable to secure the permit from the Arizona Fish and Game Department prior to the start of construction. The contractors skipped over this segment, leaving it for last. When they were unable to secure, one of Citizens' senior managers had to personally "walk" the permit through to get the Governor's signature.

The Bidding Process

Northern Pipeline Construction and Henkels & McCoy were awarded the construction of the distribution facilities under the terms of a blanket contract.

Construction

The Pinetop/Lakeside build-out continued on January 6, 1998, with the installation of 10,560 feet of 6" steel, 27,317 feet of 4" PE, and 73,853 feet of 2" PE. Citizens Utilities engineered these projects and Northern Pipeline Construction and Henkels & McCoy constructed the pipeline. Subdivisions piped were Peterson Meadows, West Lane, Woodland Hills, and Quality Hills. In addition, main extensions were completed from Pinelake Road to Latigo Way (to serve the Pinetop Country Club), PTCC (west of the old Apache railroad tracks), north of Palomino, from railroad tracks to the end of Mark Twain, Sierra Pines Loop, Pinetop/Lakeside Commerce Center, Peterson Road, Cedar Ave, and East Wildwood. These projects were completed December 17, 1998.

On April 15, 1998, Navajo County notified Citizens Utilities that we would have to compensate Navajo County for repairs to county roads. Citizens agreed to pay for pavement repairs and chip sealing of county roads due to new natural gas pipeline installations.

Project Management and Inspection

Citizens' staff handled project management and inspection for this project in-house.

Operation of Facilities

As each milestone (approximately 1000 feet of main and associated services) was completed, the facilities were purged and placed into service in Show Low System 9. This system has an MAOP of 60 psig and is being operated at 58 psig.

Chapter

17

Pinetop-Lakeside Distribution Phase 5

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project be a high density, 3408 polyethylene. This material selection allowed for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and Permitting Process

Permits were obtained from ADOT, Navajo County, and the Town of Pinetop/Lakeside for the following subdivisions: PTCC (Buck Springs, east end of PTCC, east of railroad tracks to the Reservation line), Mountain View, Lakeside Forest Estates, and Bear Run. In addition, main extensions were completed in the easement behind Frontier State bank, easement behind Charlie Clarks, White Mountain Boulevard, from Penrod to Pinelake Road, Walnut Creek, Homestead Mobile Park, Porter Creek Estates, World Mark, Osprey, Peterson Road, Fox Lane, Porter Mountain Road, and Farnsworth Lane.

Easement Acquisition

No private easements were required for this job.

Engineering Services-Final Design

Citizens designed and permitted all of the distribution facilities.

The Bidding Process

Northern Pipeline Construction and Henkels & McCoy were awarded the construction of the distribution facilities under the terms of a blanket contract.

Construction

The Pinetop/Lakeside build out continued on February 15, 1999, with the installation of 22,830 feet of 4" PE and 110,365 feet of 2" PE. Northern Pipeline Construction and Henkels & McCoy constructed the pipeline. Subdivisions piped were: PTCC (Buck Springs, east end of PTCC, east of railroad tracks to the Reservation line), Mountain View, Lakeside Forest Estates, and Bear Run. In addition, main extensions were completed in the easement behind Frontier State bank, easement behind a private landowner, White Mountain Boulevard, from Penrod to Pinelake Road, Walnut Creek, Homestead Mobile Park, Porter Creek Estates, World Mark, Osprey, Peterson Road, Fox Lane, Porter Mountain Road, and Farnsworth Lane. These projects were completed on December 23, 1999.

Project Management and Inspection

Citizens' staff handled project management and inspection for this project in-house.

Operation of Facilities

As each milestone (approximately 1000 feet of main and associated services) was completed, the facilities were purged and placed into service in Show Low System 9. This system has an MAOP of 60 psig and is being operated at 58 psig.

Chapter

18

Pinetop-Lakeside Reinforcement

Arizona Build-Out Plan

Design Criteria

When the Pinetop/Lakeside Distribution System was originally designed in 1994, it was believed that the Pinetop/Lakeside Country Club would not be served. This country club area is located at the extreme southern end of the community and actually lies outside of the incorporated Pinetop/Lakeside boundary. It is located in Navajo County adjacent to the Fort Apache Indian Reservation. At the time, it appeared that this Country Club was only occupied during the summer months. However, in the event that year round occupants would be served in the future, the original plan included a contingency plan to reinforce the system.

The contingency plan was to install the first mile of distribution pipeline as 6" steel, with the exception of the segment crossing Billy Creek, with the addition of 2" high density, 3408 polyethylene joint trench with the steel. The 2" line was designed to lay a foot higher and a foot to the side of the 6" line in the trench so that both lines could be maintained in the future. All of the customers along this segment were designed to be fed from the 2" line rather than the 6" line. The 6" line was tested at a pressure of 300 psig so that, if necessary, the 6" steel pipeline could be removed from the distribution system and a "back-bone" operating at a higher pressure could be created at minimal cost.

This allowed the original Pinetop/Lakeside Distribution System to be designed in the least expensive manner, and with minor additional costs, it provided the flexibility of expansion. This contingency plan was verified through the use of gas flow analysis. Citizens' Engineering Department was able to perform an analysis of the proposed "Pinetop/Lakeside area using estimated customer loads, as well as estimated growth, to decide how the a "back-bone" system should be designed. Citizens' Engineering Department established a MAOP of 175 psig. Six inch 0.188 wall grade X -42 material was selected to allow for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

Only a segment of new 6" line was needed for this project, and it was routed in Pinetop/Lakeside Right-of-Way. Citizens' personnel obtained permits from the Town of Pinetop/Lakeside.

Easement Acquisition

No new easements were required.

Engineering Services-Final Design

Final design and construction drawings were prepared in-house by Citizens' personnel. Installing a second District Regulator modified the existing Pinetop/Lakeside City Gate Station. The original City Gate Station reduced the pressure from 800 psig to 60 psig. The modified station reduced the pressure from 800 psig to 175 psig, and then a portion of the feed was again reduced in pressure from the 175 psig to 60 psig.

In addition, a second District Regulator was needed near the intersection of White Mountain Boulevard (Highway 260) and Woodland Road. This new station is closer to the Pinetop/Lakeside Country Club, and provided system reinforcement to the Show Low System 9.

The Bidding Process

Because the majority of work was the installation of District Regulator Stations, and reconfiguring the systems, blanket contract crews were utilized under the terms of a blanket contract.

Construction

The installation of the 6" steel pipeline that crossed Billy Creek was the only difficult segment of this project.

Project Management and Inspection

Citizens' staff handled project management and inspection for this project in-house.

Operation of Facilities

The new "back-bone" created the Show Low System 13. This system has a MAOP of 175 psig but is currently operated at 150 psig.

Chapter

19

Sedona Reinforcement (The Red Rock Loop)

Arizona Build-Out Plan

Design Criteria

The Sedona Distribution system had originally been designed to serve a few thousand customers. A single District Regulator Station was installed on the western edge of town. As the community grew, this single source was not sufficient. Some of the distribution system was uprated to operate at 220 psig. But after a few years, the capacity problem reappeared.

The 220-psig systems were then extended to support the growth. But as this occurred, the number of customers fed directly off the 220 psig system grew, making the operations of the system difficult. In addition, there was a limit to this strategy and the time had come that another District Regulator Station was needed to feed the 220-psig system on the eastern side of town.

In addition, a high-pressure looped system was needed to become a segment of the overall loop to increase reliability for the entire Verde Valley.

Route Selection and the Permitting Process

The community of Sedona, and the surrounding portions of the Coconino National Forest managed by the Sedona Ranger District, had a reputation of not allowing projects to be permitted. An example of this is the road connecting Verde Valley School Road to Red Rock Loop Road at a location called the "crossing". Yavapai County had been attempting to construct this road for ten-years, but was never successful in completing the permitting process.

After an initial unsuccessful meeting conducted by staff members of both Citizens and the Sedona Ranger Station, Citizens knew it needed assistance from a firm that specialized in complicated and controversial projects. The services of Dames & Moore were obtained in November of 1994. Dames & Moore were instrumental in professionally addressing the situation.

An initial fact sheet and comment form were mailed to approximately 200 residents, public agencies, public officials, and special interest groups describing the project, requesting comments, and providing information on the public meeting. The project and public meeting were also announced in the *Red Rock News,* a local newspaper, and information was provided to the local radio stations.

The public scoping meeting was held on March 7, 1995, from 4:30 p.m. to 7:30 p.m. at the Wayside Chapel in Sedona, Arizona. Representatives from the Forest Service, CUC, and Dames & Moore were present to explain the EA process, the study area maps, and initial alternatives, and to provide information on the proposed project in general. In addition, a second public meeting was requested by individuals who were unable to attend the March 7 meeting. The next meeting was held on April 11, 1995. Twenty people attended, primarily representing the Four R's (Responsible Residents of Red Rocks) group. On September 8, the Forest Service, Citizens, and Dames & Moore attended a Red Rock Pathways meeting to review the status of the EA and discuss potential combined pathway and pipeline routes.

Citizens was in the process of further establishing contact with property owners in the vicinity of the west end of Back O' Beyond Road, east of Oak Creek. Use of Back O' Beyond Road and a portion of private property offered an alternative to crossing land closer to Cathedral Rock, which is a very scenic area that is important to the Sedona community.

A newsletter was mailed to approximately 1,000 addresses, and requested comments from the public, agencies, and other interested parties. The purpose of this newsletter was to provide a summary of the results of scoping, a description of an added alternative, and an update on the progress of the EA. Because of the addition of an alternative, the mailing list was expanded to include those with possible interests along that new alternative.

Issues were identified through scoping, as well as recommendations from the Forest Service. An interdisciplinary team collected and analyzed, then categorized the comments by issue. The issues were evaluated for their level of sensitivity as they relate to the proposed pipeline. In addition, a method to address each issue was developed and referred to as "disposition. "For each issue, a method to monitor or measure the effectiveness of the disposition was developed. These issues addressed, within the discussions on the various natural, human, and cultural resources included:

- **Limit the amount of vegetation disturbance to the smallest amount possible.** The limits of the allowed construction space were marked in the field prior to construction. The work was monitored to ensure that no work outside of the designated area took place. Portions of the natural landscape that were disturbed were regenerated.

- **The proposed pipeline at Red Rock Crossing would harm the natural beauty of the area.** The feasibility of other potential routes that resulted in unnecessary creek crossings were evaluated.

- **Will Forest Service visual objects be met?** The project committed to meeting Forest Service guidelines that address visual quality and service VQOs.

- **Installation of a buried pipeline could be dangerous, as an explosion could occur.** The engineering and construction of the pipeline took into account the possibility for explosion according to standards within the natural gas industry. The pipeline was required to meet all compliance with safety regulations. To minimize the risk of health hazards, the use of signs, periodic safety inspections, and proper maintenance are performed.

- **Discharges of natural gas could cause discomfort to people who are chemically sensitive.** The proposal included a closed gas pipeline; no discharges would occur under normal operating conditions.

- **Installation of the buried pipeline could result in additional development along the approved pipeline corridor.** The likelihood of urban development in locations administered by the Forest Service was unaffected by this proposal. The Federal Service prohibits the development of public lands without a thorough analysis relative to the Forest plan.

- **Evaluate the feasibility of including hiking trails along the pipeline.** The proposed pipeline route was evaluated for recreational opportunities. In most cases a trail was compatible with the proposed pipeline use.

- **Consider the possibility of installing the pipeline above ground near the Poco Diablo Resort so that a pedestrian footbridge can be installed in conjunction with the pipeline.** No above ground facilities crossing Oak Creek was allowed due to visual resource impacts.

- **Wildlife may be disturbed by the installation of the pipeline.** The developed alternatives evaluated impacts to wildlife during the construction and mitigated the risk impacts to wildlife from the construction of the project.

- **One of the proposed routes for the pipeline will be near Cathedral Rock, which is an active fault line.** The pipeline routes were evaluated to assess seismic activity.

- **Oak Creek is a designated by the U .S. Army Corps of Engineers as a unique water resource of Arizona. Crossing the creek could be devastating.** The U .S. Army Corps of Engineers and the Arizona Department of Environmental Quality have been contacted for coordination in the crossing. Mitigation measures and impact to the water quality were monitored.

- **Cultural resources abound in the area of the proposed pipeline.** Cultural resource surveys were conducted to comply with existing laws. Studies of the resources throughout the proposed Red Rock Loop Project were performed to identify potential cultural resources. Potential impacts on cultural resources and clearance prior to and during construction were required before construction was approved.

- **The pipeline may adversely affect private property located near the pipeline route. Decrease the amount of private property needed.** The developed alternatives evaluated the affect on private property. Mitigation measures were developed, where appropriate.

- **There will be impacts to business and residences along the proposed pipeline routes.** The impacts were short term, but mitigation measures were developed, where appropriate.

- **Need for a cost/benefit analysis for the project**. Considered in the Sunrise Engineering, Inc. report.

- **Construction will cause major traffic problems.** The amount of problems and traffic congestion was attempted to be minimized. Traffic control plans during construction were required. The congestion was for the construction phase only.

- **Noise associated with the pipeline will be a problem.** It was anticipated that noise would occur during construction of the pipeline. But construction noise was required to be in compliance with existing city and state noise requirements.

- **Evaluate the potential to use smaller construction equipment to minimize soil erosion.** The criteria for contractor selection evaluated the construction equipment to be used. During construction, the contractor was required to meet Best Management Practices ("BMP") to minimize soil erosion. The amount of ground disturbance was minimal; no permanent maintenance "roads" were allowed.

- **Upgrade existing pipelines rather than install a new one.** The majority of the existing facilities in Sedona would not accommodate higher operating pressure. Upgrading these facilities was simply not an option. The existing pipelines in Sedona were not designed to carry the capacity needed. Upgrading the existing system would not meet the requirement of the federal minimum safety requirements.

Environmental Concerns

As described in the permitting process, the level of environmental concerns was extremely high. Because of the proximity to naturally occurring water (Oak Creek), Citizens preferred method was to route around these

sensitive areas. However, this was not possible because cultural resources were so widespread they were found up and down the river.

Because the project could not be routed around, a process of "data recovery" was mandatory. The site was carefully excavated, and all artifacts preserved. Detailed analyzes were performed on exactly how these artifacts were lying when found. During this process, several human remains were discovered. Since historically the Hopi Tribe had occupied this area, they were contacted and were given the remains.

The other major obstacle was the crossing of Oak Creek. After the preferred route had been selected, the securing of the needed private easements was not progressing. Another alternative was considered. This alternative was to directionally drill from the Forest Service side of cathedral rock, exiting at Back-O-Beyond Road. The length of this bore was at the limits of directionally drilling capability. Seismic refraction exploration was conducted to determine if this bore could be done.

But when the public was asked to comment on this alternative, the level of concern was overwhelming. A large segment of the Sedona population believes that a large "vortex" exists under this rock formation and it would be sacrificed if the pipeline were drilled through it. Fortunately, as described below, this alternative was avoided by securing a very important easement.

Easement Acquisition

The Forest Service strongly prefers that private easements not be acquired until they recommend the most environmentally friendly route, and may not allow construction at all in the National Forest. Therefore, the feasibility of acquiring private easements needed to connect to the selected route thought the Forest was questionable.

Although several private easements were needed, a critical one was at the location of the direction bore. The boundary of the Forest Service extended approximately to the center of the Oak Creek. The owner of a large parcel of privately held land was not interested in even discussing the possibility of granting an easement. The owner had lived on this land for approximately twenty years, and truly loved the wildlife and natural beauty of the land. Compensation for the easement was no motivation for the owner.

Citizens solicited the assistance of a private law firm with condemnation expertise. The process was initiated, and discussions between the law firms on both sides began. During the same time period, the owner became ill, and was preoccupied with health concerns.

Approximately a year after the easement acquisition process had begun, the owner died and the property was inherited by her two sons. Negotiations began again, this time with the sons. An easement was secured.

The Bidding Process

Sunrise Engineering, Inc. competitively bid the project to Citizens' list of pre-qualified contractors. When the bids were tabulated, the bids were a million dollars over budget. It was apparent that all of the contractors were afraid of this project's long list of requirements and considered this project to be high risk.

Citizens rejected all bids and broke the project down into four spreads. In addition, Citizens separated out the majority of specialty work; Citizens was responsible for finding subcontractors to perform this work. Such as trail construction and the horizontal directional bore.

Northern Pipeline was awarded the construction contract for three of the spreads, and Pacific Industrial Pipeline Company was awarded one of the spreads. Mears, Inc., a Michigan company, was awarded the

bore and a local firm, Biddle's Nursery, was used for the revegetation and trail construction. This process led Citizens to pursue other options rather than the traditional form of competitively bidding each job. This was the last job that used this type of contractor selection.

Construction

Construction began by directionally drilling (boring) the pipeline under Oak Creek. This was Citizens-Arizona Gas' first large pipeline installed by this technique. The 1400-foot installation was difficult due to rock fracture and the limited amount of workspace. The bell-hole on the side where the pipe was strung and ready for pullback sloughed off near the edge of the designated workspace. Construction was stopped until an archeologists could be dispatched and monitor all excavation outside the area in which "data recovery" had occurred.

In addition, the pipe that was inserted into the bore had specialized Power-Crete coating. This coating protected the pipe, but made the pipe heavier than typical pipe. This made it difficult not to over bend the pipe as it was being inserted in 300-foot sections.

Spreads 2 and 3 required the installation of the pipeline down very curvy narrow roads. Traffic control workers were required to stop traffic while the pipe was being installed. Since a portion of the route is a one-way entrance to a subdivision, the maximum wait period was half an hour. The crews would need to start, make one weld, and stop, allowing traffic to pass, and then repeat the process.

One local resident became so frustrated with the delays that the sheriff was needed to resolve a dispute in order to avoid an altercation. There was not sufficient room to move the pipe-bending machine along with the construction train, so the pipe had to be pre-bent off-site to a tight tolerance.

Spread four was a mile and a half stretch through national forest land. This spread had the toughest requirements of the entire build-out. The pipeline had to be installed in a very narrow workspace, in some spots as narrow as ten feet wide. A trail had to be constructed over the pipeline, and it had to be done in a manner that a person hiking the trail after construction would not notice that he/she was actually following a pipeline. The construction team encountered solid rock that had to be hammered out with a track hoe that had a pneumatic rock breaker head.

The last spread constructed was spread one. This segment was along a residential street that had an existing distribution pipeline. This street paralleled the Forest Service boundary. Even though the residents were sent Fact Sheets throughout the permitting process, they were outraged that a high pressure pipeline was being routed down their street, making construction difficult.

The project consisted of 38,618 feet of 6" steel pipe from the Sedona First Cut Regulator Station through Bristlecone Pines Road down Red Rock Loop Road. All steel pipeline installations were qualified for a 750 psig MAOP. This 750-psig MAOP facility terminate at the Back-O-Beyond regulator station on the west side of Highway 179. This new regulator station serves two critical functions. The first is to provide a second supply to the Sedona 220-psig feeder main. The second function is to provide a second source east of Sedona. Both of these functions are essential to maintain adequate gas supplies to Citizens' customers.

Engineering Services-Final Design

During the permitting process, the public did not understand why the reinforcement line could not be routed down Highway 89A like many of the other utilities. Sunrise Engineering, Inc. was hired to estimate costs of the various alternatives as part of the permitting process.

After Citizens' employees obtained all of the easements in-house, Sunrise Engineering, Inc. produced the final construction drawings and contract specification, with the expectation of the direction drill, for which Hare and Associates was hired. Because this was Citizens first bore of this type, and with the environmental concerns, a firm that specialized in this type of engineering was desired.

Project Management and Inspection

It was originally planned that Sunrise Engineering, Inc. would provide project management and inspection services. However to maintain the project budget, Citizens had to perform these services with in-house staff.

Facility Operations

The facility was tied into the Sedona System 2, and operated at 750 psig. The 750-psig line was activated on January 16, 1998.

NSAM Customer Growth

No NSAM customers were generated from this job. A nominal number of NON-NSAM customers were added.

The Project Gains Notoriety

This project overcome so many obstacles that it was used as an example in a national trade magazine. A copy of the article is attached in Appendix B.

Chapter

20

Show-Low Reinforcement (Shoens Dam to Show-Low)

Arizona Build-Out Plan

Design Criteria

With the addition of Pinetop/Lakeside, the 4" supply pipeline to Show Low to Pinetop/Lakeside only had capacity for a year after the first phase of the Pinetop/Lakeside Distribution Build-Out.

It was determined that an eight-inch pipeline would be needed to parallel the existing 4" line. The new pipeline was designed to accept "Mainline" Pressure. The existing 4" has an MAOP of 400 psig.

A District Regulator was installed near Show Low to feed the 400 psig system in the event that it is damaged by a third party. This system now has two feeds (one at both ends) verses the one feed it historically had.

Route Selection and the Permitting Process

Shoens Dam to Show Low 8" supply pipeline required an archaeological survey. Plateau Mountain Desert Research conducted the archaeological survey for this project. This was preliminary work for the installation of the 8" transmission main from Shoens Dam to Show Low.

Permits had to be obtained from the Arizona State Land Department, Navajo County, the City of Show Low, and the USFS. Citizens' employees obtained all permits.

Environmental Concerns

3C Consulting conducted the biological survey for this project. This was preliminary work for the installation of the 8" supply pipeline from Shoens Dam to Show Low. The survey was started on October 6, 1997, and was completed on December 16, 1997.

Easement Acquisition

One easement acquisition, from a private property owner, was necessary to facilitate the installation of the new 8" steel main.

Engineering Services-Final Design

Final design work and construction drawings were done in-house by Citizens' Engineering Department.

Project Management and Inspection

Project management and inspection were handled in-house by Citizens' personnel.

The Bidding Process

Because Citizens had already gone through a process of selecting and hiring a sole contractor in a partnering arrangement to be assigned to all Arizona Build Out projects, this job was not bid. The job was awarded to Northern Pipeline Construction Company and the notice to proceed was issued on May 7, 1998.

Construction

The Shoens Dam to Show Low Supply Pipeline was started with the installation of 66,200 feet of 8" steel from Shoens Dam to Show Low City Gate #1. This main was connected to the existing 8" transmission main at Shoens Dam extending to the Show Low City gate # 1. Northern Pipeline Construction Company constructed the pipeline. The project was completed August 3, 1998.

Facility Operations

After construction was completed, the pipeline was tied into the Show Low System 7 and operated at El Paso's pipeline pressure, which ranged from 600 to 880 psig.

NSAM Customer Growth

No NSAM customers were served directly off this pipeline, but it did reinforce the supply needed to serve the NSAM customers located in Pinetop/Lakeside.

Chapter

21

Clarkdale to Camp Verde Supply Pipeline Phase 2 (Rio-Mesa to Horseshoe Bend)

Arizona Build-Out Plan

Design Criteria

The Citizens' 10" pipeline, Clarkdale to Camp Verde Phase 1, was extended to feed the Horseshoe Bend area of Camp Verde, and provide a starting point to ultimately serve the Village of Oak Creek. This pipeline was designated to ultimately provide a "back feed" to the Sedona system by extending the pipeline from the Village of Oak Creek, north to Sedona.

Citizens' Engineering Department, through the use of gas flow analysis software, performed calculations in order to correctly size the pipe that would be needed for this project. After performing various calculations, it was decided that the project would consist of a 10" extension the entire way down to the Horseshoe Bend Subdivision. The material selected by the Citizens' Engineering Department was an API-5L X-42, .365" wall, 10" IPS ERW steel pipe for a portion of the route, and API-5L X-52, .307" wall, 10" IPS ERW steel pipe for the remaining length. API-5L Y-52 fittings, and API-5L Y-42 fittings were also specified. The pipeline was designed with a MAOP of 720 psig.

Citizens' Engineering Department reviewed the Citizens' Arizona Gas Division Construction Standards, as well as Citizens' Arizona Gas Division Joining Procedures Manual, to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this pipeline. Finally, Citizens' Engineering Department required that the testing of the pipeline be performed under the written direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

Because the majority of the route was through the Prescott National Forest, the Forest Service dictated the route. The initial route was designed to begin at the existing 10" pipeline just south of the Fir Regulator Station. The route was taken through the United States Forest Service and through private easements to get into Yavapai County Right-of-Way. Citizens tried to acquire County permits for Quail Run Road and Goddard Road, but the County had stringent requirements that would significantly increase construction costs, and impair Citizens ability to maintain this pipeline. Citizens opted for private easements that by-passed a majority of the County Right-of-Ways. This process of acquiring private easements proved to be very time consuming. The route was then chosen to follow an existing 50 feet wide APS Easement, then down existing Forest Service Road 279 (Old Highway 279). This roadway would take the line all the way to Highway 260, where it was routed adjacent to the highway east, in private easement and state lands, until it intersected with Old Highway 279 (Camp Verde jurisdiction). Citizens obtained a Camp Verde permit for the construction of the pipeline down Old Highway 279. Old Highway 279 intersects Highway 260, then heads south, and bends back to Highway 260, approximately 2 miles south of the first intersection. From the exit of

Highway 279, the pipeline was placed in a combination of private easements and Forest Service Lands that ended at the Horseshoe Bend Subdivision. A district regulator station was needed to serve the community.

Environmental Concerns

Arizona Engineering Company and SWCA were contracted by Citizens to provide services for the permitting of the project, and started work in late 1992. An environmental assessment was prepared for this project. A few members of the public had concerns and were very vocal and persistent in persuading the Forest Service to route the gas pipeline near their property (they desired gas service). The Forest Service approved Citizens' permit in September of 1999, but mandated an alternative route, and made stipulations in regard to environmental issues. Examples include washing vehicles before they were allowed into the construction areas on Forest Service land, in order to lessen the possibility that weeds carried in by vehicular traffic would contaminate the area.

There were also some concerns regarding the crossing of washes and drainage ways on Forest Service lands. After a number of field meetings with Forest Service personnel, it was explained to them how the crossings would be done. Citizens committed to restore the area to its original condition. During construction the Forest Service and Citizens monitored the contractor for compliance with these terms.

This project also required an archaeologist be on-site when crossing near designated archaeological sites along Old Highway 279.

Easement Acquisition

The easement and right-of-way acquisition for this project was very time consuming and frustrating because of the many route changes involved with this project. After the final route had been selected, there were a total of ten private easements necessary to complete this project.

The first easement needed was at the corner of Quail Run Road and Rio Mesa Road. This easement was very important because this is where Citizens planned to install a district regulator station. Because the property owner lived out of state, it was very difficult to correspond in a timely manner. Finally, Citizens and the property owner were able to come to an agreement and the easement was signed and recorded.

The original route called for the pipeline to be installed down Quail Run Road to the intersection with Goddard Road. Yavapai County imposed some very costly requirements as described above. Goddard Road was dedicated to Yavapai County by easement for ingress and egress only, so Citizens negotiated with the property owners along Goddard Road for an easement for our gas line. Then Citizens realized that a route change was needed. Yavapai County issued some very costly stipulations regarding piping down Quail Run Road and had some very strong opinions regarding piping down Goddard Road. Citizens evaluated all the possible alternatives around Quail Run and Goddard Road and decided that the Company would pipe down Quail Run a certain distance and then acquire private easements to the existing APS overhead electric line easement, to the north of Quail Run.

The second private easement needed after the route change involved a piece of privately owned property. Acquiring an easement was complicated by the fact that the owners were in the process of finalizing a divorce. In time, Citizens was able to come to an understanding with the property owners. The compensation for the easement was finalized and the easement was signed and recorded after negotiations that had lasted several months.

The third and fourth easement needed to provide access to the APS overhead electric lines was across two parcels of land owned by several individuals. These individuals make up a group that is one of the major landowners in the Verde Valley. Because there were multiple people involved in the decision-making, it was

a very time consuming process. This group also was working in conjunction with the adjacent property owner, which increased the difficulty of negotiations. In addition, the parcel of land where this easement was to cross was in the beginning stages of a planned subdivision, and the engineering firm was handling the subdivision design became involved at the request of the property owner. This large group worked with Citizens over several months to get what they felt was just compensation for the easement. APS had already written a letter explaining that they had the right to assign a portion of the 50-foot overhead electric easement to Citizens. The group of property owners challenged that letter and involved legal counsel on their behalf. After months of negotiations and meetings, Citizens was able to reach an agreement with the group. An easement was signed and recorded for both parcels of land.

The next easement that was needed was across the property owned by Montezuma Schools. This easement was negotiated and an agreement for compensation was met. The property owner signed the easement and Citizens recorded it to make it an official document.

From the Montezuma School, the pipeline followed an existing Forest Service road called Old Highway 279. A portion of this road was determined to cross from Forest Service to private land. Citizens hired Woodson Engineering to survey and provide a legal description for the road crossing the private property. This process took several weeks for Citizens to obtain the legal description. The easement was then presented to the owner, which he signed and returned to Citizens. The easement was then recorded and made into an official document.

From that point, the pipeline follows Forest Service Road Old Highway 279 to a point of intersection with Highway 260. The first easement needed along Highway 260 was across another privately owned parcel of land. The owner's only condition to granting the easement was that the billboard signs that were existing where the easement was to be dedicated were not to be disturbed. Citizens agreed and the easement was signed and recorded.

The next easement along Highway 260 involved a parcel where the owner and his family owned the piece of land for a very long time. The compensation the owner wanted for an easement was much higher than what Citizens believed to be reasonable and the owner had no appraisal to support his demand. At this point Citizens searched for a route around this property.

The alternate route involved crossing Highway 260 onto private land, where the land was owned by someone Citizens had worked with in the past. Citizens reached an agreement with the owner and the easement was signed and recorded.

From that point, the pipeline followed Highway 260 to the intersection of Old Highway 279. Approximately 1 mile down Old Highway 279, Citizens had to negotiate and easement for a regulator station and a cathodic protection anode bed. The easement was proposed to be on private property. The private owner cooperated with Citizens; he was building a funeral home and cemetery on the property in question and wanted gas service. The easement went through several changes in the language before it was acceptable for both parties. The easement was signed and recorded.

The final easement needed to complete this project was across land owned by the Yavapai-Apache Nation. This land was not part of the reservation but still required Tribal Council approval. Negotiating and finalizing the acquisition of an easement from the Tribe was a complex undertaking. Multiple meetings and telephone conversations, stretched over a period of about a year, took place before an agreement was reached. Once the final details were worked out, the easement was signed and approved by the Tribal Council. The easement was then recorded and made part of the project documents.

Engineering Services-Final Design

The engineering and final design for this project were performed in-house by Citizens' Engineering Department. Woodson Engineering, Summit Surveys, and Landmark Engineering provided some survey services for portions of this project.

Project Management and Inspection

Citizens' newly formed Project Management Department handled project management for this project in-house. Inspection for the project initially utilized Citizens' staff and was later contracted to Ozzie's Technical Service.

The Bidding Process

Citizens had already gone through the process of selecting and hiring a sole contractor to be assigned to all Arizona Build Out projects so this job was not bid. The job was awarded to Northern Pipeline Construction Company, in a partnering arrangement.

Construction

The construction duration was extended an additional 27 working days to take into account the poor weather conditions.

Facility Operations

The Horseshoe Bend feeder line starts at the Fir Avenue regulator station located in the city limits of Cottonwood and continued south approximately 13 miles to the intersection of Horseshoe Bend and Highway 260 in the town limits of Camp Verde. Three district regulators were installed along this path: Quail Run, Cherry Creek, and Horseshoe Bend. Each of these regulator stations was installed to provide gas service to residential and commercial customers.

The pipeline was designed with a MAOP of 720 psig, but the pipeline was be brought into service with a MAOP of 570 psig, so it could be operated as a distribution pipeline initially and later reclassified as transmission if needed. The pipeline was tied into the Cottonwood System 7, and placed into service at 450 psig.

NSAM Customer Growth

This supply pipeline currently does not have any NSAM customers being served directly off this line, but serves the distribution system that feeds the Horseshoe Bend area of Camp Verde. Later this line was extended to serve the "Old-Town" portion of Camp Verde. In addition, it is anticipated that future growth will occur in the general proximity in many areas along the pipelines route.

Chapter

22

Camp Verde (Horseshoe Bend) Distribution

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project be a high density, 3408 polyethylene. This material selection allowed for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems would be performed under the direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

This job was installed in the Town of Camp Verde roadway right-of-ways, except for a small piece from the Horseshoe Bend Regulator Station to Verde West Drive. The Town of Camp Verde has a roadway right-of-way from the US Forest Service on that section, so Citizens had to acquire a US Forest Service permit from the Prescott National Forest. The Prescott National Forest office did an amendment to the original permit for Cottonwood to Camp Verde to add and approve this section.

The route selection was based on the Citizens' Rules of Service and all areas were piped if they met these rules.

Franchise Negotiations

On January 6, 1999, notice was given to the Mayor and the Town Council of Camp Verde to adopt Resolution No. 99-410 authorizing the Town to hold an election so voters may decide whether a franchise should be granted to Citizens Utilities Company. The Mayor and the Town Council determined that the franchise would be beneficial to the corporation and citizens of the Town by providing an alternate fuel and heating sources. The election was held on March 9, 1999, in the Town of Camp Verde. The vote was 950 (for) and 132 (against); the voters approved the franchise for Camp Verde.

Easement Acquisition

Some of the roads that existed in the subdivision, were designated and recorded as ingress/egress only, so the Town of Camp Verde's permit didn't cover these roads. Through the acquisition of private easements, Citizens was able to pipe down these roads, to make natural gas available to the majority of the subdivision.

Engineering Services-Final Design

The engineering and final design for this project was performed in-house by Citizens' Engineering Department. Construction drawings were also completed utilizing Citizens' Engineering staff and staff from the local office.

Project Management and Inspection

Citizens staff handled project management for this project in-house. Inspection for this project was contracted to Ozzie's Technical Services.

The Bidding Process

Citizens had already gone through a process of selecting and hiring a sole contractor to be assigned to all Arizona Build Out projects so this job was not put out for bid. The job was awarded to Northern Pipeline Construction Company.

Construction

This project consisted of 16,945 feet of 4" PE pipe and 24,677 feet of 2" PE pipe.

Facility Operations

All newly installed facilities were installed and tested for a 60 psig MAOP. The Horseshoe Bend distribution system is an independent system that operates at the 60 psig MAOP. This system was certified at 60 psig on June 28, 2000.

As each milestone (approximately 1000 feet of main and associated services) was completed, the facilities were purged and placed into service in the Cottonwood System 9. This system has an MAOP of 60 psig, and is being operated at 30 psig.

NSAM Customer Growth

"Horseshoe Bend" describes the section of Camp Verde that is under discussion, therefore, all of the customer added for this project are NSAM customers. Currently, Citizens has 145 customer being served from these facilities.

Chapter

23

Village of Oak Creek 8" Supply Line

Arizona Build-Out Plan

Design Criteria

The Citizens' 10" pipeline that currently existed at Clover Leaf Ranch (Clarkdale to Camp Verde Phase 2) was extended in order to feed the Village of Oak Creek. This supply line would ultimately be tied into the supply line that feeds Sedona, if needed.

Citizens' Engineering Department, through the use of gas flow analysis software, performed calculations in order to correctly size the pipe that would be needed for this project. After performing various calculations, it was decided that the project would consist of a 10" extension under the Verde River, and north to Middle Verde Road. The rest of the route would consist of an 8" line extended north to the Village of Oak Creek. The material selected by the Citizens' Engineering Department was an API-5L X-42, .365" wall, 10" IPS ERW pipe, API-5L X-52, .250" wall, 8" IPS ERW pipe, API-5L Y-52 fittings and API-5L Y-42 fittings. The pipeline was designed with a MAOP of 570 psig, but the pipeline was tested to a pressure that would allow for a 720 psig MAOP, in case extra capacity in the pipeline were needed in the future.

Citizens' Engineering Department reviewed Citizens' Arizona Gas Division Construction Standards, as well as the Citizens' Arizona Gas Division Joining Procedures Manual, to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this pipeline. Finally, Citizens' Engineering Department required that the testing of the pipeline would be performed under the written direction of the Engineering Department, using the guidelines stated in part IV of the Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

The route begins at Clover Leaf Ranch, where a stub was left after constructing the 10" line to Horseshoe Bend. The 10" pipeline was routed under the Verde River with a directional drilling bore, then continued up River Ranch Estates, where the pipeline was put in a joint trench with a 2" polyethylene distribution line. This portion of the pipeline project needed a permit from the Town of Camp Verde before the pipeline could be installed. The pipeline was then headed east down Middle Verde Road to meet up with Forest Service Road 119A, where the pipeline was reduced to an 8" steel supply line. Forest Service Road 119A provided a good route; it took a direct route to the north to meet up with Cornville Road. The FSR 119A portion of this job was constructed on a Forest Service Permit obtained through the United States Forest Service. The pipeline was bored under Cornville Road, under a permit obtained through Yavapai County. The pipeline route then continued north, up Beaverhead Flats Road (Forest Service Road 120), which was under construction for realignment by Yavapai County. This road realignment required six months of discussions to coordinate with Yavapai County, Citizens, and the Forest Service.

This allowed Citizens the opportunity to have the pipe designed to lie just at the border of the future right of way with the Forest Service and Yavapai County Right-of-Way. The design contractor for Yavapai County, also contracted with Citizens to make sure the designed pipeline would remain out of the way of the new

Beaverhead Flats realignment project. This area needed a dual permit, one from Yavapai County, and the other through the United States Forest Service.

The remainder of the job was routed through the "saddle" just south of the Village of Oak Creek. Originally, the Forest Service had many concerns with this route, but after many meetings in the field and in the office, a route was selected that would avoid any of the many archeological concerns, as well as any concerns about the visual effects of the project on the "saddle" area approaching the Village.

Environmental Concerns

Environmental concerns for this project were mainly focused in the "saddle" area just south of the Village of Oak Creek. Concerns regarding the visual effects to the land were raised by the United States Forest Service. To handle this concern, Citizens suggested many methods to minimize the damage to vegetation. Although these methods of construction caused increased construction costs and longer time period to perform, Citizens agreed to the permit requirements to secure the Forest Service permit.

Archeological sites were the other concern. After the discovery of archeological areas, Citizens had numerous meetings with Forest Service personnel to route the pipeline around these sites, but also to minimize visual and vegetation loss.

Easement Acquisition

The only easement needed for this project was from the tie-in at Clover Leaf Ranch Road and Old Highway 279 to the River Ranch Estates subdivision. The first easement needed proved to be difficult to obtain. The easement was across land owned by the Yavapai-Apache Nation but was not part of the Reservation. This easement covered an area of land from the intersection of Old Highway 279 and Clover Leaf Ranch Road to the south side of the Verde River. The easement followed the existing road to the Clover Leaf Ranch. After numerous Tribal Council meetings and a time-frame of approximately a year, the easement was approved and signed by the Yavapai-Apache Nation.

The second easement needed would be across Tract "A" of the River Ranch Estates subdivision. The owner of this subdivision lived in California, which proved to be a difficulty. After countless meetings and negotiations over the telephone, the easement was finally signed and approved from the property owner.

Engineering Services-Final Design

The engineering and final design for this project was performed in-house by Citizens' Engineering Department. Construction drawings were also completed utilizing Citizens' Engineering staff.

The Beaverhead Flat portion of this project was designed as a combined effort from Citizens' Engineering staff and the staff at Shepard Wesnitzer Engineering. Field staking and as-built also managed by a combined effort from Shepard Wesnitzer Engineering and ASC Surveying.

Project Management and Inspection

Citizens handled the task of project management in-house, while the inspection was contracted out to Ozzies Technical Services.

The Bidding Process

Citizens had already gone through the process of selecting and hiring a sole contractor to be assigned to all Arizona Build Out projects so this job was not put out to bid. The job was awarded to Northern Pipeline Construction Company.

The project was estimated by Citizen's personnel and then awarded to Northern Pipeline. The project started on August 30, 2000, and ended on December 22, 2000.

Construction

The project consisted of 8,860 feet of 10" steel, 77,346 feet of 8" steel, 210 feet of 6" PE, 277 feet of 4" PE, and 2,086 feet of 2" PE. The 10" and 8" steel line was constructed and tested for an MAOP of 720 psig, even though a MAOP of 570 psig was actually assigned to the system. A large district regulator was installed at the terminal end of this line to deliver distribution pressure to all customers located in the Village of Oak Creek.

Facility Operations

The entire 14.6 miles of pipe was energized on December 8, 2000, and became part of Cottonwood System 7. Once purging was complete, the regulator station was activated creating a new system named "Sedona System 25". The distribution facility was installed simultaneously to the feeder main.

NSAM Customer Growth

All customers served off the distribution regulator station at the terminal end of this facility in the Village of Oak Creek were part of the NSAM rate structure.

Chapter

24

Village of Oak Creek Distribution

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project be a high density, 3408 polyethylene. This material selection allowed for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems be performed under the direction of the Engineering Department, using the guidelines stated in part IV of Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

The route was selected by the number of applicants that were interested in converting to natural gas along each street in the Village. The permit process was negotiated with Yavapai County and Citizens' Engineering staff. Citizens financed a bond for two years covering the work in Yavapai Right-of-Ways. The purpose of the bond was to minimize expenses for pavement repairs. If Citizens adequately repaired all streets to the satisfaction of Yavapai County inspectors to that slurry backfill material would not be required.

Easement Acquisition

Easement acquisition was handled in-house by Citizens' Right-of-Way Department. A total of six private easements were needed during the construction of this project. Easements in the Village of Oak Creek area proved to be very difficult to obtain due to the "not in my backyard" mind-set of the customers living in this area.

Engineering Services-Final Design

The final design and construction drawings were completed by Citizens' Engineering Department, using the newly implemented Geographical Information System ("GIS") program. A contractor was hired to

electronically map the installed facilities utilizing Global Positioning System ("GPS") equipment. The GPS data was evaluated and approved by Citizens' staff and then brought into our GIS, showing the as-built facilities.

Project Management and Inspection

Citizens handled the project management for this project in-house. The inspection for the project was contracted Ozzie's Technical Services.

The Bidding Process

Citizens had gone through a process of selecting and hiring a sole contractor to be assigned to all Arizona Build Out projects so this job was not put out for bid. The job was estimated by Citizens' personnel and then awarded to Northern Pipeline Company.

Construction

Construction began on November 10, 2000, and ended on July 3, 2001. The size of distribution gas main installed included 6" PE, 4" PE, and 2" PE. The target area of service was the Village of Oak Creek. This project included 2 phases: Phase 1 was the main backbone for the entire project and some miscellaneous areas required by Yavapai County; and Phase 2 was the rest of the system.

Facility Operations

To better serve our customers, a multitude of gas main sections were energized at the time installation was completed. After putting in a section, Citizens would gas that section as soon as possible. This approach enabled Citizens to immediately provide gas to the customers that signed up, instead of waiting months for the whole project to be completed.

All facilities were designed, installed, and tested for a 60 psig MAOP. The Village of Oak Creek distribution facilities were tied into the VOC Regulator Station described above, and became a part of Sedona System 25. The system was initially operated at 35-psig.

NSAM Customer Growth

As of October 5, 2001, there are 671 customers in the Village of Oak Creek that have meters installed. There is a potential for adding many more in the future.

Chapter

25

Clarkdale to Camp Verde Phase 3 (Horseshoe Bend to I-17)

Arizona Build-Out Plan

Design Criteria

Citizens' 10" pipeline that currently existed at the Horseshoe Bend Subdivision (Clarkdale to Camp Verde Phase 2) was extended to feed the "Old Town" portion of Camp Verde. This supply line would also be utilized for an extension to provide service to the Town of Payson if the need ever arose in the future.

Citizens' Engineering Department, through the use of gas flow analysis software, performed calculations in order to correctly size the pipe that would be needed for this project. After performing various calculations, it was decided that the project would consist of continuing the 10" pipe the entire way down to the east side of I-17. The material selected by Citizens' Engineering Department was an API-5L X-52, .307" wall, 10" IPS ERW pipe, and API-5L Y-52 fittings. The pipeline was designed with a MAOP of 570 psig, but the pipeline was tested with a pressure allowing for a MAOP of 720 psig.

This leg of the project encompassed a number of auger bores across Highway 260 to avoid obstacles along the selected route. A directional drill was also involved in order to cross I-17 with the pipeline. These bores were designed in-house by Citizens' Engineering Department.

Citizens' Engineering Department reviewed Citizens' Arizona Gas Division Construction Standards, as well as Citizens' Arizona Gas Division Joining Procedures Manual, to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this pipeline. Finally, Citizens' Engineering Department required that the testing of the pipeline be performed under the written direction of the Engineering Department, using the guidelines stated in part IV of Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

The project began at the regulator station installed at Horseshoe Bend. The pipeline then followed the ADOT right-of-way for Highway 260 in a mixture of private easements and National Forest lands, down to the Chevron station located on the south side of Highway 260. At the Chevron station the pipeline turns south and is installed in private easement through the Chevron station property, a mobile home sales company, and finally a privately owned parcel. From that property, the pipeline was horizontally drilled under Interstate-17. Once on the easterly side of Interstate 17, the pipeline was located within a private easement from the Carioca Company. The pipeline ends just east of the regulator station set behind the Comfort Inn to feed "Old Town" Camp Verde.

An amendment to the original Forest Service permit was required due to a route change for this project.

Numerous ADOT permits and revisions to these permits were required due to the proposed widening of Highway 260. The revisions to the ADOT permits were time consuming because of all the parties involved

with the proposed widening of Highway 260. The alignment was changed several times due to the changes in ADOT proposed highway expansion plans.

A permit was required to be filed with the Environmental Protection Agency addressing the concerns of storm water discharge from the proposed project. This requirement was met on all of the projects, although not specifically mentioned.

Environmental Concerns

An environmental assessment was done for this project in conjunction with Phase 2. The permitting effort was extensive, primarily dealing with coordination with other agencies. For example, even though ADOT did not voice any concerns when Citizens originally permitted the project, they later started their own permitting process and dictated that Citizens change its alignment since a highway is more complex and ADOT was unwilling to consider and redesigns to consider the affect they are having on utilities. After each change, additional archeology and biology reports were required to be amended to cover the new alignment.

Easement Acquisition

When this project first got underway, it was decided that the preferred route would be running adjacent and parallel to State Highway 260 from Horseshoe Bend Road to Wilshire Road just outside the state's right-of-way. At Wilshire Road it was determined that Citizens followed the previously installed water line to I-17. From there the Company bored under I-17 and followed the waterline route to Industrial Drive. Easement acquisition activities commenced following the above-described route.

The first easement needed would be from a parcel owned by Castillo Porton Properties. The original property owners were unwilling to grant Citizens' Arizona Gas an easement for the proposed gas line. This property was later sold to Investments Unlimited. On December 15, 2000, the easement for this property was secured.

The next easement needed was on a privately parcel. After numerous attempts to contact the property owners, Citizens was referred to a property management company. The property management company informed the Company that the property was in probate and would remain in the legal system for several years. The route had to be adjusted to avoid the condemnation process.

The next parcel an easement was needed, was also privately owned and the owner wanted far more than fair market value for the proposed easement.

The next easement was on property owned a trust. After obtaining an appraisal to determine fair market value for the proposed easement, a Citizens' easement was secured.

The difficulty of acquiring the next needed easement was the determining factor behind making a complete design and route selection change.

Citizens obtained one private easement on June 15, 2001, for the new route.

Another private easement was from a parcel owned by Bar T Bar. After Citizens recorded the new easement, it was determined that a substantial amount of dirt needed to be removed before construction could begin on this parcel. Citizens agreed to stack the dirt on the property for future use.

The next easement was difficult to obtain because the property owner was very hard to track down and meet with. The owner's main issue was compensation. It was finally agreed that Citizens would install six

conduits for future use as compensation for the easement. On March 29, 2001, the utility easement agreement was recorded.

A second route design change was deemed necessary after reviewing the proposed easement with the next private landowner. This parcel had numerous problems associated with it. The biggest obstacle was the mountain of dirt that was in the path of the proposed gas line. Because Citizens would have to pay the high cost of dirt removal, an alternate approach evolved.

The only way possible around the mountain of dirt involved working with ADOT on a route located inside their right-of-way. This proved to be very difficult because of the planned highway widening project and the numerous people involved with the design of that project. After endless correspondents and telephone conversations it was determined that the best route would be to bore across Highway 260 at the end of Shills property to the north side of the highway, and run the gas line approximately 10 feet of the northerly fence line to a point near the Chevron Station. The Company then bored back to the south side of Highway 260 into the Chevron Station property. This amendment to the ADOT permit was approved by all parties involved and made a part of the original permit.

The next easement was obtained from the Chevron Station. This was an easement for ingress and egress that had already been a private easement.

A critical easement that provided a way across I-17 required several trips to Phoenix to meet with the property owner. Citizens agreed to provide grading activities in exchange for the easement. Once the approved grading plan was completed the easement was signed and recorded on June 15, 2001.

The last and final easement was also a critical easement because it was also the only route for the line to get across I-17. The easement was secured and recorded.

The right-of-way/easement acquisition for this project proved to be very difficult. One of the main problems was coordinating with ADOT to make sure Citizens did not create any future conflicts with the proposed highway widening project. This was difficult because the firms involved in the design of the highway widening were just starting to develop the design for the project and right-of-way acquisition or notification had not started with regards to the private property owners.

Engineering Services-Final Design

Citizens' Engineering Department handled all engineering work, as well as the production of construction drawings.

Citizens contracted with Arizona Engineering Company for the survey and as-built aspect of this project. All welds, joints, sag bends, over bends, and fittings for this project were surveyed and the exact location was referenced on the as built of the project.

Project Management and Inspection

Citizens handled project management in-house, while the inspection was contracted out to Ozzies Technical Services.

The Bidding Process

Citizens had already gone through the process of selecting and hiring a sole contractor to be assigned to all Arizona Build Out projects so this job was not put out for bid. The job was awarded to Northern Pipeline Construction Company.

Construction

This project consisted of approximately 2 miles of 10" fusion bond epoxy coated pipe. No PE pipe was installed on this project. The target area of service was the Town of Camp Verde and the commercial district located just east of the traffic interchange of I-17 and Highway 260. Several valves and stub-outs were installed along the route in strategic locations, determined by the potential for growth, to accommodate future expansion. A district regulator station was installed behind the Comfort Inn, at the end of this line, to reduce the high distribution pressure used to serve the areas around Camp Verde, as well as the Town itself. After the regulator station was built and installed, it was determined that there was some leftover 10" pipe. Citizens decided to extend the 10" steel pipe by approximately 400 feet down Bird Blvd. to a point equal with the property line for the Burger King Restaurant. This extension will serve as the tie in point for future extension through Camp Verde to Verde Lakes and possibly Payson.

Facility Operations

The 10" steel line from Horseshoe Bend to the regulator station behind the Comfort Inn in Camp Verde was hydro-tested and energized on June 18, 2001. Similarly with the other phases, this facility became part of Cottonwood System 7.

NSAM Customer Growth

At this time there are no NSAM customers served directly off the 10" steel line associated with this project. A larger district regulator station was installed at the terminal end of this project to provide a feed into a distribution system that directly serves NSAM customers.

Chapter

26

Camp Verde "Old Town" Distribution

Arizona Build-Out Plan

Design Criteria

Through the use of gas flow analysis, Citizens' Engineering Department was able to perform an analysis of the proposed build-out area using estimated customer loads, as well as estimated growth, to decide how the distribution system should be designed. Citizens' Engineering Department established that a MAOP of 60 psig would be assigned to this system, and was able to use the flow analysis tools to design where in the system the 4" backbone lines would be placed, and where the 2" lines would be needed to supply natural gas to all customers within the scope of the project. These analyses allowed for a more efficient usage of the pipeline in the system design, and helped in the creation of a system that was neither oversized, nor undersized. Citizens' Engineering Department specified that the material selection for this project be a high density, 3408 polyethylene. This material selection would allow for the strength and durability that was needed throughout the lifetime of the system. Material availability, cost, procedures, and standards were taken into account, when specifying the materials.

Citizens' Arizona Gas Division Construction Standards, as well as Citizens' Arizona Gas Division Joining Procedures Manual, were reviewed to assure that all construction practices and procedures needed for this project would be covered by the company standards. Company standards state that all pipelines will be designed using a Class 3 location, and the Engineering Department took into account these specifications when designing this distribution system. Finally, Citizens' Engineering Department required that the testing of the distribution systems would be performed under the direction of the Engineering Department, using the guidelines stated in part IV of Citizens' Arizona Gas Division Construction Standards Manual.

Route Selection and the Permitting Process

The selected route began at the regulator station behind the Comfort Inn located near Bird Boulevard in Camp Verde. The pipeline runs northerly along Bird Boulevard to a point where it leaves the Town of Camp Verde right-of-way. Then the pipeline runs within a dedicated easement across the Burger King property to the southerly right of way line of Highway 260. From there the line was bored under Highway 260 and ran easterly within the Arizona Department of Transportation right-of-way, near the Bashas' shopping center. From there, the distribution system enters the populated area of Camp Verde in an area called "Old Town".

The permitting process for this job involved the Town of Camp Verde and the Arizona Department of Transportation. The Town of Camp Verde was very cooperative and issued a permit for Citizens to install the proposed gas line that covered all the Town's right-of-way. The Arizona Department of Transportation permit proved to be difficult and complex in nature to obtain because of the planned widening of Highway 260. Citizens was required to correspond with not only ADOT, but all outside consultants working for ADOT on this project. This process added several months to the overall normal permitting process that is usually encountered with ADOT. After all parties associated with the proposed widening project of Highway 260 agreed that the distribution system would not adversely affect their project, Citizens was finally issued a permit.

Easement Acquisition

When this project first started it was determined that the original easement dedicated from Carioca Company would not work due to the fact that the Comfort Inn had constructed their off-site improvements in the dedicated easement. Once this was discovered, negotiations with Carioca Company to obtain a new easement started. On August 21, 2001 the new easement was recorded.

The next easement that was needed could have been from with either a private or business owner. It became clear that the private owner wanted more compensation than Citizens was willing to provide. The business owner negotiated a reasonable compensation on August 10, 2001, the signed easement was delivered to Citizens.

There were several other miscellaneous easements needed in the Town of Camp Verde to legally serve some customers. One of these easements was needed to serve the Town Hall Complex for the Town of Camp Verde. Several telephone conversations with the Town of Camp Verde happened before reaching an agreement on the language for the proposed easement. Once the language was satisfactory, the proposed easement went to vote at the City Council meeting and was approved. On August 14, 2001, Citizens' Arizona Gas received the signed easement of the Town of Camp Verde for recording.

Engineering Services-Final Design

The final design and construction drawings were completed by Citizens' Engineering Department.

The contractor, utilizing GPS data collection units, will create electronic as-builts. The GPS data is to be evaluated by Citizens' staff and then brought into our GIS system.

Project Management and Inspection

Citizens' staff handled project management for this project. The inspection of this project was contracted out to Ozzie's Technical Service.

The Bidding Process

Citizens had already gone through the process of selecting and hiring a sole contractor to be assigned to all Arizona Build Out projects so this job was not put out for bid. The job was estimated by Citizens' staff and then awarded to Northern Pipeline.

Construction

This project consisted on 6" PE, 4" PE, and 2" PE pipe. The total of pipe installed for this project is estimated since we have not completed the project. 13,000 feet of 6" PE pipe has been installed as of October 08, 2001, 15,000 feet of 4" PE pipe installed, 31,800 feet of 2" PE pipe was installed.

The 6" PE was installed from the regulator station behind the Comfort Inn down Finney Flat Road as the feeder line for this system. 4" PE and 2" PE laterals were installed to serve various subdivisions, trailer parks, and town areas.

The estimated completion date for this project is October 27, 2001.

Facility Operations

All gas lines installed will be designed, installed, and tested for a 60 psig MAOP, and operated initially at 30 psig. A new system will be created and it is anticipated that it will be named Cottonwood System 11.

NSAM Customer Growth

As of October 5, 2001, there are 9,989 residents who live in Camp Verde Town limits. However, we did not pipe the whole Town of Camp Verde as of October 5, 2001. Citizens received 111 applications for gas service from the residents of Camp Verde.

Chapter

27

Non Build-Out Projects/Non NSAM Areas

1992 – 2000

Prescott Valley Distribution (General to all Phases)

In 1992, the Town of Prescott Valley was finalizing its plans for construction of the State's largest sewer project. A significant portion of the $28,000,000 price tag would be borne by the property owners, so the town officials held several property owner meetings to explain the necessity of the project. Their audience was not receptive to being assessed a charge for the sewer; most were content with their septic tanks. The Town knew that for public health reasons the project needed to proceed. One thing they kept hearing at these meetings was that the residents wanted natural gas service. At that time, only a small portion of the town had natural gas service available.

In an attempt to make the sewer project more appealing, the Town Manager arranged a meeting with Citizens' management to persuade them to install natural gas facilities in conjunction with the sewer project. The Town made a compelling argument. At the time most of the streets were unpaved, the Town Manager pointed out that after the sewer mains and services were installed the streets would be paved. Citizens' recognized that there would be a significant cost savings derived from installing our facilities prior to the streets being paved. The Town was convincing in presenting its belief that Prescott Valley would continue its rapid rate of growth, with homes and businesses soon occupying many of the then vacant lots.

In July 1992, Citizens prepared to install natural gas facilities in coordination with the Prescott Valley sewer project. A distribution system was designed consisting of 6" steel, 4" polyethylene, and 2" polyethylene mains. The mains were designed, installed, and tested to operate at 60 psig; however the new piping was connected to and integrated with an existing 55-psig MAOP system and therefore limited to a 55-psig MAOP.

The sewer project was to be installed in phases. The engineering firm for the first phase of the sewer was Hook Engineering. Hook Engineering provided pre-mapping and as-built mapping services for the gas installation. Citizens' created a set of construction specifications, a bid packet, and with the help of Hook Engineering, plans for the first phase. On March 5, 1993, a pre-bid conference was held to acquaint interested gas pipeline contractors with the project. There were four bids received for the project. Northern Pipeline Construction Company ("NPL") was selected as the installation contractor. On April 1, 1993, NPL was issued a notice to proceed with the installation of natural gas facilities in Prescott Valley.

A Company Inspector was assigned to the project and a small temporary office was manned by a Company employee to assist residents with the sign-up, and conversion process opened in Prescott Valley. In order to assure that the gas line installation did not interfere with the sewer contractor, the Town prescribed the following requirements:

a) Gas line installation shall be performed after sewer work is completed, after installation of sewer trunks, laterals and taps, but prior to placement of chip seal surfacing.

b) City Engineer will authorize Gas Company in writing to proceed. Each authorization will cover a continuous length of not less than 1,320 feet and not more than 5,280 feet.

c) The gas contractor has 60 calendar days to complete all work within authorized area, including backfill, compaction and all testing.

Construction continued through the remainder of 1993 and most of 1994. By the end of the first phase, 447,757 feet of main had been installed. When the project began there were 1,360 gas customers in Prescott Valley, by the end of 1994 the number had grown to 3,525.

For the second phase of the sewer project, the Town chose Sunrise Engineering to design the sewer system and manage the project. Citizens decided to utilize Sunrise for project management and inspection of the gas installation. In February 1995, bids were accepted for this phase of the gas installation project. This time there were seven bidders. Once again, NPL was the successful bidder.

Construction continued through the remainder of 1995, and was completed in 1996. 182,711 feet of main were installed in this phase.

By the end of the project, natural gas service was available to almost every lot in Prescott Valley. In total, 6.3 miles of 6" steel, 23.7 miles of 4" PE and 89.4 miles of 2" PE mains had been installed. In addition, services, meters, and regulators were installed for all of those homes and businesses that converted from electricity or propane, as well as new buildings constructed during this project. By the end of 1996, there were 5,724 Citizens' Arizona Gas customers in Prescott Valley. People continued to convert their homes to natural gas and most of the vacant lots in Prescott Valley have been built upon. At the end of 2000 there were 8,532 Citizens' Arizona Gas customers in Prescott Valley.

1998

Kachina Village Approach (Flagstaff)

In early 1997, the Coconino National Forest was contacted and the project scoping began. The services of Northland Research were awarded to conduct project scoping, biological clearances, and archeological clearances. Final approval was obtained on May 4, 1998. In addition, several easements were obtained along Highway 89A, and on the parcel that separates Kachina Village from the National Forest Service.

Northland Exploration was hired to do the survey work, and Citizens' personnel engineered the project. Project management (contract specifications development, bidding, and inspection) was handled in-house. Northern Pipeline was awarded the construction contract, and High Desert Investments was awarded the clearing/grubbing and tree removal.

Construction of the project began May 21, 1998, with the construction of 22,196 feet of 8", 6", 4" and 2" steel. The project began where the 8" Kilte-Zuni Loop line crossed Highway 89-A, and extend into Kachina Village to what is known as the Tovar Regulator Station.

The pipe was installed on ADOT ROWs, Coconino County ROWs, City of Flagstaff ROWs, and in the private easements previously mentioned. The pipeline was routed down "Old Munds Highway", which is an old logging road that had once been part of the National Forest. During construction, a landowner shut down the project claiming that he "owned the road".

After researching the issue, it was verified that an irregularity had occurred when the Forest Service (US Government) deeded the land over to a private party. Fortunately, an easement was negotiated, and the project was allowed to continue.

Revegetation Services was hired to restore all USFS ROWs to specified conditions. Northern Pipeline was awarded the contract and constructed the pipeline. Citizens' inspectors were assigned to the project to

assist in project management and inspection. Upon completion, there were three new areas served with natural gas for the first time. Regulator stations were installed for Pine Dell, Forest Highlands and Kachina Village. The project was completed September 20, 1998.

Kachina Village Distribution (Flagstaff)

The project began with Phase 1 on April 21, 1998. The plan was to build the distribution system in six phases, which were coordinated throughout Kachina Village for the most economical and efficient installation possible. The beginning of the phases did overlap with the construction of the other phases, as well as the "approach line".

The timing of completion of all these phases was critical to ensure gas was in the mains prior to the upcoming winter. The overall footage installed was 61,714 feet of distribution mains from 2" to 4". All of the lines were installed within the Coconino County ROWs.

Citizens' engineered the project, as well as provided a portion of the inspection. Ozzies Technical Services provided inspection to the project. Western Technologies was contracted to do all of the compaction testing as required by Coconino County.

Northern Pipeline was the successful bidder and constructed the system. The installation of this distribution system made for quite the challenge due to the enormous amount of rock encountered and the fact that it was being installed in a developed area. In addition, some of the existing utilities owned by others were not locatable, and slowed the pace of construction.

For every block in which the water lines could not be located, valves were identified and tested prior to allowing any excavation. In addition, the County restricted the number of crews allowed in the Kachina Village area. The final phase was completed in May of 1999.

Forest Highlands Distribution (Flagstaff)

The project began on April 21, 1998, in conjunction with the Kachina Village approach and the Kachina Village Distribution. The overall footage installed was 141,577 feet of distribution mains from 2" to 4". A majority of the lines were installed within the Coconino County ROWs, although the roads are privately maintained, and therefore there were additional requirements from the Forest Highlands Board of Directors. A few private easements were secured to minimize the footage requirements.

Citizens' engineered the project, as well as provided a portion of the inspection. Ozzies Technical Services provided inspection to the project, as well.as Western Technologies was contracted to do all of the compaction testing as required by Coconino County.

Northern Pipeline was the successful bidder and constructed the system. The installation of this distribution system made for quite the challenge, due to the enormous amount of rock encountered and the fact that it was being installed in a developed area. The project was completed in July of 1998. Forest Highlands is an exclusive gated community.

Pine Dell Distribution (Flagstaff)

The project began in June of 1998, in conjunction with the Kachina Village approach, the Kachina Village Distribution, and Forest Highlands Distribution. The overall footage installed was 5,503 feet of distribution mains from 4" to 2". All of the lines were installed within the Coconino County ROWs. Citizens' engineered the project, as well as provided inspection. Ozzies Technical Services provided inspection to the project as

well. Western Technologies was contracted to do all of the compaction testing as required by Coconino County. Northern Pipeline was the successful bidder and constructed the system. The installation of this distribution system made for quite the challenge due to the enormous amount of rock encountered and the fact that it was being installed in a developed area. The project was completed in July of 1998.

1999

Timberline Approach (Flagstaff)

The project began March 26, 1999, with the construction of 5,379 feet of 6" steel main. It tied into the 8" main that was built in 1994 at Flagstaff Tap #5 on Highway 89 North. The line extended north to serve the Timberline South, Timberline North and the Fernwood subdivisions.

Citizens' engineered the project, which was entirely on ADOT ROWs. Citizens and Ozzies Technical Services both provided for inspection services. Northern Pipeline was the successful bidder and constructed the pipeline. The pipeline was complete May 15, 1999.

Timberline Distribution (Flagstaff)

The project began on March 3, 1999, in conjunction with the Timberline Approach Line. The project was constructed in three phases (Timberline North, Timberline South and Fernwood) simultaneously in order to provide gas to all three phases at or about the same time. There were several delays due to snow during the spring of 1999. The project was engineered and inspected by Citizens' personnel. ADOT and Coconino County ROWs were utilized, in addition to fourteen private easements that had to be obtained. Northern Pipeline Company was the successful bidder and constructed the entire system. The installation of this system through an already developed sub-division made for a challenging job. The project was finally completed January 7, 2000, with the total footage installed at 128,790 feet of 4" and 2" mains.

Mountainaire Approach (Flagstaff)

In early 1999, the Coconino National Forest was contacted and the project scoping began. The services of Northland Research were awarded to conduct project scoping, biological clearances, and archeological clearances. Final approval was obtained on July 5, 1999. In addition, several easements were obtained to be able to route the pipeline from Tovar, crossing under Interstate 17, and extending to Old Munds Highway.

Northland Exploration was hired to do the survey work, and Citizens' personnel engineered the project. Project management, contract specifications development, bidding, and inspection was handled in-house. Northern Pipeline was awarded the construction contract.

The project began July 26, 1999, with the construction of 10,366 feet of 8" and 4" steel mainline. It tied into the existing 8" line in Kachina Village that was stubbed for this installation. Citizens" personnel engineered and inspected this project, with assistance from Ozzies Technical Services for inspection. The route went through ADOT and Coconino County ROWs with additional easements that have to be obtained from USFS and two other private owners. Northland and Summit Engineering firms were utilized to provide additional surveying and land acquisition support. High Desert Investments performed tree removal and restoration services on USFS and private lands.

Part of the route of this pipeline took it underneath Interstate 17. An auger bore was the method used to get under the interstate. This turned out to be an incredible challenge due to the extremely hard rock encountered. The rock was so hard that two diesel powered auger machines were burned up in making this attempt. A third, much larger, machine was brought in to complete the bore. The bore, which was estimated

to be completed in about five days, took 19 days, due to the conditions that were encountered. The pipeline was completed September 1, 1999.

Mountainaire Distribution (Flagstaff)

The project began on July 2, 1999, in conjunction with the Mountainaire Approach Line. The project was engineered and inspected by Citizens' personnel. Coconino County ROWs were utilized. Northern Pipeline Company was the successful bidder and constructed the entire system. The installation of this system through an already developed subdivision made for a challenging job. The project was finally completed October 13, 1999, with the total footage installed at 25,939 feet of 4" and 2" mains.

2000

Show-Low Reinforcement

Citizens up-rated a part of the existing Show Low System 4 and installed a new district regulator near the intersection of North 6th Street and Adams Street. This up-rated portion was designated "Show Low System 12". This new regulator was needed to supplement increased demand and load added to the system.

Chapter

28

Appendices

APPENDICES INCLUDE EXCERPTS OF RELEVANT SECTIONS OF REFERENCED MATERIALS.

Appendix A

Copies of the fact sheet, newsletter, and public announcement are located in Appendix A (Red Rock Loop)

GEOTECHNICAL/GEOLOGICAL ENGINEERING REPORT

PIPELINE CONSTRUCTION
UPPER RED ROCK LOOP ROAD
SEDONA, ARIZONA

TERRACON PROJECT NO. 65975093
FEBRUARY 6, 1998

Terracon

GEOTECHNICAL/GEOLOGICAL ENGINEERING REPORT

PIPELINE CONSTRUCTION
UPPER RED ROCK LOOP ROAD
SEDONA, ARIZONA

TERRACON PROJECT NO. 65975093
FEBRUARY 6, 1998

Prepared for:

Citizens Utilities
Arizona Gas Division
420 North San Francisco
P.O. Box 1448
Flagstaff, Arizona 86002

Attn: Mr. Robert J. Franson, P.E.

480-897-8200

Prepared by: 4685

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February 6, 1998

Citizens Utilities
Arizona Gas Division
420 North San Francisco
P.O. Box 1448
Flagstaff, Arizona 86002

Attn: Mr. Robert J. Franson, P.E.

Re: **Geotechnical/Geological Engineering Report**
Pipeline Construction
Upper Red Rock Loop Road
Sedona, Arizona
Terracon Project No. 65975093

Terracon Consultants Western (Terracon) has completed geotechnical/geological engineering exploration for the pipeline alignment along Upper Red Rock Loop Road in Sedona, Arizona. This study was performed in general accordance with our proposal number D6597285 dated September 8, 1997. Our preliminary engineering report for the project was issued on September 23, 1997.

The results of our geotechnical/geological study, including the findings of our geological research, our field observations before and after pipeline construction, site maps and cross sections, and geotechnical/geological conclusions and recommendations are attached.

The geological survey and literature review indicated conditions which are typical of soils/bedrock commonly found in the Sedona area. Exposed geologic materials in the roadway embankments and adjacent areas were observed to consist of interbedded sandstone and mudstone of the Supai Formation. The bedrock was observed to be generally flat-lying. The sandstone was observed to be typically fine to medium grained and moderately to well-cemented; however, some weakly cemented zones were observed. Mudstone observed in recently constructed roadcuts to the south was massive, poorly indurated, and very soft.

The sandstone was observed to be commonly jointed, with the joints vertical to near vertical. Joint attitudes were measured to be generally at high angles (>75 degrees) to vertical. No evidence of low angle discontinuities or a tendency for wedge failure was noted during our review of joint attitudes in bedrock outcrops. The Cathedral Rock Fault has been mapped by

others as crossing the project alignment at two different locations; however, during our field work we observed no evidence of faulting.

Road cuts along the proposed pipeline alignment were observed during our site reconnaissance to vary in slope from approximately 3.3:1 to approximately 2.5:1 (horizontal:vertical). One slope of 1.8:1 was observed in a well-cemented sandstone outcrop. No indications of overall stability problems with the existing road cuts were noted during our field reconnaissance. No evidence of low angle discontinuities, movement along fracture surfaces, scarps, or other evidence of landsliding was observed. Some minor rockfall potential was noted in the sandstone roadcuts due to the jointing of the rock; however, this is a common hazard in the Sedona area and we observed no areas in the cuts along the proposed alignment which would warrant mitigation measures.

We observed no evidence of groundwater seepage or springs from the existing road cuts/outcrops or within the adjacent drainage channels.

We have appreciated being of service to you in the geotechnical/geological engineering phase of this project. If you have any questions concerning this report or any of our consulting services, please do not hesitate to contact us.

Sincerely,
TERRACON CONSULTANTS WESTERN, INC.

REGISTERED GEOLOGIST
CERTIFICATE NO.
28782
HERBERT M.
SPITZ
Date Signed 2/4/98
ARIZONA, U.S.A.

Herbert M. Spitz, R.G.
Senior Professional

Reviewed by:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
12546
DONALD R.
CLARK
Date Signed 2/6/98
ARIZONA, U.S.A.

Donald R. Clark, P.E.
Principal

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Copies to: Addressee (5)

Pipeline Crossing of Oak Creek
Terracon Project No. 65975093
February 6, 1998

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GEOTECHNICAL/GEOLOGICAL ENGINEERING REPORT

PIPELINE CONSTRUCTION
UPPER RED ROCK LOOP ROAD
SEDONA, ARIZONA

TERRACON PROJECT NO. 65975093
February 6, 1998

INTRODUCTION

This report contains the results of our geotechnical/geological engineering exploration for the pipeline construction along Upper Red Rock Loop in Sedona, Arizona. The project site is an approximate one-mile section of the alignment located in Section 22, Township 17 North Range 5 East of the Gila and Salt River Base and Meridian. The project site is located entirely within the city limits of the City of Sedona.

The purpose of these services is to provide information and geotechnical/geological engineering recommendations relative to:

- geological conditions and hazards
- soil and bedrock conditions
- groundwater conditions
- design recommendations based upon geotechnical/geological conditions

The conclusions and recommendations contained in this report are based upon the results of field observations and geologic mapping, engineering analyses, and experience with similar soil and bedrock conditions, structures and our understanding of the proposed project.

PROPOSED CONSTRUCTION

Citizens Utilities is undertaking the design and construction of a proposed pipeline which will provide natural gas service to an expanded area in Sedona, Arizona. The proposed pipeline project includes installation of the pipeline in an alignment along Upper Red Rock Loop Road as shown on the Vicinity Map, Figure 1. The alignment construction requires cutting into the existing road embankments on the west side of Upper Red Rock Loop Road. A six-inch diameter steel pipe will be placed into trenches constructed in the alignment. The trenches will be backfilled to grade and new cut slopes along the roadway will be created.

SITE EXPLORATION

The scope of the services performed for this project included site reconnaissance by an engineering geologist, geological literature review, and providing geotechnical/geological engineering recommendations.

The field work consisted of reviewing geological conditions exposed in, and adjacent to the embankment areas of the project. The work was conducted on September 15, 1997 by Herbert M. Spitz, an engineering geologist with Terracon.

Prominent road cuts along the proposed alignment were designated as "stations" as shown on the site plans (Figures 2-4). Geologic data including bedding and joint attitudes and existing cut slope angles were obtained at each station using a Brunton compass and recorded in a field book. The existing road cuts were also observed for evidence of existing or potential slope instability including the presence of landslides, rockfalls, faults, clay seams, or groundwater seepage.

The existing cut slope attitudes observed during our field work are shown on the cross sections presented on Figure 5. Photographs of embankment conditions along the project alignment are presented in Appendix A.

SITE CONDITIONS

The alignment is located on the western (southbound) side of Upper Red Rock Loop Road south of State Highway 89A in the City of Sedona. The alignment is adjacent to the existing roadway and generally cuts existing embankments on the side of the Upper Red Rock Loop Road right-of-way. Vegetation on the slopes of the embankments generally consists of a combination of native grass, cacti and other indigenous plants. Topographically, the alignment and Upper Red Rock Loop Road right-of-way generally cut into northeast-, east- and to south-facing slopes that slope downward from Scheurman Mountain to the west toward Carroll Canyon to the east.

Two unnamed ephemeral drainage channels cross the study area. These channels trend northwest-southeast and flow toward Carroll Canyon to the east. The bottom of these channels are an estimated 10 feet lower in elevation than the ground surface of the road

adjacent to the alignment. Neither of the channels was flowing at the time of the field exploration.

SUBSURFACE CONDITIONS

Regional Geology: The project is located in the Transition Zone or Central Mountain Region (Nations and Stump) physiographic province of Arizona. The Central Mountain Region is a northwest-trending structure between the Basin and Range physiographic province to the southwest and Colorado Plateau to the northeast. Landscape features of the Central Mountain Region include the Black Hills near Jerome and Prescott, the Mazatzal and Sierra Ancha Mountains near Roosevelt Lake, and the Salt River Canyon between Show Low and Globe. The Central Mountain Region is characterized by rugged mountains of igneous, metamorphic and deformed sedimentary and volcanic rocks.

Local Geology: Local surficial and bedrock geological conditions have been mapped by the US Geological Survey at a scale of 1:100,000[1]. Surficial geological conditions at the site were observed to consist of siltstone and sandstone bedrock of the Supai Formation of lower Permian age. This formation has been described as containing siltstone, sandstone, conglomerate and minor dolomitic limestone. The sandstone in the formation is chiefly composed of silty, reddish brown and very fine to fine grained materials. This portion of the Supai formation is approximately 700 to 1000 feet in thickness.

Structure: The Central Mountain Region physiographic province of Arizona is characterized by northwest trending faults. According to Twenter[2] et al (1963), the northwest-trending Cathedral Rock fault crosses the northern portion of the proposed project location. The Cathedral Rock fault is a high-angle normal fault and is upthrown to the north and east, and downthrown to the west and south. The fault extends roughly a distance of 8 miles from Bell Rock to the Dry Creek area. Total displacement of the fault is difficult to determine; however, at Bell Rock the displacement is estimated at 250 feet; displacement at Dry Creek is estimated at 800 feet, and average displacement along the length of the fault is estimated at about 500 feet. Age assessment of the fault is not provided by Twenter;

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[1] Weir, Gordon, W., Ulrich, George E., and Nealey, L. David, 1989, "***Geological Map of the Sedona 30' by 60' Quadrangle, Yavapai and Coconino Counties, Arizona***", US Geological Survey, Map I-1896

[2] Twenter, Floyd R., and Metzger, D.G., ***Geology and Groundwater in Verde Valley-The Mogollon Rim Region, Arizona"***, United States Geological Survey, Bulletin 1177, 1963

however, marker beds used to determine displacement are located in the Supai Formation of Permian Age.

More recent mapping of the Sedona quadrangle by Weir[3] et al (1989) indicates the Cathedral Rock fault crosses the southern portion of the project area rather than the northern portion as indicated by Twenter et al. This mapping also indicates that a Quaternary-age terrace gravel covers the trace of the fault northwest of the project location northwest of Highway 89A. The gravel is not displaced by the fault, indicating a likely absence of movement during Quaternary time. Quaternary age alluvium in Oak Creek to the southeast is also shown to cover the fault trace and not be displaced by faulting.

Discussions with Mr. Phil Pearthree of the Arizona Geological Survey indicates he is unaware of Quaternary or historic seismicity in the Sedona area; however, he indicated there is a paucity of Quaternary soils in the site vicinity to aid in evaluating fault activity. Mr. Pearthree was unaware of any historic seismicity associated with the Cathedral Rock fault.

Seismicity associated with faulting in central Arizona has been reported by Pearthree and Scarborough[4]. In their analysis, Pearthree and Scarborough attempted to delineate Quaternary age faulting for the US Bureau of Reclamation surrounding potential dam sites in central Arizona. Evidence of Quaternary age faulting is used an indicator of recent fault movement if the fault displaces deposits of this age. Although further study was suggested, the Cathedral Rock fault was not considered of Quaternary age in their analysis.

The largest historic earthquake in central Arizona, of Richter magnitude 5, occurred in 1976. The epicenter of this event was located in Chino Valley near Prescott. Other historic earthquakes in central Arizona are reported at Modified Mercalli Intensity VI.

Site observations did not identify evidence of recent or ancient faulting along either of the reported traces of the Cathedral Rock fault across the project area. No evidence of faulting such as scarps, gouge zones, slickensided bedrock, or off-sets of bedding or other lithologic markers were observed in bedrock outcrops during our field reconnaissance.

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[3] Weir, Gordon, W., Ulrich, George E., and Nealey, L. David, 1989, "***Geological Map of the Sedona 30' by 60' Quadrangle, Yavapai and Coconino Counties, Arizona***", US Geological Survey, Map I-1896

4Pearthree, P.A., and Scarborough, R.B., "***Reconnaissance Analysis of Possible Quaternary Faulting in Central Arizona***", Arizona Bureau of Geology and Mineral Technology, 1984

Bedrock Conditions: Exposed geologic materials in the roadway embankments and adjacent areas were observed to consist of interbedded sandstone and mudstone of the Supai Formation. The bedrock was observed to be generally flat-lying, with a maximum dip of 11 degrees measured in one outcrop. The sandstone was observed to be typically fine to medium grained and moderately to well-cemented; however, some weakly cemented zones were observed. Mudstone observed in recently constructed roadcuts to the south was massive, poorly indurated, and very soft.

The sandstone was observed to be commonly jointed, with the joints vertical to near vertical. Spacing of the joints typically varied from approximately 4 to 18 inches. Joint surfaces were observed to vary from rough to slightly rough and were only rarely observed to be filled with caliche. Joint attitudes were measured to be generally at high angles (>75 degrees) to vertical. No evidence of low angle discontinuities or a tendency for wedge failure was noted during our review of joint attitudes in bedrock outcrops.

Bedding and joint attitudes measured at the designated stations in the field are shown on the following tables. Representative bedding and joint attitudes are shown on the attached Site Plans, Figures 2 through 4.

Station	Bedding Attitudes
1	N83W, 6NE
3	Horizontal
7	N61W, 11SW

Station	Joint Attitudes
1	N56W, 86NE
1	N20E, 90
1	N57W, 84NE
1	N45E, 86SE
2	N20E, 84NW
2	N76W, 86NE
2	N42E, 90
2	N50W, 75NE
3	N36E, 85NW

Station	Joint Attitudes
3	N10W, 85SW
3	N26E, 82SE
3	N11W, 90
4	N70W, 86SW
4	N25E, 90
5	N56W, 78NE
5	N25E, 83SE
6	N34W, 80NE
6	N44E, 89SE
7	N62W, 76NE
7	N27E, 75NW
7	N78W, 77NE
7	N74E, 86NW
8	N13W, 90
8	N79W, 67NE
10	N66W, 70NE
10	N54W, 86SW
10	N80E, 82NW

Road cuts along the proposed pipeline alignment were observed during our site reconnaissance to vary in slope from approximately 3.3:1 to approximately 2.5:1 (horizontal:vertical). One slope of 1.8:1 was observed in a well-cemented sandstone outcrop. The toe of the existing slopes were typically 2 to 3 feet away from the edge of the paved road surface. The steeper slopes were observed to occur where cuts were predominantly into sandstone, particularly where the sandstone was well cemented. Shallower slopes were noted in embankments where mudstone predominated, or where poorly cemented sandstone was observed.

No indications of overall stability problems with the existing road cuts were noted during our field reconnaissance. No evidence of low angle discontinuities, movement along fracture surfaces, scarps, or other evidence of landsliding was observed. Some minor rockfall potential was noted in the sandstone roadcuts due to the jointing of the rock; however, this is a common hazard in the Sedona area and we observed no areas in the cuts along the proposed alignment which would warrant mitigation measures.

Groundwater Conditions:

Based on information from Twenter[5] et al (1963), the regional groundwater table in the site vicinity is at a depth of over 500 feet below grade.

We observed no evidence of groundwater seepage or springs from the existing road cuts/outcrops or within the adjacent drainage channels during our site reconnaissance.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of the geologic survey, primary geotechnical/geological considerations for the design and construction of the cut slopes along the proposed pipeline at the project location include:

- Excavation of bedrock in embankments;
- Recommended stable slope configurations;
- The presence of the Cathedral Rock fault; and,
- Seismicity at and in the vicinity of the project area.

Each of these primary considerations is discussed below.

Excavation: It is anticipated that excavation of cut slopes in the bedrock can be accomplished with conventional earth moving equipment. However, some additional effort may be necessary to extract boulder sized materials, particularly in deep narrow trench excavations.

Based upon the strength of the bedrock and the cementation characteristics, trench excavations penetrating the sandstone will require the use of specialized heavy-duty equipment, together with drilling and blasting (as needed) to facilitate rock break up and removal.

[5]Twenter, Floyd R., and Metzger, D.G., ***Geology and Groundwater in Verde Valley-The Mogollon Rim Region, Arizona"***, United States Geological Survey, Bulletin 1177, 1963

Slope Stability: The pre-construction road cuts observed during our reconnaissance along the proposed pipeline alignment are in sandstone and mudstone and vary in slope from approximately 3.3:1 to 2.5:1 (horizontal:vertical). One slope of 1.8:1 was observed in a well-cemented sandstone outcrop. The embankment slopes range from 0 to approximately 12 feet high. No indications of overall stability problems with the existing road cuts were noted during our field reconnaissance. Some minor rockfall potential was noted in the sandstone roadcuts due to the jointing of the rock; however, this is a common hazard in the Sedona area and we observed no areas in the cuts along the proposed alignment which would warrant mitigation measures.

Based on our observations, we recommend that slope configurations of the final road cuts match the existing slope angles. Following construction of the final cut slopes the slopes should be scaled as necessary to remove loose, overhanging, or protruding blocks or rock masses.

Cathedral Rock Fault: An evaluation of the available fault and seismic information indicates the potential for fault rupture at this Tertiary-age fault is unlikely to be higher than in other areas of northern Arizona. The exact location of this fault beneath the project location is uncertain, as it has been mapped in two different locations by previous studies. We observed no evidence of this fault across the project location during our field work.

Seismic Considerations: The project site is located in Seismic Risk Zone 2B, of the Seismic Zone Map of the United States as indicated by the 1994 Uniform Building Code. Based upon the nature of the subsurface materials, a seismic site coefficient, "s" of 1.0 should be used for the design of structures for the proposed project (1994 Uniform Building Code, Table No. 16-J).

Maximum historic earthquakes in central Arizona are reported at Modified Mercalli Intensity VI. According to Richter[6], probable maximum accelerations associated with an earthquake of this intensity is 300 mm/sec^2.

---

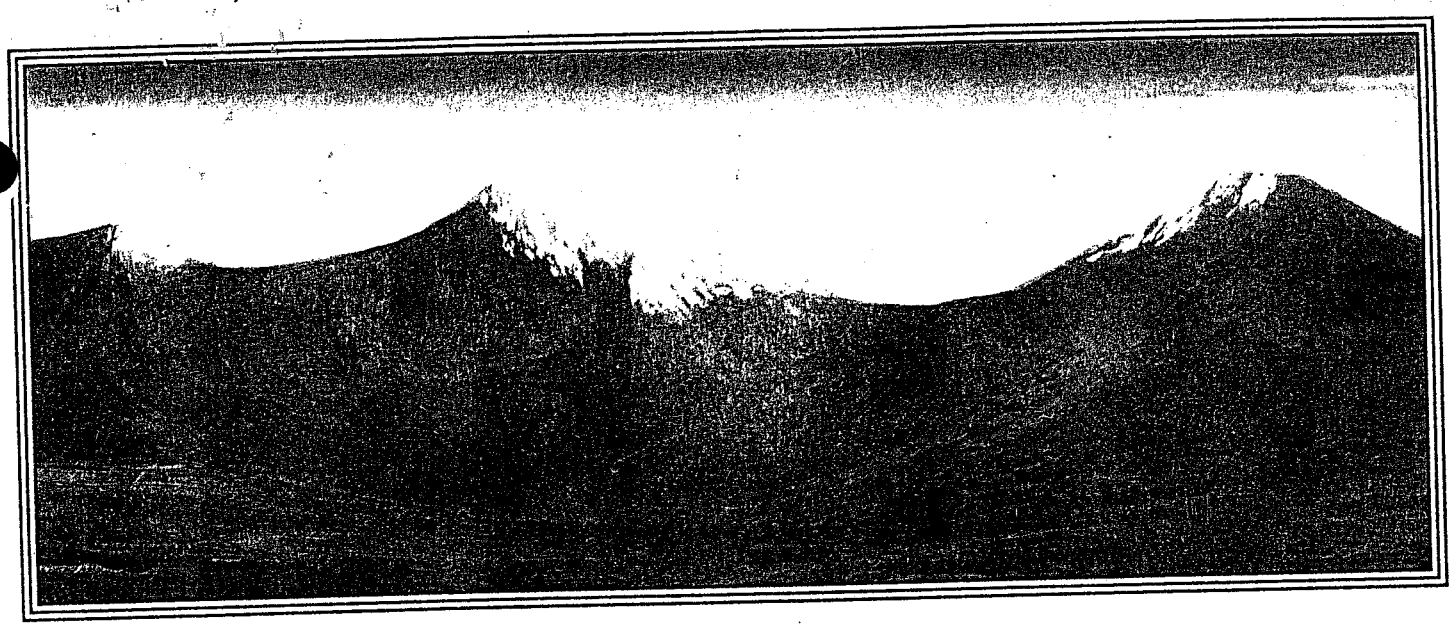
[6]Zeevart, Leonardo, ***"Foundation Engineering for Difficult Subsoil Conditions"***, Van Norstrand Reinhold Company, 1972

GENERAL COMMENTS

The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the location of test borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities. No warranty, express or implied, is made. We prepared the report as an aid in design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction techniques to be used on this project.

This report is for the exclusive purpose of providing geotechnical/geological engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken.



SEDONA RED ROCK LOOP

NATURAL GAS PIPELINE PROJECT

SPECIFICATIONS AND
CONTRACT DOCUMENTS

CITIZENS UTILITIES COMPANY
ARIZONA GAS DIVISION

SUNRISE ENGINEERING INC.

MAR 1 0 1997

SPECIFICATIONS AND CONTRACT DOCUMENTS

FOR THE

SEDONA RED ROCK LOOP
NATURAL GAS PIPELINE PROJECT

CITIZENS UTILITIES COMPANY
ARIZONA GAS DIVISION

Registered Professional Engineer (Civil)
CERTIFICATE NO.
19050
ALDEN C.
ROBINSON
Date Signed 1-28-97
ARIZONA, U.S.A.

Prepared By:

SUNRISE ENGINEERING, INC.
3660 East University #2
Mesa, Arizona 85205
Tel: (602) 832-4420
Fax: (602) 830-4150

Alden C. Robinson, P.E.
Arizona License No. 19050

Date: January 27, 1997

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25 EAST 500 NORTH • FILLMORE, UTAH 84631
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MESA, AZ
AFTON, WY
SALT LAKE CITY, UT
PRESCOTT VALLEY, AZ
WASHINGTON, UT

ADDENDUM NO. 3

to the

PLANS AND SPECIFICATIONS

for the

SEDONA RED ROCK LOOP NATURAL GAS PIPELINE PROJECT

March 10, 1997

Planholder:

This Addendum No. 3 shall become part of the plans, specifications, and contract documents for the above referenced project, and all provisions of the contract shall apply thereto.

Bidder's shall acknowledge receipt of all addenda by number in the space provided in the bid.

Item #1:

Appendix D, U.S. West Specifications for Conduit, shall be deleted from the specifications and contract documents.

Sincerely,

Mark A. Huntsman
Manager, Compliance and Contract Administration

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WASHINGTON, UT

ADDENDUM NO. 2

to the

PLANS AND SPECIFICATIONS

for the

SEDONA RED ROCK LOOP NATURAL GAS PIPELINE PROJECT

February 6, 1997

Planholder:

This Addendum No. 2 shall become part of the plans, specifications, and contract documents for the above referenced project, and all provisions of the contract shall apply thereto.

Bidder's shall acknowledge receipt of all addenda by number in the space provided in the bid.

Item #1:

The attached meeting attendance roster shall be included with the minutes of the pre-bid tour, which was included as part of Addendum No. 1.

Item #2:

The attached minutes of the directional bore bid showing shall be included in the specifications and contract documents. The sign in sheet for this bid showing is included with the minutes.

Sincerely,

Mark A. Huntsman
Manager, Compliance and Contract Administration

MEETING ATTENDANCE ROSTER

Name of Project: Sedona Red Rock Loop Natural Gas Pipeline Project		Purpose of Meeting: Pre-Bid	
Location: Sedona City Airport Conference Room		Date: January 30, 1997	
Name	**Representing**	**Address**	**Telephone No.**
Mark Huntsman	Sunrise Engineering	25 E 500 N Fillmore UT	800-560-6151
Steve Christensen	" "	" "	"
Kim Erickson	" "	" "	"
Delinda Edison	" "	" "	"
John Tempest	The Tempest Co.	4681 So 300 West Murray Utah 84107	801-262-4165
JOHN MILLER	CITIZENS UTILITIES	705 N. BEAUBE FLAG, AZ	774-7399
MARTIN ANAYA	" "	1459 E. BUTLER " "	774-4591
Brian Dugan	Superior Co. Ready Mix, Materials Supplier	P.O. Box 786, Camp Verde, Az 86322	Ph: 800-649-6413 Fax: 520-567-0245
Dewey Foutz	Foutz + Bursum Const Co Inc	P.O. Box 307 Farmington, NM 87499	505-325-3712
Dick Smith	Paul R Aoney Cement	695 W Bennett St SLC UT	801 3644445
Darrell Barney	" " "	—	Fax 801-364-9306
Lemmie Rockford	Rockford corp	P.O. Box 538 Rio Vista CA	707 374 5530

Name of Project: Sedona Red Rock Loop Natural Gas Pipeline Project		Purpose of Meeting: Pre-Bid	
Name	Representing	Address	Phone
Richard Castro	Citizens Utilities Co.	1526 E Aspen, Cottonwood AZ	(520) 634-5555
Stephen Ross	Citizens Utilities Co.	1459 E Butler	520 774-4591
Otis Larry	A&L Underground	15561 Capital Port San Antonio	210 - 493-5545
Robert Franson	CUC	420 N. San Francisco St	520 - 774-4591 Ext.
Bill Stafford	USFS	P.O. Box 300 Sedona	520-567-4820
Mary Adams	U S West	320 S. Main St.	520 634-7556
Irene Freeman	Citizens Utilities	PO Box 157 Cottonwood, AZ	520-634-5555
~~Mary Adams~~			
Dale Edwards	Citizens Utilities	201 Grove, Prescott, AZ 97571	520-445-2210
Patrick Rockford	Rockford Corp	PO Box 538 Rio Vista, CA	707-374-5530 FAX 5447
Brian Hallam	NPL	8000 E Long Mesa Pu AZ 92340	520-772-4570
Albert Ben Cuerey	Arizona Pipeline Co	17372 Lilac, Hesperia, CA	619-244-8212
Joe Stokes	" "	" "	"

SEDONA OAK CREEK DIRECTIONAL BORE
BID SHOWING MINUTES
January 29, 1997

Introduction - sign in

Tentative schedule

Bid Opening February 7, 1997 at 2:00 p.m. Bids can be delivered, mailed, or faxed until 2:00 p.m.

Easement on project has a 45 day appeal period. Notice to Proceed will be made on or about February 14th, unless any appeals are made before the deadline of February 9th. If any appeals are received before that date, the Notice to Proceed will be held until cleared by the Forest Service

Cultural significant

Oak Creek west side - Forest Service. In-depth cultural surveys have been completed and the area has been cleared for bore to surface. A corridor for pipe stringing has been cleared on the surface only. No digging or other disturbance of the ground will be allowed in this area. Contractor must stay within the construction corridor. This will be strictly enforced. This area is staked, and a map was provided.

Personnel should be informed to report any cultural or historical artifacts which may be found. Any findings should be immediately reported to foreman, inspector, architect, Citizens, etc.

Easements / Work Space

East side of Oak Creek. This area is private property. The easement allows no room for movement - the bore must the done in the location staked. Contractor may use the road, but must allow the homeowners access as needed.

Forest Service Requirements. No parking, welding, personal vehicles, or plant damage outside of corridor. If demonstrated to be necessary, clearing and grubbing can be done with special permission of Forest Service.

Identify working area, install protective fencing around trees.

Restoration of area, reseeding and revegetation will be done by pipeline contractor.

Fire Plan. Extreme fire danger in the forest was stressed. The welding standards require shields in winds over 8 mph. Equipment, vehicles require spark arrestors, mufflers, etc., to prevent the possibility of sparking. Fire tools shall be available on the job. Citizens and Forest Service may instruct Contractor to weld or not. In instances of extreme fire danger, project may be shut down. A Forest Service representative will be on the job full-time.

Welding Requirements

API 1104 - Certified Welders only allowed on project

Coating Requirements

Pipe is 14-16 mils fusion coated with 80 mil Powercrete

Girth welds will be coated with either Powercrete-J or Protal 7000 (specifications on both were provided.) Citizens will provide the coating.

Powercrete-J. Pipe must be sandblasted, coating applied, maintain temperature, curing time, etc. as per manufacturers specifications.

Protal 7000. Sandblast pipe, preheat pipe, following manufacturer's specifications

Martin Anaya of Citizens will oversee the joint coating

Directional Drill Requirements

Sedona City may have restrictions on work hours. Citizens will check with City and inform Contractors.

Pullback may take 24 - 48 hours. Can Contractor get special permission to work at night for 1, possibly 2 nights to complete the pullback without stopping? Citizens will check with City. Possibly check with nearby homeowners to get permission.

Water Availability. No fire hydrants in area, cannot use creek water. Water must be hauled in.

Mud Disposal. Local landfills will not accept liquid materials. Citizens will check with local ranchers who might be interested in the mud/slurry for pond lining. However, mud disposal will be the contractor's responsibility.

The crossing easement can be staked on the ground surface. The easement is 25' wide. Additional stakes can be provided. Contractors requested 50' centers with

elevations. Contractors also requested permission to stake 20' on each side of pipe for tracker wire to make sure the pipe is in the easement. This should not be a problem.

Contractors expressed concern about tieing into pipe at such a sharp 18° entrance and exit angle.

Testing Requirements

Pipe will be jointed in 3 or 4 segments. Each segment will be pretested for a minimum of 4 hours. After pipeline is complete, the pipeline will be tested for 24 hours.

100% X-ray testing will be conducted. This will be paid for by Citizens; however, it will require some coordination with the Contractor.

Geotechnical Report

Core samples have been taken by a geotechnical engineer in both the in and out areas. A geotechnial report is available upon request.

Questions from Contractors

Q. Is it possible to block road?
A. Yes.

Q. Question on contract time. Specs show 45 days in one place and 150 days in another.
A. The 150 days is an error. This will be changed to show 45 days.

Q. Is $2000 liquidated damages correct?
A. Yes. The reason for this is that the project has to be completed by March 25.

Field Tour

GENERAL CONTRACTORS THAT ATTENDED BID SHOWING

The Tempest Company 801-262-4165
John Tempest
4681 South 300 West
Murray, UT 84107

Foutz & Bursum Construction Company 505-325-3712
Dewey Foutz
P.O. Box 307
Farmington, NM 87499

Park Acres Construction Company 801-364-9306
Dick Smith or Darrell Barney
695 West Everett Street
Salt Lake City, UT 84116

Rockford Corporation 707-374-5530
Patrick or Lemmie Rockford
P.O. Box 538
Rio Vista, CA 94571

Arizona Pipeline Company 619-244-8212
Joe Stokes
3111 West Lincoln Street
Phoenix, AZ 85009

Northern Pipeline Company 520-772-4570
Brian Hallan
8800 East Long Mesa Drive, Suite B
Prescott Valley, AZ 86314-4364

POSSIBLE CONTACTS FOR SLURRY DISPOSAL

Flagstaff Golf Maintenance Company 520-527-4511
Dan DeVere
2461 North Oakmont Drive
Flagstaff, AZ 86004

Don Cray 520-282-6387
Land Owner/Rancher
Lower Red Rock Loop Road
Sedona, AZ

SEDONA OAK CREEK DIRECTIONAL DRILL

BID SHOWING Sign In

Name	Firm	Phone Number
Robert Franson	CUC	774-4591 Ext 219
Patrick Rockford	Rockford Corp	707-374-5530
Dale Edwards	Citizens	520-445-2210 x201
(1) TIM MCGUIRE	MICHELS PIPELINE	414-583-3132 303-423-5761
(2) HERB FLUHARTY	MEARS/HDD	517-433-2929 FAX 517-433-5911
(3) GRADY BELL	ARB, INC.	918-743-3644
(4) Otis Larry	A&L UNDERGROUND	(210) 492-5545
Lemmie Rockford	Rockford Corp	707 374 5530
Albert Ben Currey	Arizona Pipeline Co	619-244-8212
Darrell Ramsey	Rock Drill Co.	801 [illegible]
Dick Smith	"	"
Joe Stokes	Arizona Pl	619-[illegible]-8212
(5) STEVE ALLEN	MILLER THE DRILLER	515-266-2261
Richard Castro	Citizens Utilities Co.	(520)-634-5555
Mark Huntsman	Sunrise Eng.	(800) 560-6151
Steve Christensen	Sunrise Eng.	(800) 560-6151
Kim Erickson	Sunrise Eng	(800) 560-6151
Delinda Edison	Sunrise Eng.	(800) 560-6151
STEPHEN ROSS	CITIZENS UTILITIES	520 774-4591
Irene Freeman	Citizens Utilities Co	520-634-5555
Bill Stafford	USFS	520-567-4501

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PRESCOTT VALLEY, AZ
WASHINGTON, UT

ADDENDUM NO. 1

to the

PLANS AND SPECIFICATIONS

for the

SEDONA RED ROCK LOOP NATURAL GAS PIPELINE PROJECT

February 4, 1997

Planholder:

This Addendum No. 1 shall become part of the plans, specifications, and contract documents for the above referenced project, and all provisions of the contract shall apply thereto.

Bidder's shall acknowledge receipt of all addenda by number in the space provided in the bid.

Item #1:

The attached minutes of the pre-bid tour shall become part of the contract documents.

Item #2:

Part II, Contract Forms, Page 1-Agreement, Item 3 states that "The Contractor will commence the work required by the Contract Documents within 14 calendar days after receipt of the Notice to Proceed..." This shall be changed to 10 calendar days.

Item #3:

Part II, Contract Forms, Page 3, Performance Bond, shall be replaced with the attached revised form.

Sincerely,

Mark A. Huntsman
Manager, Compliance and Contract Administration

SEDONA RED ROCK LOOP NATURAL GAS PIPELINE
BID SHOWING MINUTES
January 30, 1997

I. WELCOME

A. Introduction

B. Sign Roll

II. PROJECT PRESENT STANDINGS:

A. Forest Service Permit - 45 Day Appeal Period
1. Appeal Period Ends February 9th
2. Appeals may prolong startup

B. Sedona City Permit - The permit from Sedona City is secured, except for the following to be submitted by successful contractor:
1. Traffic Control Plan
2. Construction Schedule

C. Yavapai County Permit - The permit from Yavapai County is secured, except for submission of following by successful contractor:
1. Traffic Control Plan
2. Construction Schedule

D. An ADOT Permit is required for a short Section along SR-179

III. PROJECT DATES:

A. Pre-Bid Tour - Mandatory - January 30, 1997

B. Bids Due Feb. 7, 1997 - 2:00 p.m.
1. Faxes okay, mail, or deliver
2. Recommended to call to verify receipt

C. Notice of Award - as soon as possible
1. All bonds and certificates of insurance within 10 days.

D. Notice to Proceed issued February 14th -
1. Start within 10 days
2. If any appeals are received, the Notice to Proceed may be held up

E. A Pre-Construction Conference will be held during the 10 day period

F. NPDES Permit - Required to be filed by contractor at least two days before construction starts

IV. SCOPE OF WORK:

A. Brief Description - a brief description of the project was made, beginning at Dove Wing Gate Station, and following the pipeline alignment, gate station, boring Hwy 89A, following Upper Red Rock Loop Road, cutting across road just past school, pathway along URRL road over pipeline trench, joint trench will start with 4" and 2" PE main, block secionalizing valve station, steel and PE spur lines, 6" continues on Chavez to drop-off to creek bore, cross country-requires coordination with Forest Service, removal of trees for transplanting, tie-in to bore, surface restoration of bore site-including reseeding and revegetation, pick up at other end of bore on Back O' Beyond Road, 1" steel service, joint trench with 4" and 2" PE, regulator station, 3 pipes in casing crossing SR-179, PE ties-in, medium pressure continues, tie-in to existing, Chapel Road-tie-in, joint trench until leaving Chapel Road, medium pressure with 2 PVC conduits for US West to Pine Knolls, tie-in to 2" steel main, then follow ADOT right-of-way along 179 to Painted Canyon Road.

B. All Contractors are prequalified and short-listed because of experience and expertise due to construction environment and project difficulty

C. Plans - general overview of plan sheets
   1. Project design criteria and regulator station design are subject to change without a cost change order from construction contractor.

D. Specs - general overview
   1. Notice was drawn to Appendices
      a. ADOT Permit
      b. Sedona City Permit and Specifications
      c. Yavapai County Permit and Specifications
      d. US West - not included
      e. Erosion Control and Landscape Plan - Forest Service

E. Construction Notes-provide a quick reference for contractor of what is required in the specifications-these were reviewed
   1. Construction Priority Notes
      a. #1-Back O' Beyond Road along driveway by directional bore-has a temporary easement which expires March 31st.
      b. #2-Tie-ins at Pine Knolls station and Chapel Road-cross country portion
      c. #3-Upper Red Rock Loop Road - from Chavez to School-as the tourist season picks-up, the traffic will become more difficult
      d. #4-Rest of Project.

F. City of Sedona Construction Notes
   1. Specifications and Permit-contingent on traffic control plan,
   2. Compaction Requirements
   3. City Inspector will be on project while working in City.

G. Yavapai County Construction Notes
   1. Specifications and Permit-contingent on traffic control plan,
   2. Compaction Requirements
   3. County Inspector will be on project while working in County.

H. Coconino National Forest Construction Notes
   1. Erosion Control and Landscape Plan
   2. Pathway Construction along Upper Red Rock Loop Road
   3. Forest Service Construction Limits-2000' from backfill to clearing ahead of trench-this is per crew-the purpose is to minimize the tearing up of public lands and reduce the impact and shock factor on the public
   4. Forest Service will have inspector on-site
   5. Trees will be marked by FS - save, cut, transplant
   6. Environmental concerns
   7. If Forest Service inspectors has problems with any of contractor's staff, they will be removed from project and not allowed to work on Forest Service property for the duration. Likewise, if the Forest Service has continual problems with the Contractor, the FS will shut down the Contractor-most likely another contractor will come in to finish the job on Forest Service.

I. Joint Trench-two 4" PVC conduit for US West-a change has been made which is not shown on the plans and specs
   1. Instead of having concrete vaults, the first conduit must surface at intervals of every 1100' (±50'), and the second conduit must surface at intervals of 1400' (±50').
   2. Delete all references to concrete vaults.

J. Owner-furnished Materials-pipe, valves, fittings, anodes, test station, locating wire, warning tape, PVC conduit and fittings, coating for joints
   1. Two loads steel pipe in Sedona-all other pipe will be shipped FOB job site-a small amount may need to be picked up in Cottonwood
   2. Also, tape, wire, anodes, fittings, PE Pipe, etc. can be picked up in Cottonwood.

K. Contractor-furnished Materials-casing pipe for bores, welding rod, casing seals, casing spacers, sand bedding, surface restoration materials-asphalt, gravel, mulch mat, trees, seed, drip irrigation, concrete, paint, labor

1. Storage site. Can use temporary easement (on Back O' Beyond) through March 31st, if directional bore contractor is not using.
2. Also several areas along pipeline route (shown on plans) which can be used for stockpile
3. Temporary Fence required on Forest Service.
4. Contractor can check with City for temporary storage yard-if arranged privately, check with City first because of zoning requirements-if in County, must be approved by County. Proof of City and/or County approval must be submitted to Owner.
5. Coordinate with Citizens for required materials.

L. Bid Schedule-Review
1. Quantities will be measured daily in the field by inspector

M. Measurement and Payment Review-items to make note of:
1. Anodes-spaced approximately 750'
2. Where 6" high pressure and 6" medium pressure are together, the high pressure shall be painted red and stencil "High Pressure"
3. Hole Hog - 10" PVC perforated casing-try 3 times-if it fails, cut the road
4. Dove Wing-not a hot tap
5. Block Sectionalizing Valve-plans show 4"-change to 2"
6. Concrete-2500# as required or called for by inspector and/or U.S. West on conduit pipe.
7. Rock excavation for trench is included under rock trench. Method of measurement shows 4' excavation, change to 2'-basis for estimate of quantity. Measurement is foot/foot (lineal and vertical) assume 24' wide. Blasting - submit plan for blasting-must be approved by City, County, or Forest Service as applicable.
8. Bituminous Surface-for crossing-does not include repair of edge of road. If trench is in road, repair will be included under this item as determined by the Engineer.
9. Bedding will be sand-not sand pads or sand bags.
10. Bid Items #39-41 will be determined in field after surface restoration-hydro-seeding will be color matched (Sedona Red Rock color)
11. Transplant or Replacement-Forest Service will tag trees (and shrubs) for transplant-trees will be transplanted along roadways to hide the line of pipeline and soften the impact on public. Local nurseries are accustomed and experienced in this procedure. Must have 80% success rate. If trees die, Contractor is responsible for replacing. Removal of trees for transplanting will not be included in the 2000' construction limit.

V. CONSTRUCTION ENVIRONMENT

A. Players

1. Citizens Utilities
2. Sunrise Engineering
3. City of Sedona
4. Yavapai County
5. Forest Service.
6. US West

B. Construction Requirements

1. 7:00 a.m. to 5:00 or 5:30 - Monday thru Saturday working hours for Sedona City
2. Traffic control plan will determine how long open trench can be
3. Compaction Testing-Contractor pays only if tests fail.
4. Sunrise Engineering will process change orders and pay requests [Citizens will approve]
5. Sunrise Engineering and Citizens Utilities will provide inspection
6. Communication will be through Kim Erickson, Chief Inspector for Sunrise
7. Listen to Citizens Utilities inspectors-non-compliance issues
8. Follow specifications
9. Weekly coordination meetings with contractor, inspectors, Forest Service/City/County/ADOT/School District as applicable
10. Construction schedule changes must be submitted in writing
11. US West will have inspector on the conduit section

C. Forest Service comments:

1. Contractor was cautioned not to drive, park, or cut outside the construction corridor
2. Public involvement-the public is interested and will be involved-Foreman should be diplomatic and informed
3. Preserve visual quality of area-no burying of undesirable/hazardous materials-preserve quality of watershed
4. Project has required in-depth involvement from all parties-two year process
5. Keep high standards in construction
6. Reputation of Forest Service, Citizens, Sunrise and Contractor on the line
7. FS and CU will be here after project is over-and will pay or benefit from failure or success of project
8. Archaeological-Contractors staff should be instructed to report any findings-surface has been checked over, very little subsurface investigation has been made-could be found during excavation. Contractor may be shut down for a short time while this is being investigated, but in the long run, it is better than liability and prosecution if findings are made and not reported. Cultural arch. area is the flat area around the directional bore.

Once the pipeline moves up the hill, arch. sites are not expected to be found.

9. Keep fire tools-shovels, extinguishers, available at all times on project. Winds over 25 mph can be extreme fire hazard. Welding in cleared areas only. Spark arrestors, mufflers, turbo chargers, etc. on equipment, welders, vehicles. Also, check for fuel leaks on equipment.

10. Don't plan on using Forest for storage areas other than construction corridor or getting water - requires length permitting-try private entities first-but they will work with you.

VI. GENERAL COMMENTS

Q. How close can trench come to trees?

A. Stay outside of drip-line or the tree will most likely be killed. Use temporary fencing around trees left in construction corridor. The purpose is to preserve the visual quality.

Q. Does Contractor have to pay for City/County inspectors?

A. Citizens will pay if charges are made for this.

VII. An addendum will be faxed and mailed out which shall include the minutes of pre-bid tour.

VIII. TOUR

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INVITATION TO BID
SEDONA RED ROCK LOOP NATURAL GAS PIPELINE PROJECT

Separate sealed bids for the construction of the SEDONA RED ROCK LOOP NATURAL GAS PIPELINE PROJECT will be received from prequalified bidders by Citizens Utilities Company. Bids will be opened and reviewed privately at 2:00 p.m., on February 7, 1997, at Citizens Utilities Company, 420 North San Francisco, Flagstaff, Arizona.

The work on the project has been separated into Task A and Task B:

Task A will consist of the installation of about 7 miles of steel natural gas pipeline, together with some polyethylene plastic and PVC pipe, earthwork, trench excavation and surface restoration, boring and jacking, valve installation, fencing, and all other related appurtenances, materials and work items necessary to produce a complete and functional natural gas project. The Owner will furnish all materials, supplies, and valves, and other appurtenances for the construction of the project, except for the following Contractor furnished items:

Standard Trench Work	Road Boring Work	Surface Restoration Work
Weld rod	Casing Pipe	Seed Mix
Pipe Bedding Material	Casing End Seals	Mat Mulch
Paint	Casing Spacers	Hydro Mulch
	Vent Pipe and Fittings	Replacement Trees & Shrubs
		Drip Irrigation System
		Temporary Fencing
		Boulder Barricades

Task B will consist of a directional bore of Oak Creek with installation of about 1175 feet of steel natural gas pipeline.

Plans and specifications for Task A have been prepared by Sunrise Engineering, Inc., and are available at their office at 25 East 500 North, Fillmore, UT 84631, Tel: (801) 743-6151, Fax: (801) 743-7900 upon receipt of Fifty Dollars ($50.00) for each set. (Non-refundable.)

Drawings and specifications for Task B are available from Citizens Utilities Company, 420 North San Francisco, Flagstaff, Arizona. Upon receipt of Twenty Dollars ($20.00) for each set. (Non-refundable).

Bidders may submit bids for either or both Task A and Task B. Bidders bidding on both tasks should submit a transmittal letter clearly stating that their bid covers both tasks.

A pre-bid tour will be held on January 30, 1997, at 9:00 a.m. The meeting location will be the conference room at the Sedona City Airport, Sedona, Arizona.

BID

SEDONA RED ROCK LOOP NATURAL GAS PIPELINE PROJECT

Proposal of _____

(hereinafter called "BIDDER"), organized and existing under the laws of the State of _____,

doing business as _____.* To CITIZENS UTILITIES COMPANY - ARIZONA GAS DIVISION, (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of the SEDONA RED ROCK LOOP NATURAL GAS PIPELINE PROJECT, in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID, each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 120 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of $2500.00 for each consecutive calendar day thereafter as provided in Section 15 of the GENERAL CONDITIONS.

BIDDER acknowledges receipt of the following ADDENDA:

_____

_____

*Insert "a corporation", "a partnership", or "an individual" as applicable.

GENERAL CONDITIONS

1. Definitions
2. Additional Instructions & Detail Drawings
3. Schedules, Reports and Records
4. Drawings and Specifications
5. Shop Drawings
6. Materials, Services and Facilities
7. Inspection and Testing
8. Substitutions
9. Patents
10. Surveys, Permits, Regulations
11. Protection of Work, Property, Persons
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13. Changes in the Work
14. Changes in Contract Price
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16. Correction of Work
17. Subsurface Conditions
18. Suspension of Work, Termination and Delay
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20. Acceptance of Final Payment as Release
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23. Assignments
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26. Subcontracting
27. Engineer's Authority
28. Land and Rights-of-Way
29. Guarantee
30. Arbitration
31. Taxes

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the AGREEMENT which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS, and SPECIFICATIONS, by additions, deletions, clarifications, or corrections.

1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BIDDER - Any person, firm, or corporation submitting a BID for the WORK.

1.5 BONDS - PERFORMANCE and PAYMENT BONDS and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

1.6 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion, or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7 CONTRACT DOCUMENTS - The contract, including INVITATION TO BID, INFORMATION FOR BIDDERS, BID, BID SCHEDULE, AGREEMENT, PAYMENT BOND, PERFORMANCE BOND, PROOF OF INSURANCE AND DRUG TESTING AFFADAVIT, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8 CONTRACT PRICE - The total moneys payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.10 CONTRACTOR - The person, firm, or corporation with whom the OWNER has executed the AGREEMENT.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which the CONTRACTOR proposes to carry on the WORK, including dates at which he will start the various parts of the WORK, estimated date of completion of each part and, as applicable:

3.2.1 The dates at which special detail drawings will be required; and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies, and equipment.

3.2.3 The CONTRACTOR shall also submit a schedule of payments that the CONTRACTOR anticipates he will earn during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, except materials specifically called out to be OWNER furnished, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWINGS shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of

DOCUMENTS.

7.6 The ENGINEER and the ENGINEER'S representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection, or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for his observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. For CONTRACTOR furnished material, the CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 For CONTRACTOR furnished material, the CONTRACTOR shall pay all applicable royalties and license fees, and shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, the CONTRACTOR shall be responsible for such loss unless the CONTRACTOR promptly give such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile loca-

SITEWORK MATERIALS

1. GENERAL.

A. These are general specifications; the project at hand will not necessarily require the use of every procedure or material described in this section. "Earthwork for Pipelines and Structures" for additional discussion of earthwork and sitework methods and materials.

B. Base, bedding, and backfill materials, where required, shall conform to the following specifications and, unless indicated otherwise, shall be paid for as part of the unit price for pipeline construction or the bid item to which it otherwise pertains.

C. The Contractor shall import, transport, process, furnish and install materials as herein specified and as required by the plans for all base materials, clay materials, drain materials, bedding materials, fill materials, backfill materials, untreated base course, rip rap, surface protection, and bituminous surface course.

D. Differences may exist between these specifications and those of local government entities for sitework materials such as backfill, bedding, untreated base course, and bituminous surface course, which may affect contract prices. The Contractor shall make himself aware of the local government's specifications for those materials when project work is located within its boundaries. If differences arise, unless otherwise approved by the Engineer, the more stringent specifications shall apply.

E. No frozen materials of any kind shall be used in any bedding, fills, or backfill.

2. BORROW AND DISPOSAL SITES.

A. Contractor shall himself, and at his own expense, secure all necessary access to such sites and to the acquisition or disposal of such materials. Borrow and disposal sites are subject to the approval of the Engineer.

B. The cost of furnishing, processing, hauling, and placing import bedding shall be paid for under separate bid items for that purpose.

3. UNTREATED BASE COURSE.

A. This material shall be composed of natural gravel, crushed rock, or crushed slag and shall be of a special gradation as defined below. Its primary use shall be to provide a base upon which bituminous material can be placed. However, when specifically called for on the drawings, it is also located in driveways, gravel roads, under concrete slabs and other miscellaneous locations which require a highly compacted bearing capacity.

B. Untreated base course shall meet the following gradation requirements.

SIEVE SIZE	PERCENT PASSING RANGE
1 inch	100
1/2 inch	75-95
#4	40-60
#16	20-40
#200	5-12

9. PIPE BEDDING.

A. GENERAL. The Contractor shall ensure that pipe is bedded in properly sized material. As required, and with the approval of the Engineer, he shall import material, transport excavated material, process excavated material, or use other means to accomplish this. If the necessity for special bedding material has been caused by an act, or a failure to act, on the part of the Contractor, then the Contractor shall bear the expense of the material and any additional excavation which may be needed.

B. BACKFILL BEDDING.

1. Unless otherwise authorized by the Engineer, backfill bedding is required in all locations along the pipeline. Backfill bedding material shall be a fine grained, rounded material free of rock and may be straightrun or segregated native material where suitable material is found in the excavation. The following schedule shows the maximum allowed sieve size for bedding and shading material for each type of pipe.

MAXIMUM SIEVE SIZE FOR BEDDING MATERIAL

PIPE MATERIAL	SIEVE SIZE
P.E. Pipe	3/16"
Steel Pipe (Coated)(Natural Gas)	3/16"

2. Cost of processing, hauling, and placing of native materials shall not be paid for separately but shall be included in the price of furnishing and installing the pipe. No additional compensation will be made for the processing of native material unless approved by the Engineer.

C. IMPORT BEDDING. In areas where suitable native material is not available, imported bedding material shall be used. Unless otherwise specified, bedding is to be placed in the trench starting at the bottom and ending 6 inches above the top of the pipe as shown on the plans. Size restrictions for import bedding shall be the same as given in the schedule in paragraph B above.

1. Sand Bedding. When called for on the plans or required by the Engineer, the Contractor shall furnish and install sand bedding or other non-compacting, granular bedding. Black cinder sand is allowed. (Red cinder sand is not allowed.)

2. Drain Gravel Bedding. When called for on the plans or required by the Engineer, the Contractor shall furnish and install drain gravel bedding. Drain gravel bedding shall be as specified in subsection 6 above.

10. TRENCH BACKFILL..

A. Native Backfill. Unless otherwise authorized by the Engineer or specifically called for on the plans or in the specifications, native trench backfill is required in all locations along the pipeline. Subject to the provisions set forth herein or as may otherwise be specifically shown on the plans or called for by the Engineer, the material obtained from project excavations shall be used as trench backfill, with the exception that all organic material, rubbish, debris, and other objectionable matter are first to be removed. No rock with a maximum size greater than six (6) inches shall be placed in the backfill. No frozen earth shall be placed in trench backfill.

Apparent Opening Size	0.210	mm	(ASTM D4751)
Permitivity	1.4	sec^{-1}	(ASTM D4491)
Flow Rate	115	gpm/ft^2	(ASTM D4491)

D. Seams in sections shall be overlapped a minimum of 6 inches.

DRAFT ENVIRONMENTAL ASSESSMENT
SEDONA PIPELINE PROJECT

CITIZENS UTILITIES PROJECT

Coconino National Forest
Sedona Ranger District

December 1, 1995

DAMES & MOORE

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TRIP VISIT

Purposed Citizens Utilities Gasline Corridor Trail

November 27,1995

On Monday November 27, 1995 I met with Bill Stafford at the Sedona Ranger Station and he briefed Larry Pokorny (Engineering Technician from Supervisors Office) and myself on the purposed Citizens Utilities Gasline Installation and trail. We spotted a vehicle on the southern end of the project off Chapel Rd and then drove to the northern end of the project at the end of Pine Knolls Drive. We walked the approximately .9 mile location of the project.

OBSERVATIONS AND CONCERNS: There is currently a moderate to heavy used trail that follows the aerial telephone corridor. It appears to be used mostly by mountain bikes, however, I noticed considerable more foot traffic on the southern end. The phone line runs perpendicular to the slope and crosses 6-8 small drainages. In most cases the trail crosses the draws parallel to the phone line, however, on the southern end the trail contours to the east around steep draws.

I support the idea of a utility corridor, however, I am concerned with construction limitations of installing an underground gasline in the close proximity to the overhead fiber optic cable. The cable is only approx. 10-12 feet above the ground at mid-span when crossing some small ridges. If a person was mounted on a horse they could touch the cable. Because of the equipment limitations of pipelaying derricks, as an example, it seems improbable to me they they would be able to operate on the existing phone service road/trail. This equipment would be able to pass under the overhead line in drainages but existing guywires would force equipment to a parallel path. To lessen ground disturbing impacts of construction the dozer size should be limited. This however would limit the ability to possibly rip some of the rock in the area. If rock could not be ripped it would either need to be drilled and shot or cut through with a rock saw. Because of close proximity of fiber optic cable mats and other safeguards would need to be utilized for explosive work. Consultation with US WEST would be needed to determine shot distance to reduce vibration problems. If you do no blasting the options of using a track mounted rock saw introduces the need to construct a resonably level operating platform from which to work. It seems the only reasonable thing to do is get as close to the existing overhead line as possible which would mean a new ground disturbing corridor.

The ideal would be to do as mentioned above and then install conduit which would house the communication lines. With the increased encroachment of homes in the area and additional use of the trail it seems to me only a matter of time before vandals shoot the fiber optic cable or associated equipment. I believe burying the phone cable would be a win-win situation for all parties. I do not think it prudent to have overhead lines, buried gasline and a trail in the same location because of conflicting maintenance requirements. If the overhead lines remain and the trail is constructed, access to each pole would necessitate short spur roads to be constructed. Additionally, turning radius

of trail curves in the draws would need to be constructed to accommodate a boom trucks to maintain the pole mounted lines.

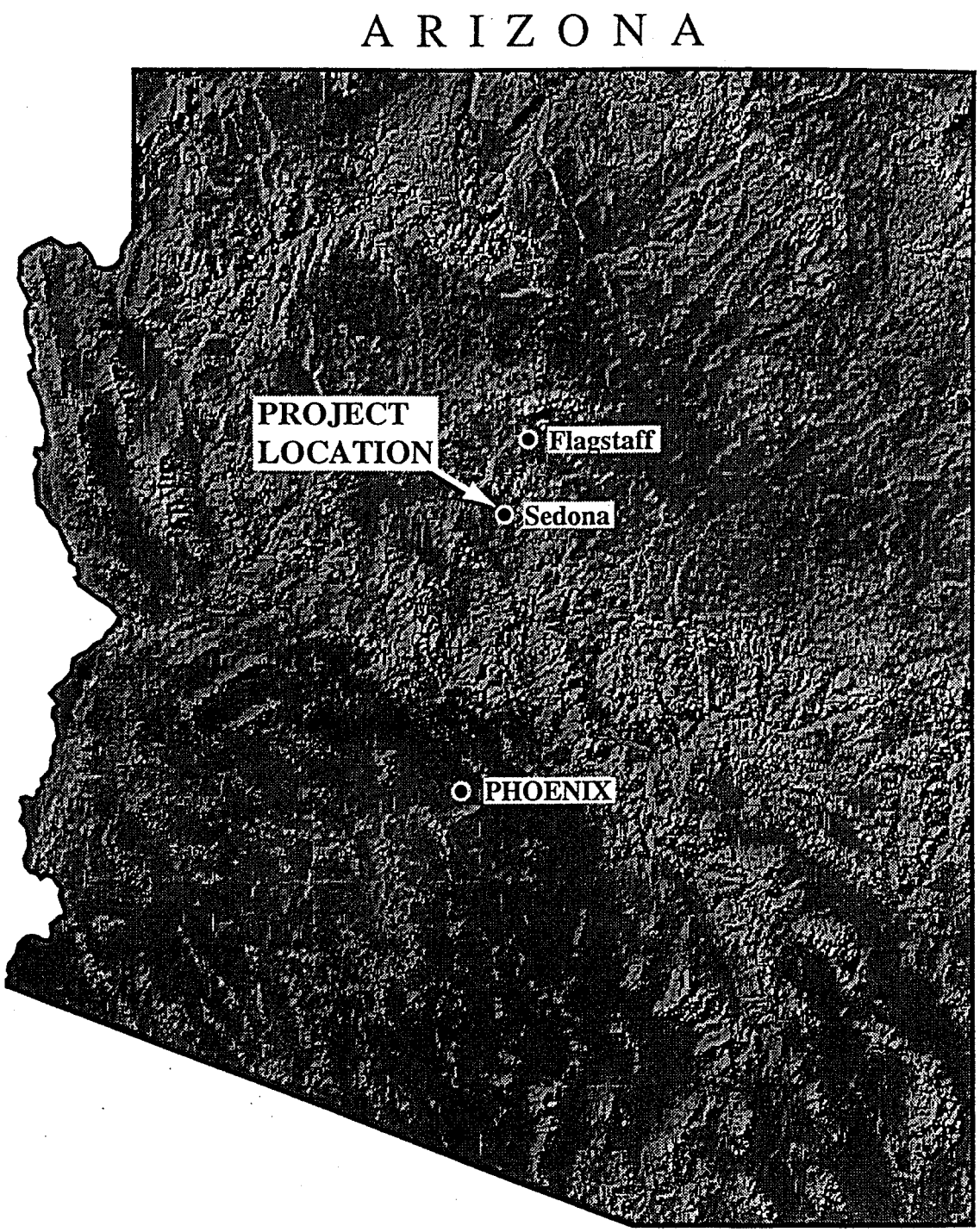
I have a concern over the contractors ability to bury the gasline to a minimum on 4 feet at the creek bottoms and have the deflection (vertical curvature) in the pipe to make it over the adjoining ridges without very deep cuts. We should not allow through cuts across these small ridges to reduce the trench depth due to visual impacts of the cutbanks.

RECOMMENDATIONS:

1) Bury phone line and remove existing overhead line.
2) Contour "trail" staying within disturbed area where practical.
   a) Construct 8-10 feet wide.
   b) Maintain outslope (Max. 3%) and no berm
   c) Limit grade to 8.3% or less.
   d) Use rolling dips to control water.
3) Construct to "Easier" specs. (see above) per Outdoor Recreation Access Route. My brief examination today makes me think this is possible.
4) Recognize that although Mtn. Bike is the main use presently once constructed the user group may switch to jogging etc.
5) Assign someone familiar with trail construction using engineering specs. to inspect contractors work.
6) Use excavated oversize rock to create visually appealing closures on existing trail and/or utility road.
   a) Excavated rock can also be used to armored aprons on stream crossings to slow water velocity and allow sediment to settle out on the trail.
7) Try to save as much Pinyon Pine as possible and develop a vegetation rehabilitation plan for the project.
8) Backfill trench to pre-installation contours and sculpture cutbanks where present.

I believe this project can be beneficial to all parties. However, because of the complexities it will require careful planning, review of all contract specifications and O&M plans and most importantly GOOD field inspection while work is underway.

DAVID E. MICHAEL
Forest Trails Specialists



VICINITY MAP

Figure

C. PROPOSED ACTION

The proposed Sedona Pipeline Project consists of a buried six-inch-diameter high-pressure natural gas pipeline, buried at a depth of about four feet with a temporary trench width of approximately two feet, and marked with four-foot-tall above-ground markers spaced at appropriate distances for safety requirements along the final route, identifying the general line location. A construction corridor of 10 feet will be required with additional pull-out areas in which vehicles can pass each other (pull-out areas can be specifically designated in the final design). Some material will need to be stockpiled, for example pipe, water, directional drilling material, and excavated material. In addition, equipment storage will be necessary, particularly in areas that are not adjacent to roads. It is anticipated that stockpiling and sotring equipment on site may cause less damage to existing vegetation because there will be less movement back and forth.

Operation of the pipeline will require periodic leak surveys and maintenance along the right-of-way. For locations of the route not adjacent to an existing road, routine preventive maintenance (e.g., leak surveys, cathodic protection) can be completed with the use of an all-terrain vehicle or walking. Unanticipated repairs would likely require the use of a truck. Public access will be limited except where compatible uses are applicable (i.e., right-of-way combined with a multiple use trail).

There are four general alternative routes being considered for analysis. Two routes are located adjacent to the US 89A and SR 179 corridor (northern) and the other two are located south of Table Top Mountain (southern). A major distinction between the northern and southern routes is the termination point of the pipeline.

The northern routes roughly parallel the US 89A and SR 179 corridor beginning at the City Gate Regulator Station and terminating near the intersection of Back-O-Beyond Road and SR 179 at the proposed Back-O-Beyond Regulator Station. The southern routes generally follow existing corridors south of Table Top Mountain and terminate at the Morgan Wash Regulator Station. Figure 2 shows end point locations. Additional aboveground regulator/meter stations may be required in the future, but are not considered part of the proposed action. A 20-foot-wide permanent right-of-way would be granted in the special use permit, so any additional regulator stations would have to be located within the 20-foot area. For visually sensitive areas, the disturbance area would vary from possibly 100 feet to 10 feet for the purposes of minimizing negative environmental and visual effects. This means that the corridor may have to narrow to as little as 10 feet in some areas for visual and environmental impact minimization, but where the area is so small, there will be compensation in another area (up to 100 feet) for staging and/or storage.

Typical construction methods include the following:

a. Following the issuance of a special use permit on an approved route, the design of the line, and the approval for construction, a survey crew marks the proposed route with stakes, identifying the location of the line. Limits of construction are also defined in the field with markers and ribbon (for this project, the route will be agreed to by the Forest Service and CUC).

b. Appropriate portions of the right-of-way are bladed or grubbed to accommodate construction equipment, and debris are removed.

Visual Quality Objectives

The proposed project alternatives cross lands designated by the Forest Service (Coconino National Forest Plan, August 1987) as having a VQO of "retention" (Figure 8). Non Forest Service lands are shown as private lands on Figure 8.

Environmental Consequences - Visual Resources

The proposed project is not expected to create any significant visual impacts. However, impacts may result if dense vegetation is cleared or if construction activities create noticeable contrasts with the surrounding landscapes. Mitigation measures have been incorporated in the analysis to minimize these impacts. In addition, an analysis was conducted to provide an indication of whether the proposed pipeline would be compatible with the Forest Service's VQOs.

No-Action Alternative - No impacts would occur to visual resources if the no-action alternative is selected.

Northern Routes (N1 and N2) - Most of the northern alternatives are within road rights-of-way (Links 120, 110, 100, 80, and 74). The construction of the pipeline would occur under sidewalks, or next to the road, resulting in low impacts to scenic quality. Low visual impacts to Oak Creek and the associated riparian area are expected because directional boring will cause minimal ground disturbance at the Oak Creek crossing. By reducing vegetation removal and soil disturbance, a moderate impact to viewers would result for Link 10, as an alternative to Link 120.

The northern route is primarily located on private land with no established VQOs; however, the northern route does cross retention landscapes on Forest Service land with the use of alternative Links 10 and 90 (links common to both northern and southern alternatives). Even with specific mitigation, Link 10 is not expected to comply with Forest Service VQOs. Link 110 briefly crosses retention landscapes, but the proposed construction is located within an ADOT right-of-way, resulting in compliance with the VQOs. Conversely, Link 90 will not comply with the retention objective. Per Jim Beard, Coconino National Forest landscape architect, a partial retention VQO could be achieved with specific mitigation and the undergrounding of the existing fiber optic cable located parallel to Link 90.

Southern Route (S1 and S2) - With specific mitigation, such as reducing the right-of-way and avoiding plant material, potential impacts would be moderate for B variety landscapes (Links 20, 50, 70, and 71) and A variety landscapes (Link 71, crossing Cathedral Rock foothills). By reducing vegetation and soil disturbance, potential impacts would be low-moderate in B variety landscapes (Link 40) or in urban settings with strong visual contrasts (Link 90). Low impacts are anticipated in areas within road rights-of-way with low-moderate visual contrast ratings. These occur along Links 30, 60, 70, 71, 72, 73, 74, 80, and 100. Low impacts to scenic quality would also occur at creek crossings where the proposed construction method is directional boring (Links 71 and 72).

Proposed specific mitigation, which includes reducing the construction right-of-way, bending the pipeline to break up the line of sight, and reducing vegetation disturbance, would result in a moderate impact

along Link 71 for one-tenth of a mile in variety Class A landscape (Cathedral Rock foothills). With specific mitigation, a moderate impact would result along Links 20, 50, and 70 to dispersed recreation users, viewpoints along Upper Red Rock Loop Road, and to residents along Oak Creek. By reducing the width of the right-of-way and the amount of vegetation disturbance, bending the pipeline, and replanting vegetation where applicable, a low-moderate impact would result along Links 30, 40, 74, and 80. Low impacts are predicted where construction activities are within a road and visibility potential is currently low (Links 60 and 70). Where directional boring construction methods would be used (portions of Links 71 and 72), a low impact would also result.

The southern routes are located primarily within the retention VQO. The anticipated high level of contrast created from the proposed project along Links 20, 40, and 50 would not be reduced through the application of mitigation and subsequently would not meet retention or partial retention VQOs. Links 30, 60, 70, and 71 have portions that do not meet the existing retention objective. With extensive mitigation, it has been determined that the areas of noncompliance would achieve a partial retention objective. Examples of extensive mitigation include relocating Link 71 lower on the side slope of Cathedral Rock Foothills resulting in reduced visibility, planting woody plant materials to break up strong lines created from landform and vegetation modification, and bending or jogging the pipeline to minimize extensive sight lines. The remaining southern links are located on private lands with no established VQOs, resulting in no identifiable impacts.

D. BIOLOGICAL RESOURCES

Affected Environment

The project area is characterized by a mix of woodland and grassland vegetation types on upland areas, well-developed riparian habitats along Oak Creek, a perennial stream, and limited riparian habitats along several ephemeral drainages that traverse the area. There are sparse to extensive urban developments along portions of the alternative routes. Portions of the area are undisturbed, providing habitat for a variety of plant and wildlife species. Appendix C provides detailed tables of the various plant and wildlife species in the area.

Special Status Species

Special status species are those species listed by USFWS as endangered, threatened, proposed, and candidates for such listing; Forest Service sensitive; or species of concern at the state level. There are 12 species of mammals, 16 species of birds, 5 reptiles and amphibians, 5 fish, 1 invertebrate, and 4 plants listed as potentially occurring in the area, but no federally listed threatened or endangered species are known to occur there.

Vegetation Types

Vegetation types within the study area include piñon-juniper woodlands and semi-desert grasslands in the northwestern portion, and chaparral associations throughout the northern, eastern, and southeastern

response to evapotranspiration. The area is prone to significant flooding. Chemical quality of the surface water is generally acceptable (McGavock and others 1986). Water quality in Oak Creek is affected by streamside recreation and tourist usage of some popular sites. High fecal coliform counts may occur as a result, typically at several sites during a portion of the summer (Owen-Joyce and Bell 1983). Oak Creek has been designated as a "unique waters of the United States" by the U.S. Army Corps of Engineers and is therefore subject to protection by the Clean Water Act which is administered jointly by the U.S. Army Corps of Engineers and Environmental Protection Agency. The Arizona Department of Environmental Quality must also review the project for compliance with state water quality standards. Links 70, 71, 72, 100, and 110 cross Oak Creek or a portion of the 100-year floodplain of Oak Creek. These areas are subject to intense flooding.

Environmental Consequences - Earth and Water Resources

No-Action Alternative - No impacts would occur with the no-action alternative.

Northern Routes (N1 and N2) - The northern alternatives generally cross areas that have been previously disturbed. Links 74, 80, 100, 110, and 120 include placement of the pipeline in roadway right-of-way or adjacent to rights-of-way which are previously disturbed. An option to Link 120 of the northern alternative, Links 10 and 130 would require placement of the pipeline for Link 10 in undisturbed soils. Links 110 and 130 would be redisturbed adjacent to the right-of-way of US 89A. Link 90 is an alternative to Link 80. Link 80 crosses areas where soils have a slightly higher erosion potential than Link 90; however, Link 90 crosses broad rock outcrop areas. With adherence to the mitigation measures, adverse impacts are expected to be minimal and short term. Impacts to areas previously undisturbed would initially be greater than those to areas that have been previously disturbed.

The northern alternatives would cross Oak Creek along a portion of Link 110. The pipeline crossing would be directionally bored under Oak Creek. With adherence to mitigation measures and subject to conditions of any required permits from the U.S. Army Corps of Engineers, Arizona Department of Environmental Quality, and Forest Service, no long-term adverse impacts are anticipated. Additional ground disturbance would result along Link 90, associated with alternative N2; however, implementation of appropriate mitigation measures are anticipated to reduce overall impacts to low.

Southern Routes (S1 and S2) - The southern alternative (S2), including Links 30, 60, 73, 74, 100, 120, and 130, primarily follow paved or graded roadways except portions of Links 70 and 90 also parallel roads. ~~Link 70 does not~~ An option to the southern alternative (S1) includes Links 20 and 50 instead of Links 30 and 60. Although the soil map units are similar for Links 20, 30, 50, and 60, Links 20 and 50 cross undisturbed areas and have steeper slopes. Link 72 is an~~other~~ option to Link 71. Links 72 and 71 cross under Oak Creek, so some soil disturbance is expected outside of the high water mark for the drilling and boring work area. Link 80 is an alternative to Link 90. Link 80 crosses areas where soils have a slightly higher erosion potential than Link 90 but Link 90 crosses broad rock outcrop areas. Soil disturbance in these links are gross estimates and subject to detailed engineering. ?

The southern alternatives would cross Oak Creek by either Link 71 or 72. The pipeline crossing would be directionally bored under Oak Creek. With adherence to mitigation measures such as recompacting soil, revegetation, boring under the creek, and subject to conditions of any required permits from the U.S.

Impacts are anticipated to be both short and ~~long-term~~ in nature and may affect the use of the area for spiritual enhancement and meditation purposes.

Potential mitigation measures that may reduce impacts to this type of use include notifying the public of the start date for construction activities, revegetation of the construction area, and limits to the amount of noise and other disturbance to the surrounding locations.

K. CUMULATIVE EFFECTS

Cumulative effects are the combined effects including both direct and indirect impacts, on a given ecosystem, regardless of what agency (federal or non-federal) or person is undertaking them. Cumulative impacts can result from individually minor, but collectively, significant actions taking place over a period of time (40 CFR 1508.7). Reasonably foreseeable future actions consist of projects, actions, or developments that can be projected with a reasonable degree of confidence to occur within a defined time frame and that will impact the same, or portions, of the same resources.

An analysis of cumulative impacts was performed for those resources that were found to have some long-term adverse effect on the environment.

The following steps were taken to analyze cumulative impacts for this proposed action:

1. The area of influence for the analysis of cumulative effects was defined for each resource to include the project study area.

2. The kinds of impacts for other past and existing actions were determined for each resource. The base year was selected as 1995, the year the EA was initiated. Past actions were evaluated for one to five years depending on the type of action or resource affected and the data available.

3. Other reasonably foreseeable future actions with potential impacts to the same resource categories were then identified and screened. Future actions were evaluated for their status and feasibility. The projected impacts of these actions were determined based on the best available information and through consultation with key planning agencies or the project proponent.

Additional anticipated development within the study area includes the following:

- proposed road and highway improvement projects
- additional residential and commercial development
- construction, expansion, and use of additional recreational trails
- continued growth and population increases in the Sedona area

The direct and indirect impacts, according to the specific resources evaluated during this assessment include the following:

- **Land Use Resources** - Impacts to land use resources are generally associated with the permanent re-allocation of public and private lands to utility right-of-way easements. These impacts are

CHAPTER 5 - CONSULTATION AND COORDINATION

The preparation of this EA required communication and coordination with various federal, state, and local agencies; environmental and citizen groups; industries; and citizens. The following list summarizes the agencies and individuals contacted during the preparation of the Sedona Pipeline Project EA.

Agencies, including the U.S. Army Corps of Engineers, Arizona Department of Environmental Quality, City of Sedona, and various special interest groups, were contacted to identify any issues or concerns which may be related to the future development of this project.

The general public, special interest groups, and agencies will continue to be consulted throughout this process.

In addition, U.S. WEST Communications has been contacted for the purposes of discussing the potential to bury existing overhead communication lines along certain portions of the route. This would result in an overall net improvement to the existing visual quality in the Sedona area.

Federal Agencies

Coconino National Forest

Ken Anderson, District Ranger, Sedona Ranger District
Bill Stafford, District Recreation Staff Officer, Sedona Ranger District
Judy Adams, NEPA Compliance Officer, Sedona Ranger District
Jim Beard, Forest Landscape Architect, Coconino National Forest
Jerry Bradley, Beaver Creek District Biologist, Coconino National Forest
Marietta Davenport, Forest Archeologist, Coconino National Forest
Janie Agyagos, Sedona District Biologist, Sedona Ranger District
Barbara Phillips, Forest Botanist, Coconino National Forest
Dave Lutz, Biologist, Coconino National Forest

U.S. Army Corps of Engineers

Larry Flatau, Biologist, Los Angeles District
Cindy Lester, Chief, Arizona Section

U.S. Fish and Wildlife Service

Sam Spiller, Field Supervisor
Don Henry, Biologist

February 1995

FACT SHEET

Sedona Pipeline Project Environmental Assessment

Project Description

The Coconino National Forest, Sedona Ranger District will be directing the preparation of a third-party environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to analyze the potential impacts related to the construction and operation of the proposed Sedona Pipeline Project. A majority of the proposed alignment for the pipeline crosses Forest Service lands. Therefore, the Forest Service will serve as the lead federal agency for the NEPA process. Citizens Utilities Company (CUC) is proposing to build approximately four miles of underground natural gas pipeline beginning in western Sedona near the intersection of Bristlecone Pine Road and Dove Wing Road north of Highway 89A and terminating east of Pine Knolls Drive in the Son Silver West residential area east of Highway 179. The proposed natural gas pipeline will be six inches in diameter and buried approximately four feet underground throughout its entire length. An approximate 50-foot width will be required for construction. The purpose of the pipeline is to provide additional transfer of natural gas to eastern and southern Sedona. This project will also enable CUC to improve existing service in the eastern and southern Sedona areas and other nearby residential and commercial locations.

Appropriate federal, state, county, and local agencies; and public interest groups will be contacted and consulted throughout the EA process. The objectives of the EA and related activities will be to study and assess the potential impacts of the proposed project on various environmental resources including biological (e.g., threatened or endangered species), cultural, visual, land use, socio-economic, geology, soils, and water.

The accompanying map shows the proposed project study area and potential routes selected for further evaluation.

Public Participation and Environmental Analysis Process

The process of conducting environmental and engineering studies to identify a suitable location for the project is ongoing. Studies are being conducted in cooperation with the Forest Service to determine the location of corridors suitable for this type of use. Potential pipeline corridors have been identified. However, more information is needed from the public; federal, state, and local agencies; and potentially affected landowners.

The EA will be prepared by Dames & Moore, an environmental consulting firm, under the direction of the Forest Service. Environmental studies are currently being conducted to identify and evaluate the proposed action and alternatives for the project, including a "no-action" alternative.

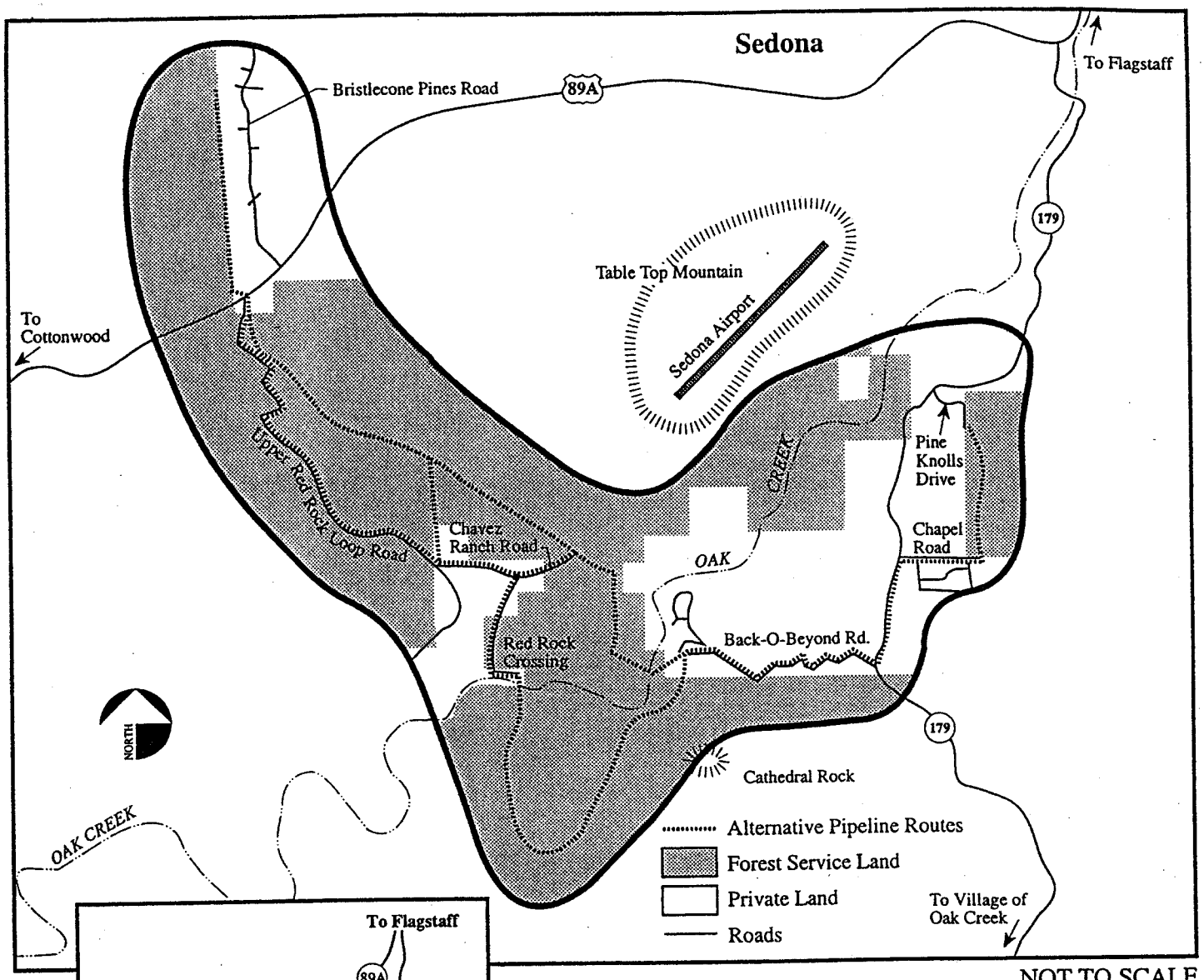
The purpose of this fact sheet is to give you an opportunity early in the project to participate in the development of the EA and to comment on the proposed project. Comments on this project must be received by March 24, 1995. A self-addressed comment form is enclosed with this fact sheet. Please provide any comments you have on the project. Include any issues or opportunities you feel are relevant to this project.

In addition to this fact sheet, a public scoping meeting will be held to discuss the proposed project and the EA. This meeting will be an open house to be held at the following time and location:

March 7, 1995
4:30 p.m. to 7:30 p.m.
Wayside Chapel
401 N. Highway 89A
Sedona, Arizona

We look forward to your comments. If you need additional information or if you have questions concerning the project, please contact

Lauren Weinstein or
Niklas Ranta
Dames & Moore
(602) 371-1110 or
Judy Adams
Sedona Ranger District
USDA Forest Service
(602) 282-4119



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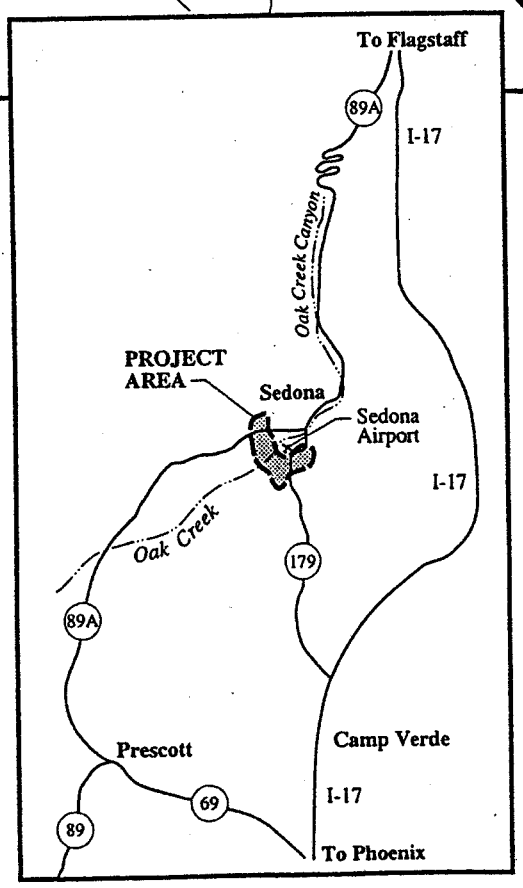


PROJECT AREA MAP

Sedona Pipeline Project Environmental Assessment

June 1995

NEWSLETTER

Sedona Pipeline Project Environmental Assessment

The purpose of this newsletter is to provide an update and review of the proposed Sedona Pipeline Project. The map located on the back of this newsletter displays the project area and locations of project alternative routes being studied.

Results of Scoping

In January 1995, the Coconino National Forest and Citizens Utilities Company (CUC) initiated the preparation of an environmental assessment in compliance with the National Environmental Policy Act to analyze the potential impacts related to the construction and operation of the proposed Sedona Pipeline Project. A public and agency scoping process was initiated in February to solicit public comments on the proposed project. The two major issues and concerns identified during the public scoping period include:

- ***impacts to visual quality and aesthetics in the Sedona area***
- ***proliferation of utility corridors on national forest lands in the Sedona area***

Additional issues and concerns include impacts to biological resources (threatened and endangered species, habitats); irreversible land use allocation to utility uses; and potential development as a result of pipeline construction.

It was also suggested by some that Highway 89A and 179 through west Sedona be considered as an alternative route. In response to public comment and re-evaluation of system requirements, engineering and feasibility studies are currently being conducted on the Highway 89A and 179 corridor.

CUC engineers and managers have carefully evaluated the overall need for the project and determined that the completion of "looped" pipeline systems in Sedona and the Verde Valley is necessary to increase and maintain a high level of reliability of natural gas supply in these areas. A high pressure loop system linking western and eastern Sedona is needed so that pipeline segments can be taken out of service for routine maintenance and during emergency situations such as natural disasters (i.e., floods) or due to third-party damage (i.e., accidental"dig in"). The Sedona Pipeline Project would provide the connection between the existing 4-inch supply pipeline entering Sedona from the west and a planned gas supply pipeline that will approach Sedona from the south (coming from Middle Verde). The Sedona Pipeline Project is intended to:

- ***construct a geographically separated "high pressure supply system loop" to serve the communities, including Sedona, in the Verde Valley***
- ***improve existing gas service in the Sedona area***
- ***increase system capacity and reliability for the Sedona and Verde Valley areas***

Project Description

The proposed pipeline would begin in western Sedona near the intersection of Dove Wing and Bristlecone Pine roads and would terminate on the west side of Highway 179 north of Morgan Wash approximately one-half mile north of Bowstring Drive. Existing linear features as well as new corridors were identified as potential pipeline alternative routes.

CUC studies indicate that the existing natural gas system in Sedona will not be capable of supplying customers with continuous service this winter. The proposed pipeline will solve the immediate capacity shortage and will provide for any future growth of the area.

The proposed project requires the construction of approximately 4 miles of underground natural gas pipeline. The pipeline will consist of a 6-inch-diameter steel pipe buried approximately 4 feet underground throughout its entire length. The potential creek crossing would be completed by boring, rather than trenching, underneath the creek itself to limit the disturbance at the creek banks. CUC has requested a 20-foot-wide permanent easement for pipeline operation and maintenance, and may require up to an additional 30 feet of temporary construction easement in certain places during the construction phase of the project only. In areas sensitive to disturbance, construction right-of-way width may be reduced to decrease the area of disturbance.

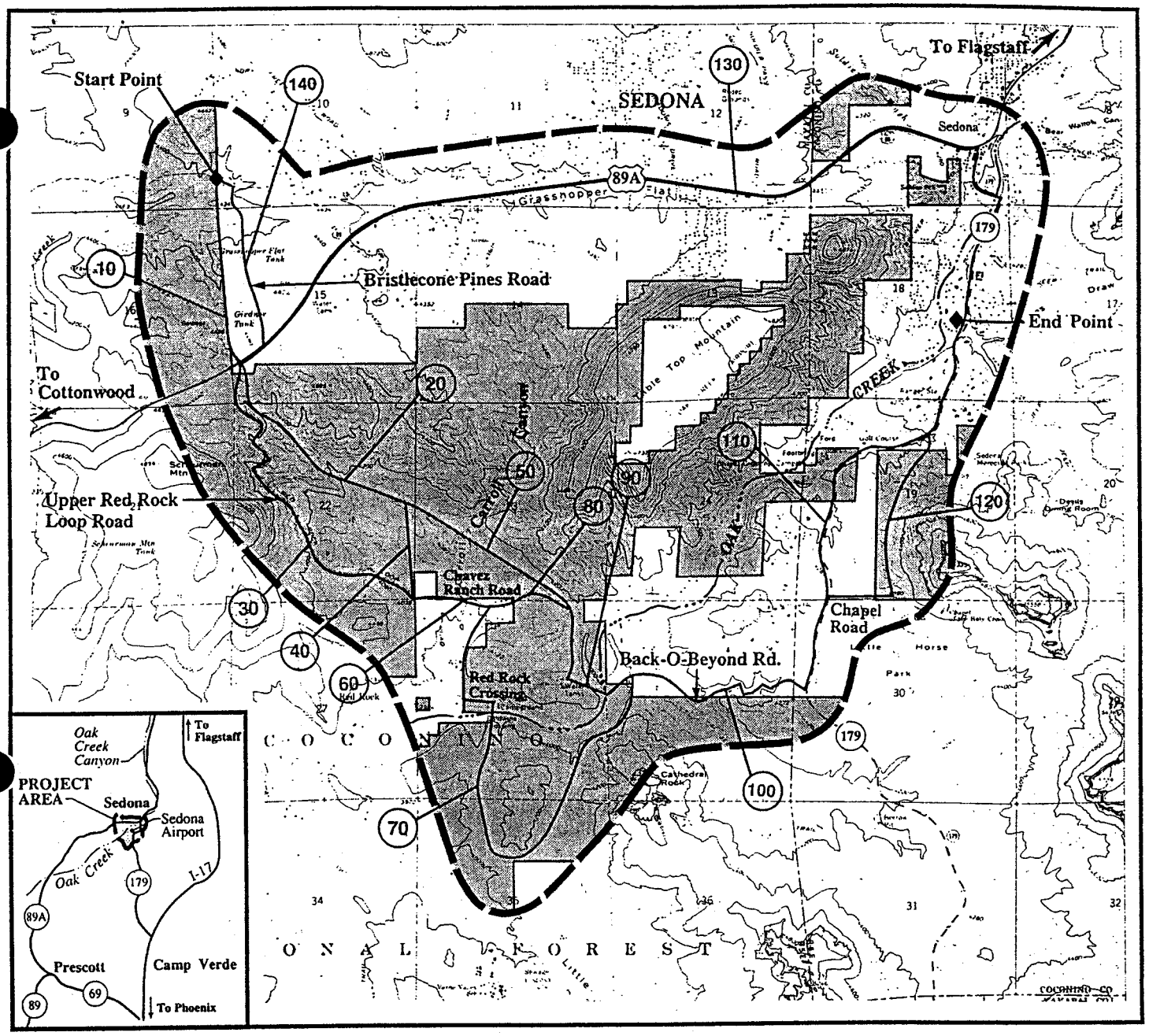
The Coconino National Forest continues to request comments on the proposed pipeline project. If you or someone you know would like to comment on the project, please call or write to:

Lauren Weinstein or
Niklas Ranta
Dames & Moore
(environmental consultant)
7500 N. Dreamy Draw Drive,
Suite 145
Phoenix, Arizona 85020
(602) 371-1110

For specific information regarding Coconino National Forest and Citizens Utilities, please write to:

Bill Stafford
Coconino National Forest
Sedona Ranger District
P.O. Box 300
Sedona, Arizona 86339-0300

Rob Franson
Citizens Utilities Company
P.O. Box 1448
Flagstaff, Arizona 86002



Study Area Map

Sedona Pipeline Project Environmental Assessment

Private

National Forest

(20) Link Number (identifies alternative route segments)

NORTH

0 1/2 1 2

Scale in miles

Lauren Weinstein
James & Moore
7500 N. Dreamy Draw Drive,
Suite 145
Phoenix, Arizona 85020

PUBLIC MEETING NOTICE

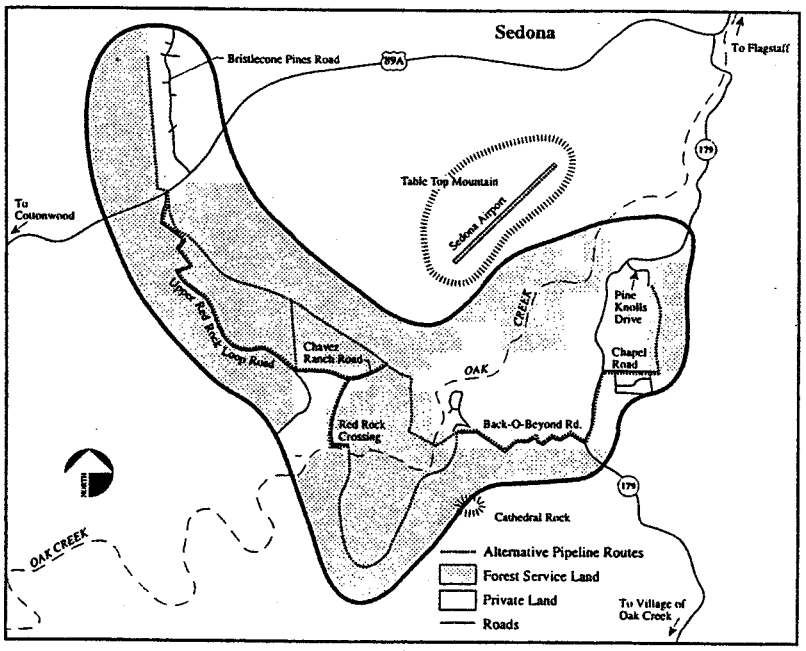
Sedona Pipeline Project Environmental Assessment

The Coconino National Forest, Sedona Ranger District is seeking public input on the preparation of an environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to analyze the potential impacts related to the construction and operation of the proposed Sedona Pipeline Project. A majority of the proposed alignment for the pipeline crosses Forest Service lands. Therefore, the Forest Service will serve as the lead federal agency for the NEPA process. Citizens Utilities Company (CUC) is proposing to build approximately four miles of underground natural gas pipeline beginning in western Sedona near the intersection of Bristlecone Pine Road and Dove Wing Road north of Highway 89A and terminating east of Pine Knolls Drive in the Son Silver West residential area east of Highway 179. The proposed natural gas pipeline will be six inches in diameter and buried approximately four feet underground throughout its entire length. The purpose of the pipeline is to provide additional transfer of natural gas to eastern and southern Sedona and improve existing service in the eastern and southern Sedona areas and other nearby residential and commercial locations.

A public meeting will be held to give you an opportunity to comment on the proposed project.

Open House – March 7, 1995
4:30 p.m. to 7:30 p.m.
Wayside Chapel
401 N. Highway 89A
Sedona, Arizona

Questions and Comments by:
March 24, 1995
Lauren Weinstein or Niklas Ranta
Dames & Moore
(Environmental Consultants)
7500 N. Dreamy Draw Drive, Ste. 145
Phoenix, Arizona 85020
or Judy Adams
Sedona Ranger District
USDA Forest Service
250 Brewer Road
Sedona, Arizona 86339



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FEBRUARY 1995

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TECHNICAL REPORT
FOR THE
SEDONA PIPELINE PROJECT

VISUAL RESOURCES

DRAFT

December 14, 1995

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VISUAL RESOURCES

INTRODUCTION

To expand the capacity and reliability of the existing natural gas distribution system in the Sedona area, the Citizens Utilities Company (CUC) is proposing to construct approximately eight miles of pipeline, the Sedona Pipeline Project. There are four proposed routes for the new pipeline, all of which traverse Forest Service land at one point or another. In compliance with the National Environmental Policy Act of 1969 (NEPA), an environmental assessment (EA) is being prepared to determine the potential environmental impacts, if any, of the project. As part of the EA process, a visual resource study was conducted to evaluate the inherent scenic values of the landscape, public values of viewing the landscape, and sensitivity to visual intrusions that could result from the construction, operation, and maintenance of the proposed project. This technical report provides a discussion of the study methods, models, and results used for the evaluation of the visual resources along the proposed alternative routes identified by CUC and the Forest Service.

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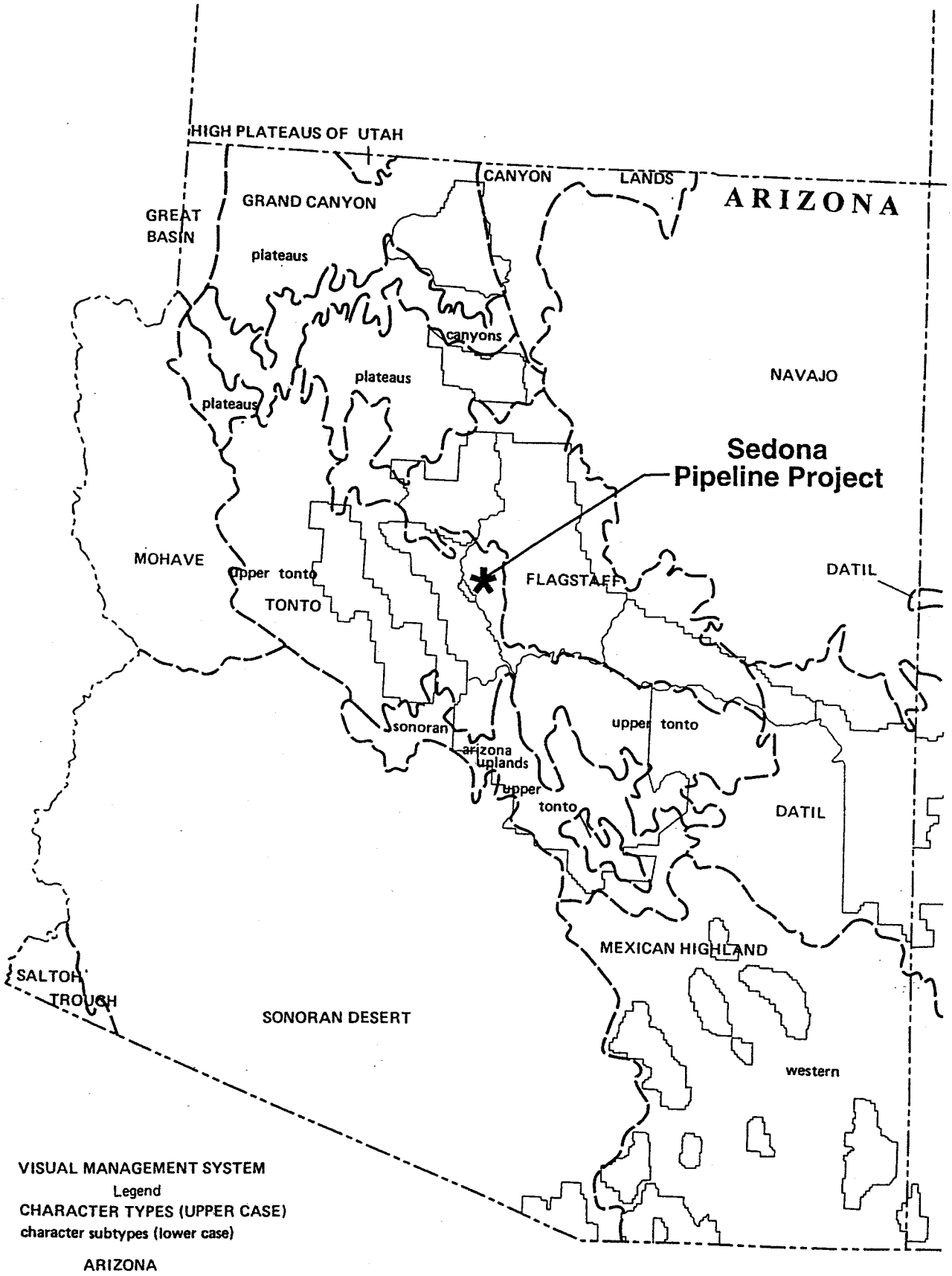
Study Area Overview

Physiography

The Sedona Pipeline Project is located within the southern edge of the Colorado Plateau in Arizona (Figure 1). Specifically, the project alternatives are located in the Coconino National Forest and through the City of Sedona. The landscape is characteristic of the Upper Tonto (Fennemen 1931). The valley is visually dominated by dissected red sandstone cliffs including Cathedral Rock, which rises several thousand feet above the valley floor. Terrain is rolling and covered primarily with piñon-juniper vegetation. Oak Creek Canyon is unique to the region and includes extensive riparian areas consisting of stands of coniferous and deciduous trees.



UPPER TONTO PROVINCE SECTION

Figure 1

Issues

Visual issues located within the alternative study corridors include the following:

- Residences—potential views from residences
- Recreation—potential views from existing and proposed parks, dispersed recreation, and day use areas
- Travel routes—potential views from highways, scenic loops, and state routes (e.g., US Highway 89A, State Route (SR) 179, Upper Red Rock Loop Road)
- Scenic quality—impacts influencing landscapes that have a significant diversity of features and are considered as having the greatest level of aesthetic appeal
- Visual resource management—determining whether or not the resulting contrast of the project meets Forest Service Visual Quality Objectives (VQOs)

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Study Personnel

The visual resource study team consists of landscape architects and resource analysts from Dames & Moore, as well as Mr. Jim Beard, Coconino Forest Landscape Architect, who serves as advisor for the visual studies. Below are brief biological sketches of the key Dames & Moore personnel working on this project.

Mr. Tim Tetherow is a special senior advisor for the visual resource study, including review of the visual resources inventory and impact assessment methodologies. With more than 20 years of experience, Mr. Tetherow has developed various methodologies for integration of visual resource values and visual simulations into Dames & Moore's interdisciplinary decision-making process for compliance with NEPA.

He has prepared approximately 40 visual resource studies for energy facilities, mining, transportation programs, and other linear corridors. He has a masters degree in landscape architecture from the University of Pennsylvania.

Mr. Paul Trenter is the principal investigator for the visual resource study. Mr. Trenter has conducted or reviewed over 20 visual resource studies pertaining to linear projects requiring NEPA compliance. His primary responsibility for this project is data accuracy and quality control. He holds a bachelor of science degree in landscape architecture from the University of Wisconsin.

Mr. Jason Pfaff was investigator and analyst for the visual resources study. His responsibilities included data collection, field review of existing visual conditions, agency contacts, and impact assessment methodology. Mr. Jason Pfaff holds a bachelors degree in landscape architecture from the University of Idaho.

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INVENTORY

Methods

Methods used in conducting the visual resource inventory included site visits and review of secondary data. A baseline inventory was established to identify scenic resources within a one-mile-wide study corridor, and significant viewpoints beyond the study corridor (such as Red Rock State Park and Schnebly Hill Road) were also identified and inventoried.

Most of the lands within the alternative study corridors are either private or Forest Service lands. For Forest Service administered lands, the visual inventory focused on direction provided by Coconino National Forest Plan (1987). Visual resource data were collected from the Forest Service, including variety classes, visual sensitivity, and VQOs.

There are no formal guidelines for managing visual resources on private lands. Available land planning documents were reviewed to identify any policies or guidelines for visual resources, but in the absence of formal guidelines the visual inventory focuses on landscape scenery and visual sensitivity associated with residential development, recreation areas, and travel routes.

Chapter 1 of the *Forest Service Visual Management System* (Forest Service 1974) served as the basis for developing a consistent methodology for the visual resources inventory and for assessing potential visual impacts of the alternatives on the study corridors.

The visual resource inventory consists of the following three major components:

- Variety Classes
- Visual Sensitivity
- VQOs

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As a result of varying scales and detail of mapping for visual resources, the methodology for inventory was designed to utilize and build upon existing agency information. Areas not previously evaluated were inventoried to a consistent level of detail throughout the alternative study corridors. This database can be used to assess impacts of each alternative at an equal level of detail.

The following sections define visual resource terminology and describe the specific inventory methods used for gathering, compiling, or deriving each of the inventory components listed above.

Variety Classes

The first component of the visual resource inventory is the variety class inventory. The purpose of the variety class inventory is to establish a consistent database describing the inherent scenic and aesthetic values of the landscape. The analysis of the scenic value of the landscape began by examining the region's physiography. Fenneman's *Physiography of the Western United States* (1931), *Landscape*

Character Types of the National Forest in Arizona and New Mexico (Forest Service 1989), and other related literature were reviewed to determine the general visual character of landscapes within the alternative study corridors.

Variety classes have been determined previously by the Forest Service by classifying the landscape into different degrees of variety. This classification determines those landscapes that are most important and those of lesser value from the standpoint of scenic quality. The classification is based on the premise that all landscapes have some aesthetic value, but those with the most variety or diversity have the greatest potential for high scenic value (e.g., Cathedral Rock). The three Forest Service variety classes are A, B, and C, with Class A having the most variety. The Forest Service does not inventory or establish variety class ratings for private areas, but for this study, private areas were given a rating of U (urban). Table 1 describes the variety class definitions.

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TABLE 1
VARIETY CLASS DEFINITIONS

Variety Classification	Forest Service Variety Classes
Class A	Areas where features of landform, vegetation patterns, water forms, and rock formations are of outstanding or unusual visual quality. These features exhibit considerable variety in form, line, color, and texture.
Class B	Areas where features contain variety in form, line, color, and texture or combinations thereof, but which tend to be common throughout the character types and are not outstanding in visual quality.
Class C	Areas with minimal variety, if any, in form, line, color, and texture.
Class U (Urban Areas)	Not an official Forest Service classification; however, for purposes of this study it is a rating given to private lands. Form, line, color, and texture have been changed by the addition of structures, roads, and new plantings not natural to the surrounding landscapes.

For purposes of this study, variety classes were separated into individual homogeneous landscape types, or detailed descriptive landscape units that are identified by their unique landscape features. For the inventory and analysis of landscape types within the study area for this project, a landscape type inventory sheet was developed to document the variety class, the landscape type, and the elements that reference

unique homogeneous features. Appendix A provides a description and a discussion of the individual landscape types. The Forest Service has developed specific criteria to evaluate variety classes for landscape settings in Arizona and New Mexico, documented in *Landscape Character Types of the National Forests in Arizona and New Mexico* (Forest Service 1989). These criteria were used for all public lands and nonurban areas. In addition, landscape types and variety class descriptions already established by the Forest Service were used to determine visual contrasts discussed in the impact assessment/mitigation section of this technical report. Figure 2 shows the location of these established Forest Service variety classes and derived landscape types.

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Visual Sensitivity

The second component of the visual resource inventory, visual sensitivity, is a measure of viewer concern for visual resources and potential changes to the landscape. For the Sedona Pipeline Project, existing Forest Service data were used where possible and in private areas where Forest Service data were not available, they were gathered using the same methodology. The result is a visual sensitivity database, inventoried and evaluated at an equal level for all types of land. The visual sensitivity inventory consisted of three components:

- key viewpoints
- viewer sensitivity
- project visibility

The following is a description of each component in detail.

Key Viewpoints

Key areas from which the project would potentially be viewed within the study area were identified and inventoried. Significant viewpoints beyond the study area, such as Red Rock State Park and Schnebly

Hill Road, were also inventoried. Viewpoints within the study corridor were identified through personal contacts with the Forest Service and the City of Sedona, as well as a review of land use and cultural data. Viewpoints considered include the following:

- Residences—potential views for residences
- Recreation—e.g., existing and proposed parks, dispersed recreation, and day use areas
- Travel Routes—e.g., US Highway 89A, SR 179, Upper Red Rock Loop Road
- Cultural Sites—e.g., national register sites or districts, potential interpretive sites

Location of these sensitive viewpoints are shown on the corresponding land use maps—Existing Land Uses (Figure 3), and Future Land Uses (Figure 4). Visual sensitivity for these viewpoints was evaluated and rated using established Forest Service criteria (see Viewer Sensitivity). Appendix B lists the individual viewpoints identified for the Sedona Pipeline Project.

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Viewer Sensitivity

The Forest Service Visual Management System (VMS) defines visual sensitivity as a measure of viewer concern for the scenic resources and potential changes to the resource. Although there is no established method to rate viewer sensitivity on private lands, the approach for this study is to use Forest Service methodology to rate private lands, thereby maintaining consistency throughout the project area.

Sensitive viewpoints were identified and located based on discussions and mapped information provided by public agencies, interest groups, and private concerns as appropriate. Discussions with the Coconino National Forest landscape architect provided information for determining viewer sensitivity. The criteria used to assign an overall visual sensitivity level to potential viewpoints included user attitude and user volume.

POTENTIAL IMPACTS TO SCENIC QUALITY							
Link	Scenic Quality			Visual Contrast	Initial Impact	Recommended Mitigation*	Residual Impact
	A	B	U				
10		0.9		Strong	M-H	1,5,7,8	M
10			0.1	Strong	M	5	L-M
20		1.1		Strong	M-H	1,5,7,8	M
20			0.1	Strong	M	5	L-M
30		1.7		Moderate	M	1,3,4,5,8	L-M
30			0.1	Moderate	L-M	1,3,4,5,8	L
40		0.5		Moderate-Strong	M-S	1,5,7,8	L-M
50		0.8		Strong	M-H	1,5,7,8	M
50			0.1	Strong	M-H	1,5,7,8	M
60			0.6	Weak	L		L
70		0.6		Weak	L		L
70		0.2		Strong	M-H	1,3,4,5,6,8	M
71		0.3		Strong	M-H	1,4,5,6,8	M
71	0.2			Weak	L	9	L
72			0.4	Moderate	L		L
72	0.2			Weak	L	9	L
73			0.6	Weak	L		L
74			0.5	Moderate	L	1,3,4	L
80			0.9	Moderate	L	1,3,4	L
80		0.3		Moderate	L-M	1,3,4	L
90			0.4	Moderate	L	3	L
90		0.9		Strong	M-H	1,5,7,8	M
100			0.6	Moderate	L-H	1,3,4	L
110			4.3	Weak	L		L
110			0.6	Moderate	L-M	1,3,4	L

*Refer to page 32 for mitigation description.

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POTENTIAL IMPACTS TO SCENIC QUALITY							
Link	Scenic Quality			Visual Contrast	Initial Impact	Recommended Mitigation*	Residual Impact
	A	B	U				
110	0.1			Weak	L	9	L
110		0.4		Weak	L		L
120			1.0	Weak-Moderate	L	1,3,4	L
130			0.2	Weak	L		L

*Refer to page 32 for mitigation description.

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POTENTIAL IMPACTS TO VIEWERS SUMMARY									
Link	Types of Viewers	A	B	U	Visibility Potential	Visual Contrast	Initial Impact	Recom-mended Mitiga-tion*	Residual Impacts
10	US 89A, residences, proposed cultural park		0.9		High	Moderate-Strong	M-H	1,2,5,7,8	M
10	US 89A, residences, proposed cultural park			0.1	High	Strong	M-H	2,5,7,8	M
20	Upper Red Rock Loop Road, Upper Red Rock Loop Road Vista, residences/ dispersed recreation		1.1		Moderate	Strong	M-H	2,5,7,8	M
20	Upper Red Rock Loop Road, Upper Red Rock Loop Road Vista, residences/ dispersed recreation			0.1	Moderate	Strong	M-H	2,5,7,8	M
30	Upper Red Rock Loop Road, Upper Red Rock Loop Road Vista, residences		1.7		High	Moderate	M	3,5,6,7,8	L-M
30	Upper Red Rock Loop Road			0.1	High	Moderate	M	3,5,6,7,8	L-M
40	Upper Red Rock Loop Road, Upper Red Rock Loop Road Vista, Residences		0.5		Moderate-Strong	Moderate-Strong	M	2,5,7,8	L-M
50	Upper Red Rock Loop Road, Red Rock Crossing, residences		0.8		Moderate	Strong	M-H	2,5,7,8	M
50	Upper Red Rock Loop Road, Red Rock Crossing, residences			0.1	Moderate	Strong	M-H	2,5,7,8	M
60	residences, Chavez Ranch Road				High	Weak	L		L
60	Red Rock Crossing			0.6	Low	Weak	L		L

*Refer to page 32 for mitigation description.

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POTENTIAL IMPACTS TO VIEWERS SUMMARY									
Link	Types of Viewers	A	B	U	Visibility Potential	Visual Contrast	Initial Impact	Recom-mended Mitiga-tion*	Residual Impacts
70	Red Rock Crossing, residences, Cathedral Rock Trail (unknown designation)		0.5		Low	Weak	L		L
70	Red Rock Crossing, residences, Cathedral Rock Trail (unknown designation)		0.2		Moderate	Strong	M-H	1,2,3,4,5,6, 7,8	M
71	Dispersed recreation, residences, Cathedral Rock Trail & Vortex (unknown designation)		0.3		Moderate	Strong	M-H	2,5,7,8	M
71	Dispersed recreation, Red Rock Crossing, residences, Cathedral Rock Trail & Vortex (unknown designation)	0.2			Low	Weak	L	9	L
71	Dispersed recreation, residences, Cathedral Rock Trail & Vortex (unknown designation)	0.1			Moderate	Strong	H	1,2,4,5,6,7, 8	M
72	Red Rock Crossing, residences, Cathedral Rock Trail & Vortex (unknown designation)			0.4	Moderate	Weak	L		L
72	Red Rock Crossing, residences, Cathedral Rock Trail & Vortex (unknown designation)	0.2			Low	Weak	L		L
73	residences of Back-O-Beyond Road, residences			0.6	Moderate	Weak	L		L
74	SR 179			0.5	High	Moderate	M	2,3,5,7,8	L-M

*Refer to page 32 for mitigation description.

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POTENTIAL IMPACTS TO VIEWERS SUMMARY									
Link	Types of Viewers	A	B	U	Visibility Potential	Visual Contrast	Initial Impact	Recom-mended Mitiga-tion*	Residual Impacts
80	SR 179, residences, commercial views, Chavez Campground, and Paco Diablo			1.2	High	Moderate	M	2,3,5,7,8	L-M
90	SR 179, residences along Chapel Road			0.4	High	Weak-Moderate	L-M	3	L-M
90	residences		0.9		Moderate	Strong	M-H	2,5,7,8	M
100	SR 179			0.6	High	Weak-Moderate	M	2,3,5,7,8	L-M
110	SR 179, US 89A			4.3	High	Weak	L	2,3,5,7,8	L-M
110	SR 179			0.6	High	Moderate	M	2,3,5,7,8	L-M
110	SR 179	0.1			Low	Weak	L	9	L
110	US 89A		0.4		High	Weak	L	3	L
120	Residences of Back-O-Beyond Road			1.0	High	Weak-Moderate	L-M	3	L-M
130	US 89A			0.2	High	Weak	L		L
*Refer to page 32 for mitigation description.									

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COMPATIBILITY TO VQO						
Link	VQO Class	Miles	Initial Visual Contrast	VQO Compliance	Recommended Mitigation*	VQO Compliance After Mitigation
10	R	0.9	Strong	No	1,2,5,7,8	no
10	U	0.1	Strong	Private	—	private
20	R	1.1	Strong	No	1,2,5,7,8	no
20	U	0.1	Strong	Private	—	private
30	U	0.1	Moderate	Private	—	private
30	R	1.7	Moderate	No	3,4,5,7,8	yes/no
40	R	0.5	Moderate-Strong	No	1,2,5,7,8	no
50	R	0.8	Strong	No	1,2,5,7,8	no
60	U	0.4	Weak	Private	—	private
60	R	0.2	Weak	Yes		yes
70	R	0.2	Strong	No	1,2,3,4,5,6,7,8	yes/no
71	R	0.2	Weak-Moderate	Yes	9	yes
71	R	0.3	Strong	No	1,2,4,5,6,7,8	yes/no
71	R	0.1	Strong	No	1,2,4,5,6,7,8	yes/no
72	U	0.4	Moderate-Strong	Private	—	—
72	R	0.2	Weak-Moderate	Yes	9	yes
73	U	0.6	Weak	Private	—	—
74	U	0.5	Weak	Private	—	—
80	U	0.9	Weak-Moderate	Private	—	—
80	R	0.3	Weak-Moderate	No	3,4,5,7,8	yes
90	U	0.4	Weak Moderate	Private	—	—
90	R	0.9	Strong	No	1,2,5,7,8	no
100	U	0.6	Weak-Moderate	Private	—	—
110	R	0.4	Weak	Yes	9	yes
110	U	4.6	Weak	Private	—	—
120	U0	1.0	Weak-Moderate	Private	—	—
130	U	0.2	Weak	Private	—	—

*Refer to page 32 for mitigation description.

DRAFT

DENNIS L. LOPEZ
& ASSOCIATES

APPRAISAL REPORT

PARCEL:	408-13-025
OWNER:	Deshon and Jane Vojnovich
LOCATION:	775 Back 'O Beyond Road, Sedona, Arizona
TYPE:	Vacant Residential Land
PROJECT:	Natural gas pipeline and fiber optics easement
DATE OF VALUATION:	April 8, 1996
APPRAISERS:	Dennis L. Lopez, MAI, SRA Craig D. Anderson, SRA
OUR FILE NO.:	960145

DENNIS L. LOPEZ & ASSOCIATES
REAL ESTATE APPRAISERS AND CONSULTANTS

July 19, 1996

Mr. Lex Smith
Brown and Bain
2901 North Central Avenue
Phoenix, Arizona 85012-2788

RE:	Assignment:	Valuation of Partial Acquisition
	Project:	Natural gas pipeline and fiber optics easement
	Parcel:	408-13-025
	Owner:	Vojnovich
	Location:	775 Back 'O Beyond Road, Sedona, Arizona
	Our File No.:	960145

Dear Mr. Smith:

Pursuant to your request, we inspected and appraised the above referenced property, for the purpose of estimating the market value of the fee simple interest, assuming a cash transaction, as of the date of valuation April 8, 1996, in order to estimate the value of the proposed partial acquisition for a natural gas pipeline and fiber optics easement. A value for the temporary construction easement, assuming a monthly payment for the use of the land, was estimated as well. The accompanying report is to be used by the Citizens Utilities, Arizona Gas Division, for eminent domain purposes.

Although the property is improved with a single-family residence and related improvements, the attached appraisal includes only a valuation of the underlying land. The proposed acquisition will involve only land and natural growth and will not benefit or detract from the marketability of the primary improvements.

The opinion of value rendered in the accompanying report is subject to the following:

- The proposed partial acquisition will encumber a portion of an existing ingress/egress easement belonging to two adjoining property owners. At the client's request, we have ignored the effect of the ingress/egress easement in the valuation of the partial acquisition.

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- The assumptions, limiting conditions, certification, and market value definition set forth in the body of the report
- This appraisal was performed without pressure from anyone desiring a specific value. Our current or future employment was not conditioned upon the appraisal producing a specific value or a value within a given range
- Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraiser or the firm with which he is connected, nor any reference to the *Appraisal Institute*) shall be disseminated to the public through advertising media, public relations media, news media, sales media, or any other public means of communication without prior written consent and approval of the undersigned.

During the course of the appraisal and analysis, we became thoroughly familiar with the subject property and its location. For the purpose of estimating the market value of this property, we inspected the public records, examined and analyzed numerous sales of similar properties in the immediate and competing areas and spoke with well-informed persons familiar with real estate values.

Based on the information found in our investigation, coupled with our professional analysis, it is our opinion that the market value of the proposed easement acquisition, as of the date of valuation, April 8, 1996, was:

FIVE THOUSAND SIX HUNDRED EIGHTY DOLLARS

($5,680)

The value of the temporary construction easement was estimated to be **$153.00** per month.

Summary

Estimated Value of the Whole Parcel	$1,082,000				
Acquisition as Part of the Whole	($ 5,680)				$ 5,680
Remainder Before the Acquisition	$1,076,320	$1,076,320			
Remainder After the Acquisition Before Special Benefits		($1,076,320)			
Preliminary Severance Damages		$ 0	$ 0		
Remainder After the Acquisition After Special Benefits		($1,076,320)			
Special Benefits		$ 0	$ 0		
Preliminary Severance Damages			$ 0	$ 0	
Cost-to-cure				($ 0)	$ 0
Net Severance Damages				$ 0	$ 0
Minor Improvements					$ 0
Estimated Value of Partial Acquisition					**$ 5,680**
Temporary Construction Easement	**$153.00** per month				

The opportunity to assist you has been appreciated.

Respectfully submitted,

Dennis L. Lopez, MAI, SRA
Certified General Real Estate Appraiser
State of Arizona
Certificate No. 30189

Craig D. Anderson, SRA
Certified General Real Estate Appraiser
State of Arizona
Certificate No. 30383

DLL:cda

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APPENDIX

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UNDERLYING ASSUMPTIONS AND CONTINGENT CONDITIONS

1. The information furnished by the property owner, agent, management or the client is correct as received.

2. The legal description obtained by the appraiser was assumed correct and descriptive of the subject property. No responsibility is assumed for the legal description provided or for matters including legal or title considerations. A survey and title report should be obtained to verify its accuracy.

3. No site survey was provided to the appraiser, unless referenced in this particular appraisal report. The estimated site area was assumed to be correct.

4. All furnishings and equipment (or other personal property), except those specifically indicated and/or typically considered as a part of real property (under common accepted definitions) have been disregarded in this valuation. Only the real estate, as permanently affixed to the subject site, has been valued herein.

5. No hidden or unapparent conditions of the property, subsoil, or structures that render it more or less valuable were assumed to exist. No responsibility is assumed for such conditions for arranging engineering studies that may be required for their discovery.

6. Subsurface rights (mineral, oil, etc.) and their potential impact upon value were not considered in this appraisal, unless stated otherwise.

7. It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined and considered in the appraisal report.

8. The utilization of the land by the improvements is assumed to be within the boundaries or property lines described and that no encroachments exists unless otherwise noted in the report.

9. The subject property is assumed not to be in violation of any government regulations or laws pertaining to the environment.

10. Unless otherwise stated in this report, the existence of hazardous material, which may or may not be present on the property, was not observed by the appraiser. The appraiser has no knowledge of the existence of such materials on or in the property. The appraiser, however, is not qualified to detect such substances as asbestos, PCB transformers, urea-formaldehyde foam insulation, or other toxic,

hazardous, or contaminated substances and/or underground storage tanks (containing hazardous materials). The value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value. No responsibility is assumed for any such conditions, or for any expertise or engineering knowledge required to discover them.

Should the client have a concern over the existence of such substances, he or she is urged to retain the services of a qualified independent environmental specialist to determine the extent of the contamination, if any, and the cost of treatment or removal. The cost of detection, treatment or removal and permanent storage must be borne by the client or owner of the property. This cost can be deducted from the estimate of market value of the subject property if requested by the client.

11. The title to the property is assumed to be marketable and free and clear of all liens.

12. The fee simple estate in the property contains the sum of all fractional interests which may exist.

13. The property is appraised as if owned in fee simple title without encumbrances, unless otherwise mentioned in this report.

14. Responsible ownership and competent management is assumed to exist for the subject property.

15. The appraiser is not responsible for the accuracy of the opinions furnished by others and contained in this report, nor is he responsible for the reliability of government data utilized in the report.

16. The values assigned to the improvements shown in this report are in proportion to the contribution they make to the value of the property as a whole. The separate estimates of value for the land and building must not be used in conjunction with any other appraisal and are invalid if so used, or if used separately.

17. The compensation for appraisal services rendered is dependent only upon the delivery of this report and that it is not contingent upon the values estimated.

18. This report is not considered a legal document and the appraiser assumes no responsibility for matters of a legal nature.

19. The appraiser is not required to testify regarding this report in deposition or in court unless arrangements were previously made.

20. Neither this report, nor any of its contents, may be used for the sale of shares or similar units of ownership in the nature of securities, without specific prior approval of the appraiser. No part of this appraisal may be reproduced in any promotional materials without the permission of the appraiser.

21. The appraiser cannot predict or evaluate the possible effects of future wage or price control actions of the government upon rental income or financing of the subject property; hence, it is assumed that no controls will apply which would nullify contractual agreements, thereby changing property values.

22. This report is the confidential and private property of the client and the appraiser. Any person other than the appraiser or the client who obtains and/or uses this report or its contents for any purpose not so authorized by the appraiser or the client is hereby forewarned that all legal means to obtain redress may be employed against him or her.

23. Statement of Policy. The following statements represent official policy of the *Appraisal Institute* with respect to neighborhood analysis and the appraisal of residential real estate:

    a. It is improper to base a conclusion or opinion of value upon the premise that the racial, ethnic, or religious homogeneity of the inhabitants of an area or of a property is necessary for maximum value.

    b. Racial, religious, and ethnic factors are deemed unreliable predictors of value trends or price variance.

    c. It is improper to base a conclusion or opinion of value, or a conclusion with respect to neighborhood trends, upon stereotyped or biased presumptions relating to race, color, religion, sex, or national origin, or upon unsupported presumptions relating to the effective age or remaining life of the property being appraised or the life expectancy of the neighborhood in which it is located.

24. This appraisal assumes the subject property complies with the requirements under the *ADA, Americans With Disabilities Act.* The appraiser is not qualified to detect each and every item of compliance or lack thereof. The value estimate is predicated on the assumption that there is no lack of compliance that would cause a loss in value. No responsibility is assumed for any such conditions, or for any expertise or engineering knowledge required to discover them.

Should the client have a concern over the subject's state of compliance, he or she is urged to retain the services of a qualified independent ADA specialist to determine the extent of compliance and the cost to bring the property into compliance if needed. The cost of inspection, study and compliance must be borne by the client or owner of the property. The cost could be deducted from the estimate of market value of the subject property if indicated by the market.

25. This appraisal assumes the subject property, as vacant or as improved, has no historical or archeological significance. The value estimate is predicated on the assumption that no such condition exists. Should the client have a concern over the subject's status, he or she is urged to retain the services of a qualified independent specialist to determine the extent of either significance, if any, and the cost to study the condition or the benefit or detriment such a condition brings to the property. The cost of inspection and study must be borne by the client or owner of the property. Should the development of the property be restricted or enhanced in any way, the appraiser reserves the right to modify the opinion of value indicated by the market.

SUMMARY OF IMPORTANT FACTS AND OPINIONS

PROJECT:	Natural gas pipeline and fiber optics easement
PARCEL:	408-13-025
TYPE OF PROPERTY:	Vacant Residential Land
ASSESSOR'S PARCEL NUMBER:	408-13-025
LOCATION:	775 Back 'O Beyond Road, Sedona, Arizona
OWNER:	Deshon and Jane Vojnovich
OWNER CONTACT:	On January 19, 1996, Citizens Utilities sent a letter of notification to the owners at P.O. Box 917, Sedona, Arizona 86339. At the client's request, no additional attempts were made to contact the owner.
PURPOSE AND FUNCTION:	The purpose of this report is to estimate the market value of the fee simple interest in the subject property, assuming a cash transaction as of the date of valuation, April 8, 1996, in order to estimate the value of the proposed easement for a natural gas pipeline and a fiber optics line. A value for the temporary construction easement, on a monthly basis, was estimated as well. The appraisal will be used for eminent domain purposes.
SITE AREA:	27.05 net acres
ZONING:	RS-35, Single Family Residential
HIGHEST AND BEST USE:	As Vacant - Develop with single-family residential subdivision As Improved - The existing residence represents the highest and best use of one lot in a subdivision of the larger parcel.

VALUATION SUMMARY:

Estimated Value of the Whole Parcel	$1,082,000				
Acquisition as Part of the Whole	($ 5,680)				$ 5,680
Remainder Before the Acquisition	$1,076,320	$1,076,320			
Remainder After the Acquisition Before Special Benefits		($1,076,320)			
Preliminary Severance Damages		$ 0	$ 0		
Remainder After the Acquisition After Special Benefits		($1,076,320)			
Special Benefits		$ 0	$ 0		
Preliminary Severance Damages			$ 0	$ 0	
Cost-to-cure				($ 0)	$ 0
Net Severance Damages				$ 0	$ 0
Minor Improvements					$ 0
Estimated Value of Partial Acquisition					**$ 5,680**
Temporary Construction Easement	**$153.00** per month				

DATE OF INSPECTION: April 8, 1996

DATE OF VALUATION: April 8, 1996

DATE OF APPRAISAL: April 8, 1996

APPRAISERS: Dennis L. Lopez, MAI, SRA
Craig D. Anderson, SRA

Conclusions

Sedona has a stable economy based primarily on tourism. All signs point to Sedona continuing as an important tourist center in the decade ahead. Because of the nature of the area and its location within the United States, economic growth will be stronger than the country's average in the long run given the appeal of the area and its history of in-migration of commerce, industry and population.

At this time, the local economy appears stable with limited growth. The area will continue to remain an attractive area of the country well into the next century.

SITE ANALYSIS

LOCATION:	775 Back 'O Beyond Road, Sedona, Arizona
ASSESSOR'S PARCEL NUMBER:	408-13-025
SCHOOL DISTRICT:	Sedona School District
NET SITE AREA:	27.05 acres, based upon the Yavapai County Assessor's records
SHAPE AND DIMENSIONS:	Irregular (see exhibits)
TOPOGRAPHY:	Mostly hillside with a downward slope from south to north and northwest; western portion of site in creek bottom
DRAINAGE:	Drainage appears adequate, however, approximately 18 percent of the site is low-lying within Oak Creek and subject to flooding. Additionally, the northern area of the site is affected by an active wash that crosses Back 'O Beyond Road to empty into Oak Creek in the northwest portion of the site. A survey by an engineer is recommended to determine if any adverse drainage conditions exist on the remainder of the property.
FLOOD ZONE:	According to Flood Insurance Rate Map 040093 0660B, Oak Creek runs within the western portion of the subject property placing it within Flood Zone A, defined as an area subject to a 100-year flood. Approximately 18 percent of the site is located within the flowage of Oak Creek. Although the wash in the northern portion of the subject is not designated with Flood Zone A status, development is restricted by this natural flowage channel.

IMPROVEMENT ANALYSIS

The site is improved with a single-family residence and supporting site improvements. According to the Yavapai County Assessor's records, the home was constructed in 1950 and contains approximately 3,249 square feet. Site improvements include a gravel driveway, sidewalks, decks, fencing, stables, arena, and tennis court and landscaping. The subject's improvements are among those allowed under its RS-35 zoning designation.

Further analysis and discussion of the improvements is presented in the Eminent Domain valuation section of the report.

ZONING ANALYSIS

Zoning Classification

The subject adjoining property is zoned from RS-35, Single Family Residential. This district is intended to promote and preserve low density single family residential development.

Permitted Uses

The principal land use is single-family residential dwellings and incidental accessory uses. It permits one single-family dwelling or factory-built home per lot with a minimum lot size of 35,000 square feet. Mobile or manufactured homes are not permitted. Non-commercial keeping of domestic farm animals, guest houses, and in-home offices are permitted. Accessory uses and structures including pools, barns, etc. are also permitted.

Prohibited Uses

More intense residential, industrial or commercial uses would not be permitted at the subject's location.

Existing Improvements

The site and improvements conform with the subject's current zoning designation.

Comments

Given the subject's location and surrounding development, it could be split into several smaller parcels or subdivided into a formal subdivision, however, rezoning of the site for more intense uses would not be permitted.

Summary - Estimated Value of the Partial Acquisition

Value of the Land in the Partial Acquisition	$ 5,680
Cost-to-Cure	$ 0
Net Severance Damages	$ 0
Improvements	$ 0
Total	**$ 5,680**
Temporary Construction Easement	**$153.00** per month

FINAL VALUATION SUMMARY

Summary

Estimated Value of the Whole Parcel	$1,082,000				
Acquisition as Part of the Whole	($ 5,680)				$ 5,680
Remainder Before the Acquisition	$1,076,320	$1,076,320			
Remainder After the Acquisition Before Special Benefits		($1,076,320)			
Preliminary Severance Damages		$ 0	$ 0		
Remainder After the Acquisition After Special Benefits		($1,076,320)			
Special Benefits		$ 0	$ 0		
Preliminary Severance Damages			$ 0	$ 0	
Cost-to-cure				($ 0)	$ 0
Net Severance Damages				$ 0	$ 0
Minor Improvements					$ 0
Estimated Value of Partial Acquisition					**$ 5,680**
Temporary Construction Easement	**$153.00** per month				

CERTIFICATION

The undersigned does hereby certify that, except as otherwise noted in this appraisal report:

1. We have no present or contemplated future interest in the real estate that is the subject of this appraisal report.

2. We have no personal interest or bias with respect to the subject matter of this appraisal report or parties involved.

3. To the best of our knowledge and belief, the statements of fact contained in this appraisal report upon which the analysis, opinions, and conclusions expressed herein are based are true and correct.

4. This appraisal report sets forth all the limiting conditions (imposed by the terms of this assignment or by the undersigned) affecting the analysis, opinions and conclusions contained in this report.

5. Our compensation is not contingent on a action or event resulting from the analyses, opinions, or conclusions in, or the use of this report.

6. We have made a personal inspection of the property that is the subject of this report.

7. No one other than the undersigned prepared the analysis, conclusions and opinions concerning real estate set forth in this appraisal report.

8. To the best of our knowledge and belief, the reported analysis, opinions and conclusions were developed, and in this report prepared, in conformity with the requirements of the Uniform Standards of Professional Appraisal Practice and the Code of Professional Ethics as adopted by the *Appraisal Institute*.

9. Disclosure of the contents of this appraisal report is governed by the By-laws and Regulations of the *Appraisal Institute* and the direction of the client.

10. The *Appraisal Institute* conducts a program of continuing education for their designated members to assist members in remaining aware of changes in theory, practice, and economic climates affecting value. As of the date of this report, Dennis L. Lopez, MAI, SRA, and Craig D. Anderson, SRA, have completed the requirements under this continuing education program.

11. The undersigned hereby acknowledge that they have the appropriate education and experience to complete the assignment in a competent manner. The reader is referred to the Statement of Qualifications for the undersigned.

12. This appraisal assignment was not based on a requested minimum valuation, a specific valuation, or the approval of any loan.

Our opinion of market value of the proposed easement acquisition, as of the 8th day of April, 1996, was **$5,680** based on our independent and professional appraisal. The value of the temporary construction easement was estimated to be **$153.00** per month.

Dennis L. Lopez, MAI, SRA
Certified General Real Estate Appraiser - State of Arizona
Certificate No. 30189

Craig D. Anderson, SRA
Certified General Real Estate Appraiser - State of Arizona
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Appendix B

Sedona Pipeline Project

Cultural Resources Inventory and Treatment Plan

Dames & Moore Intermountain Cultural Resource Services

Research Paper No. 36

Prepared for

Citizens Utilities Company

Lead Federal Agency

Coconino National Forest

CNF Project 96-44-A

1996

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MANAGEMENT SUMMARY

Agencies: U.S. Forest Service, Coconino National Forest, Sedona Ranger District

Project Title: Sedona Pipeline Project

Project Number: Dames & Moore Job Number 04738-006-050

Project Description: The proposed project will involve construction by Citizens Utilities Company (CUC) of a buried, six-inch natural gas pipeline approximately eight miles long, designed to provide improved service and reliability to residents and businesses in the Sedona area. Conduit for possible future use by telecommunications or electrical utilities will be buried adjacent to the pipe. The federal undertaking for which the investigation reported here was conducted will be issuance by the Coconino National Forest of a special use permit to CUC for construction of the pipeline across lands administered by the Forest, and granting of a 20-foot-wide permanent right-of-way along the pipeline route.

Location: The project area is located in Yavapai and Coconino counties, approximately 2 to 3 miles south and west of Sedona, predominantly within the Coconino National Forest (CNF). The proposed route follows existing corridors south of Table Top Mountain. Intensive pedestrian cultural resource survey was conducted in Sections 9, 15, 22, 23, 25, 26, and 27 of T17N, R5E and in Section 19 of T17N, R6E as depicted on the Sedona 7.5 minute U.S. Geological Survey quadrangle.

Number of Acres Surveyed: Approximately 176.5 acres were intensively surveyed in the Coconino National Forest.

Personnel and Dates of Effort: Dr. J. Simon Bruder served as principal investigator. Glenn P. Darrington was the field director assisted by Kristopher S. Shepard. The field crew included Sharon K. Bauer and Lara E. Wiatrowski. The survey was conducted from 11 to 13 December 1995. The fieldwork accumulated to 12 person days of effort.

Number of Properties: Six archaeological sites and a historic ranch containing a variety of buildings and structures.

Listing of Recommended Eligible Properties:

AR-03-04-06-238 (CNF), Site 238 (criterion "d")
AR-03-04-06-915 (CNF)/AZ O:1:86 (ASM), Steely Dan (criterion "d")
AR-03-04-06-916 (CNF)/AZ O:1:87 (ASM), the "V" Site (criterion "d")

Listing of (previously recorded) Determined Eligible Properties:

AR-03-04-06-250 (CNF), Site 250 (criterion "d")
AR-03-04-06-412 (CNF), Site 412 (criterion "d")
AR-03-04-06-839 (CNF), Site 839 (criterion "d")
individual buildings and structures within the historic Crescent Moon Ranch (AR-03-04-06-408 [CNF], criteria "a" and "c")

Comments:

Two of the six archaeological sites found within the original pipeline corridor, site 238 (AR-03-04-06-238 [CNF]) and Steely Dan (site AR-03-04-06-915 [CNF]/AZ O:1:86 [ASM]), can be avoided by minor shifts in the route, and CUC has agreed to those modifications. One additional site AR-03-04-06-916 (CNF) also may be avoided dependant on which of the two alternate routes immediately east of Oak Creek are selected for construction. Site AR-03-04-06-839 (CNF) is not within the proposed pipeline corridor. It will not be affected by construction activities although a road proposed for access transects it.

The two final sites (AR-03-04-06-250 and 412 [CNF]), both located in the Crescent Moon Ranch area, cannot be avoided. Therefore, CUC has agreed to fund data recovery at these sites (and if necessary, at site AR-03-04-06-916 [CNF]) prior to project implementation. A research design and work plan have been developed to guide that effort, and are included in this report. Data recovery will mitigate the adverse effects of pipeline construction as well as possible future impacts associated with maintenance and repair within the permanent right-of-way to some extent. Because disturbance of human burials may be unavoidable at sites AR-03-04-06-250 and 412, however, we recommend a determination of "adverse effect" as defined by regulations for *Protection of Historic Properties* (36 CFR Part 800).

Two structures (Property 29A, the Dumas ditch and property 32B, an old ditch) within the historic Crescent Moon Ranch area were determined eligible for listing on the National register under criteria "a" and "c" during an earlier project, and it was determined that the project would have an "adverse effect" on them. Historic American Engineering Record recording and documentation were undertaken as mitigation. These structures may be subject to disturbance associated with installation and maintenance of the CUC pipeline as well. Because they have already been thoroughly recorded, no additional mitigation is recommended.

ACKNOWLEDGMENTS

The study reported here was conducted with the cooperation and assistance of numerous individuals. Marietta Davenport, Zone Archaeologist for the Coconino National Forest Sedona Ranger District, accompanied us during site visits, providing informative background discussion as well as helping us to identify several types of ceramics. Forest Archaeologist Peter Pilles also provided valuable insight regarding previous research in the Crescent Moon Ranch area, and we appreciate the time he took to review and comment on a draft of this report. Gallina Franz, with the Coconino National Forest Flagstaff Office, was extremely helpful in assisting with our records search and providing pertinent background information.

We appreciate the cooperation of several others who assisted with our site file searches. Regina and Shurban at the Arizona State Museum provided instantaneous and thorough assistance during our records search and advice concerning assignment of site numbers. Gwen Gallenstein at the Museum of Northern Arizona worked with us in person and by telephone assuring that we gleaned as much information as possible from the site files.

We are indebted to the members of the field crew for the professionalism they exhibited by keeping their eyes focused on the ground rather than being distracted by the spectacular scenic views afforded by the project area. As always the computerized graphics produced by Ron Savage for this report are second to none.

We also thank Lauren Weinstein and Niklas Ranta of Dames & Moore who took responsibility for overall project management. Finally, we appreciated the information and advice supplied by Citizens Utilities Company representative Rob Franson.

INTRODUCTION

Citizens Utilities Company (CUC) is proposing to construct a new natural gas pipeline in an area 2 to 3 miles south and west of Sedona, Arizona (Figure 1). Dames & Moore was retained as a third-party consultant to conduct an environmental assessment (EA) of the proposed project under the direction of the Coconino National Forest (the Forest). The cultural resource inventory and data recovery plan presented in this document were prepared to supplement that assessment as well as to provide a basis for compliance with historic preservation regulations. Our survey of federal lands was conducted under the terms of a special use permit dated 3 March 1995 issued to Dames & Moore by the Coconino National Forest for nondisturbing-noncollecting archaeological survey. Additionally, the research design for data recovery is intended as the basis for Dames & Moore's application to the Forest for a special use permit to conduct the proposed research in compliance with the Archaeological Resources Protection Act.

PROJECT DESCRIPTION AND LOCATION

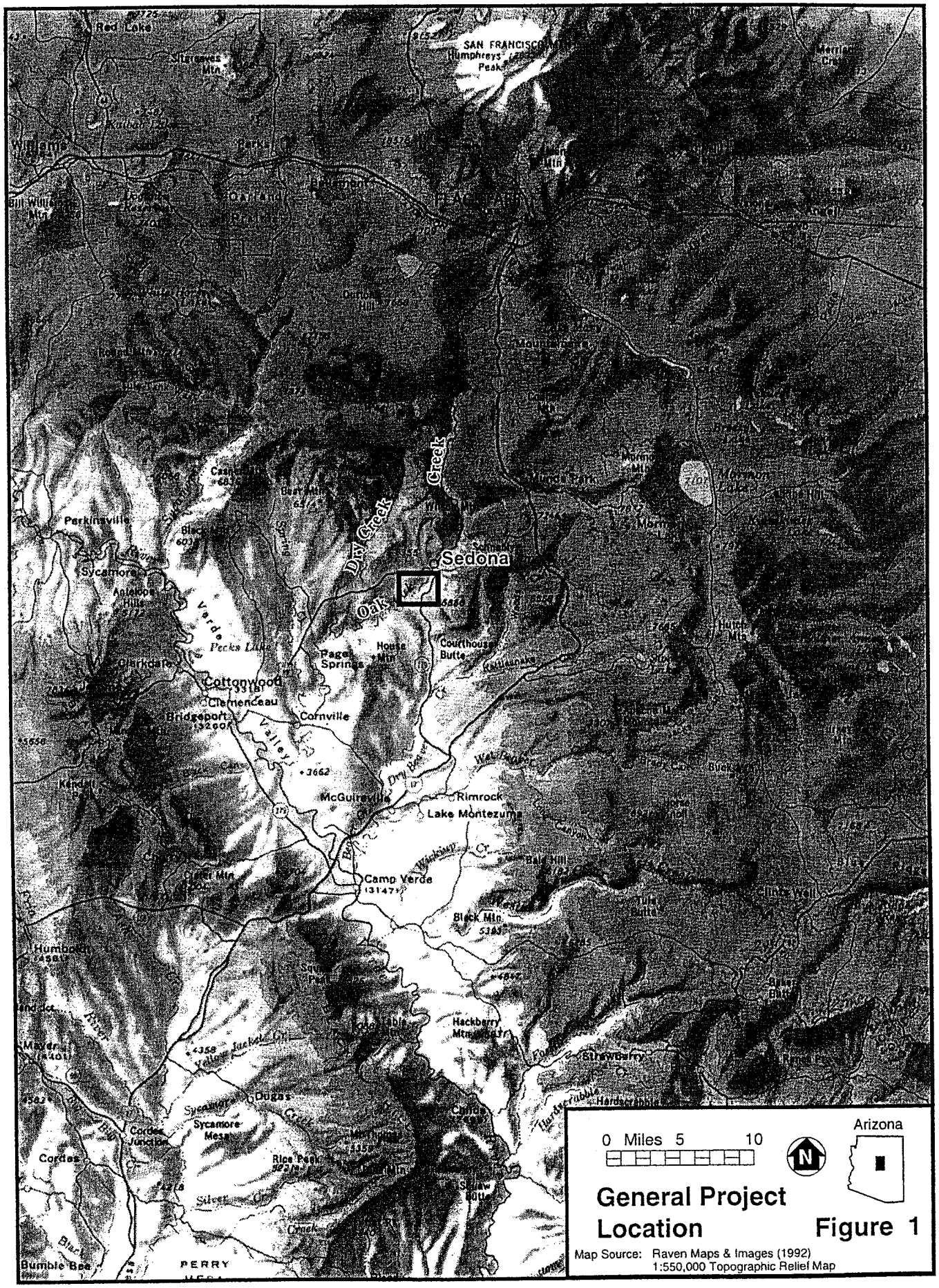
The proposed project will involve the construction of approximately 8 miles of a buried 6-inch natural gas pipeline that will provide improved service and reliability to residents and businesses in the Sedona area. Conduit for possible future use by telecommunications or electrical utilities will be buried adjacent to the pipe. The proposed pipeline route originates at the existing City Gate Regulator Station, and generally follows existing corridors south of Table Top Mountain, eventually terminating at the Morgan Wash Regulator Station (Figures 2 and 3). The proposed pipeline route is located in sections 9, 22, 23, 25, and 26 of T17N, R5E and section 19 of T17N, R6E as referenced on the Sedona, Arizona 1969 U.S. Geological Survey (USGS) 7.5 minute quadrangle.

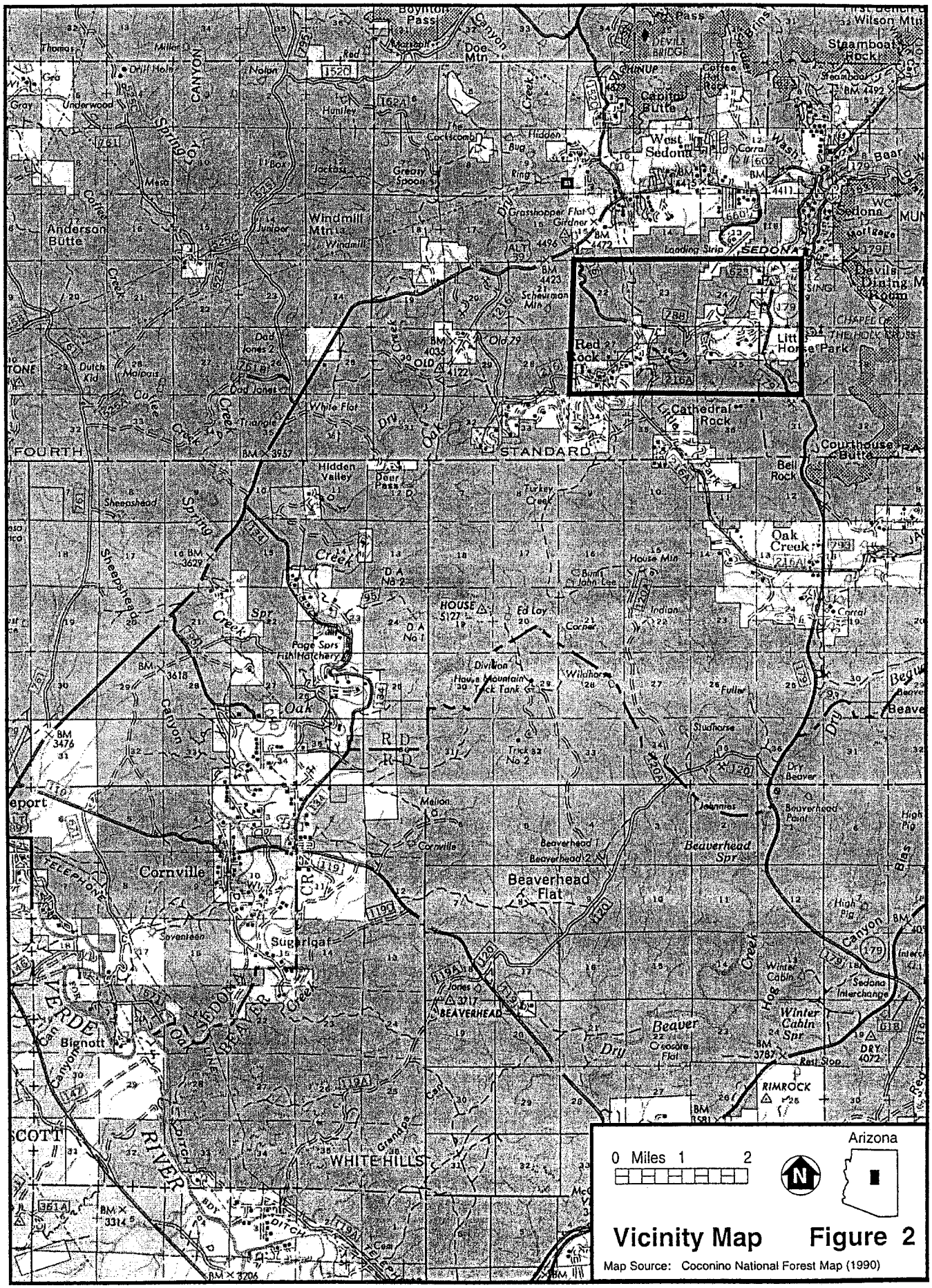
For the EA, a study area encompassing approximately 8 square miles was defined to include a number of potential alternative routes for the proposed pipeline. We undertook a records and files check for this entire area to provide information for defining project alternatives. This report, however, is confined to a consideration of the preferred route and its several variants. We undertook intensive inventory along the route considered most likely to be selected for construction. Only those segments of the proposed route on lands administered by the Forest were surveyed.

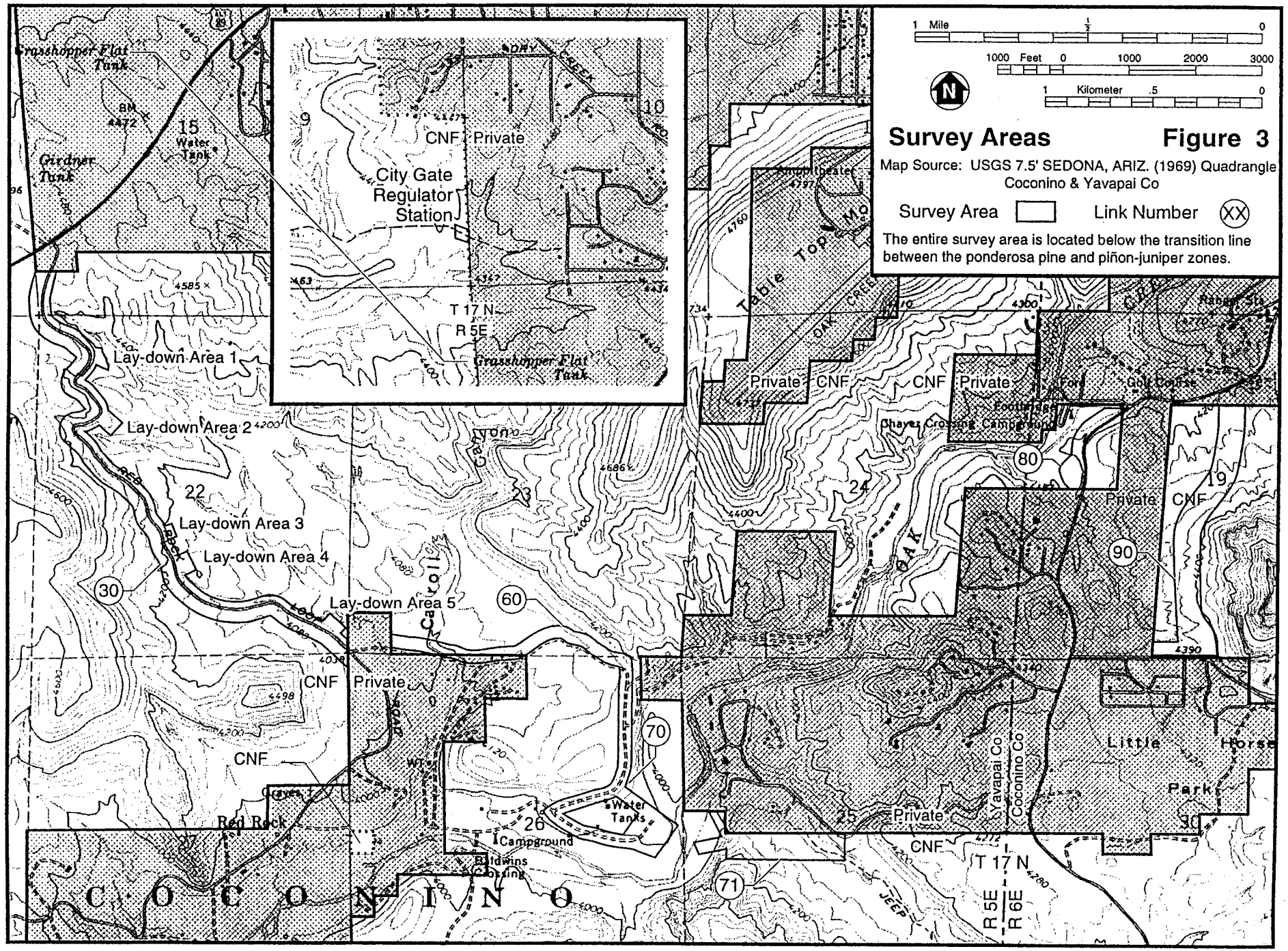
REGULATORY REQUIREMENTS

Issuance by the Forest to CUC of a special use permit to construct the pipeline within a permanent right-of-way that will be granted in conjunction with the permit will constitute a federal undertaking. Thus, the Forest is the lead federal agency responsible for compliance with the National Historic Preservation Act (NHPA) as well as the National Environmental Policy Act (NEPA).

NEPA (Section 101[b][4]) establishes a federal policy of preserving not only the natural aspects, but also the historic and cultural aspects of our nation's heritage when undertakings regulated by federal agencies are planned. Implementing regulations for *Protection of Environment* (40 CFR Part 1502.16[g]), issued by the Council on Environmental Quality, specifically stipulate that the consequences of federal undertakings on historic and cultural resources be analyzed. Additional regulatory protection of cultural


Red Lake
SAN FRANCISCO MTN
Humphreys Peak
Williams
Parks
Bill Williams Mtn
Oak Creek
Dry Creek
Sedona
Perkinsville
Sycamore
Antelope Hills
Verde
Pecks Lake
Page Springs
Cottonwood
Clarkdale
Clemenceau
Bridgeport
Cornville
Valley
Courthouse Butte
McGuireville
Rimrock
Lake Montezuma
Camp Verde
Black Mtn
Humboldt
Mayer
Hackberry Mtn
Strawberry
Dugas
Sycamore Mesa
Cordes Junction
Cordes
Rice Peak
Bumble Bee
PERRY
Arizona
0 Miles 5 10
N
General Project Location
Figure 1
Map Source: Raven Maps & Images (1992)
1:550,000 Topographic Relief Map


Arizona
0 Miles 1 2
N
Vicinity Map
Figure 2
Map Source: Coconino National Forest Map (1990)
SEDONA
West Sedona
Cathedral Rock
Red Rock
Oak Creek
Cornville
Beaverhead Flat
Beaverhead Spr
Beaver
Winter Cabin Spr
RIMROCK
WHITE HILLS
Bignott
Superior
Page Spr
Fish Hatchery
Andersen Butte
Windmill Mtn
Doe Mtn
Steamboat Rock
Devils Dining Room
Courthouse Butte
Bell Rock
Sedona Interchange
FOURTH
STANDARD
CANYON
VERDE
RIVER
SEDONA
BEAVER
SCOTT


1 Mile
1000 Feet
1 Kilometer
Survey Areas
Figure 3
Map Source: USGS 7.5' SEDONA, ARIZ. (1969) Quadrangle
Coconino & Yavapai Co
Survey Area
Link Number
The entire survey area is located below the transition line between the ponderosa pine and piñon-juniper zones.
Grasshopper Flat Tank
Girdner Tank
Water Tank
CNF
Private
City Gate Regulator Station
T 17 N
R 5E
Lay-down Area 1
Lay-down Area 2
Lay-down Area 3
Lay-down Area 4
Lay-down Area 5
Table Top Mo
Oak Creek
Chavez Crossing Campground
Golf Course
Footbridge
Ranger Sta
Little Horse Park
Yavapai Co
Coconino Co
Red Rock
Chavez
Campground
Baldwins Crossing
Water Tanks
T 17 N
R 5E
R 6E
C O C O N I N O

resources has been established by other federal legislation, the NHPA being of particular importance to the investigation reported here as discussed below.

Other requirements for protecting historic properties are identified in the Antiquities Act of 1906, and the Archaeological Resources Protection Act of 1979 (93 Stat. 721; 16 U.S.C. 470). In addition, the American Indian Religious Freedom Act of 1978 (P.L. 95-431) requires that all federal agencies take into account the effects of their actions on traditional Native American religious and cultural values and practices. Also, the Native American Graves Protection and Repatriation Act of 1990 expressly provides for the protection of Native American graves, funerary objects, sacred objects, and items of cultural patrimony, and gives affiliated Native American groups priority in the ownership and control of such human remains and artifacts.

The NHPA, as amended (80 Stat. 915; 94 Stat. 2987; 16 U.S.C. 490; Title XL HR 429), defines "historic properties" as prehistoric and historic sites, buildings, structures, districts, and objects included in, or eligible for inclusion in, the National Register of Historic Places (National Register), as well as artifacts, records, and remains related to such properties (Section 301[5]). Traditional cultural properties rooted in a community's history also may be eligible for inclusion in the National Register because of their association with cultural practices or beliefs that are important in maintaining the cultural identity of the community (*National Register Bulletin 38*). The more general term "cultural resources" is used here to refer to all types of heritage resources worthy of inventory and evaluation for listing on the National Register, or for other types of state and local designation.

Regulations for *Protection of Historic Properties* (36 CFR Part 800), which primarily implement Section 106 of the NHPA, define key regulatory requirements. These regulations define a process for federal agencies to consult with State Historic Preservation Officers (SHPOs), the federal Advisory Council on Historic Preservation (ACHP), and other interested parties to ensure that historic properties are duly considered as federal projects are planned and implemented. The steps in the "Section 106 consultation" process involve:

1. identifying and evaluating the eligibility for National Register listing of properties that may be affected by a proposed undertaking

2. assessing the potential effects of the undertaking on historic properties

3. consulting with the SHPO, the ACHP, and other appropriate interested parties to determine ways to avoid or reduce any adverse effects

4. providing the ACHP a reasonable opportunity to comment on the proposed undertaking and effects on historic properties

5. proceeding with the undertaking under the terms of a memorandum of agreement or in consideration of comments from the Advisory Council

STUDY GOALS, STUDY TEAM, AND REPORT ORGANIZATION

The overall goal of this report is to provide a document for the Forest to use in their Section 106 consultation with SHPO and ACHP. More specifically, our intent was to (1) thoroughly inventory cultural resources on the Forest that might be affected by pipeline installation and maintenance along the several alternative routes being considered, (2) evaluate the eligibility of those resources for National Register listing, (3) assess potential impacts the project might have on those resources, and (4) identify appropriate mitigation measures.

Dr. J. Simon Bruder served as principal investigator. Glenn P. Darrington was the field director assisted by Kristopher S. Shepard. The field crew included Sharon K. Bauer and Lara E. Wiatrowski.

The subsequent section of this report documents our study methods. The next two sections describe the natural environment of the project area and its cultural historical setting. We then document our review of background information and describe the results of the intensive survey. The concluding section presents recommendations for follow-up studies including a mitigation plan for data recovery to be conducted at those sites that cannot be avoided by construction.

INVENTORY METHODS

The inventory was conducted in two phases. First, an inventory of recorded and potential cultural resources located near the route judged most likely to be selected as the preferred alternative was compiled through records searches, literature review, and interviews with knowledgeable individuals. In conjunction with this review of background data and as an aspect of the public scoping phase for the EA, Native American communities identified in the following paragraph were contacted as described below to solicit information concerning potential impacts on traditional cultural resources. Thereafter, we undertook intensive pedestrian inventory of the areas on the Forest that could be impacted by construction or subsequent maintenance of the proposed pipeline.

RECORDS CHECK AND NATIVE AMERICAN CONTACTS

The records search was undertaken to determine the extent of prior survey in the study area and to identify cultural resources that had been previously recorded. Records were reviewed at the Arizona State Historic Preservation Office, the Coconino National Forest office in Flagstaff, the Museum of Northern Arizona (MNA), the Arizona State University Anthropology Department (ASU), and the Arizona State Museum (ASM). Government Land Office (GLO) plats at the Bureau of Land Management also were examined for indications of possible unrecorded historic era cultural resources, and the *Sedona Community Plan* was consulted to identify historic buildings and structures regarded as potentially worthy of preservation efforts by that community. Forest Archaeologist Peter Pilles and Zone Archaeologist Marietta Davenport provided additional relevant information based on personal familiarity with the resources of the project area. The cultural resources overview of the Coconino National Forest (Pilles and Stein 1981) also was used as a primary source of pertinent background information.

The Hopi Tribe, Navajo Nation, Yavapai-Apache Tribe, and Yavapai-Prescott Tribe were contacted by letter to determine whether those communities had concerns about the project. In addition, they were provided with copies of the executive summary of the draft EA. Also, the Forest meets with various tribes several times a year and communicates with them periodically in order to inform them of all projects being planned that might affect areas of concern to them within the Coconino National Forest. A single response to the Native American contacts was received: a request from the Navajo Nation for a complete copy of the draft EA. This was provided to them.

SCOPE OF FIELD SURVEY

An intensive pedestrian inventory of approximately 176.5 acres was accomplished by walking transects at spacings no wider than 60 feet (20 meters). Dimensions of the survey area exceed those that will be required for construction, and cover considerably more acreage than will be granted as permanent right-of-way. This strategy was adopted at the direction of Zone Archaeologist Marietta Davenport in consideration of the fact that the precise route was not defined in all places when we undertook the survey and also to provide some room for slight adjustments to the route if necessary to avoid cultural or biological resources. The intensive inventory areas are depicted on Figure 3 and included:

- 150-foot by 150-foot block at the City Gate Regulator Station—0.5 acres

Table 5
Summary of Significance and Effect Recommendations

	Forest Number*	Other Number	Name	Location	Site Type	National Register Eligibility	Effect Recommendation	Proposed Treatment
General Pipeline Corridor								
1	238			Link 80	artifact scatter	recommended eligible- "d"	no effect	avoidance
2	915	AZ O:1:86	Steely Dan	Link 30	artifact scatter	recommended eligible- "d"	no effect	avoidance
3	916	AZ O:1:87	"V" Site	Link 71	artifact scatter	recommended eligible- "d"	no adverse effect* or no effect	data recovery* or avoidance
Crescent Moon Ranch Area: Sites								
4	250			Link 70	pit houses & burial	eligible- "d"	adverse effect	data recovery
5	412			Link 70	possible pit houses & burials	eligible- "d"	adverse effect	data recovery
6	839			access road	possible pit houses & burials	eligible- "d"	no effect	no treatment
Crescent Moon Ranch Area: Other Properties								
1	property 3A/B		water wheel/shed			not eligible	NA	no treatment
2	property 4		building foundation			not eligible	NA	no treatment
3	property 26		stone wall			not eligible	NA	no treatment
4	property 29A		Dumas Ditch			eligible- "a" and "c"	adverse effect	no treatment
5	property 32B		old ditch			eligible- "a" and "c"	adverse effect	no treatment
6	property 33B		Old Sedona Road			eligible- "a"	no effect	no treatment
7	stone wall					recommended not eligible	NA	no treatment
8	trash scatter					recommended not eligible	NA	no treatment

Prefix for all sites is AR-03-04-06-.

* If Link 71 is selected for construction, data recovery focused on the 20-foot permanent right-of-way through the "V" Site can be expected to result in "no adverse effect."

NA = not applicable

Depth below the modern ground surface as well as relationship to the permanent datum will be recorded for all subsurface manifestations. Excavation will be done in 10 centimeter levels unless natural levels can be followed. Within excavation blocks, artifacts that appear to be *in situ* and fire cracked rock will be mapped as the excavation progresses. Fire cracked rock will be identified as to material type and counted and weighed in the field. Photographs will be taken throughout the excavation.

Based on earlier work in the area (especially Pilles 1991), we anticipate that several types of subsurface features will be encountered. These are likely to include pit houses, storage pits or small hearths (either within pit houses or in extramural contexts), larger extramural ovens or roasting pits, trash deposits, inhumations, and possibly cremations.

Storage Pits, Small Hearths and Large Roasting Pits

Generally, non-structural features will be exposed in plan view and then cross-sectioned, profiled, and sampled for macrobotanical remains and pollen. Small or discrete features may be entirely excavated after they have been exposed in cross section. Sampling will depend on the size of the feature, but generally flotation samples will be approximately 1 liter in size. Feature fill that is not bagged for samples will be screened in the field through one-quarter-inch mesh. Radiocarbon samples will be collected from each feature as appropriate, either in the form of charcoal or bulk sediment. Archaeomagnetic samples or wood appropriate for dendrochronology would be collected as well. Fire cracked rock from features will be counted and weighed in the field.

Pit Houses

Pit houses will be sampled for floral, faunal, and datable materials with a special emphasis on floor contacts. Features discovered within pit houses will be sampled individually. Pit houses will be totally excavated after being exposed in plan view, and all fill passed through one-quarter inch mesh. We anticipate excavating pit houses using 1 by 1 meter square control units unless the houses are so small that excavation in quarters would provide finer control. If adequate information cannot be obtained from the trench profile, an exploratory 1 by 1 meter control unit will be excavated initially to locate the floor and to sample substrate beneath the floor. All levels in the control unit will be screened. Thereafter, the remaining units will be excavated in several levels, with level 1 generally pertaining to fill above the floor. "Floor zones" generally are expected to vary from 5 to 20 centimeters in thickness. Individually provenienced artifacts also may be recovered in direct association with the floor contact. Floors that obviously reflect multiple occupation episodes would, of course, be excavated in additional levels. Plans of pit houses will be drawn to illustrate floor features and other architectural information, and profiles will be recreated as appropriate.

Trash Deposits

Unless they are quite insubstantial (in which case they will be entirely excavated), trash deposits will be sampled using 1 by 1 meter test pits excavated in arbitrary 10 centimeter levels unless it is possible to observe internal stratification. Pollen and macrobotanical samples as well as radiocarbon specimens if present will be recovered throughout trash deposits.

Inhumations and Cremations

The treatment of human remains is discussed below because of the special consultation process required by law. However, one final point regarding human remains should be mentioned. The requirement for the entire permanent right-of-way to be "cleared" of archaeological materials has already been discussed. The data recovery methodology outlined above is expected to serve that purpose quite well from an archaeological research perspective. That is, we expect to investigate all discovered features and to recover a representative sample of artifactual material as well as numerous non-artifactual specimens. We will not, however, have inspected every square meter of ground within the permanent right-of-way. Therefore, our final field activity will involve an effort to locate human burials that might have been missed. To do this, likely areas will be exposed either by hand, heavy equipment, or both depending on what is found earlier, the depth at which burial are anticipated to occur, soil conditions, and so forth. If it is necessary to remove overburden with heavy equipment, these stripping operations will be closely monitored. Thereafter, hand testing will be undertaken. Any additional inhumations or cremations that should be encountered will be excavated as discussed below.

Laboratory Analysis

After being transported to the Dames & Moore laboratory in Phoenix, all artifactual materials and samples will be treated in accordance with guidelines for preparations, cataloging, and curation established by ASM. Artifactual materials will be cleaned as necessary for analysis and curation, but in keeping with currently accepted practice, cleaning will be minimized to the extent possible in order to minimize potential inadvertent data loss.

Anticipated artifact classes include primarily ceramics and chipped and ground stone, with lesser amounts of shell, turquoise, and other "exotics." Faunal bone as well as human skeletal material also is anticipated. We also expect to recover specimens for pollen and flotation analysis and radiocarbon and possibly archaeomagnetic dating. Proposed analytical methods are described briefly here.

Ceramics

Ceramics will be categorized using established typologies following especially Colton (1958) and Wood (1987) so that our results can be compared to those from other sites in the region. Initially, ceramics will be sorted by ware into categories of plain ware, plain ware or red ware, red ware, and decorated or buff

ware. Thereafter, they will be typed if possible. Attributes such as smudging will be noted. Because we anticipate recovery of Hohokam ceramics, Figure 14 is included as an illustration of the decision-making methodology we ordinarily employ in dealing with those kinds of ceramics. We will plan to work closely with Forest Service archaeologists during the ceramic analysis to ensure comparability with earlier and ongoing work in the area.

Chipped and Ground Stone

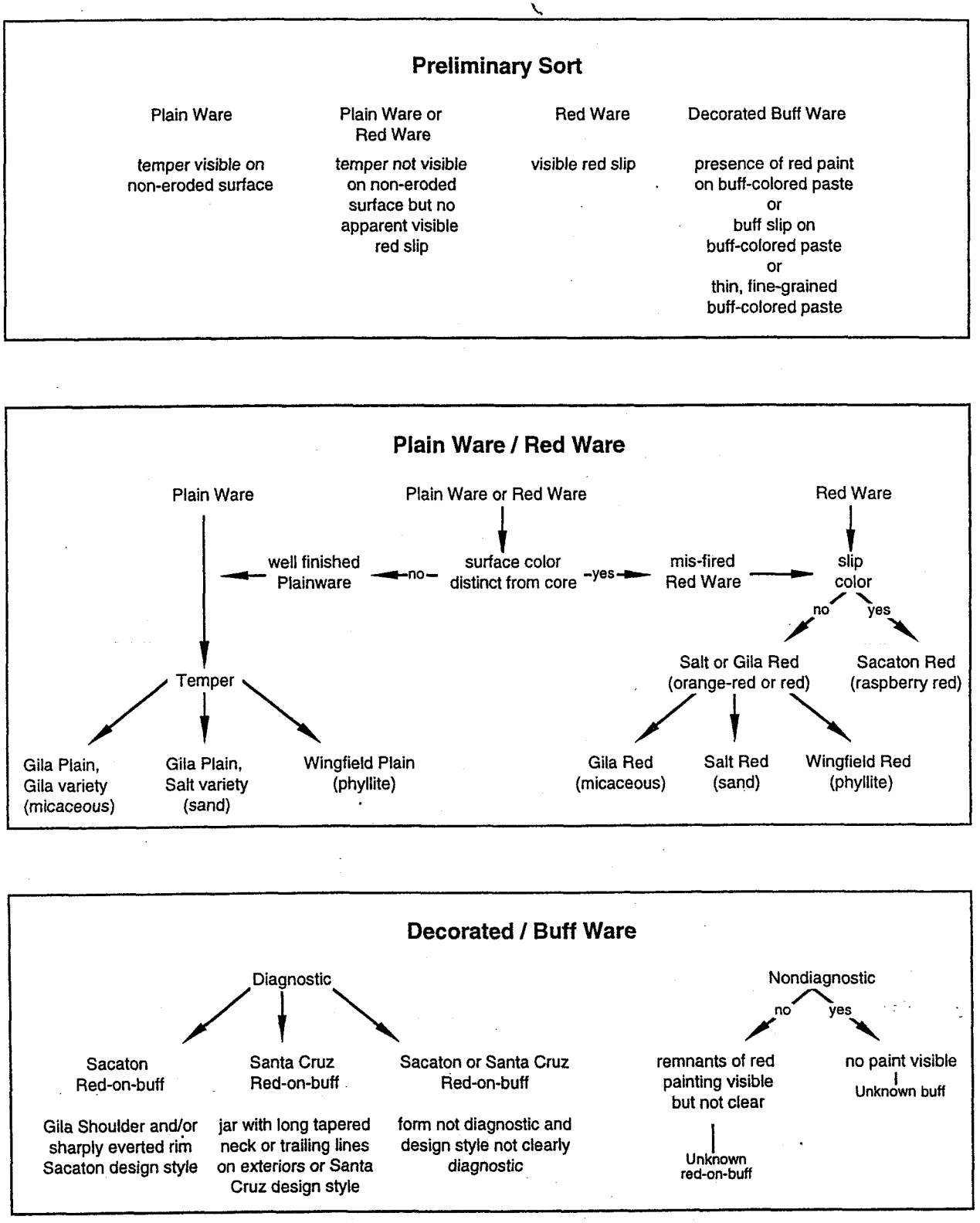
The lithic analysis will be expected to provide information concerning reduction strategies, raw material preferences, and tool use. Prior to beginning the analysis, we plan to coordinate our efforts with those currently being undertaken by the Forest with lithic materials recovered during earlier excavations in the Crescent Moon Ranch area. We will be interested to determine whether the chipped lithic assemblage reflects expedient tool use primarily or more formal tool manufacture. We will also attempt to distinguish evidence suggestive of heat treatment, especially with reference to cherts. Lithic raw materials will be recorded along with morphological attributes as depicted in Figure 15. Flake sizes also will be recorded and various additional observations will be made on cores and tools. Variability in cores can provide important information on early reduction stages and may have implications for raw material availability as well. Information recorded for cores will include core type (unidirectional, bidirectional, multidirectional, or tested cobble), condition (battering, grinding, exhausted), estimated number of flake scars, amount of retained cortex, and size or weight.

Flaked lithic tools include all artifacts that have undergone intentional modification or that exhibit evidence of use (wear). Consequently, the analysis will include an array of materials that incorporate aspects of technology (for example, tools at various stages of reduction—biface blanks and preforms), function (for example, cobble choppers, drills, projectile points), and morphology (for example, identified projectile point styles). Information to be recorded for complete tools is contingent on tool type. Analysis of unifacially worked tools will include recording the number of modified edges, location of edges (proximal, distal, lateral), and estimates of edge angle indicative of probable function.

Analysis of ground stone will emphasize the following attributes: type (mano, metate, pestle, other), condition (broken or complete), modification (pecked, flaked, ground, or other), stage (original nodule, shaped, indeterminate), estimated number of grinding surfaces, size, and weight. Additionally, it may be useful to record macroscopic evidence of use wear (battering, striations, or polish), evidence of heat alteration, and presence of any type of cultural adhesions.

Other Artifacts

Artifact classes that may be recovered in low numbers are marine shell, turquoise, copper, and various other minerals including pigments. Although they may be few in number, items such as these can be highly valuable to considerations of social differences and craft specialization as well as the extent of



Proposed Classification Methodology for Hohokam Ceramics **Figure 14**

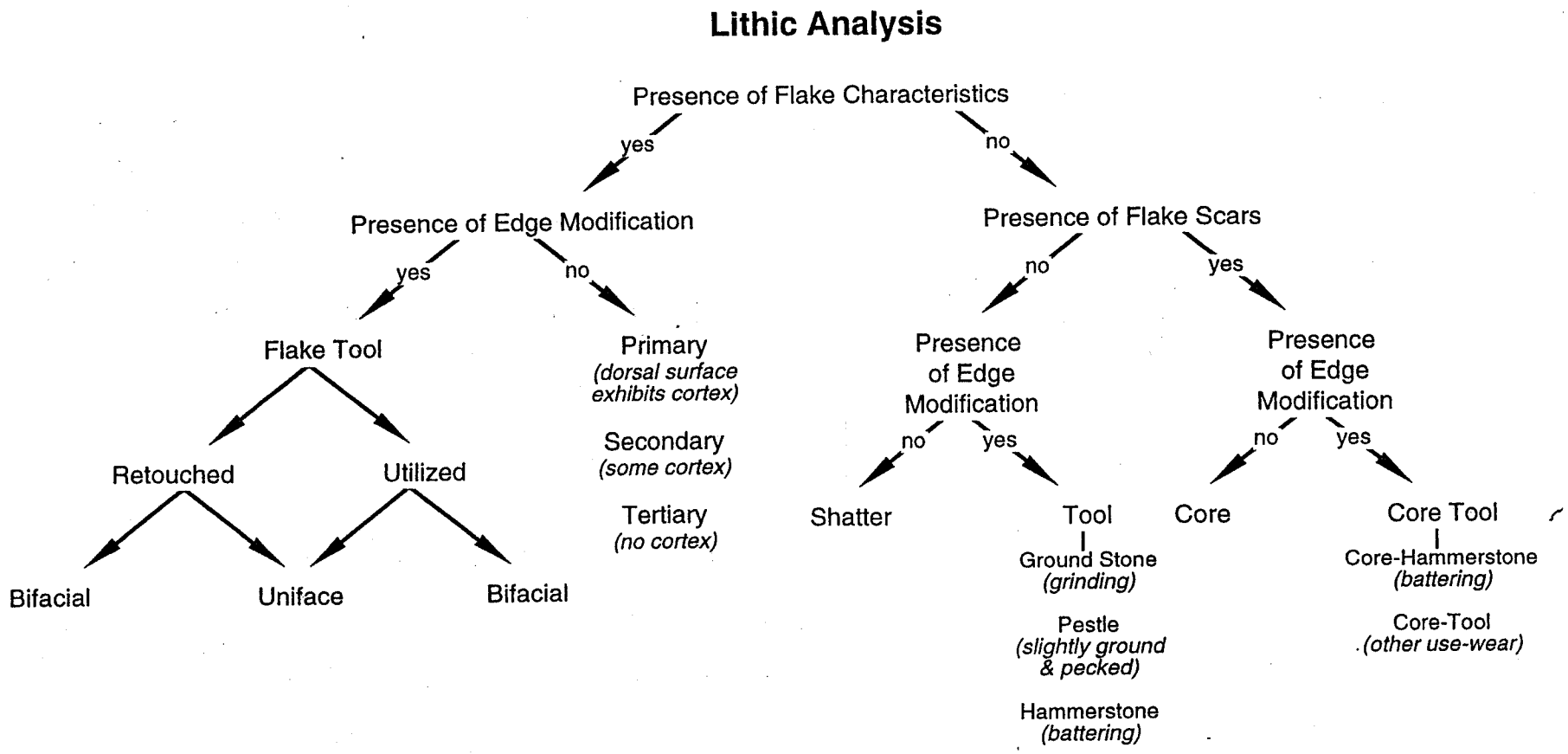


Figure 15 Proposed Lithic Analysis Classification Methodology

exchange networks. "Exotics" will be identified and described to allow comparison with other assemblages. In addition, specialized compositional analyses may be possible if, for example, obsidian or argillite artifacts are recovered. Such studies will be undertaken if appropriate samples are recovered form other than mortuary contexts.

Other Samples

Analysis of faunal materials (excluding shell, which is considered above as an artifact class) and various samples including pollen, float, and charcoal, as well as archaeomagnetic specimens, will be undertaken by specialists. Information from these investigations is expected to provide primary subsistence data as well as chronometric input. The flotation analysis also may contribute to considerations of depositional processes in that it is a means by which microrefuse is recovered. Proposed faunal, pollen, and flotation analyses are discussed below.

Faunal Analysis

The first phase of faunal analysis will be the identification of remains to the most specific taxonomy possible, as well as individual element identification. The second phase will focus on cultural modifications such as the presence or absence of burning and butchering marks, and evidence for use as tools. The final phase of analysis will involve an attempt to determine the minimum number of identified species in order to examine cultural preferences or opportunities. All faunal information will be tabulated and analyzed to define general subsistence patterns.

Palynology

Standard methods for the chemical extraction of pollen from soils with low pollen density and poor preservation will be followed. These methods include treating the soil samples with a 10 percent hydrochloric acid solution to remove calcium carbonates and then screening them through 150-micron mesh. Samples then are treated with hydrofluoric acid and accelerated for 3 minutes to remove any remaining inorganic particles. Finally, samples are rinsed with distilled water to remove dissolved huminates.

Pollen identification is conducted under a light microscope at a magnification of 430x until a total count of between 100 and 200 grains is reached for each sample. Comparative reference materials are consulted as necessary. Pollen data are expected to contribute to a consideration of subsistence and mortuary practices and also may help to define local environmental conditions.

Macrobotanical Analysis

Bulk soil samples of approximately 1 liter will be processed. The end result of the flotation process will be to produce a wet screened fraction, a light fraction, and a heavy fraction. The wet screened fraction will be allowed to dry completely out of direct sunlight prior to being examined for microrefuse materials. The light fraction and heavy fraction recovered from the flotation process will be dried and examined under 20X magnification by a specialist. Macrobotanical remains will be identified to the family and genus level where possible.

Treatment of Human Remains

It is anticipated that human remains (inhumations or cremations) and associated funerary objects may be encountered during the subsurface investigation at sites 250 and 412. Respectful treatment of the dead is always appropriate, and all members of the project team will be expected to conduct excavation, analysis, and reporting of human remains with this in mind. As representatives for the lead federal agency for this project, Coconino National Forest archaeologists have initiated a consultation process with the Hopi, Yavapai-Apache, and Yavapai-Prescott tribes as an aspect of the Forest's compliance with NAGPRA.

The consultation process is expected to result in the establishment of standards for the treatment of human remains as well as any objects of cultural patrimony encountered during the course of the project. These standards may include stipulations with regard to field recovery techniques and analytical methods as well as ultimate disposition of the remains.

Until standards concerning field recovery techniques have been agreed upon, the following methodology is suggested. Should inhumations be encountered, all contents of the burial pit will be excavated and screened through one-eighth-inch mesh, and pollen and macrobotanical samples collected. After careful exposure of the skeletal remains and any associated mortuary items, scale drawings will be prepared and photographs taken. After recording, individual skeletal elements will be removed, either individually or in matrix depending on preservation, wrapped in tin foil and cotton batting, and placed in a cardboard box. Mortuary offerings also will be recovered individually. Cremations will be excavated using careful hand and trowel scraping of the cleared surface. Finer tools, such as dental picks and soft bristle brushes, also will be employed if necessary. Fill associated with the remains will be screened through one-eighth-inch mesh. Pollen and macrobotanical samples will be collected as well. Each cremation will be mapped in plan and profile to record the distribution of remains and any artifacts associated with the feature.

Data Management and Dissemination

Recovered data will be stored temporarily at the Dames & Moore office in Phoenix during analysis and reporting. A report detailing the results of the data recovery will be published in the Dames & Moore

Intermountain Cultural Resource Services Research Paper series. Copies will be filed at the Arizona SHPO, the Coconino National Forest, and ASM.

Disposition of Recovered Materials and Records

When reporting is complete, all project materials including field data, maps, photographs, artifacts, non-artifactual samples, and reports resulting from the investigation will be curated permanently at ASM. The only exception to this commitment involves human remains and items of cultural patrimony, which will be treated in accordance with procedures established in consultation among representatives of appropriate Native American tribal authorities and the Coconino National Forest.

Public Involvement

We plan to extend invitations to the Hopi, Yavapai-Apache, and Prescott-Yavapai tribes as well as members of the Arizona Archaeological Society to participate in a field visit during the data recovery efforts. Should members of these groups wish to participate in the field efforts (or subsequent laboratory analysis), we would pursue appropriate arrangements.

IMPLEMENTING THE RESEARCH PLAN

In this section we provide a schedule and estimated level of effort for the data recovery program and identify the proposed study team.

Schedule and Level of Effort

We propose to accomplish the data recovery during a single field session that we estimate will require four weeks of effort with a crew of eight. The assumptions upon which this estimate is based are included in Table 6. Thereafter, we anticipate that analysis will require six weeks of effort followed by an additional five to six weeks for report preparation and submission of project materials to ASM.

Study Team Personnel

Our proposed study team structure is depicted in Figure 16. It blends Dames & Moore and subconsultants (as needed) to cover all aspects of fieldwork, analysis, and reporting. Current resumes for Dames & Moore personnel are on file at the Coconino National Forest Supervisor's Office in Flagstaff.

Table 6
Estimated Scope of Field Investigation and Analysis

Investigations Focused on the Permanent Right-of-Way and Temporary Use Areas Where Near-Surface Ground Disturbance is Expected in the Crescent Moon Ranch Area

Feature Type	Worker Days To Excavate	Estimated Number of Features	Worker Days
Pit House	20	4	80
Storage Pit/Small Hearth	1	10	10
Large Roasting Pit	2	6	12
Trash Deposit	2	3	6
Inhumation	4	4	16
Cremation	1	1	1
		total	125

Other Field Activities	Estimated Effort	Worker Days	
Surface Collection and Initial Stripping Monitoring*	24,600 sq ft	2	
Trench Monitoring	2,580 sq ft (5% sample)	6	+ six additional trenches along s-curve in the access road
Mapping/Photography		5	
Feature Definition		5	
Final Stripping Monitoring**		1	
Travel		16	
	total	35	

Laboratory Analysis

Artifact Analysis	Number of Artifacts
Ceramics	10,000
Lithics	3,000
Other	50

160 worker days = 20, 8-person crew days (4 weeks of field work)

Special Analysis	Number of Specimens
Inhumations	3
Cremations	1
Float	30
Pollen	15
Faunal	500
Radiocarbon	10
Obsidian	5

This level of field effort equates to an estimated 6 weeks of analysis, with an additional 5-6 weeks of report preparation and project close-out efforts.

* initial removal of vegetation and loose rock as needed within the 20-foot-wide permanent right-of-way
** stripping within the permanent right-of-way to search for human remains in site areas

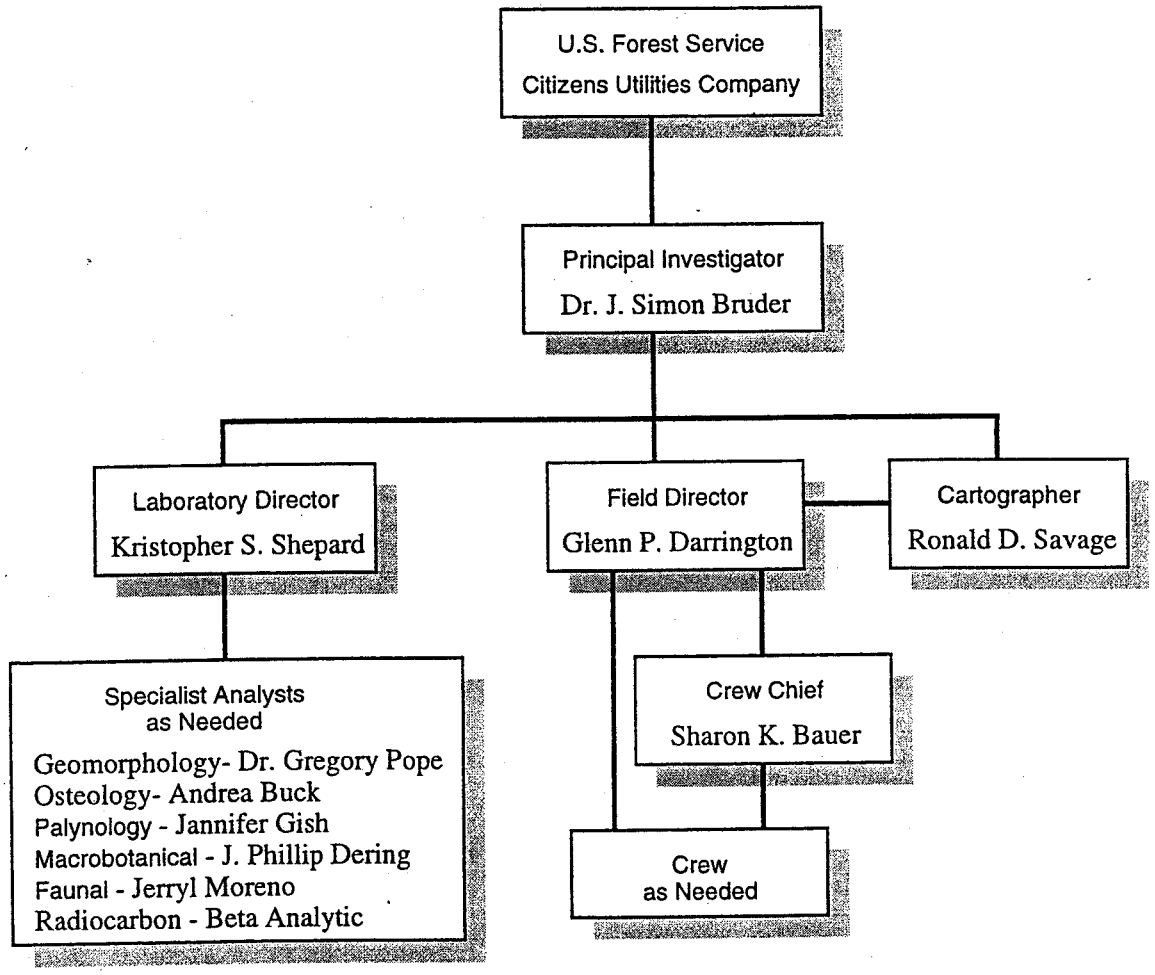


Figure 16 Proposed Study Team

CONCLUSION

Implementation of this treatment plan should serve to partially mitigate the adverse effects of the Sedona Pipeline Project on historic properties located within the Coconino National Forest. The Forest will use this plan to satisfy the requirements of the MOA and thus conclude their Section 106 consultation for this undertaking.

Sedona Pipeline Project

Cultural Resources Inventory and Treatment Plan Addendum

Dames & Moore Intermountain Cultural Resource Services

Research Paper No. 36A

Prepared for:
Citizens Utilities Company

Lead Federal Agency
Coconino National Forest
CNF Project 96-44A

1996

DAMES & MOORE
INTERMOUNTAIN CULTURAL RESOURCE SERVICES
RESEARCH PAPERS

J. Simon Bruder, General Editor

Number 36A

SEDONA PIPELINE PROJECT
CULTURAL RESOURCES INVENTORY AND TREATMENT PLAN ADDENDUM

1996

The Dames & Moore Intermountain Cultural Resource Services Research Papers publishes the results of archaeological and ethnographic research and cultural resource management studies conducted primarily in the Intermountain West.

Cover Photograph

View Southeast Looking Across Oak Creek at the "V" Site AR-03-04-06-916 (CNF) / AZ O:1:87 (ASM)

SEDONA PIPELINE PROJECT
CULTURAL RESOURCES INVENTORY AND TREATMENT PLAN

ADDENDUM

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Dames & Moore Intermountain Cultural Resource Services
Research Paper No. 36A

Confidential

This report may contain sensitive information about the location of archaeological sites, historic buildings and structures, or traditional cultural resources. Such information is to be distributed only on an as-needed basis in order to prevent vandalism of these resources.

1996

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MANAGEMENT SUMMARY

Agencies: U.S. Forest Service, Coconino National Forest, Sedona Ranger District

Project Title: Sedona Pipeline Project

Project Number: Dames & Moore Job Number 04738-006-050

Project Description: The proposed project will involve construction by Citizens Utilities Company (CUC) of a buried, 6-inch natural gas pipeline approximately 8 miles long, designed to provide improved service and reliability to residents and businesses in the Sedona area. Conduit for possible future use by telecommunications or electrical utilities will be buried adjacent to the pipe. The federal undertaking for which the investigation reported here was conducted will be issuance by the Coconino National Forest of a special use permit to CUC for construction of the pipeline across lands administered by the Forest, and granting of a 20-foot-wide permanent right-of-way along the pipeline route. The ancillary survey reported here was performed to inventory privately-owned land not included in the initial inventory report. As lead agency for the project, the Forest requires that privately-owned lands that might be affected by the proposed pipeline be intensively inventoried and that cultural resources identified in the area of potential effect be recorded and evaluated for their significance.

Location: The project area is located in Yavapai and Coconino counties, approximately 2 to 3 miles south and west of downtown Sedona, predominantly within the Coconino National Forest. The proposed route follows existing corridors south of Table Top Mountain. Intensive pedestrian cultural resource survey of privately-owned land was conducted in Sections 10, 15, 23, 25, and 26 of T17N, R5E and in Sections 19 and 30 of T17N, R6E as depicted on the Sedona 7.5 minute U.S. Geological Survey (USGS) quadrangle.

Number of Acres Surveyed: Approximately 57 acres of privately-owned land were intensively surveyed during the ancillary inventory reported here.

Personnel and Dates of Effort: Dr. J. Simon Bruder served as principal investigator. Glenn P. Darrington was the field director assisted by Kristopher S. Shepard. The survey was conducted from 9 to 10 September 1996. The fieldwork accumulated to four person days of effort.

Number of Properties: We searched for and evaluated one previously recorded archaeological site and recorded three isolated occurrences.

Listing of Recommended Eligible Properties: none

Comments: The integrity of site 857 (AR-03-04-06-857 [CNF], AZ O:1:73 [ASM]), a can scatter, has been severely degraded by erosion and probably by human activities as well. We recommend that the site is not eligible for inclusion on the National Register of Historic Places because it lacks information potential. No treatment is recommended.

INTRODUCTION

Citizens Utilities Company (CUC) is proposing to construct a new natural gas pipeline in the vicinity of Sedona, Arizona (Figure 1). Dames & Moore was retained as a third-party consultant to conduct an environmental assessment (EA) of the proposed project under the direction of the Coconino National Forest (the Forest) (Coconino National Forest 1995). We prepared a cultural resource inventory and data recovery plan to supplement that assessment as well as to provide a basis for compliance with historic preservation regulations (Shepard and Bruder 1996). Our survey of federal lands was conducted under the terms of a special use permit dated 3 March 1995 issued to Dames & Moore by the Coconino National Forest for nondisturbing-noncollecting archaeological survey. Additionally, the research design for data recovery is intended as the basis for Dames & Moore's application to the Forest for a special use permit to conduct the proposed research in compliance with the Archaeological Resources Protection Act. This addendum to that report documents additional cultural resource survey undertaken to inventory privately-owned land that CUC plans to cross with the pipeline.

The preferred proposed pipeline route originates at the existing City Gate Regulator Station, and generally follows existing corridors south of Table Top Mountain, eventually terminating at the intersection of Highway 179 and Pine Knolls Drive (Figures 2 and 3). (Existing pipe will be used to carry the gas from the intersection of Highway 179 and Pine Knolls Drive to the Morgan Wash Regulator Station.) Privately-owned land was surveyed in sections 10, 15, 23, 25, and 26 of T17N, R5E and sections 19 and 30 of T17N, R6E as referenced on the Sedona, Arizona 1969 USGS 7.5 minute quadrangle.

A description of the project background, regulatory requirements, overall study goals, inventory methods, natural environment, and cultural setting was presented in the initial survey report and is not repeated here. The subsequent sections of this addendum document the scope of our additional fieldwork, the results of the survey, and conclusions that summarize our recommendations with regard to significance and effect.

SCOPE OF FIELD SURVEY

The overall goal of this study was to provide documentation that the Coconino National Forest could use to continue Section 106 consultation with the Arizona State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation. Specifically, our intent was to thoroughly inventory cultural resources located on privately-owned land that might be affected by the proposed pipeline, evaluate the significance of those resources, and assess potential impacts on resources recommended as eligible for listing on the National Register of Historic Places.

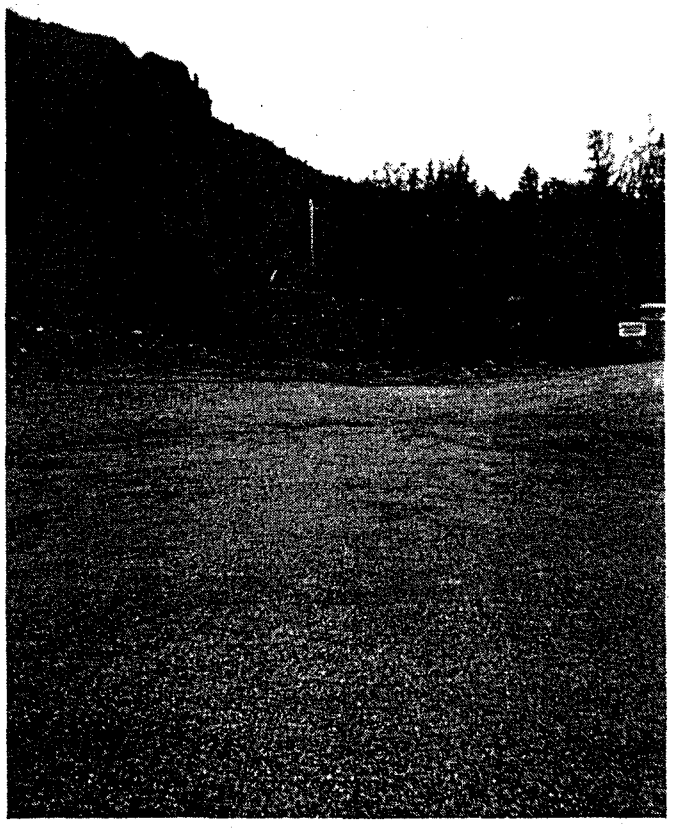
Dr. J. Simon Bruder served as the principal investigator. The field survey was undertaken by Glenn P. Darrington, serving as field director, and Kristopher S. Shepard. The supplemental survey was conducted during a single episode of fieldwork on 9 and 10 September 1996. A total of four field person days was expended in the effort.

We undertook intensive pedestrian surveys consisting of 20-meter-wide (60-foot-wide) transects on either side of roads the proposed route will follow across privately-owned land. With a single exception, pipeline installation on private land will be either within existing roads or immediately adjacent to them (but within existing road rights-of-way). The single exception is a short cross-country stretch between the east bank of Oak Creek and Back-O-Beyond Road. A 200-foot-wide corridor was surveyed along that stretch. A total of approximately 57 acres inventoried during this effort. The intensive inventory areas are depicted on Figure 3 and included:

- 120-foot by 4,800-foot along Bristlecone Pines Road (Link 120)—13 acres
- 120-foot by 1,100-foot along Navoti Drive (Link 130)—3 acres
- 120-foot by 700-foot along Upper Red Rock Loop Road immediately south of SR 89A (Link 30)—2 acres
- 120-foot by 2,600-foot along Chavez Ranch Road (Link 60)—7 acres
- 200-foot by 900-foot along the cross country segment from Oak Creek to Back-O-Beyond Road (Link 72)—4 acres
- 120-foot by 5,500-foot along Back-O-Beyond Road (Link 73)—15 acres
- 120-foot by 4,300-foot along city streets through Indian Cliffs and Chapel Bell Estates subdivisions (Link 74)—12 acres
- 120-foot by 1,200-foot along Pine Knolls Drive (Link 100)—3 acres

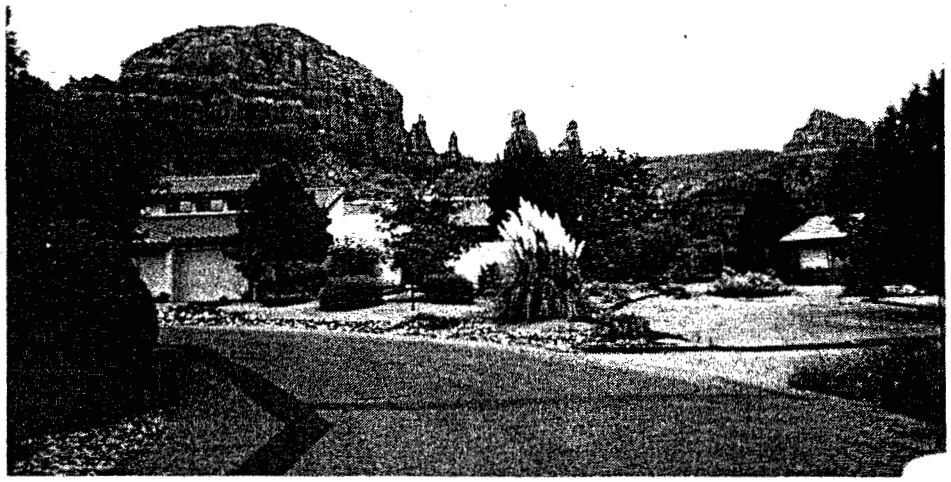
We encountered two basic types of land use during the intensive pedestrian inventory. These can be characterized either as highly developed (that is, heavily disturbed) or relatively undeveloped. The former comprised the majority of the privately-owned land within the study area.

Disturbances to the natural setting include landscaping and paved driveways and city streets. In many cases, landscape rocks had been brought in and spread to completely cover the underlying surface. In a few instances we were afforded a relatively unobstructed view of the surface in lots that had been bladed or otherwise subjected to heavy equipment use, but not totally developed. Photographs 1 through 5 exemplify stretches of the preferred alternative on private land that exhibit major disturbance or development.

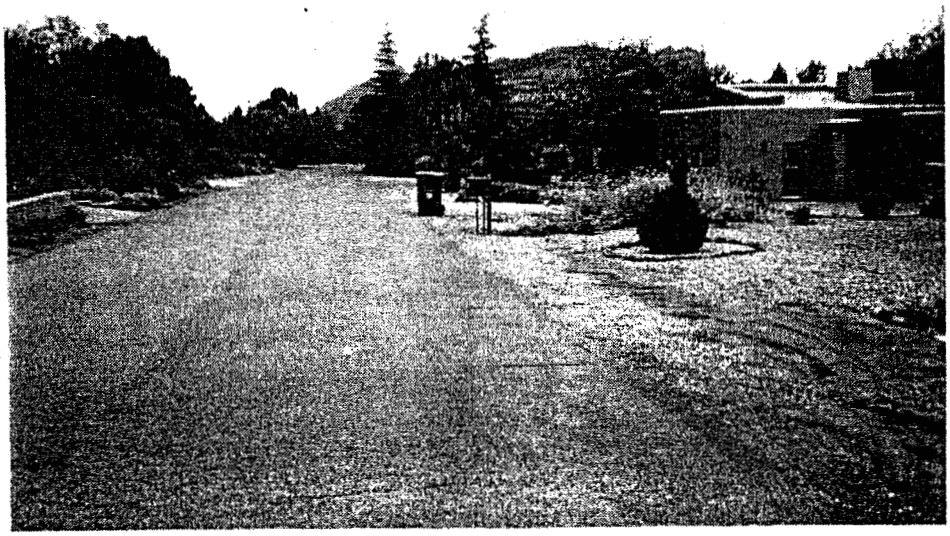


Photograph 1. Southern Terminus of Pine Knolls Drive. This view to the southwest documents the level of development that has been undertaken on privately-owned land compared to the Forest beyond.

We were able to inspect the natural surface within the areas that remain relatively undeveloped including the southern portion of Bristlecone Pines Road (Link 120), Navoti Drive (Link 130), Upper Red Rock Loop Road (Link 30), and along Back-O-Beyond Road (Links 72 and 73)—totaling approximately 23 acres. Photographs 6, 7, and 8 are examples of land that remains relatively undeveloped, although not entirely free from disturbance.



Photograph 2. Example of Heavily Developed Privately-owned Land within the Indian Cliffs and Chapel Bell Estates Subdivisions. This view to the east from the intersection of Antelope Drive and Lynx Drive demonstrates the complete obliteration of the natural surface in this area.

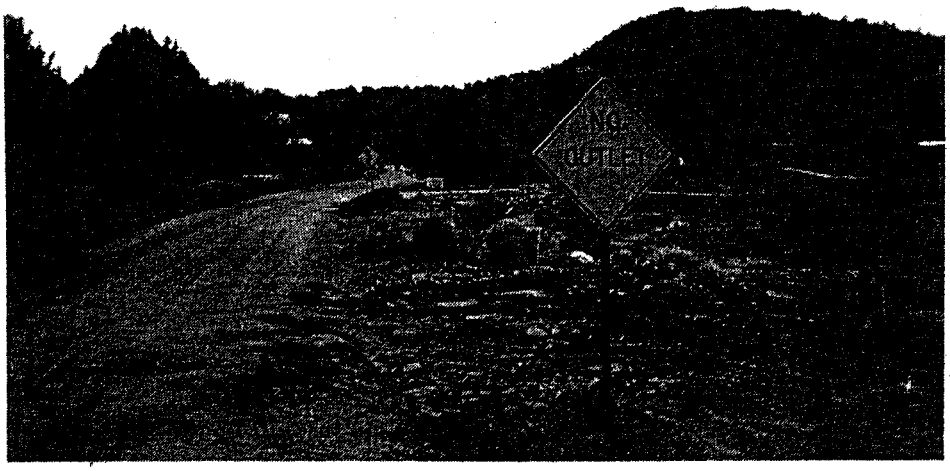


Photograph 3. Example of Developed Privately-owned Land within the Indian Cliffs and Chapel Bell Estates Subdivisions. This view to the south along Antelope Drive demonstrates the generally poor visibility of the natural surface along this portion of the proposed pipeline route.

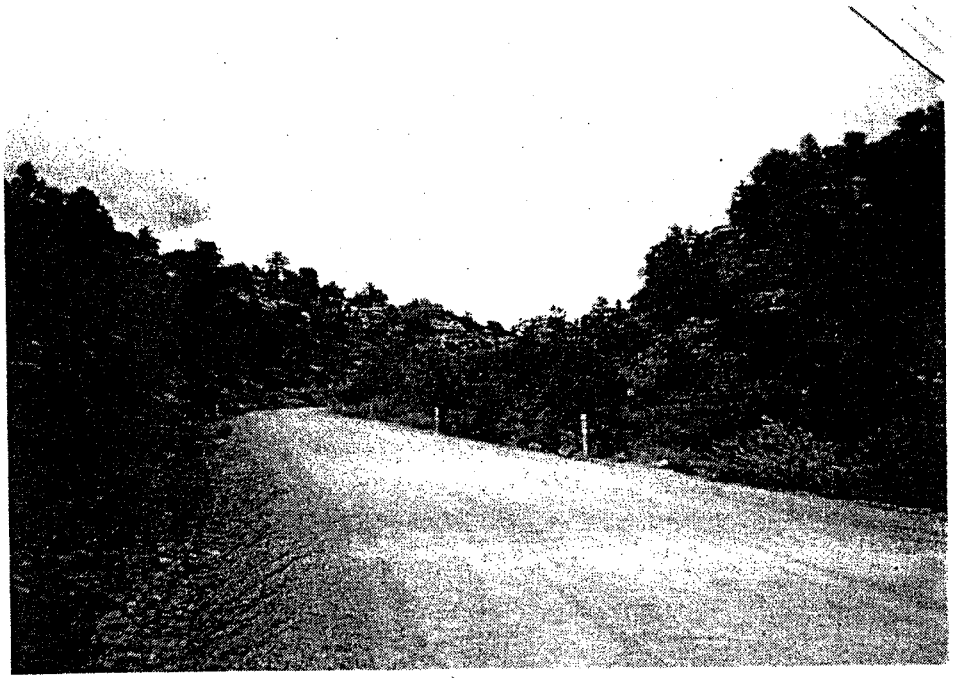
Photograph 4. Example of Somewhat Disturbed Privately-owned Land. This view to the north-northwest along Bristlecone Pines Road demonstrates partial visibility of the natural surface along the proposed pipeline route.

Photograph 5. Example of Privately-owned Land with Little Disturbance. This view to the east along Chavez Ranch Road illustrates a moderate level of development along this portion of the proposed pipeline route.

Photograph 6. Example of Relatively Undeveloped Privately-owned Land. This view to the northeast along Navoti Drive documents the natural surface immediately adjacent to the graded roadbed.



Photograph 7. Example of Disturbed Area Along Back-O-Beyond Road. This view to the west taken near Highway 179 documents recent ground disturbances adjacent to the graded road.



Photograph 8. Example of Relatively Undisturbed Privately-owned Land. This view to the east-northeast illustrates that the majority of land beyond the crowned and ditched Back-O-Beyond Road remains natural.

SUMMARY

We encountered a total of three isolated occurrences and re-recorded one historic archaeological site during the intensive pedestrian inventory of the privately-owned land within the proposed pipeline corridor. Site 857 (AR-03-04-06-857 [CNF], AZ O:1:73 [ASM]), a previously recorded historic can scatter dating to the 1940s, was found to have suffered significantly from a probable combination of erosion and human activities. The site has been disturbed to such a degree that we recommend it should be considered as not eligible for listing on the National Register and, in fact, downgraded to isolate status.

We recommend that the recording of the three isolated occurrences and re-recording of site 857 has realized their information potential. Because no cultural properties were encountered that are considered eligible for listing on the National Register during our intensive pedestrian inventory of privately-owned land along the proposed pipeline route, no treatment (other than that recommended for sites on the Forest by Shepard and Bruder [1996]) is recommended.

Appendix C

December 1997

water, sewer, gas & cable

underground construction

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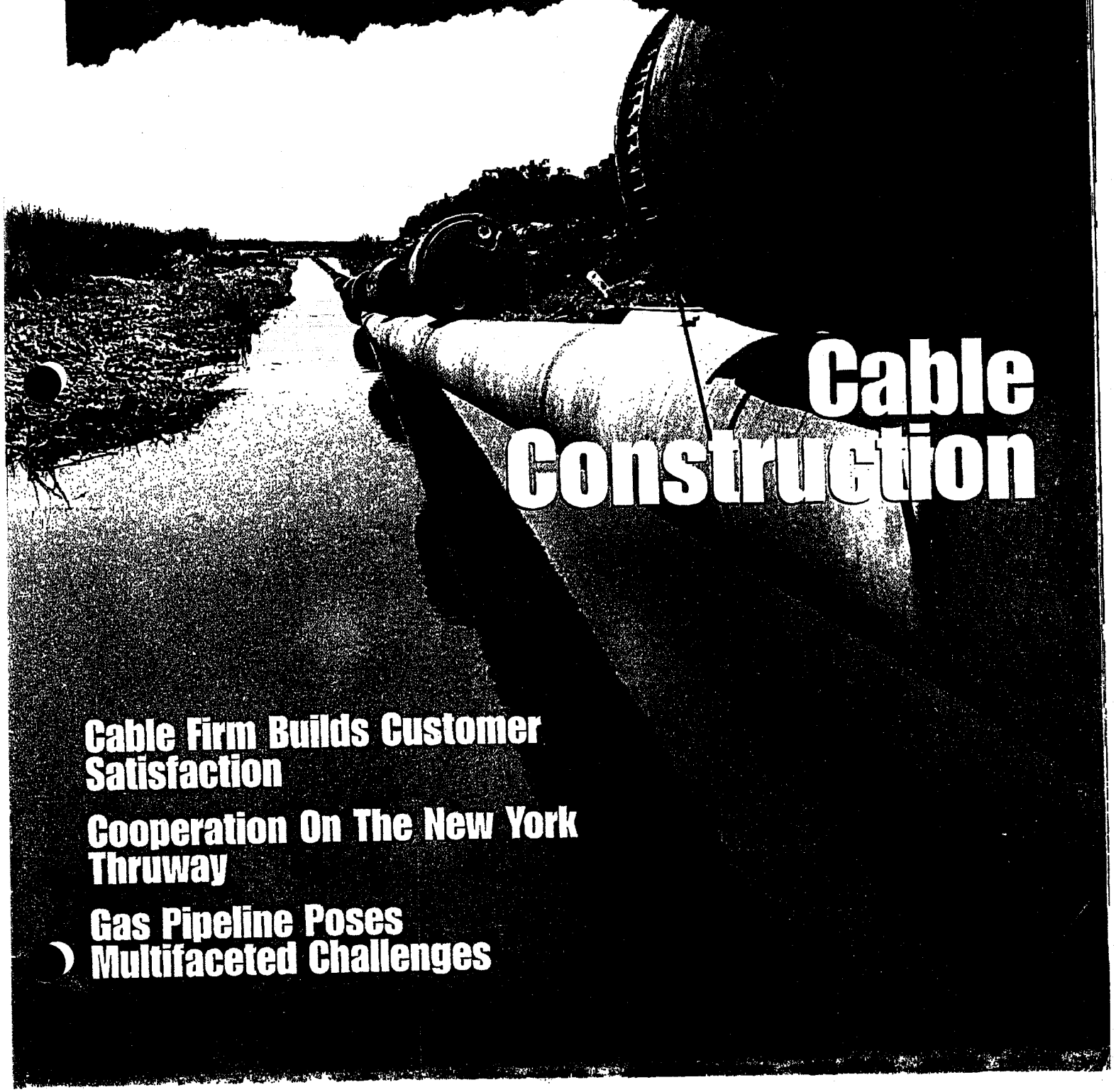
UCT '98 Preview



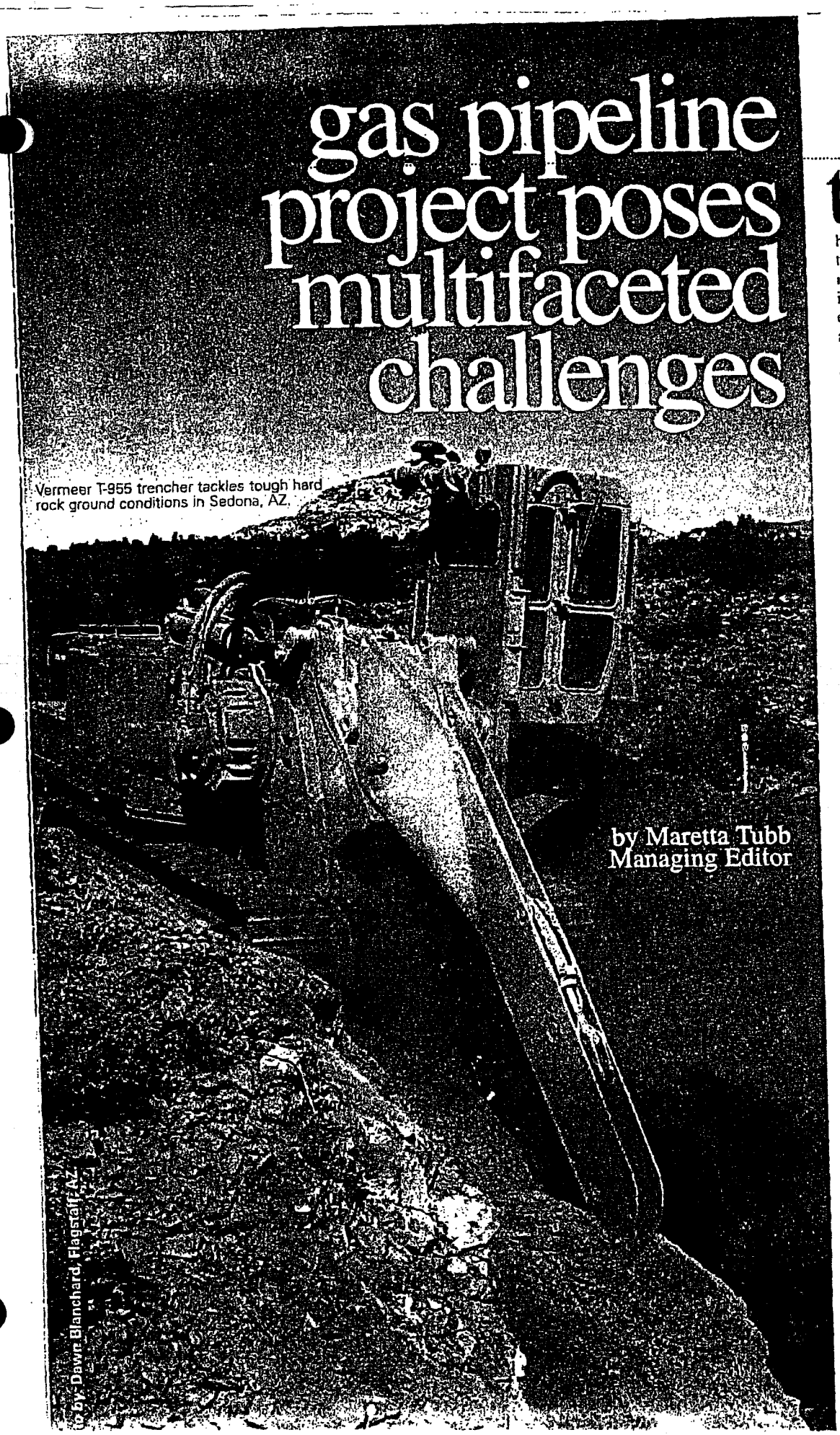
Cable Construction

Cable Firm Builds Customer Satisfaction

Cooperation On The New York Thruway

Gas Pipeline Poses Multifaceted Challenges

gas pipeline project poses multifaceted challenges



Vermeer T-955 trencher tackles tough hard rock ground conditions in Sedona, AZ.

Photo by Dawn Blanchard, Flagstaff, AZ

by Maretta Tubb
Managing Editor

The successful installation of an 8 ½ mile high pressure gas pipeline in Sedona, AZ, has demonstrated the proliferation of demands utilities and municipalities face in providing needed infrastructure for environmentally sensitive areas.

Work on the recently completed pipeline was performed for the Citizens Utilities Co.'s (CUC) Arizona Gas Division. CUC's Division Engineer, Robert J. Franson, P.E., notes that just the permitting required almost three years.

Franson said CUC's involvement in the Sedona project came about after the company purchased the Arizona operations of Austin, TX-based Southern Union Gas Co. in 1991. At that time, the Arizona Corporation Commission called on CUC to develop a plan to solve northern Arizona's immediate natural gas capacity shortage and provide for future growth in the area.

In response to the Commission's request, CUC engineers and managers carefully evaluated the overall need for the project and determined that a 50-mile "looped" pipeline system was needed in Sedona and the Verde Valley to increase and maintain a reliable natural gas distribution system.

Franson said CUC's overall plan called for a phased development scheme. Central to the plan was selecting an appropriate pipeline route.

He noted that Sedona is situated in the heart of central Arizona at an elevation of 4,500 feet. Just 30 miles south of Flagstaff and surrounded by the Coconino National Forest, it is a sought-after mecca that attracts artists, writers, entrepreneurs and four to five million tourists each year.

Franson said, "We knew from the outset the planned project posed some challenges. Shortly after reviewing details of the proposed pipeline project, the Coconino National Forest (Sedona Ranger District), the lead federal agency, determined that an environmental assessment (EA) was required in order to

analyze the potential impact of the planned project."

At that time, Dames & Moore, an environmental consulting firm, was retained as a third-party consultant to perform the environmental studies required for the EA under the direction of the National Forest.

Along with the EA, public scope meetings were held to solicit comments from the general public and other interested parties on the project.

concerns

Franson said the two major issues and concerns identified during the public comment period included:

- Impacts to visual quality and aesthetics in Sedona;
- Proliferation of utility corridors on national forest lands in the Sedona area.

As for the EA, according to Dames & Moore's J. Simon Bruder, principal investigator for the cultural resource aspects of the project, the survey team identified several undocumented prehistoric archaeological sites. Subsequently a treatment plan was designed to guide the mitigation of any 'verse effects resulting from the project.

CUC agreed to fund data recovery at these sites and worked with Dames & Moore researchers in developing a data recovery plan to mitigate the adverse effects of the pipeline construction as well as possible future impacts associated with maintenance and repair operations.

The main focus of the data recovery program included total collection of surface artifacts within the area of potential effect and systematic subsurface investigations.

According to Bruder, a backhoe was employed to investigate the subsurface within the work zone. A total of 420 linear feet of backhoe trench was excavated and inspected for evidence of cultural features or deposits. The principal finding during the subsurface investigation was the discovery of a cemetery that contained human remains.

With the exception of the burials, no cultural features were defined within the site. The fieldwork was concluded after the backhoe was used to scrape areas in the work zone to ensure that no cultural features were missed that could be disturbed during construction activities.

Bruder said the recovered artifacts from the area will provide intriguing data about the lifestyle of the individuals who made this area their home approximately 1,000 years ago.

At the conclusion of the EA, CUC agreed to 23 mitigation measures and won approval to construct an 8 1/2 -mile, 6-inch diameter high pressure natural gas pipeline. The route approved for the line was located to the south of the City of Sedona proper. Its starting point was a connection to the City Gate and terminated at a proposed Back-O-Beyond regulator station at Morgan Wash. Construction drawings and specifications were developed by Sunrise Engineering of Fillmore, UT.

Some 3.7 miles of the line was to be located in the Coconino National Forest. The remaining four miles crossed various private lands via existing or right-of way/easement to be acquired. The project also included a horizontal directional bore extending more than 1,400 feet under Oak Creek - a designated unique water area of Arizona - and the construction of several new regulator stations.

The CUC representative added that although a decision was made early on to conduct the horizontal directional drill (HDD) portion of the project first, the open trench segment portion of the job was bid separately, but at the same time.

"While the bid for the HDD was awarded to Mears/HDD, Rosebush, MI," he said, "the dozen or so bids submitted by contractors for the open trench work exceeded budgeted costs and had to be rejected."

Later, the open trench work was divided into four separate spreads and re-bid. Two local contractors - Northern Pipeline Inc. and Pacific Industrial Pipeline Co. (PIPCO) - placed the winning bids. Northern Pipeline won bids to construct spreads one, two and three, and PIPCO was awarded the bid for spread four.

horizontal directional drill

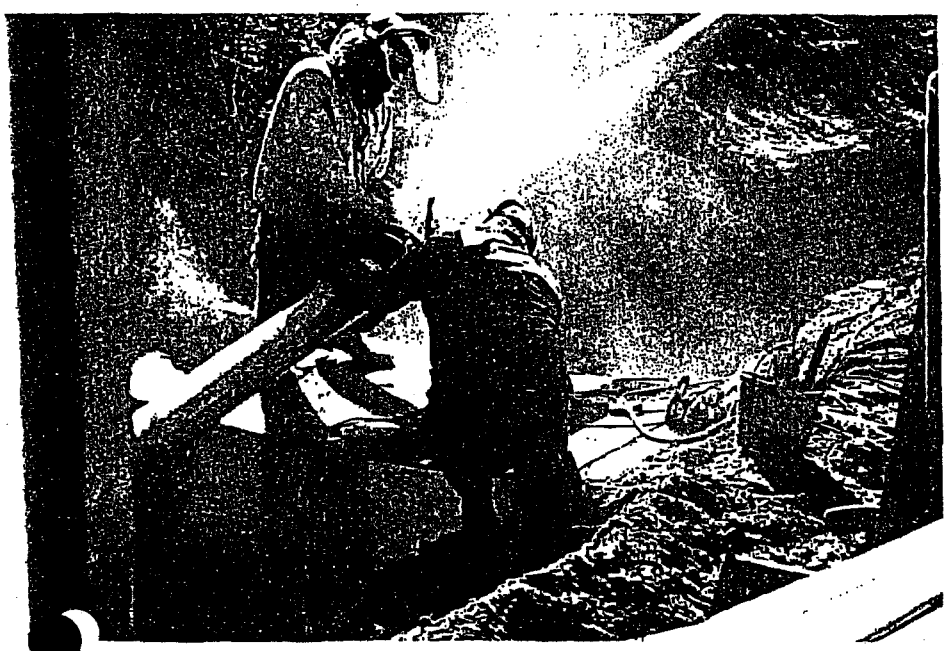
According to Franson, HDD activity on the project began in March 1997.

In describing the participation of the respective parties involved, Franson said that J. D. Hair & Associates, Tulsa, OK, was charged with developing specifications and engineering details for the directional drill; Mears/HDD was contracted to perform the 1,400 foot crossing; and Northern Pipeline contracted to fabricate the pipeline for the HDD.

In preparation for the drill, Mears/HDD Inc.'s President Herbert Fluharty said crews assembled an equipment spread on the east side of Oak Creek. Among the larger equipment items was an American Augers DD90 directional rig, a backhoe and side boom tractor. The DD90 included three large frac tanks. Two tanks were used for water storage since no water was allowed to be taken from Oak Creek. The third tank was used for drilling fluid storage if problems were encountered.

"The job," said Fluharty, "was located on private property. Obviously the bore needed to be made with as little disturbance to the site as possible."

To compound the problem, the creek crossing was located at the base of Cathedral Rock – a massive rock formation,



Limited access challenged welders and crews preparing the pipe to be lowered into the trench.

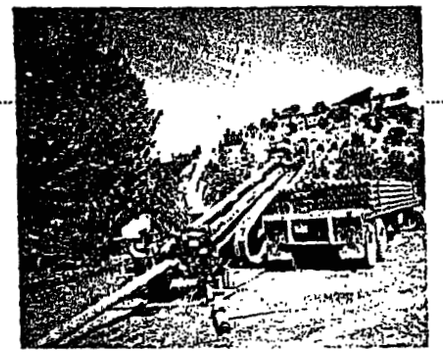
pipeline . . .

towering 800 feet high, an eighth of a mile long and about a half mile wide. Central to new age religion, it is among the most photographed landmarks in all of Arizona.

Brian Hallan, Northern Pipeline's northern Arizona superintendent said, "Since we were dealing with a coated gas line, federal mandates made it necessary to keep corrosion control voltages on the line. This was particularly critical since there would be no way of correcting or retrieving the line from under the creek in the unlikely event something cropped up."

Selected for this phase of the project was X-42 steel pipe with a 6-inch diameter and .312 wall thickness. Before being supplied to the job site, Bredero Price, Inc. factory coated the pipe with 30 MILS of external fusion bonded epoxy and an outer coating of 80 MILS of Powercrete.

The crossing, which reached a full 30 feet below the bottom of Oak Creek, kept crews busy for almost two weeks. Kurt Peterson, Mears/HDD drilling foreman for the project, said solid sandstone was



A Mears crew readies their American Augers DD90 directional rig.

encountered over almost the entire length of the drive which made for a very clean hole.

Nevertheless, the drive presented several challenges. First, a frac was encountered during the drill and grouting was attempted.

Following the frac, the job was briefly delayed again when the drill motor went bad. This was resolved the next day, however, additional difficulties were encountered as the motor was pulled back. In spite of these temporary setbacks, the drill through solid rock was completed in 14 days, well ahead of CUC's deadline.

There were also some tense moments at punch through when the drill surfaced about 10 feet from its target in a culturally sensitive area. At about 15 feet below the surface, the sandstone ended and the drill encountered large boulders and cobbles, Peterson explained. This bounced the drill motor around and made for a tough exit the last 15 to 20 feet.

At that time, it became clear that the only way to pull the pipeline back through the bore hole was to excavate 15 feet down to the bedrock. "Unfortunately," Peterson said, "we had a little problem with the excavation too, since the punch through came at a location outside the original archeological study area."

This prompted immediate action by CUC. All the enforcing agencies were contacted along with Dames & Moore, who expedited the arrival of archeologists to the site. As quickly as the survey was completed by archeologists and the go ahead given, Northern Pipeline's crews were busy preparing the exit location.

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The X-42 steel pipe used on the HDD portion of the job was given a factory coat of external fusion bonded epoxy and 80 MILS of Powercrete by Bredero Price Inc.

The materials excavated from this location consisted of good size boulders and cobblestones. All told, crews cleared a 1,600 square-foot area to depths of 4 feet to provide sufficient space to string the 6-inch diameter pipe to be pulled into the bore hole.

Hallan pointed out that the site is located on the historic and archeologically significant 60-acre Crescent Moon Ranch that was acquired by the U.S. Forest Service in 1980. Limited access made it impossible for crews to lay out the pipe and make the necessary connections for a continuous 1,400 foot pull. Instead, four 350-foot pipe sections were welded up and pulled into the bore hole. This caused stoppage during the pullback to facilitate tying in each section.

Northern Pipeline, charged with the pipeline fabrication for the pull-back, supplied the required welders, coaters, fitters and all the machinery on the pipeline side of the pull. For the joints prepared prior to the pull-back, Powercrete-J was applied to the sand blasted steel pipe. Martin Anaya, CUC's corrosion supervisor said, "This was the preferred joint coating, but to allow the tie-ins to be coated quicker, Portol 7000 was used."

CUC Inspector Steve Ross indicated they were pleased with the final results. "Protol 7000 worked great on the girth welds," he said. "We were only down for about an hour each time the procedure was repeated."

mainline construction

For the most part, contractors performing the open trench portion of the project were faced with cutting trenches in solid rock ground conditions and working in extremely environmentally sensitive surface areas. Crews were required to provide a bottom trench generally 2-feet- wide and of sufficient depth to provide a minimum of four feet of cover over the top.

As to the line length on the three spreads constructed by Northern Pipeline, it measured approximately six miles and crews had to deal with hilly and mountainous like terrain. The difficulty of the extreme slopes was compounded by the hard rock ground conditions.

When possible, to get trenches cut in the rocky soils, Northern Pipeline crews subcontracted the trenching to Tiffany Construction Co., Phoenix. Tiffany's equipment spread included a Vermeer T-955 track trencher. Weighing in at 96,000 pounds and equipped with a CAT 360 horsepower power pack, the trencher was

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well-suited to the hard ground conditions. It provided the horsepower needed to power the digging chain against the trench face, and the weight necessary to stabilize the machine.

Conversely, Pacific Industrial Pipeline was unable to rely on a trencher for its 1 ½ miles of mainline construction work since this section of the pipeline route was not located adjacent to an existing roadway and the corridor allocated within the Coconino National Forest was too narrow to accommodate larger equipment. "Instead," explained Pacific Industrial's project manager Jim Fletcher, "crews basically had to use trackhoes and hoe rams which made it impossible to install over one or two joints of pipe at a time."

A side boom is shown supporting a section of the 6-inch diameter pipe string.

Bruder said the recovered artifacts from the area will provide intriguing data about the lifestyle of the individuals who made this area their home approximately 1,000 years ago.

Another thing that set this portion of the job apart was a joint trench agreement. On approximately a one-mile section, crews installed two 4-inch PVC conduits along Chapel Road. Later, US West will be pulling both fiber optic and copper facilities through the conduits.

Now that phase one of the project is complete, Franson credits final approval of the project to CUC being able to gain local support for the project. "From the outset," he said, "planning efforts were directed to identifying the concerns of everyone involved. Ultimately, local residents, environmental and citizen groups, governmental agencies (local, state and federal) and the Hopi, Navajo Nation, Yavapai Apache and Yavapai-Prescott Tribes were all involved in the final project decision. Without this, we would not have been able to get the project permitted."

Franson also believes the 23 mitigation measures agreed to by CUC helped as well. Among these, the most popular with the public was the construction of a bicycle trail over the majority of the route. Citizen groups strongly supported the construction of both a bicycle path and the undergrounding of existing overhead telephone lines that CUC agreed to.

The primary mitigation measures favored by the Forest Service was ensuring the planned project met all their visual quality objectives.

"As you can see," Franson said, "a number of things made this job particularly challenging. None of which had to do with either the length or size of the planned pipeline."

Ken Anderson, district ranger of the Beaver Creek/Sedona Ranger Districts, Coconino National Forest, is particularly pleased with the working relationship maintained throughout the project with CUC.

While the forest services' permitting process is similar to that of other federal agencies, Anderson believes it is different as well. "We actually helped CUC gain permission to build the line," he said.

Nevertheless, Anderson is amazed at CUC success. "Believe me," he said, "the initial proposal by CUC to construct a 6-inch, high pressure gas line stirred things up."

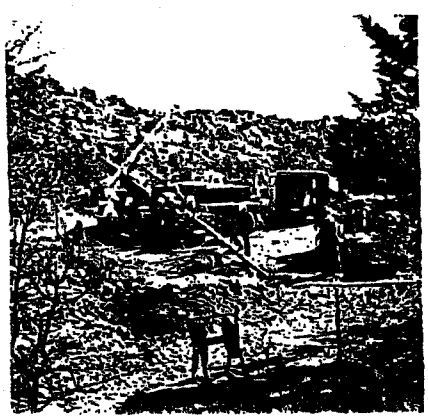
Anderson noted that no one would have predicted the project would actually gain the community support it has enjoyed. "Normally, any permit awarded for a pipeline across national forest lands would have been quickly appealed and the entire matter relegated to the courts where a decision could have been years down the road."

One of the things everyone came to appreciate was the effort CUC put into providing top level management for public meetings and meetings where decision making became essential. "Because of the sincerity they put into solving some of the most controversial issues in real terms, and not necessarily the cheapest possible way, will provide long term benefits for the community," he explained.

The forest service spokesman pointed out that CUC provided money up front for services area communities wanted and actually needed. The joint trench arrangement with US West is a good example of that. "Certainly, the underground placement of telephone lines at another location will benefit that community as well," Anderson said. "CUC not only paid for this and a number of other mitigating factors, it did so in a way that many entities are unwilling to even try."

As to next phase construction, CUC's goal is to complete the entire 50-mile looped pipeline system around the Verde Valley by late 1999.

The environmentally sensitive area made it necessary for Mears/HDD Inc., Rosebush, MI, to complete the 1,400-foot horizontal bore under Oak Creek with as little disturbance to the site as possible.



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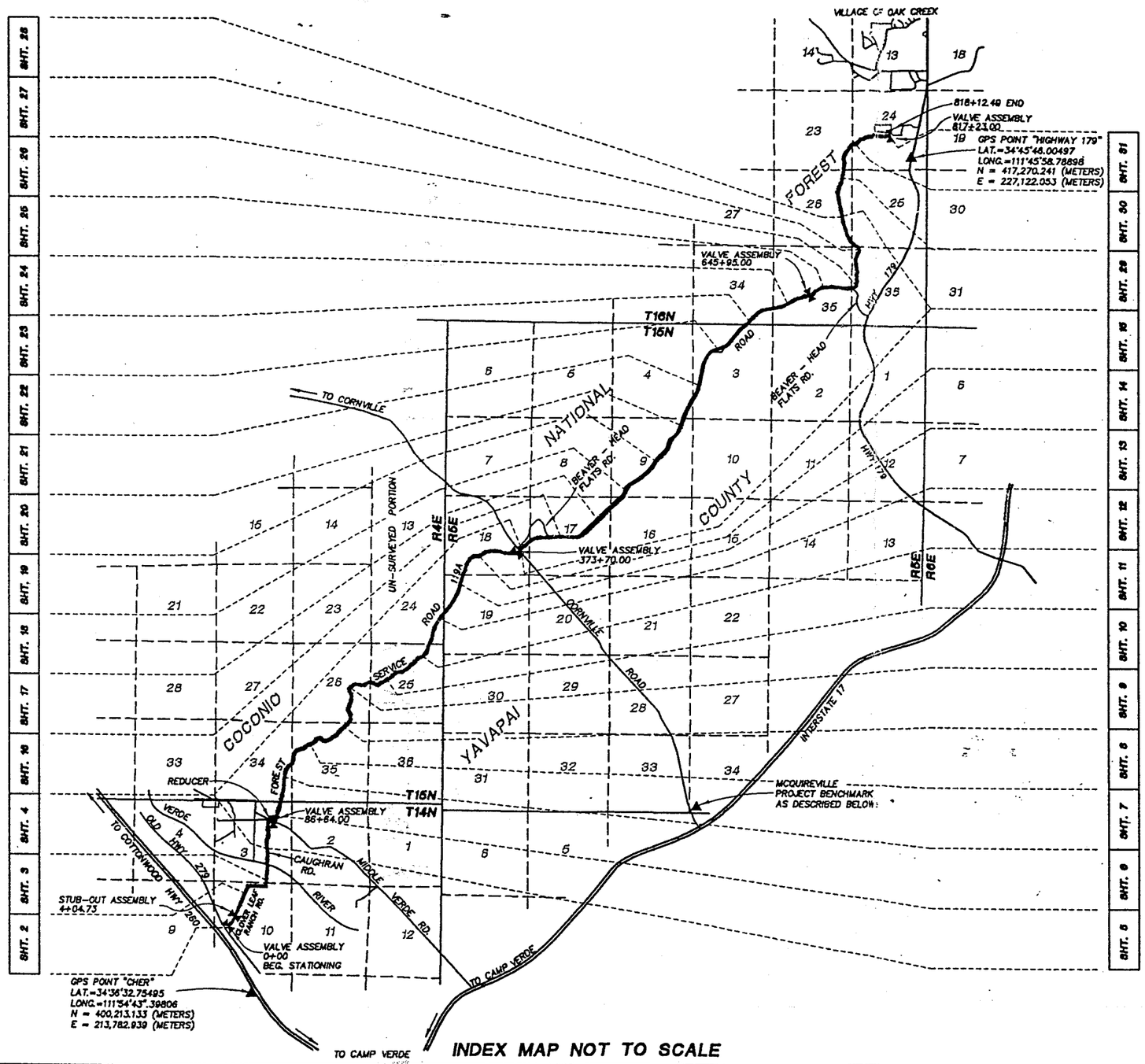
Trenching machines 197
Pipeline contractors 198
Pipe coatings 199

Appendix D



INDEX MAP NOT TO SCALE

N.T.S.

SHEET INDEX

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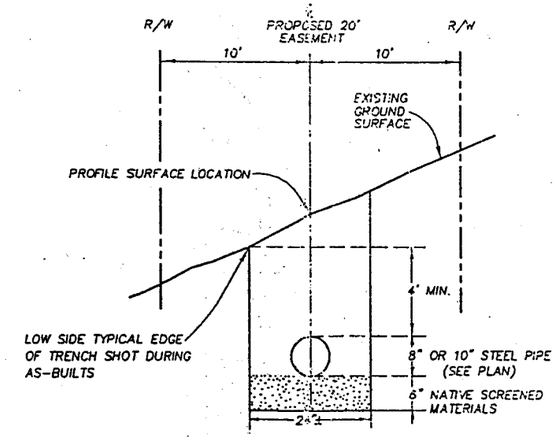
1	INDEX MAP & LEGEND
2-31	PIPELINE AS-BUILT PLANS
32-34	AS-BUILT DETAILS
35-40	INSPECTORS X-RAY SHEETS

PLAN LEGEND

- INDICATES EXISTING 8" OR 10" GAS LINE & CL 20' EASEMENT
- INDICATES 20' RIGHT-OF WAY LINE
- INDICATES EXISTING ROADWAYS

PROFILE LEGEND

- INDICATES TOP OF EXISTING 8" OR 10" PIPELINE
- INDICATES TOP OF TRENCH AT TIME OF CONSTRUCTION
- INDICATES EXISTING GROUND



TYPICAL TRENCH DETAIL
N.T.S.

LEGEND:

TB	TRENCH BREAK
	CATTLE GUARD
—x—	FENCE LINE
IR	IRRIGATION RISER
●	SECTION CORNER
0959525	HEAT NUMBER
149+50.56	HORIZ. STATION
C.T.S.	CATHODIC TEST STATION
H.B.	HORIZONTAL BEND
S.B.	SAG BEND
O.B.	OVER BEND
F.T.G.	FITTING
SEC.	SECTION LINE
T.	TOWNSHIP LINE
R.	RANGE LINE

SURVEY NOTES:

1. ALL STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS-BUILT FIELD LOCATIONS.
2. COMBINED SCALE FACTOR IS BASED UPON A MEAN LOCATION OF 3700 FEET M.S.L. TO REDUCE GROUND DISTANCES SHOWN HEREON MULTIPLY 0.9999608 EQUALS GRID DISTANCE.
3. REFER TO RECORD OF SURVEYS RECORDED IN BOOK _____, PAGE _____ AND BOOK _____, PAGE _____ MULTIPLY 0.9999608 EQUALS GRID DISTANCE.

BENCHMARK:

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STD. NGS. DISK STAMPED "MCGUIREVILLE 1958" LOCATED ON THE EAST R/W. STATE HWY. 179, 6 MILES N. OF CAMP VERDE, 2.5 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER: SECOND CLASS. (EST. BY DIFFERENTIAL LEVELING)

ELEVATION = 3401.21 FT. (NGVD 29, LEVELED IN 1969)

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R.L.S. 36161

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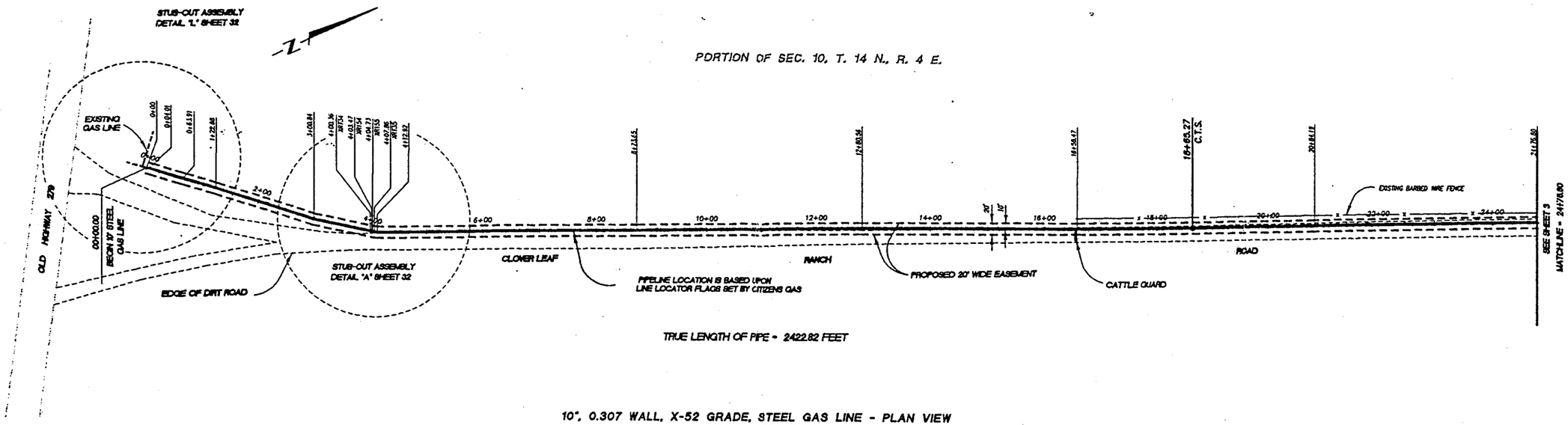
YAVAPAI COUNTY

TITLE SHEET

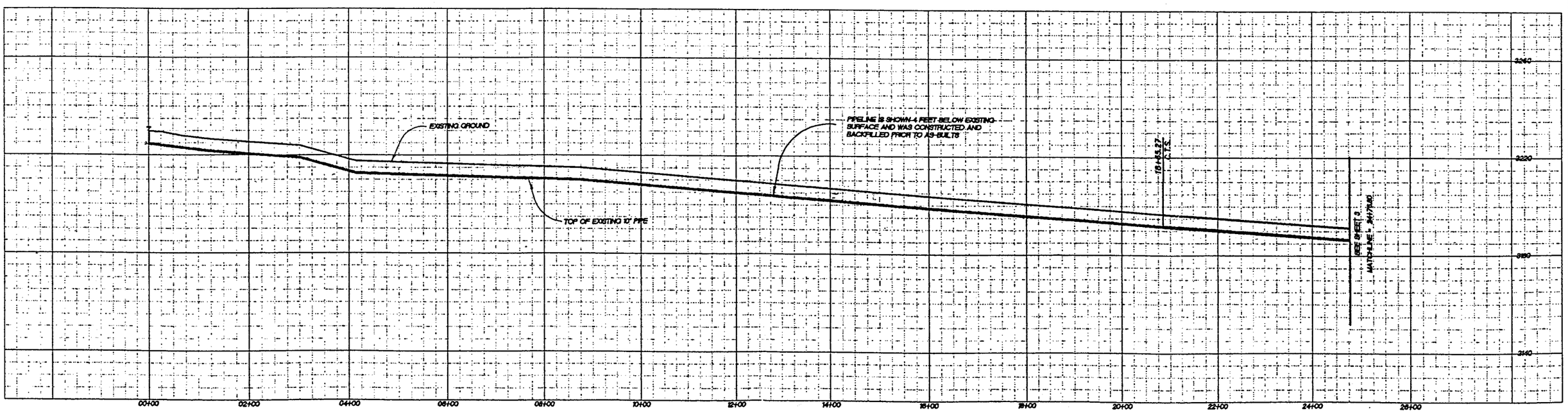
SHEET 1 OF 40

JN: 00490
DATE: 4/12/01

OWNERSHIP: YAVAPAI APACHE NATION



10", 0.307 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



10", 0.307 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ALL STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
●	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

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VERT ORDER: SECOND CLASS.
(EST. BY DIFFERENTIAL LEVELING)

ELEVATION = 3401.21 FT. (NGVD 29, LEVELED IN 1969)

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

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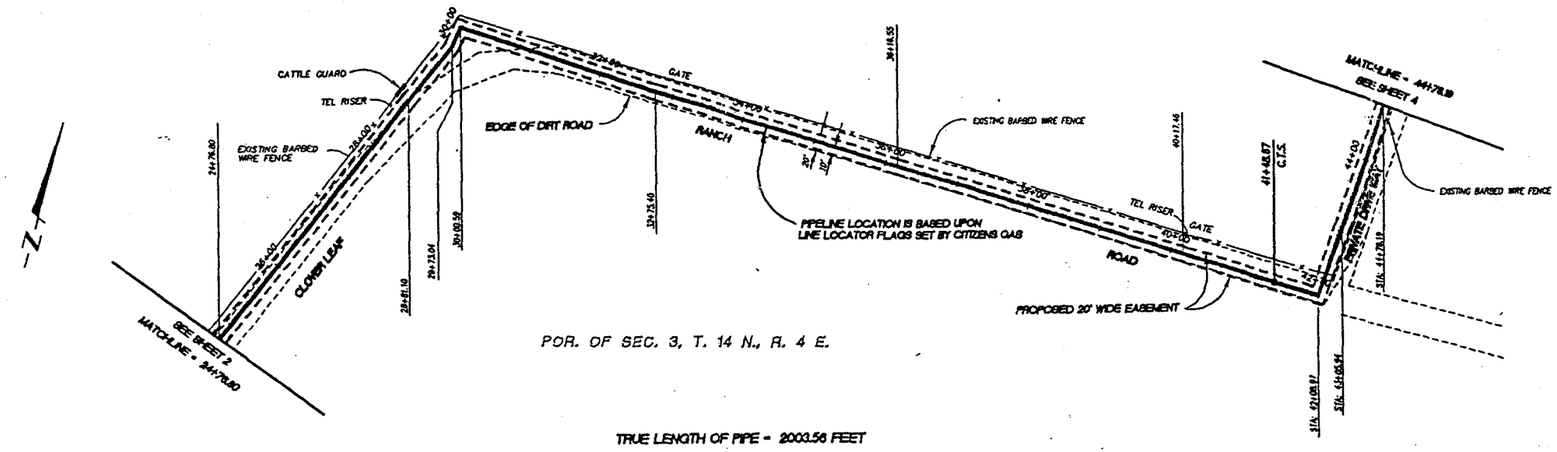
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 00+00.00 to STA. 24+76.80

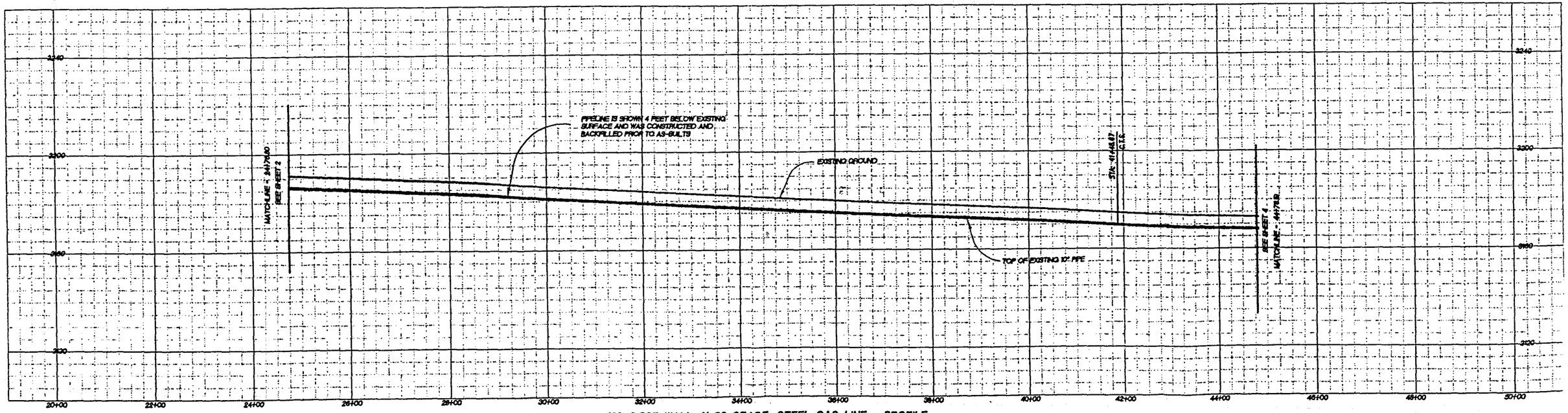
JN: 00490
DATE: 4/12/01

OWNERSHIP: YAVAPAI APACHE NATION



TRUE LENGTH OF PIPE - 2003.56 FEET

10", 0.307 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



10", 0.307 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ALL ...TIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
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— · —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
JR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
●	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL FT. "MCGUIREVILLE"

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VERT ORDER, SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. (NGVD 29), LEVELED IN 1969

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

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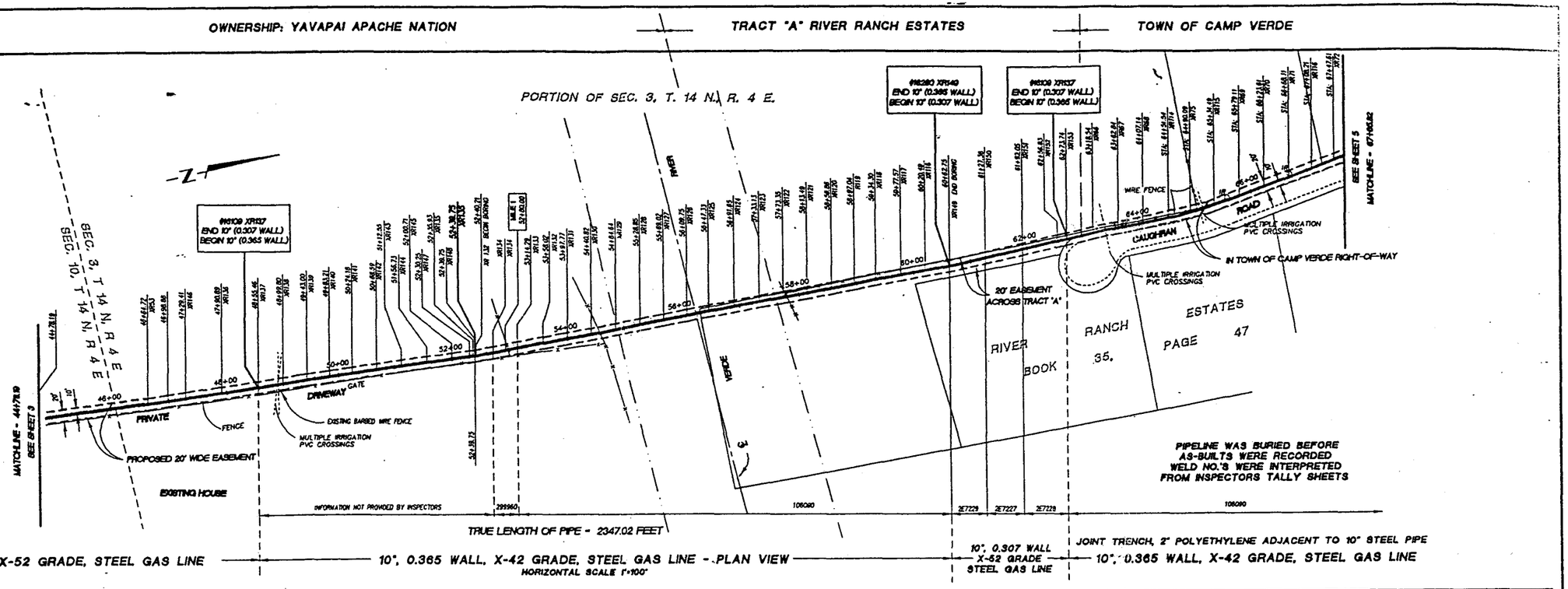
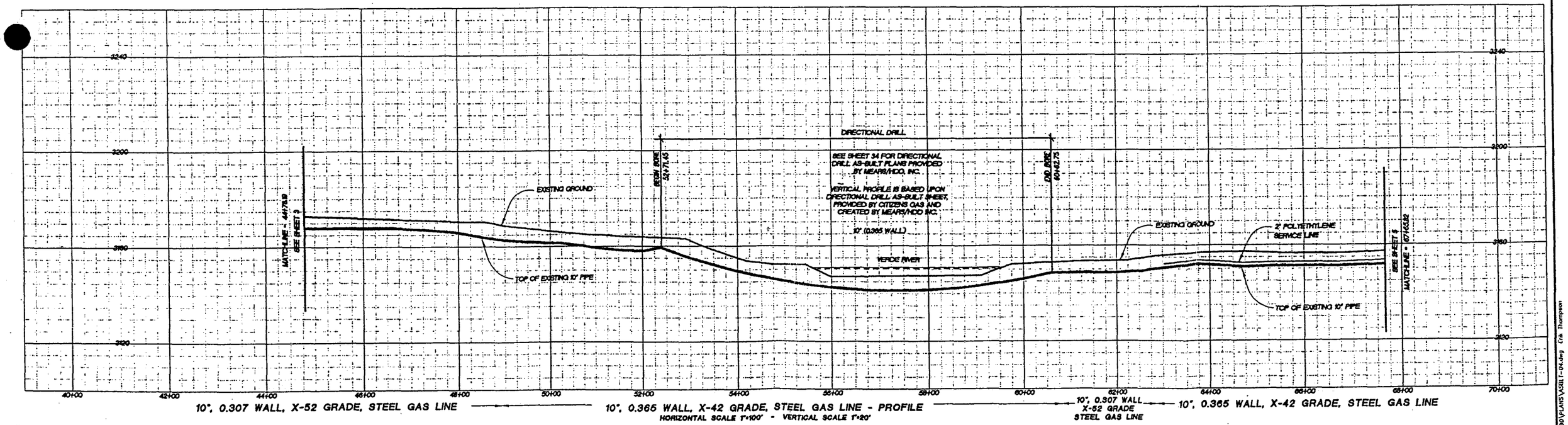
YAVAPAI COUNTY
STA. 24+76.80 to STA. 44+78.19

SHEET 3 OF 40

JN: 0049C
DATE: 4/12/





SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

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	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

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VERT ORDER: SECOND CLASS.
ESST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. NAVD 88, LEVELED IN 1989

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HORIZONTAL SCALE 1"=100'

GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

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YAVAPAI COUNTY

STA. 44+78.19 to STA. 67+65.82

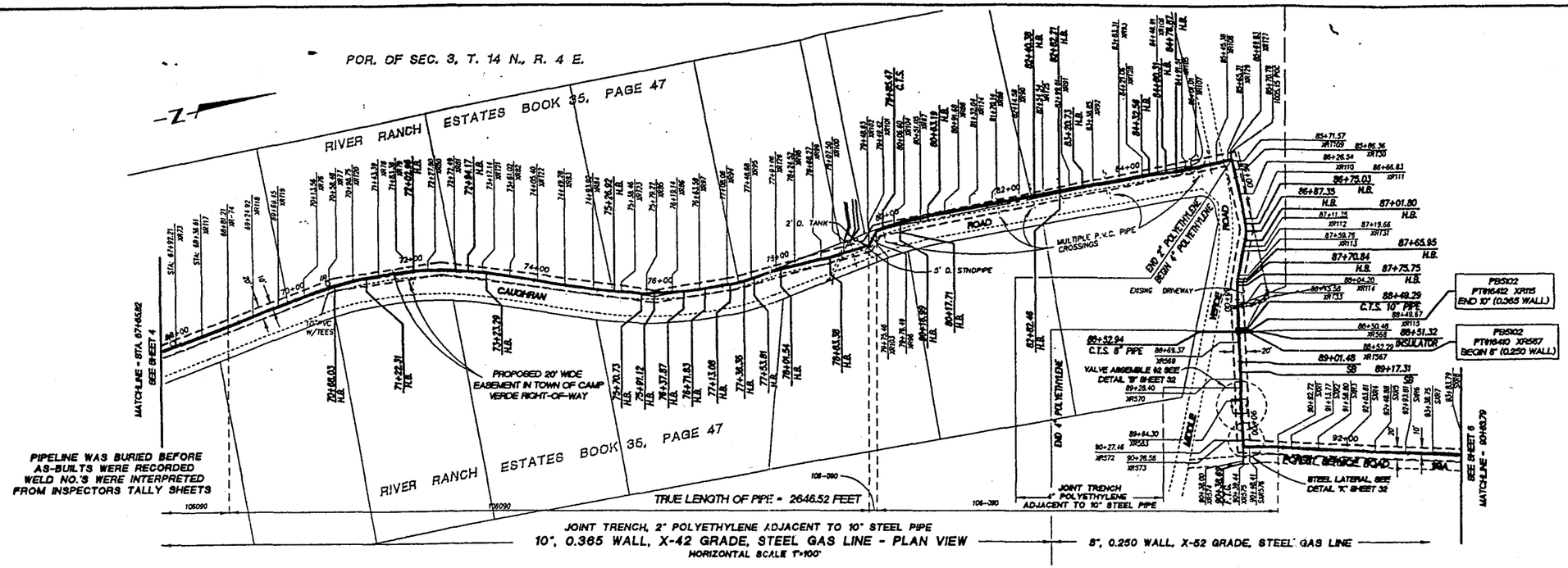
SHEET 4 OF 40

JN: 00490
DATE: 4/12/01

Plotted: 04/24/01 11:13:59 S:\00490\PLANS\ASBUI-04.dwg Cris Thompson

OWNERSHIP: TOWN OF CAMP VERDE

COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA

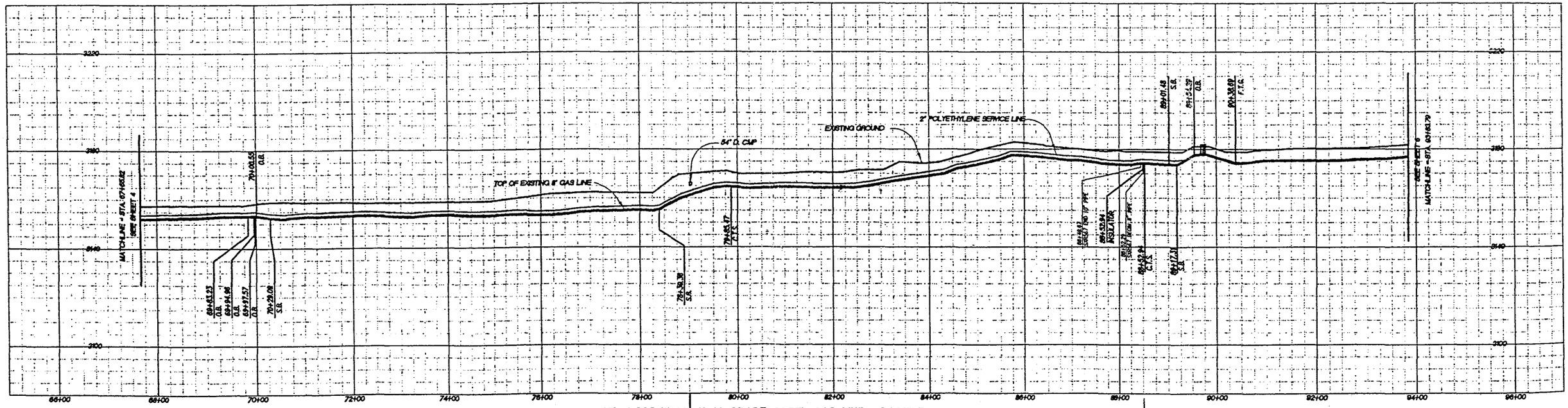


JOINT TRENCH, 2" POLYETHYLENE ADJACENT TO 10" STEEL PIPE

10", 0.365 WALL, X-42 GRADE, STEEL GAS LINE - PLAN VIEW

HORIZONTAL SCALE 1"=100'

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE



10", 0.365 WALL, X-42 GRADE, STEEL GAS LINE - PROFILE

HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE

LEGEND:

	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— · —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

ALL STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. N.G.S. DISK STAMPED "MCGUIREVILLE 1956" LOCATED ON THE EAST RW. STATE HWY. 179, 6 MILES N. OF CAMP VERDE, 3.6 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER: SECOND CLASS.
ESTD. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.31 FT. 1929 NG. LEVELED IN 1969

GRAPHIC SCALE: 1" = 100' (100' 0' 50' 100' 200')
HORIZONTAL SCALE 1"=100'

GRAPHIC SCALE: 1" = 20' (20' 0' 10' 20' 40')
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES DATE EXPIRES 12-31-01 ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC

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CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

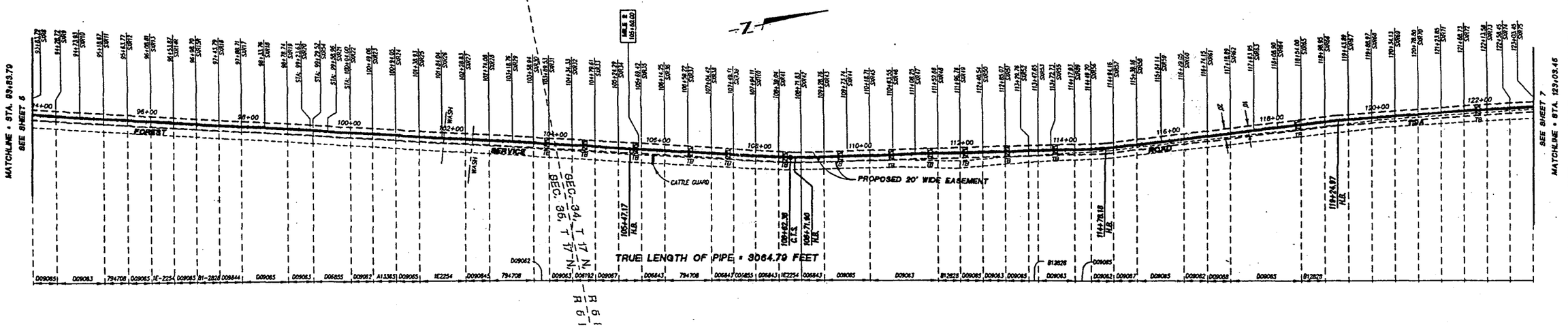
STA. 67+65.82 to STA. 93+83.79

SHEET 5 OF 40

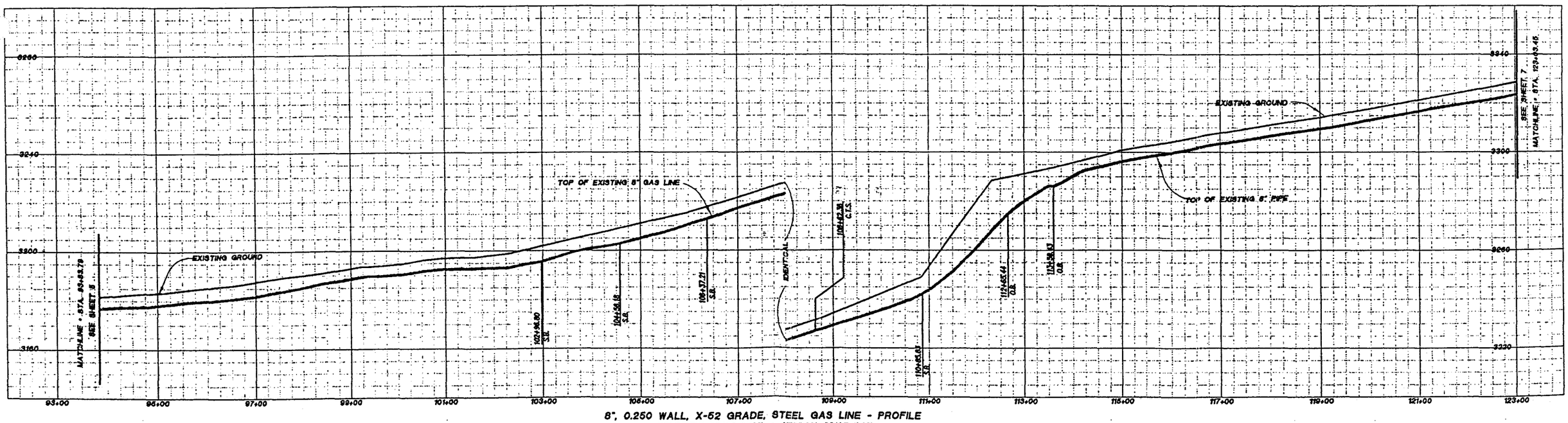
JN: 00490
DATE: 4/12/01

Plotted: 04/23/01 11:12:27 S:\00490\PLANS\ASBLT-05.dwg Crib Thompson

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

LEGEND:

	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

ALL DIMENSIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1968" LOCATED ON THE EAST RW. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.6 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE

VERT ORDER: SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. (NGVD 29), LEVELED IN 1969

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES DATE SIGNED 04-12-01 ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
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AS-BUILT PLANS

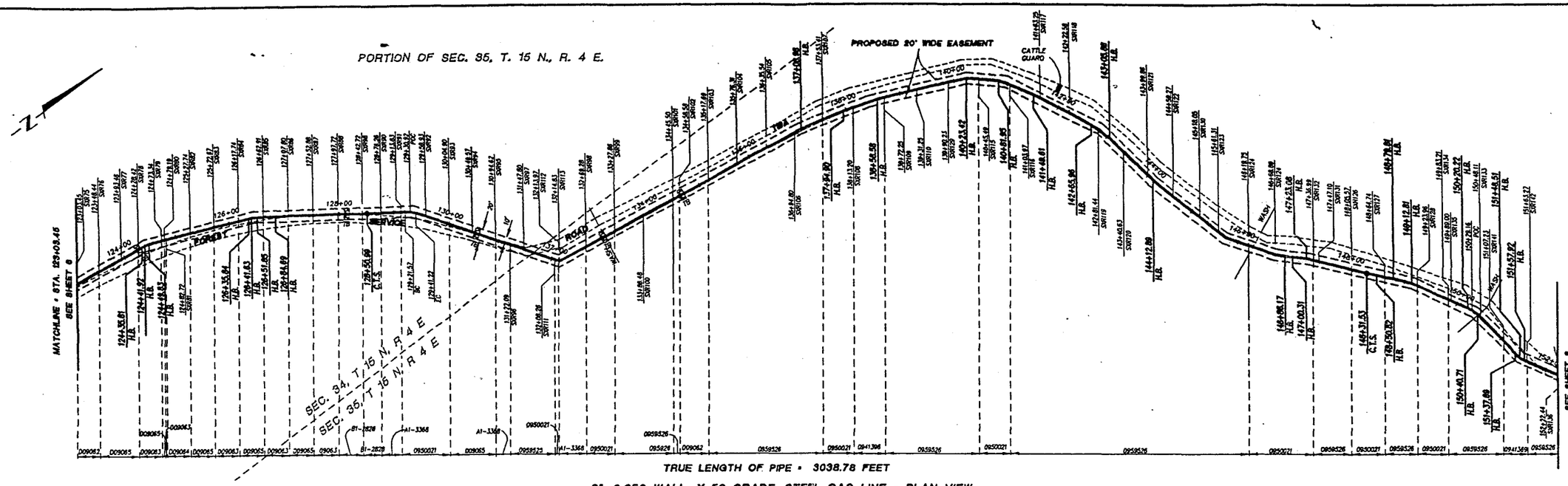
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION

VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 93+83.79 to STA. 123+03.45

JC 00490
DATE: 4/12/01

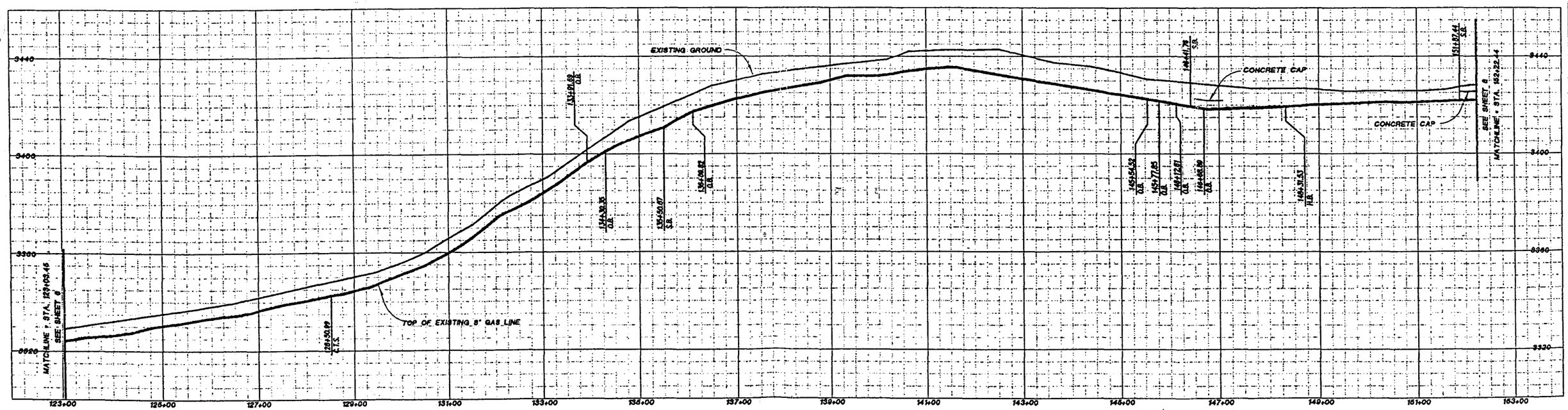
OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE • 3038.78 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW

HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE

HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

...IONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
●	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1958" LOCATED ON THE EAST RIM. STATE HWY. 179, 6 MILES N. OF CAMP VERDE, 3.5 MILES S. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. (NGVD 29, LEVELED IN 1949)

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES DATE SIGNED 04-12-01 ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
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CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

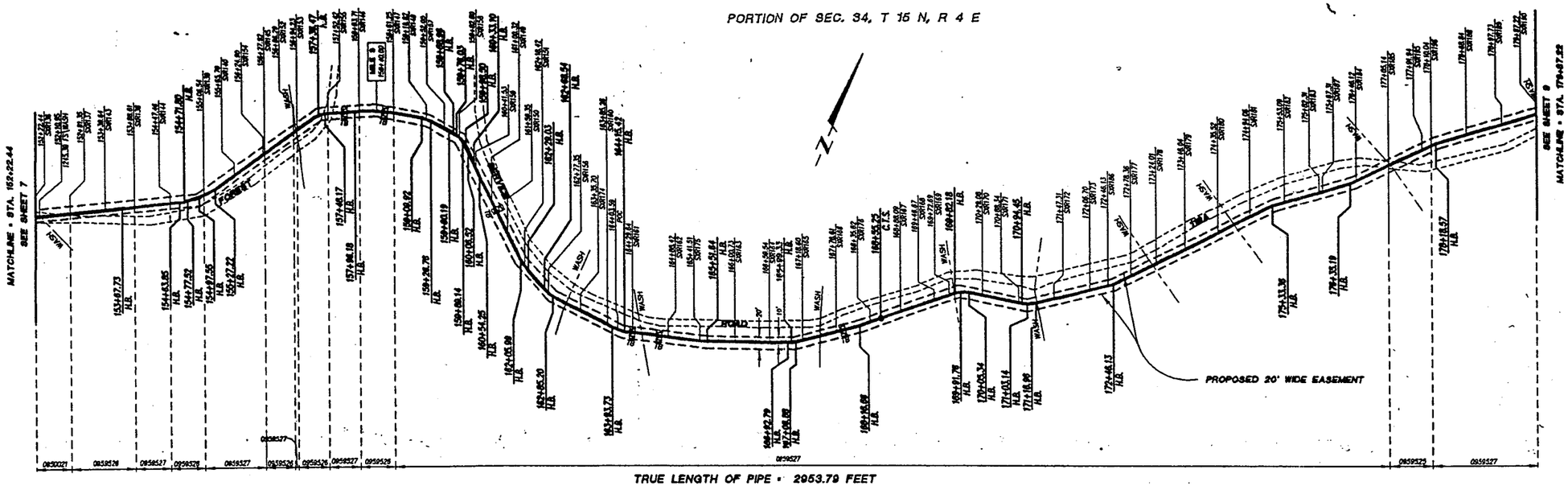
STA. 123+03.45 to STA. 152+22.44

SHEET 7 OF 40

JN: 00490
DATE: 4/12/01

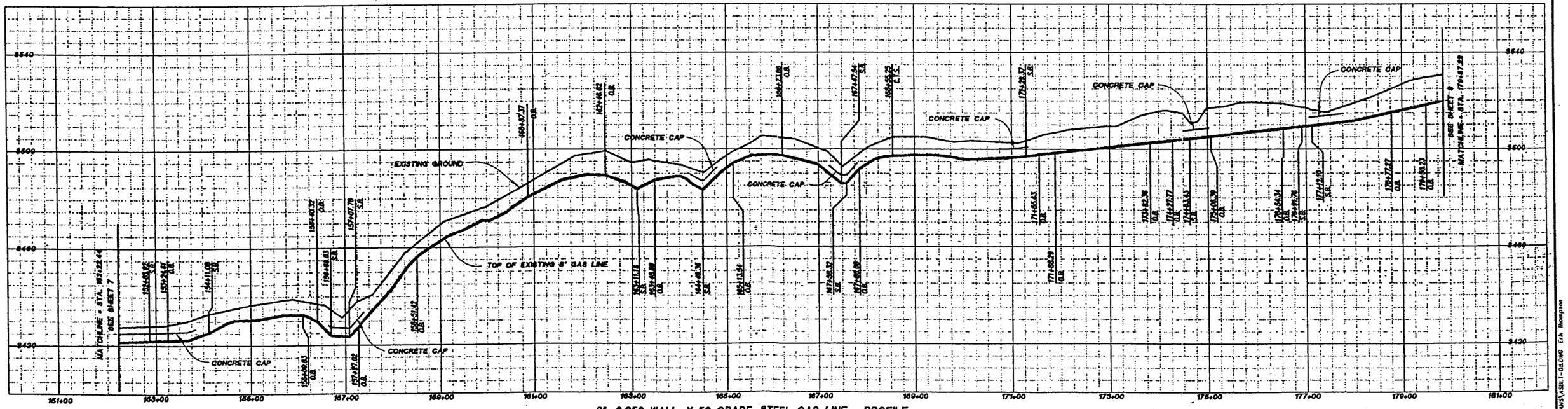
Plotted: 04/24/01 11:08:03 S:\00490\PLANS\ASBLT-07.DWG Erik Thompson

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE = 2953.79 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

...IONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1959" LOCATED ON THE EAST RW. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.5 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER: SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. (NAVD 88, LEVELED IN 1995)

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 38161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 38161 LARRY E. BARNES ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
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CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

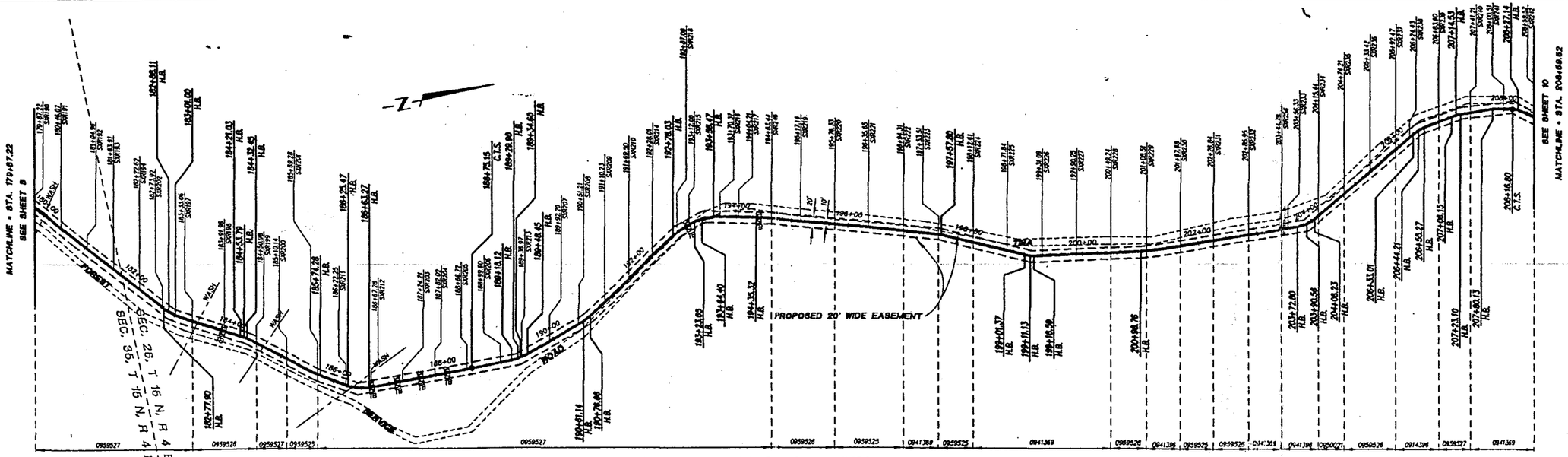
STA. 152+22.44 to STA. 179+87.22

SHEET 8 OF 40

JN: 00490
DATE: 4/12/01

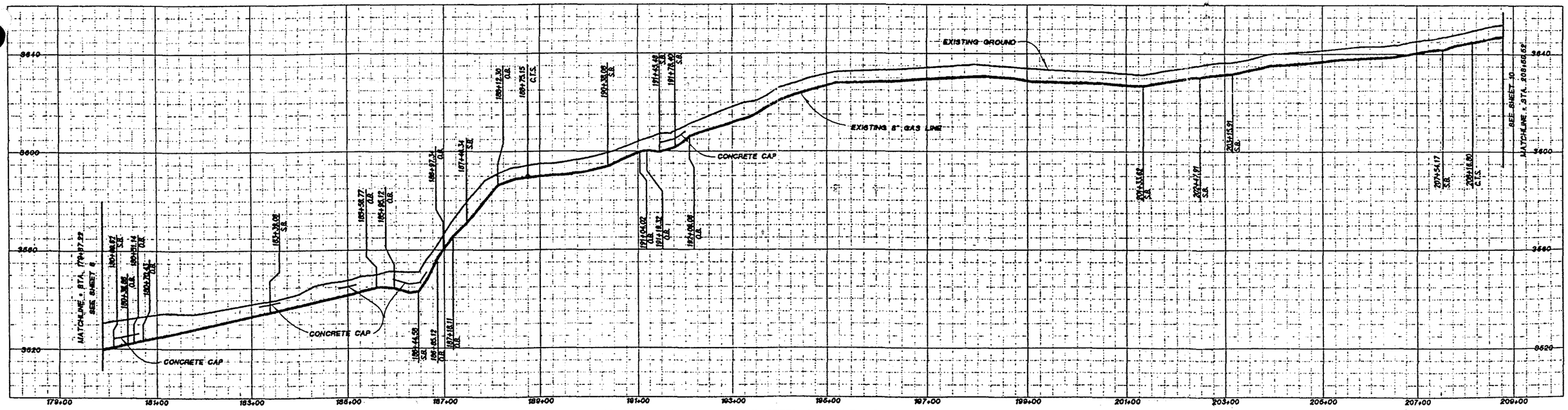
Plotted: 04/24/01 11:06:03 S:\00490\PLANS\ASBUILT-08.DWG Erik Rempasen

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE = 3081.42 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ALL STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— · —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1959" LOCATED ON THE EAST R/W. STATE HWY. 179, 6 MILES N. OF CAMP VERDE, 3.6 MILES N. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. DATUM 29, LEVELED IN 1973

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES ARIZONA U.S.A.

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CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

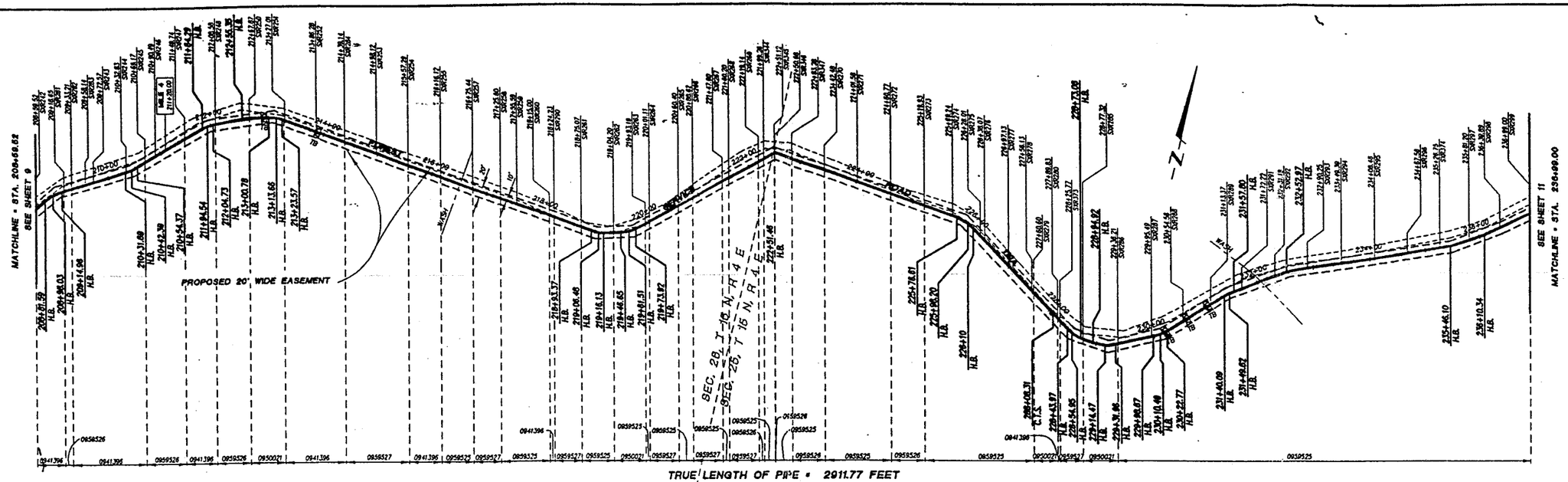
STA. 179+87.22 to STA. 208+59.52

SHEET 9 OF 40

JK: 00490
DATE: 4/12/01

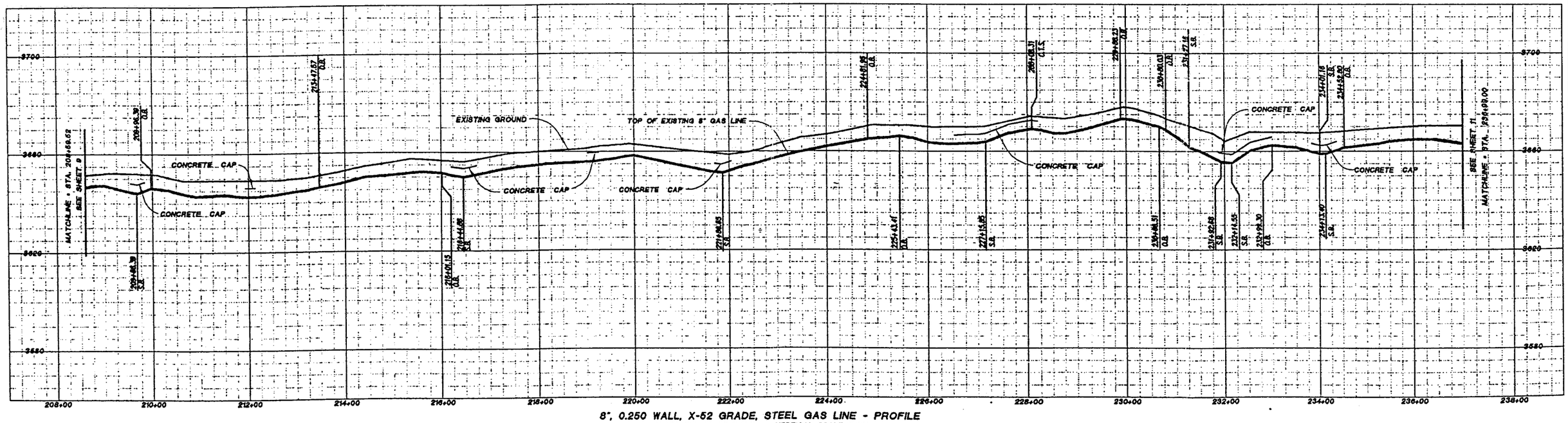
Plotted: 04/24/01 11:06:49 S:\00490\PLANS\ASBLT-02.DWG Erik Thompson

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE = 2911.77 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ALL STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
JR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1959" LOCATED ON THE EAST RYE. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.6 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER: SECOND CLASS.
(EST. BY DIFFERENTIAL LEVELING)

ELEVATION = 3401.21 FT. (NGVD 29), LEVELED IN 1969

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES DATE EXPIRES 6/30/01 ARIZONA, U.S.A.

LARRY E. BARNES DATE
R.L.S. 36161

ADVANCED SURVEY CONCEPTS, INC
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16375 BARRANCA PARKWAY
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CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

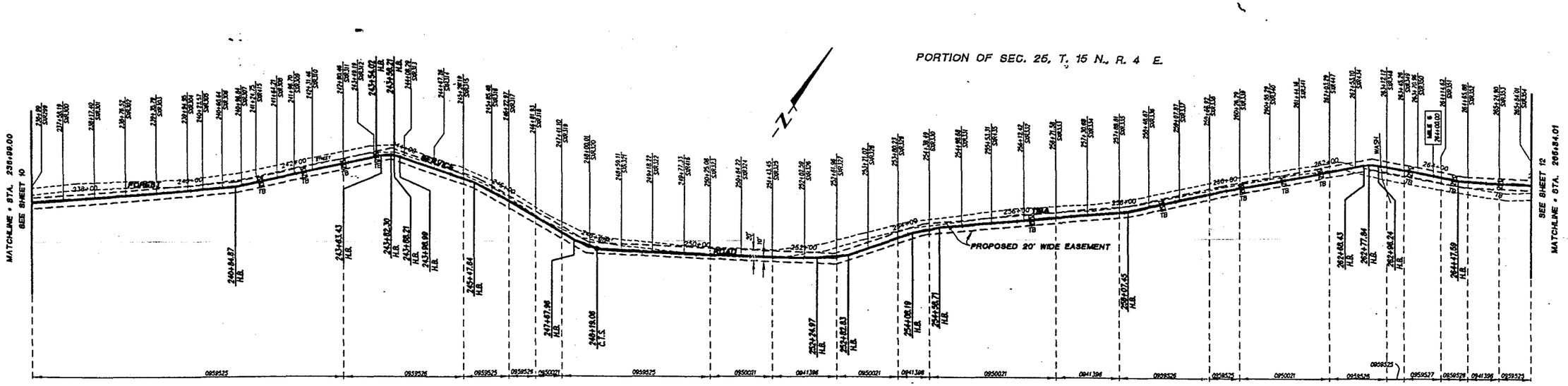
STA. 208+59.52 to STA. 236+99.00

SHEET 10 OF 40

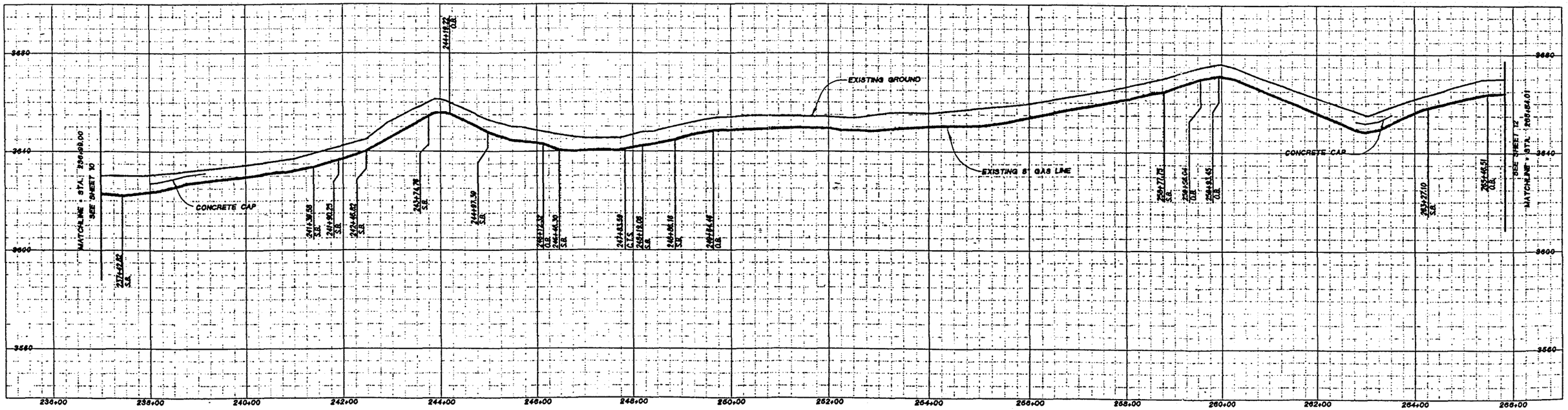
JOB 00490
DATE: 4/12/01

Plotted: 04/24/01 11:05:25 S:\00490\PLANS\SGLI-10.DWG Erik Thompson

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ALL STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— · —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
●	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1958" LOCATED ON THE EAST R/W. STATE HWY. 179, 6 MILES N. OF CAMP VERDE, 3.6 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER: SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. 3421YD 2D, LEVELED IN 1969

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES ARIZONA U.S.A.

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AS-BUILT PLANS

CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION

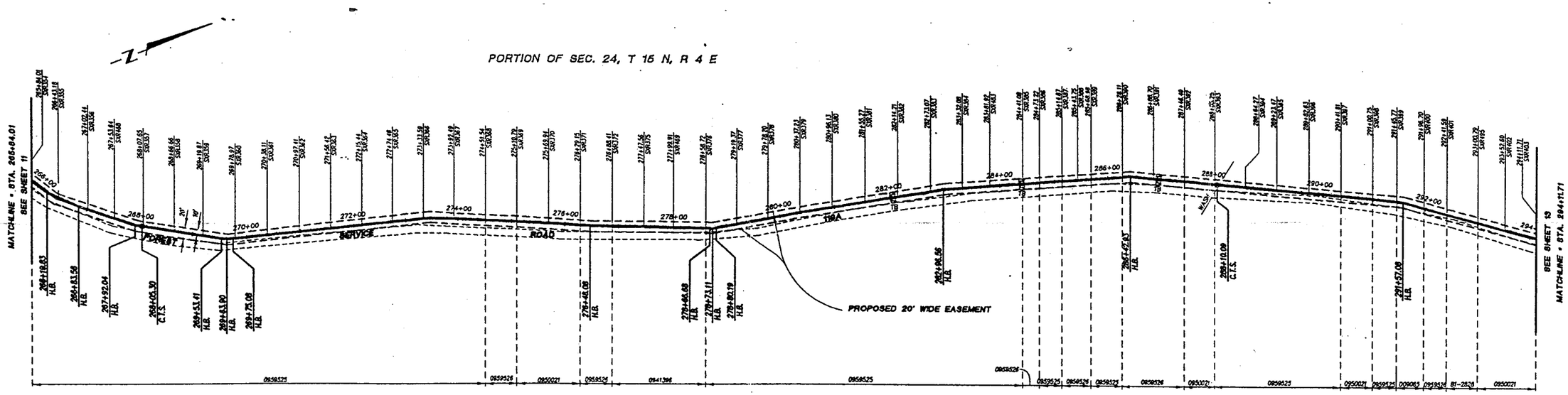
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 236+99.00 to STA. 265+84.01

JC 00490
DATE: 4/12/01

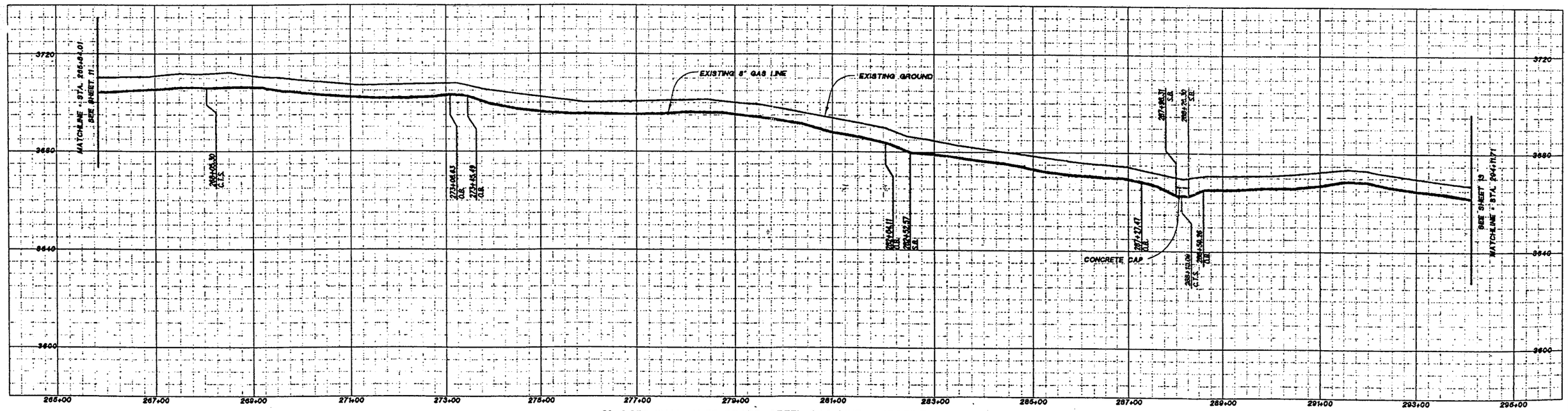
Plotted: 04/24/01 11:04:16 S:\00490\PLANS\ASBUILT-11.DWG Erik Thompson

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE • 2860.46 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

...ANS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND					
TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUREYLLE"

STD. NGS. DISK STAMPED "MCGUREYLLE 1964" LOCATED ON THE EAST RW. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.6 MILES S. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUREYLLE.

VERT ORDER: SECOND CLASS.
(EST. BY DIFFERENTIAL LEVELING)

ELEVATION • 3401.21 FT. (NGVD 29), LEVELED IN 1965

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES Date Signed: 04-12-01 ARIZONA U.S.A.

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CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

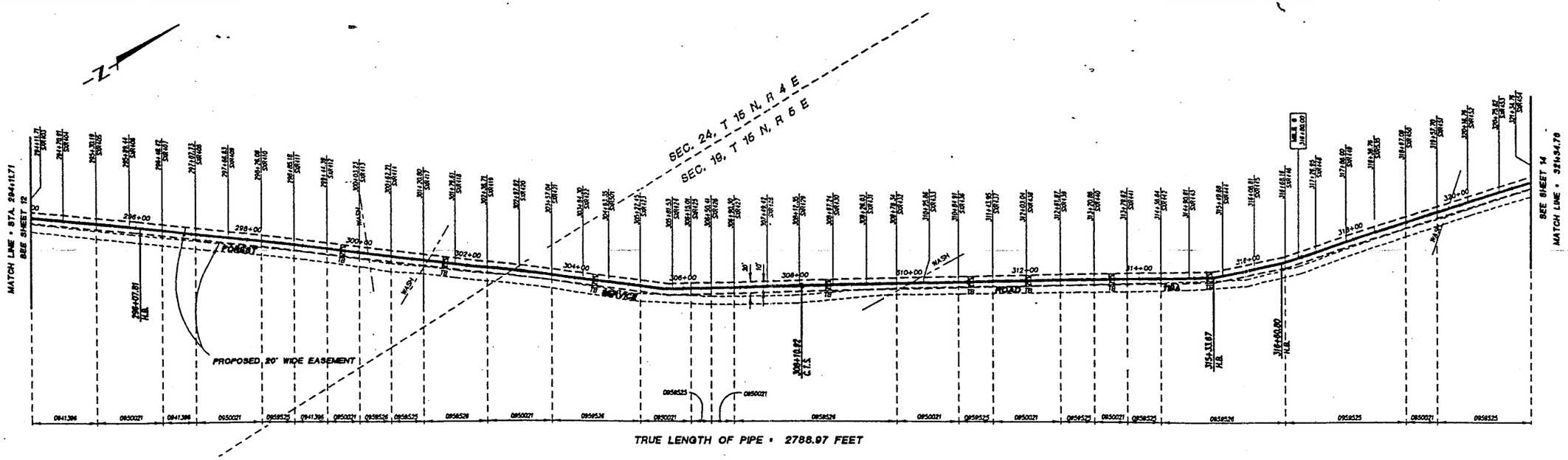
STA. 265+84.01 to STA. 294+11.71

SHEET 12 OF 40

JN: 00490
DATE: 4/12/01

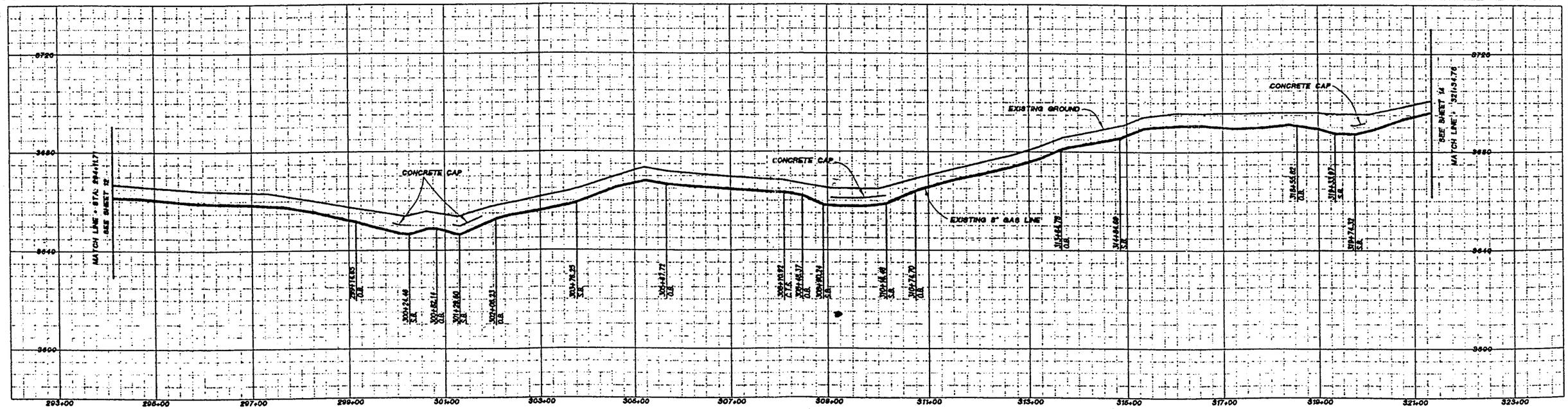
Plotted: 04/24/01 11:00:48 S:\00490\PLANS\ASBLT-12.DWG Erik Thompson

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE = 2788.97 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ALL STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1964" LOCATED ON THE EAST RIV. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.8 MILES E. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER: SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. (1929 VD 29), LEVELED IN 1969

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES Date Signed 04-12-01 ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
ASC
15375 BARRANCA PARKWAY
SUITE K - 105
IRVINE, CALIFORNIA 92618
(949) 727-9548 FAX 727-9548
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AS-BUILT PLANS
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 294+11.71 to STA. 321+34.76

SHEET 13 OF 40

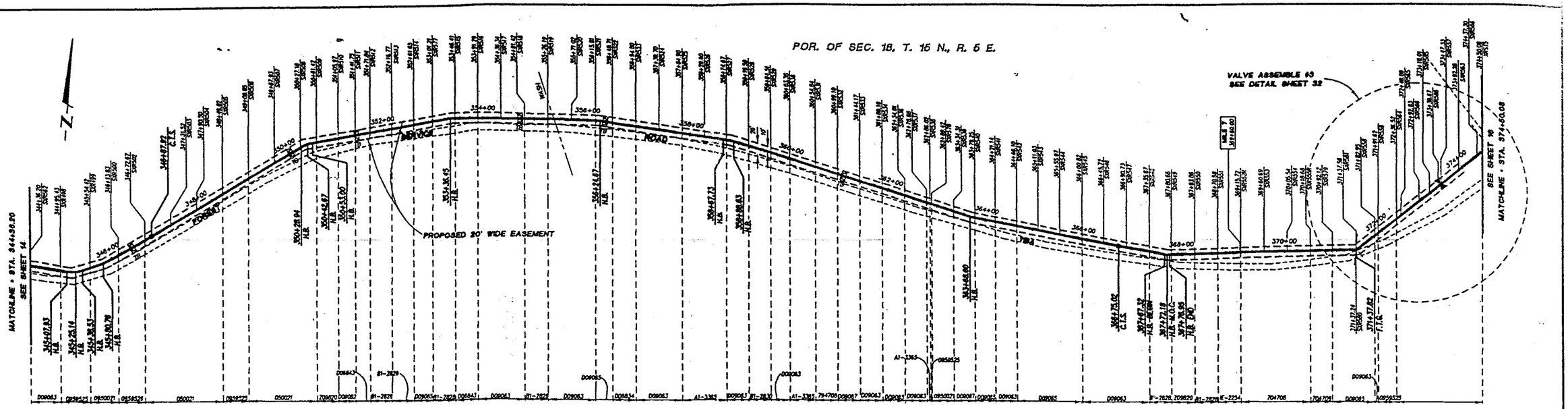
JOB: 00490
DATE: 4/12/01

Output: 04/12/01 10:30:31 S:\00490\VS\ANSVASBLT-13.DWG Erik Thompson

Error

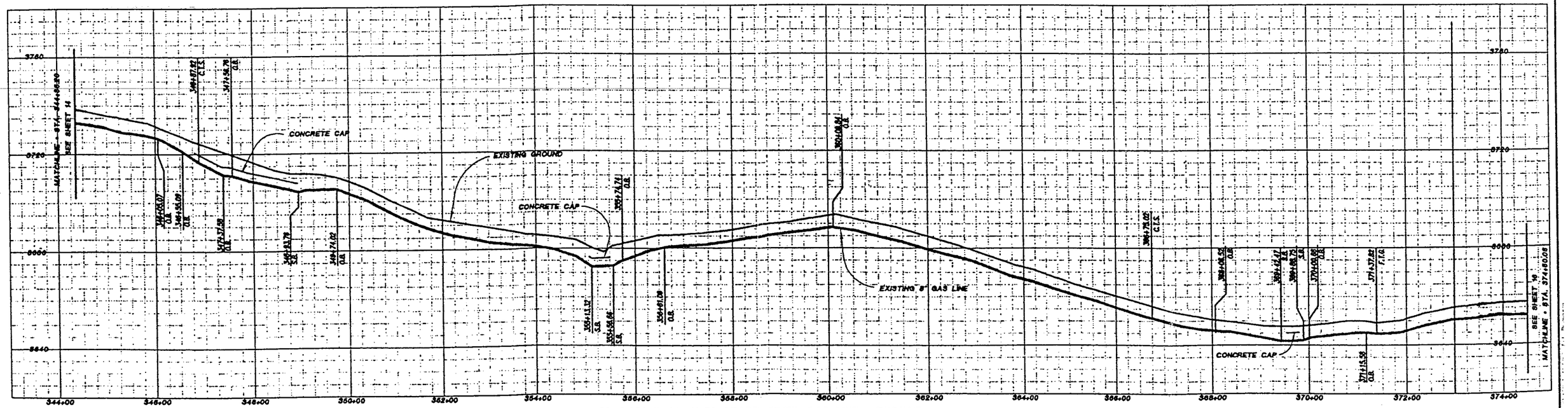
An error occurred while processing this page. See the system log for more details.

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE • 3124.90 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MOGURIEVILLE"

STD. N.G.S. DISK STAMPED "MOGURIEVILLE 1949" LOCATED ON THE EAST RIV. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.5 MILES S. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 M. N. OF M/C SURIEVILLE.

VERT ORDER SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. (NAVD 88), LEVELED IN 1999

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
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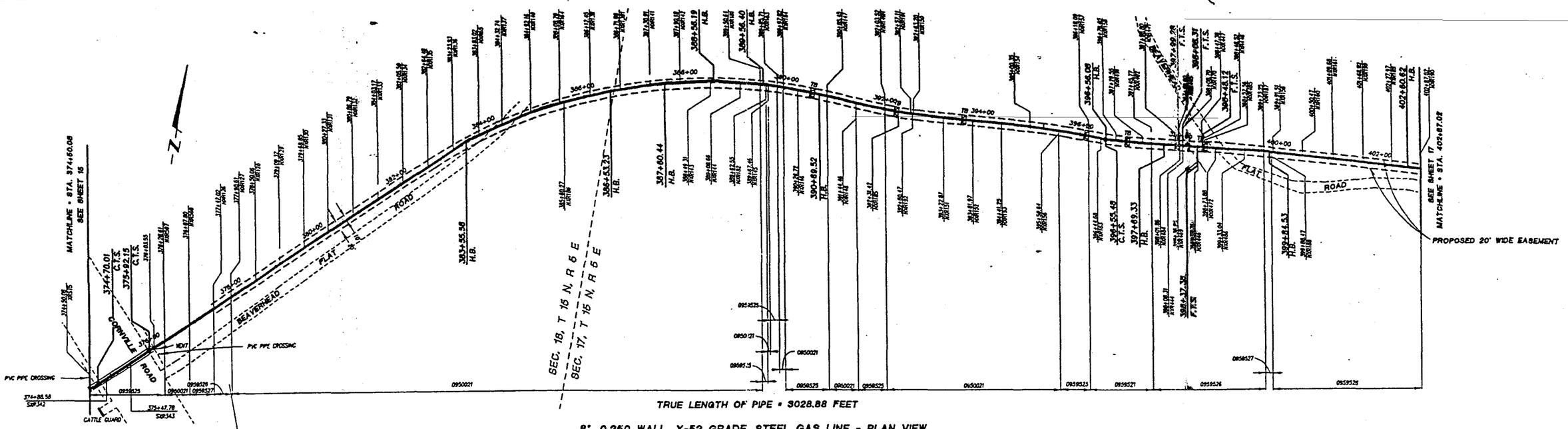
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 344+36.20 to STA. 374+50.08

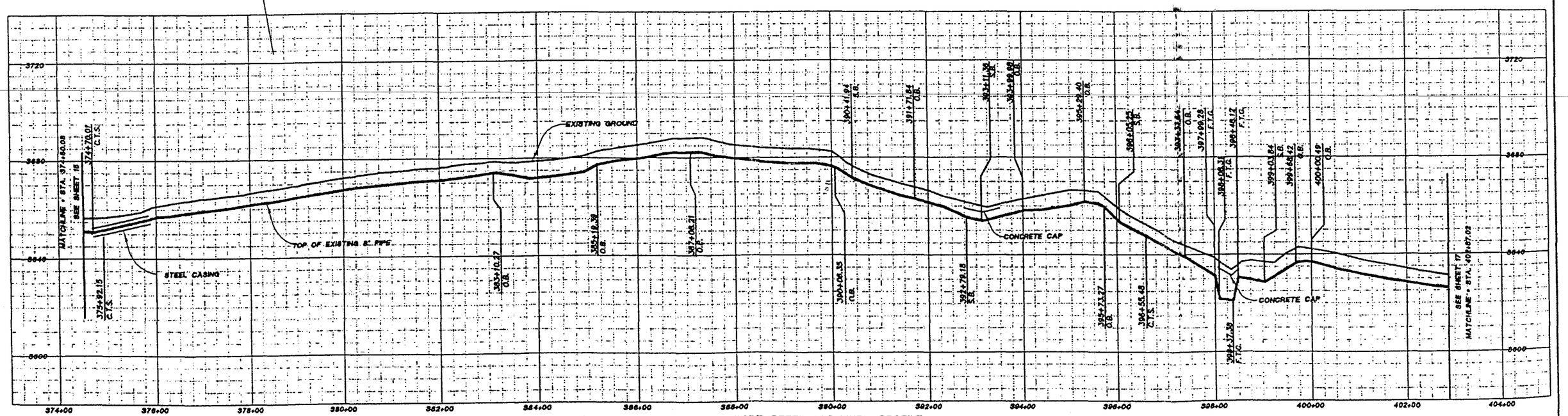
SHEET 15 OF 40

JC 00490
DATE: 4/12/01

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MOGURREYLLE"

STD. N.G.S. DISK STAMPED "MOGURREYLLE 1965" LOCATED ON THE EAST RT. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.5 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GURREYLLE.

VERT ORDER: SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.21 FT. (NAVD) 88 (EVM 97) IN 1989

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
ASC
16378 BARRANCA PARKWAY
SUITE K - 105
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(949) 727-9546 FAX 727-9546
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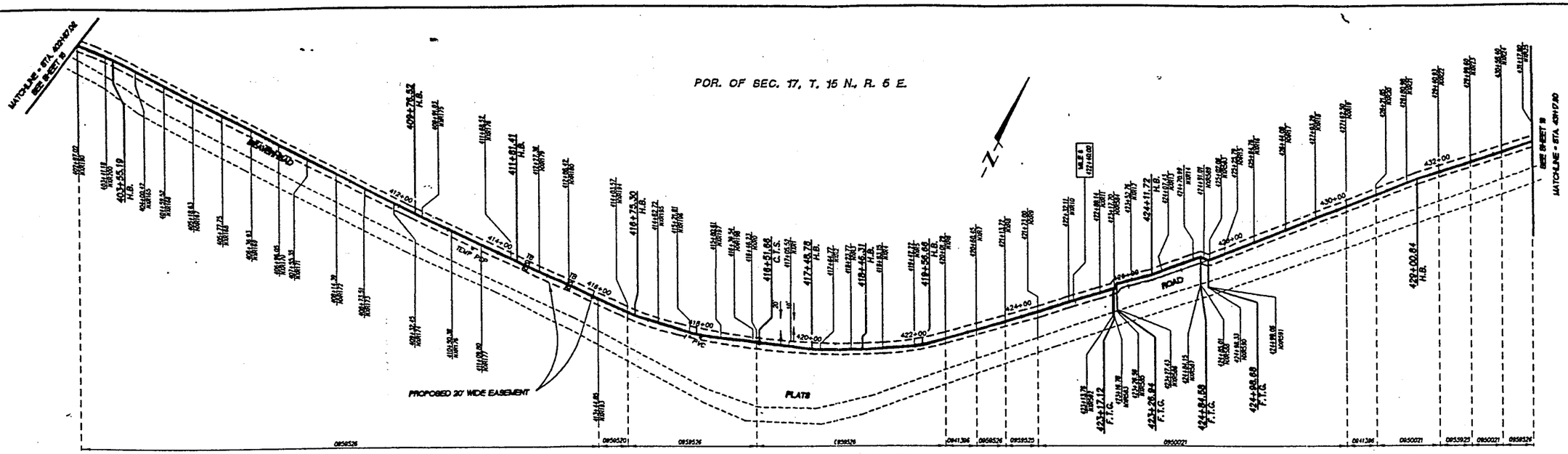
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 374+50.08 to STA. 402+87.02

SHEET 16 OF 40

JN: 00490
DATE: 4/12/01

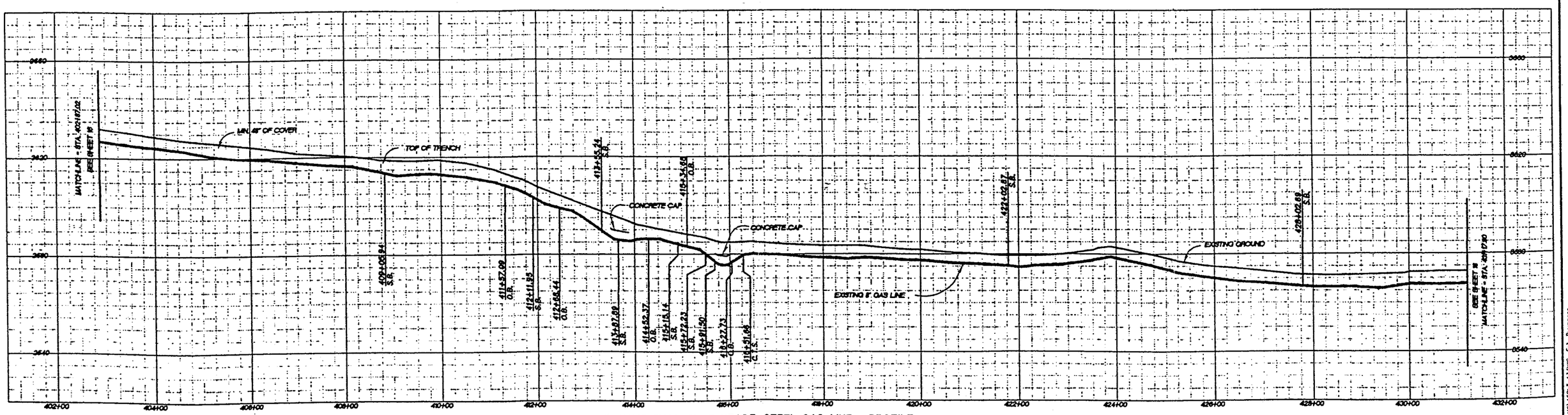
OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE: = 2895.37 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW

HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE

HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

ALL LOCATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
●	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MOGUREVILLE"

STD. NGS. DISK STAMPED "MOGUREVILLE 1956" LOCATED ON THE EAST RIM. STATE HWY. 179, 6 MILES N. OF CAMP VERDE, 3.8 MILES N. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUREVILLE.

VERT ORDER: SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.71 FT. NAVD 88, LEVELED IN 1973

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
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949/581 727-9648 FAX 727-9648
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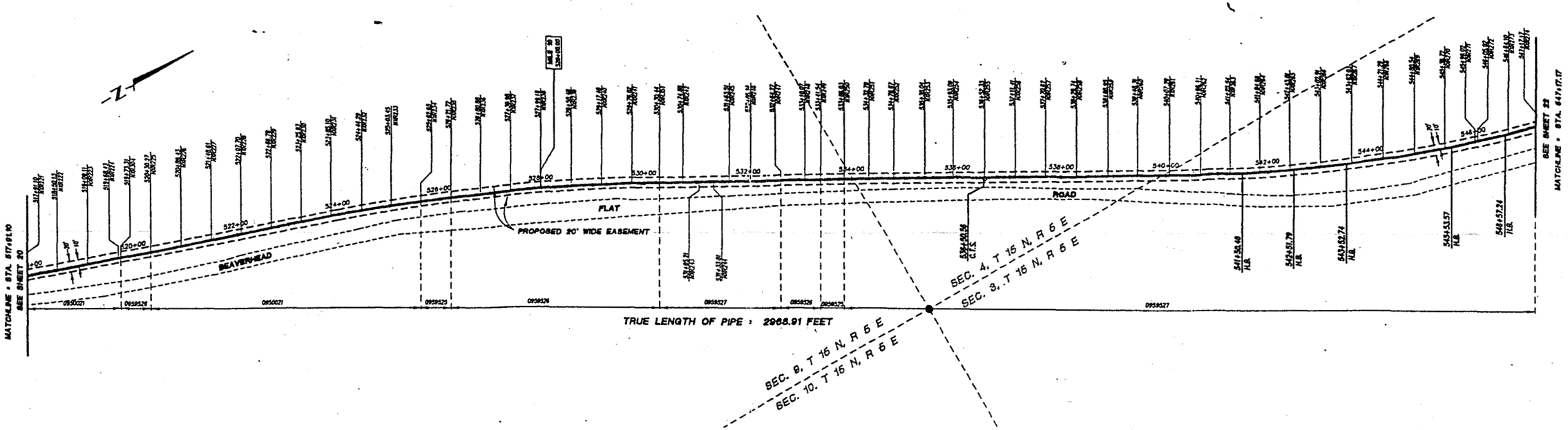
AS-BUILT PLANS
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 402+87.02 to STA. 431+17.80

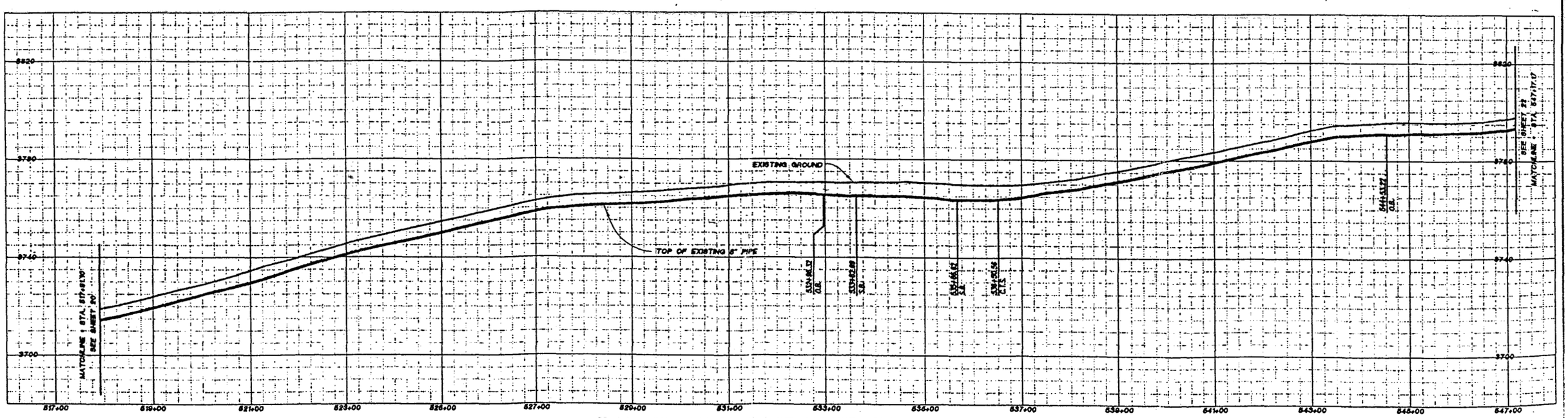
SHEET 17 OF 40

JN: 00490
DATE: 4/12/01

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— • —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1959" LOCATED ON THE EAST R/W, STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.5 MILES E. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3469.31 FT. (NAVD 88, LEVELED IN 1999

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES REGISTERED ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
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15375 BARRANCA PARKWAY
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IRVINE, CALIFORNIA 92618
(949) 727-9546 FAX 727-9545
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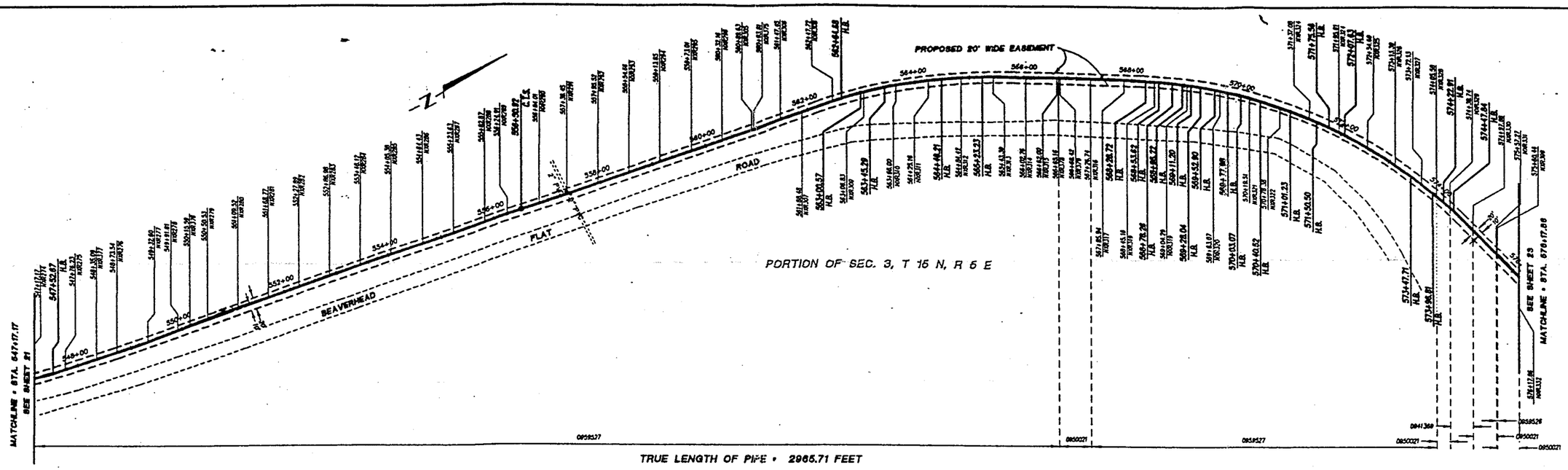
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 517+91.10 to STA. 647+17.17

SHEET 21 OF 40

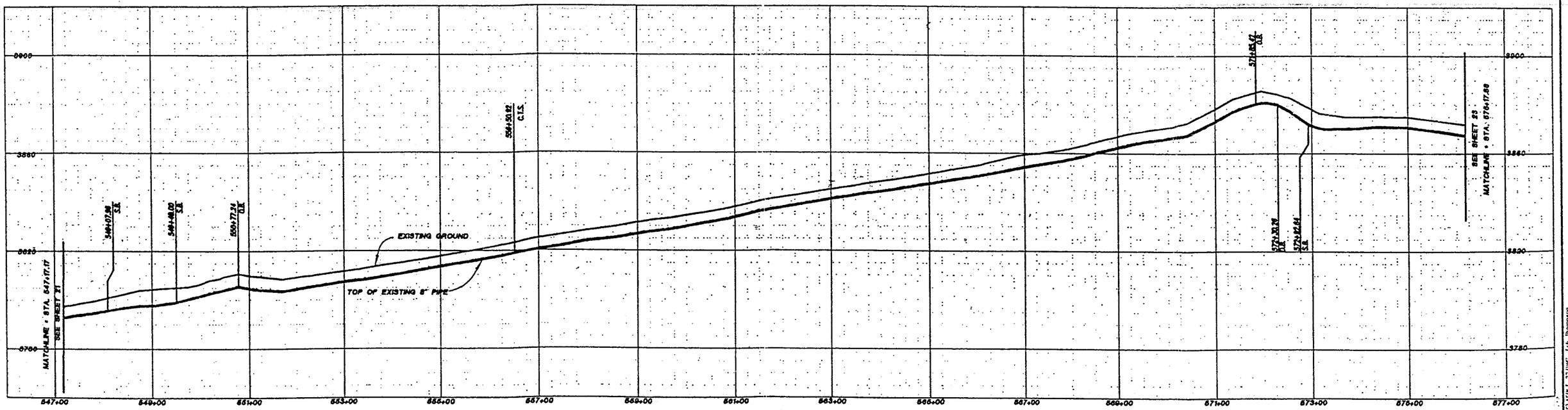
JN: 00480
DATE: 4/12/01

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE • 2966.71 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
		H.B.	HORIZONTAL BEND	R.	RANGE LINE
IR	IRRIGATION RISER	S.B.	SAG BEND		
●	SECTION CORNER	O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. NGS. DISK STAMPED "MCGUIREVILLE 1958" LOCATED ON THE EAST RTE. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.8 MILES E. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GUIREVILLE.

VERT ORDER SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION • 3401.51 FT. (1037.0 M), LEVELED IN 1969

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES DATE
R.L.S. 36161

REGISTERED LAND SURVEYOR CERTIFICATE NO. 36161 LARRY E. BARNES ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
ASC
16375 BARRANCA PARKWAY
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(949) 727-0548 FAX 727-0549
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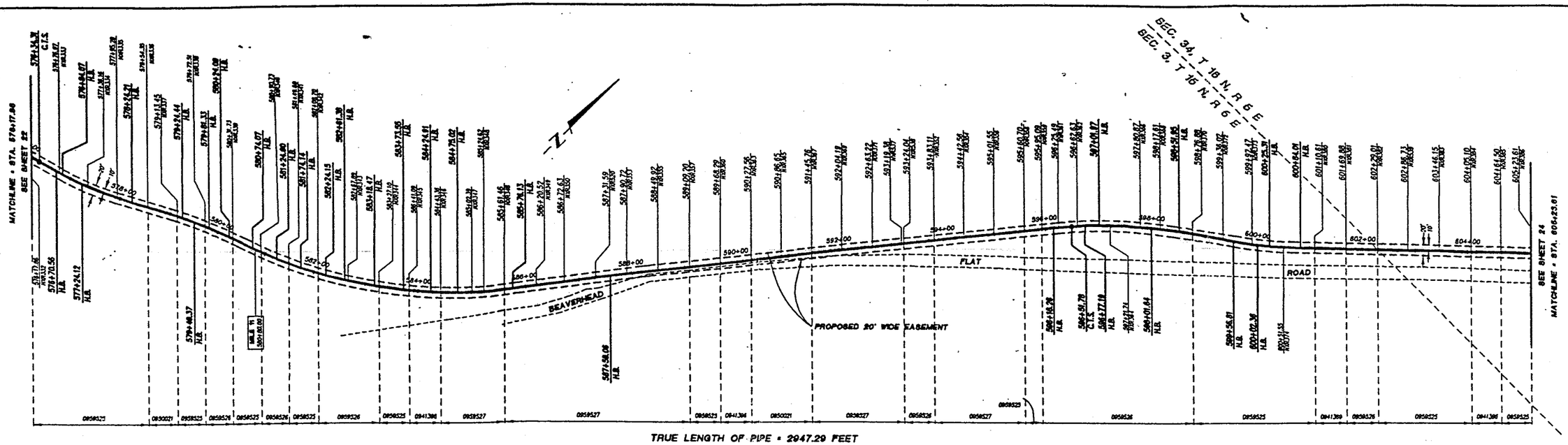
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 647+17.17 to STA. 576+17.86

SHEET 22 OF 40

JK 00480
DATE: 4/12/01

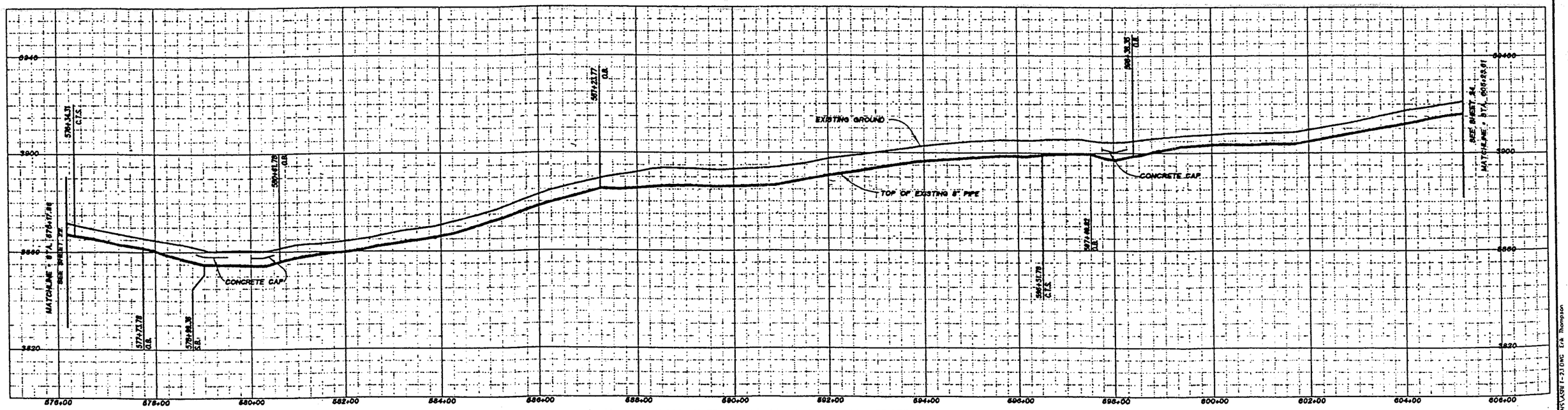
OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



TRUE LENGTH OF PIPE = 2947.29 FEET

8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW

HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE

HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

...ATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MCGUIREVILLE"

STD. N.G.S. DISK STAMPED "MCGUIREVILLE 1964" LOCATED ON THE EAST R/W. STATE HWY. 279, 6 MILES N. OF CAMP VERDE, 3.5 MILES W. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 8.1 MI. N. OF MC GUIREVILLE.

VERT ORDER SECOND CLASS.
ADJ. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.31 FT. 1929 YD 29, LEVELED IN 1969

100' 0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES
R.L.S. 36161

DATE

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
36161
LARRY E. BARNES
ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC

ASC

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CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

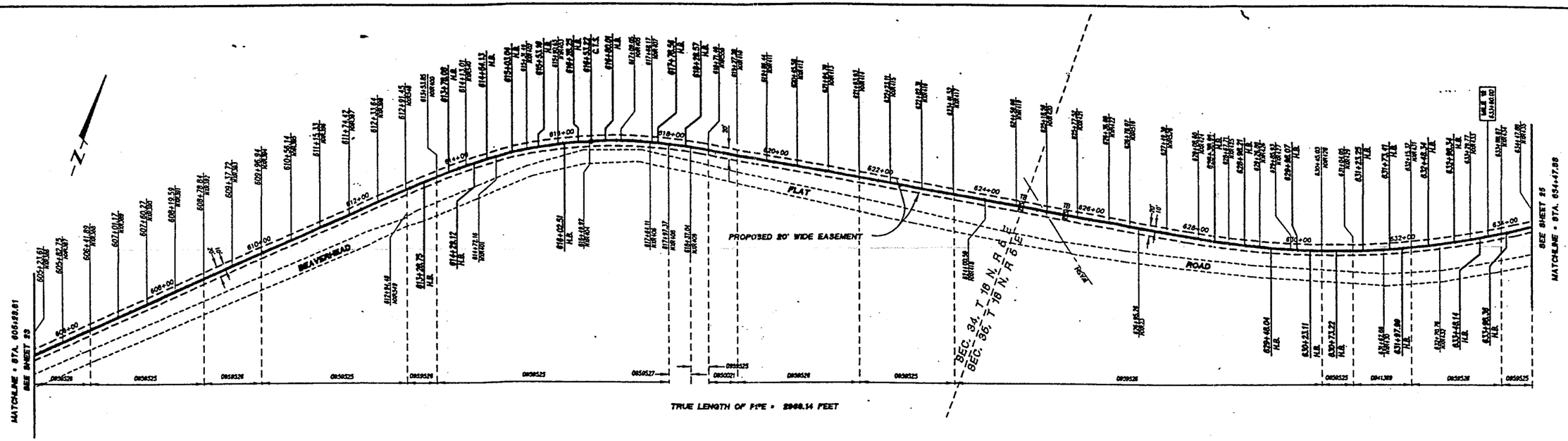
STA. 576+17.86 to STA. 605+23.61

SHEET 23 OF 40

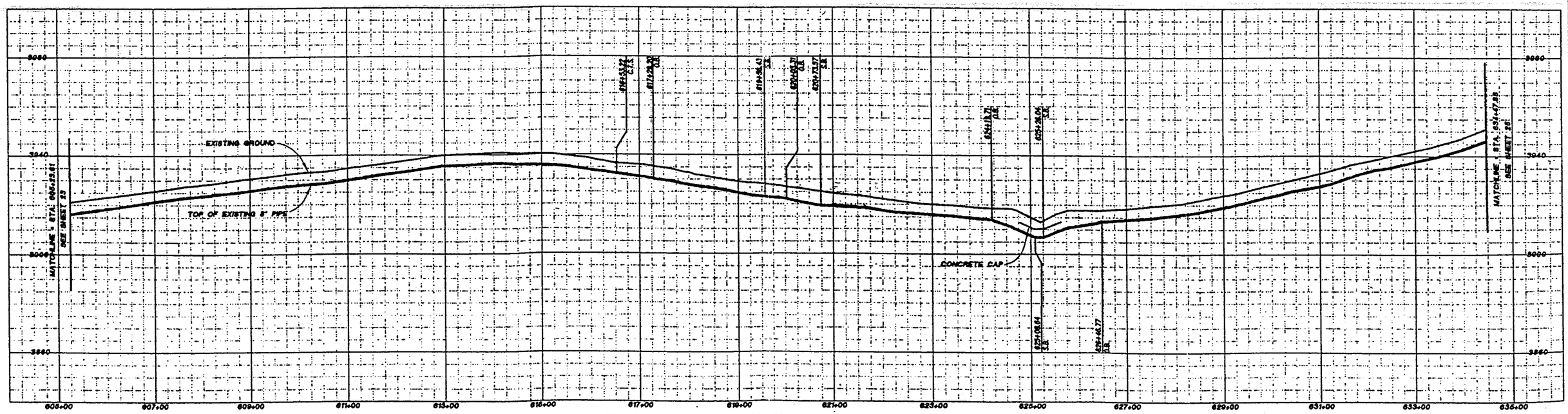
JN 00490
DATE: 4/13/01

Created 04/24/01 10:14 PM S:\00490\PLANS\ASBI T-23.DWG Erik Thompson

OWNERSHIP: COCONINO NATIONAL FOREST, YAVAPAI COUNTY, ARIZONA



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PLAN VIEW
HORIZONTAL SCALE 1"=100'



8", 0.250 WALL, X-52 GRADE, STEEL GAS LINE - PROFILE
HORIZONTAL SCALE 1"=100' - VERTICAL SCALE 1"=20'

STATIONS SHOWN HEREON ARE HORIZONTAL STATIONS BASED UPON AS BUILT FIELD LOCATIONS.

LEGEND:

TB	TRENCH BREAK	0959525	HEAT NUMBER	F.T.G.	FITTING
	CATTLE GUARD	149+50.56	HORIZ. STATION	SEC.	SECTION LINE
— x —	FENCE LINE	C.T.S.	CATHODIC TEST STATION	T.	TOWNSHIP LINE
IR	IRRIGATION RISER	H.B.	HORIZONTAL BEND	R.	RANGE LINE
●	SECTION CORNER	S.B.	SAG BEND		
		O.B.	OVER BEND		

BENCHMARK: N.G.S. CONTROL PT. "MOGURREVILLE"

STD. NGS. DISK STAMPED "MOGURREVILLE 1964" LOCATED ON THE EAST RIM. STATE HWY. 179, 6 MILES N. OF CAMP VERDE, 3.5 MILES E. OF MONTEZUMA CASTLE NATIONAL MONUMENT AND 0.1 MI. N. OF MC GURREVILLE.

VERT. ORDER: SECOND CLASS.
EST. BY DIFFERENTIAL LEVELING

ELEVATION = 3401.31 FT. DATUM 29, LEVELED IN 1969

GRAPHIC SCALE: 1" = 100'
HORIZONTAL SCALE 1"=100'

GRAPHIC SCALE: 1" = 20'
VERTICAL SCALE 1"=20'

PREPARED UNDER THE DIRECTION OF:

LARRY E. BARNES R.L.S. 35161 — DATE

REGISTERED LAND SURVEYOR CERTIFICATE NO. 35161 LARRY E. BARNES ARIZONA U.S.A.

ADVANCED SURVEY CONCEPTS, INC
ASC
15375 BARRANCA PARKWAY
SUITE K - 106
IRVINE, CALIFORNIA 92618
(949) 727-9540 FAX 727-9543
SURVEYING • MAPPING • CONSTRUCTION STAKING

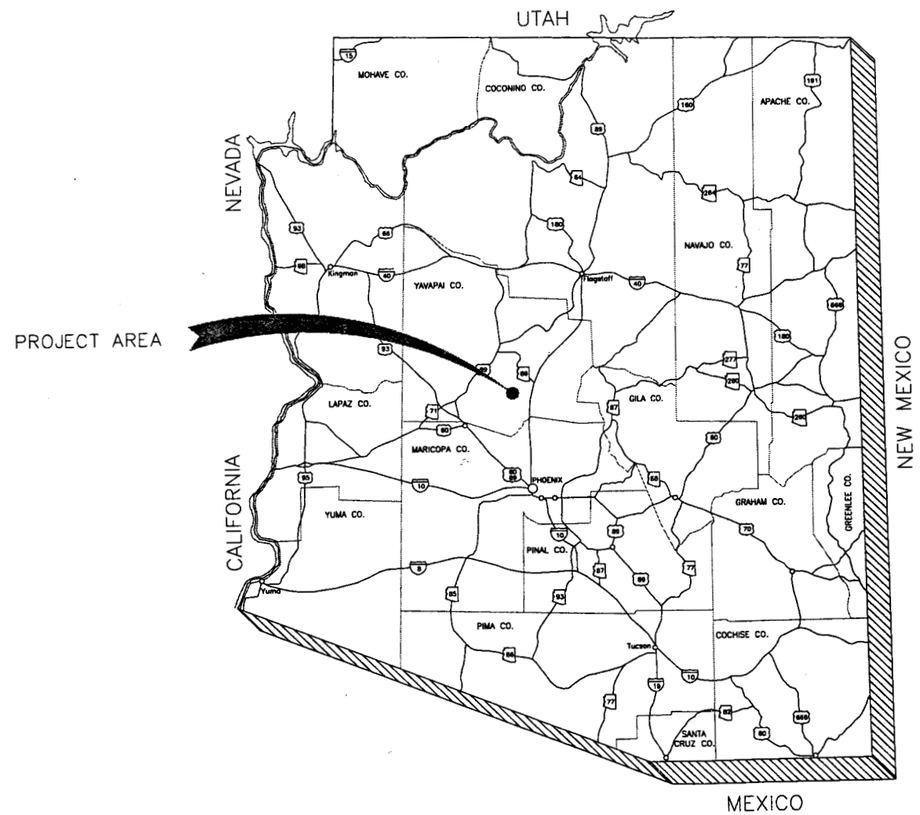
AS-BUILT PLANS
CITIZENS COMMUNICATION COMPANY
ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE
YAVAPAI COUNTY

STA. 605+23.61 to STA. 634+47.88

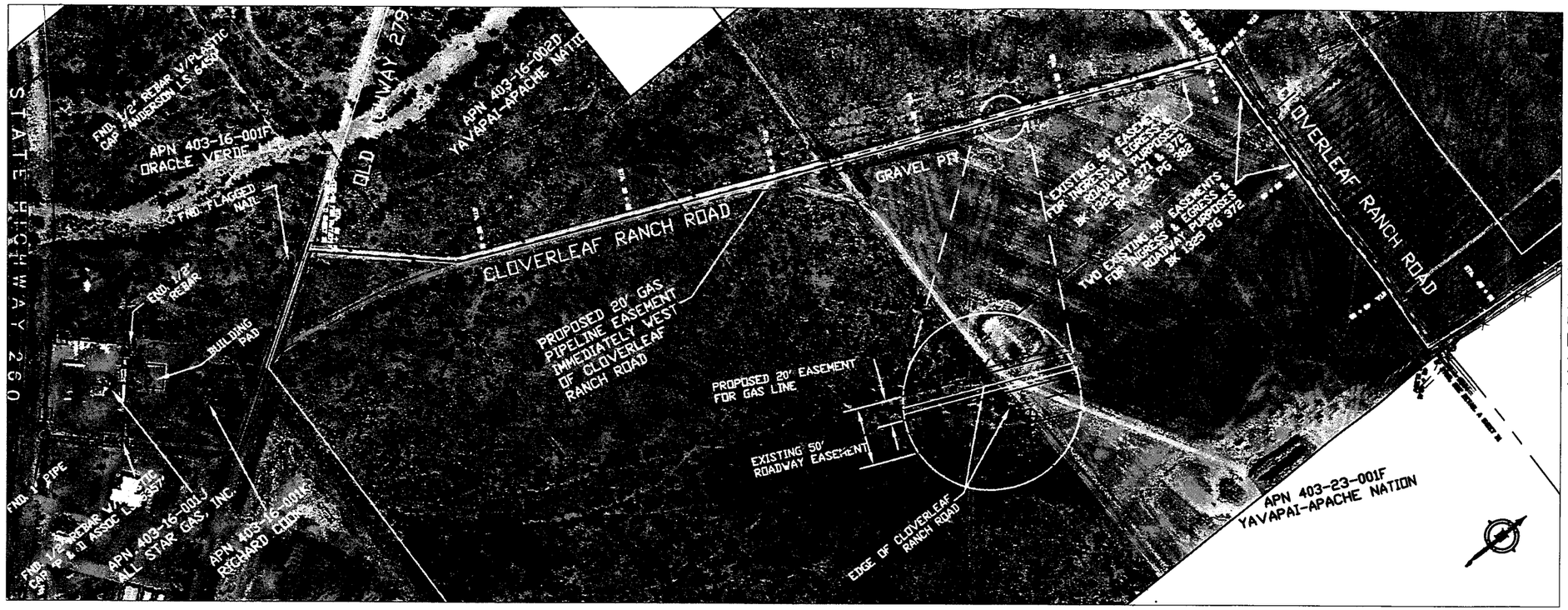
SHEET 24 OF 40

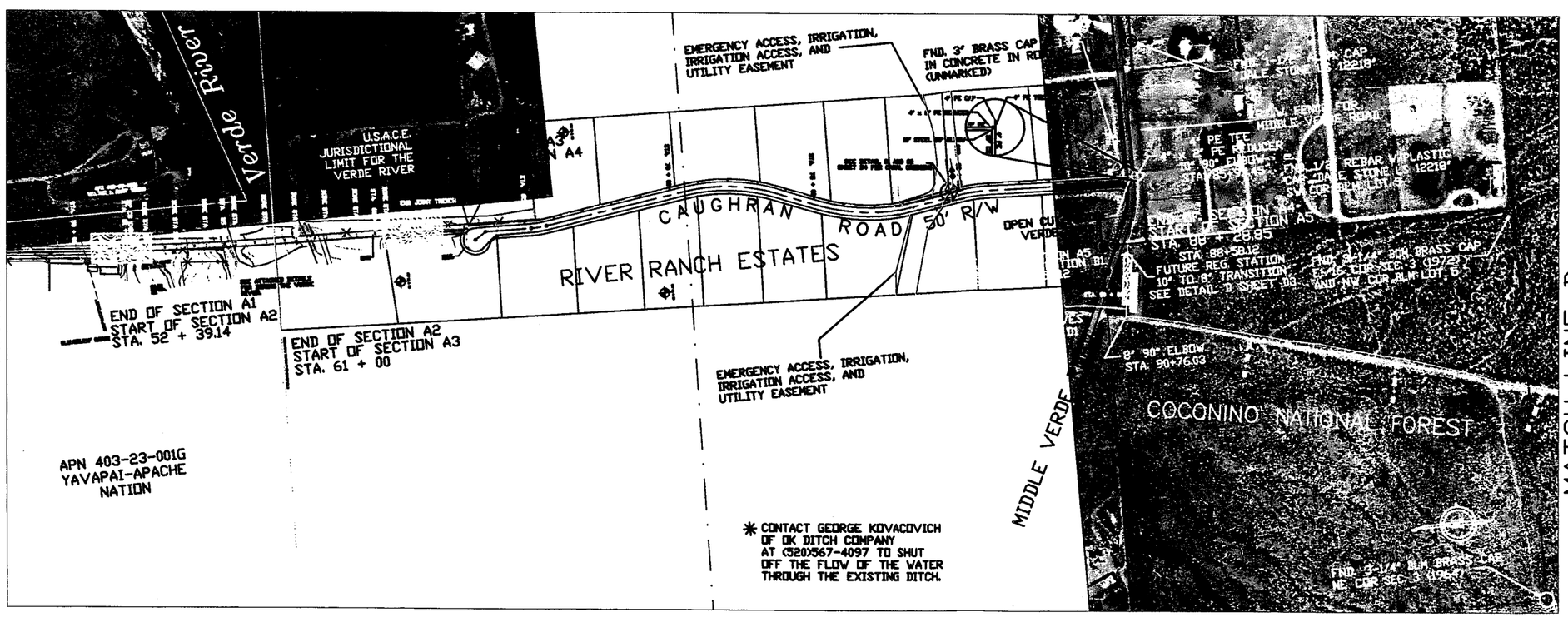
JOB: 00490
DATE: 4/12/01

CITIZENS UTILITIES COMPANY, ARIZONA GAS DIVISION
VILLAGE OF OAK CREEK
GAS SUPPLY LINE



CITIZENS UTILITIES ENGINEERING DEPARTMENT





LEGEND

- FENCE LINE
- ELEVATION LINE (METERS)
- CULVERT
- LIMITS OF ROAD SURFACE
- WATER LINE
- EASEMENT LINE
- CENTERLINE OF ROAD
- 10" STEEL GAS LINE
- 8" STEEL GAS LINE
- 4" PE GAS LINE
- 2" PE GAS LINE
- VALVE
- TEE
- CAP
- ELBOW
- REDUCER
- EXTRA WORKSPACE WITH F.S. APPROVAL

APPROXIMATE QUANTITIES

10" CS PIPE = 4083 LINEAR FEET	2" STEEL BALL VALVE = 2 EACH
10" x 8" STEEL REDUCER = 1 EACH	2" STEEL END CAP = 2 EACH
10" STEEL 90° ELBOW = 7 EACH	1/4" NIPPLE (3" LENGTH) = 3 EACH
10" x 4" STEEL TEE = 2 EACH	1/4" NEEDLE VALVE = 3 EACH
8" CS PIPE = 1083 LINEAR FEET	1/4" PLUG = 3 EACH
8" x 4" STEEL TEE = 3 EACH	4" GASKET = 6 EACH
8" STEEL 90° ELBOW = 1 EACH	.75" x 4.5" STUDS W/ 2 NUTS = 48 EACH
8" KEARNEY INSULATOR = 1 EACH	3M LIGHTER BALL (BAG) = 1 PER TEST POINT AND ONE PER STUB OUT
8" STEEL BALL VALVE = 1 EACH	4" PE PIPE = 377 LINEAR FEET
4" CS PIPE = 35 LINEAR FEET	4" PE END CAP = 2 EACH
4" x 2" STEEL REDUCER = 2 EACH	4" PE TEE = 1 EACH
4" WELD END FLANGE = 3 EACH	4" x 2" PE REDUCER = 1 EACH
4" BLIND FLANGE = 3 EACH	2" PE PIPE = 3000 LINEAR FEET
2" CS PIPE = 5 LINEAR FEET	2" PE END CAP = 1 EACH

CONSTRUCTION NOTES

1. STATIONING SHOWN ON PLANS ARE APPROXIMATE.
2. PIPE ALIGNMENT SHALL BE AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. ALL PROPERTY LINES TO THE PIPELINE REPRESENT THE BEST PLANNING PRIOR TO ACTUAL EXCAVATION.
3. CONCRETE SHALL BE 3000 PSI-28 DAY STRENGTH, WITH 5% AIR ENTRAINMENT AND 4" MAXIMUM SLUMP.
4. PLACE PIPELINE MARKERS AS CLOSE AS PRACTICAL OVER THE PIPELINE. IF IT IS INTENDED TO PLACE MARKERS AT EACH SIDE OF ROAD CROSSINGS, FENCE, DITCH, OR CULVERT, AND NOT SPACED FURTHER THAN 1000' APART UNLESS CALLED OUT ON PLANS.
5. WELDED MITER JOINTS ARE NOT ALLOWED. ALL BENDS SHALL BE WITH WROUGHT STEEL FITTINGS OR IN ACCORDANCE WITH PIPE BENDING SPECIFICATIONS.
6. ALL BUTT WELDS TO 100% INDOGRAPHED. WELDS FAILING SHALL BE WHEN ONE REPAIR ATTEMPT, THEN TESTED AGAIN. WELDS FAILING THE SECOND TEST, SHALL BE CUT OUT AND REWELDED. WHEN REQUESTED BY THE ENGINEER, THE CONTRACTOR SHALL CUT OUT A WELDED JOINT FOR DESTRUCTIVE TESTS AND REWELD THE PIPELINE.
7. WELDERS FOR THE PIPELINE SHALL BE QUALIFIED IN ACCORDANCE WITH API 1104 AND COMPLY WITH DRUG TESTING AS REQUIRED BY DOT PART 192 PIPELINE SAFETY MANUAL. ALL WELDERS MUST HAVE CURRENT CITIZENS UTILITIES WELDING CERTIFICATION.
8. THE CONTRACTOR SHALL FURNISH HOLIDAY DETECTORS AND CHECK FOR HOLIDAYS IN THE PRESENCE OF THE INSPECTOR PRIOR TO LOWERING THE PIPE INTO THE TRENCH. ALL HOLIDAYS WILL BE REPAIRED AND RETESTED PRIOR TO INSTALLATION.
9. ALL STEEL PIPE HAS BEEN FACTORY TESTED ACCORDING TO API 5L. THE CONTRACTOR SHALL HYDROSTATIC TEST ALL STEEL PIPE.
10. PLACE WARNING TAPE 12" TO 18" ABOVE THE TOP OF ALL PIPE PLACED IN THE GROUND.
11. THE TRENCH SHALL BE CUT TO SUFFICIENT DEPTH TO PROVIDE A MINIMUM OF 48" FROM TOP OF PIPE. THE DEPTH OF TRENCH SHALL BE DEEPER IN ROCK CONDITIONS UPON DIRECTION FROM THE ENGINEER.
12. RIGHT OF WAY MAPS ARE AVAILABLE AND CAN BE ACQUIRED FROM CITIZENS UTILITIES.
13. THE CONTRACTOR SHALL WORK WITHIN THE 50' TEMPORARY CONSTRUCTION EASEMENT AS STAKED IN THE FIELD.
14. FITTINGS ARE NOT TO SCALE.
15. THE INSTALLATION OF NATURAL GAS FACILITIES AND PIPING SHALL BE IN ACCORDANCE WITH WITH THE APPLICABLE CITIZENS UTILITIES CONSTRUCTION STANDARDS.
16. ALL EXISTING UTILITIES SHOWN ARE BASED OFF OF AS-BUILTS SOME UTILITIES ARE NOT SHOWN DUE TO LACK OF AS-BUILT. ALL UTILITIES ARE TO BE LOCATED IN THE FIELD PRIOR TO CONSTRUCTION, BY CALLING BLUE STAKE.
17. ALL EXISTING CULVERTS WILL REMAIN UNDISTURBED IN THE EXACT LOCATION PREVIOUS TO CONSTRUCTION.
18. CARE SHALL BE TAKEN TO KEEP THE WORK AREA TO THE MINIMUM WIDTH NECESSARY. THE METHOD OF CLEARING THE WORK AREA SHALL TAKE INTO ACCOUNT MATTERS OF SOIL STABILITY, PROTECTION OF MATERIAL SUBSTITUTE, ADJACENT RESOURCES AND MINIMAL DISRUPTION OF WALKS, ROADS, AND OTHER STRUCTURES IN THE AREA. CARE SHALL BE TAKEN DURING GRADING OPERATIONS TO MINIMIZE THE REMOVAL OF GROUND COVER (VEGETATION) AND/OR TOP SOIL OUTSIDE OF THE DITCH AREA. WHEN THIS DOES OCCUR, THE SURFACE SHALL BE STABILIZED TO AVOID EROSION, AS SOON AS POSSIBLE.
19. ALL PE FITTERS WILL HAVE CURRENT CITIZENS UTILITIES FUSION CERTIFICATION.
20. ALL PE FUSION WELDS SHALL PASS THE VISUAL TESTING PROCEDURE IN PIPELINE SAFETY PART 192.285. FUSIONS FAILING THE VISUAL TEST SHALL BE CUT OUT AND REFUSED UNTIL PASSED. WHEN REQUESTED BY THE OWNER, THE CONTRACTOR SHALL CUT OUT A FUSION WELD FOR DESTRUCTIVE TESTS AND REFUSE THE PIPE.
21. GAS LINE SHOULD BE PLACED AT A MINIMUM OF 18" FROM ALL OTHER UTILITIES.
22. IF ADDITIONAL WORKSPACE IS NEEDED ON FOREST SERVICE LAND, BE SURE APPROVAL IS GOTTEN BY CONTACTING APPROPRIATE FOREST SERVICE PERSONNEL.
23. FOLLOW LANDSCAPE AND EROSION CONTROL PLAN IN ALL AREAS OF THE COCONINO NATIONAL FOREST.
24. ALL EQUIPMENT MUST BE PRESSURE WASHED PRIOR TO ENTERING FOREST SERVICE LANDS. SHOWS SPECIAL ATTENTION TO THE UNDERCARRIAGES AND TIRES.

1-800-STAKE-IT

3

DWG #

DATE	REVISIONS	No.	

DRAWN BY: M. CONBOY
CHECKED BY: M. CONBOY
APP. BY: ROB FRANSON

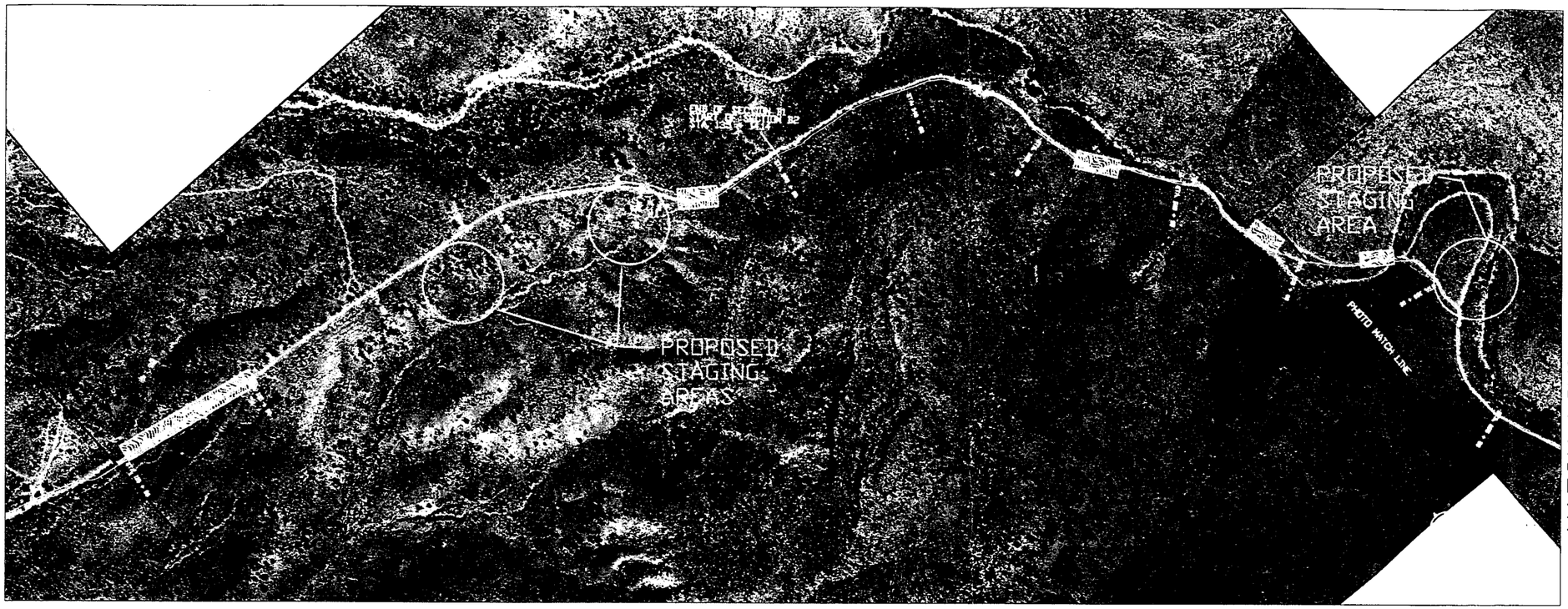
SCALE: 1" = 200'

VILLAGE OF OAK CREEK
GAS SUPPLY LINE

DATE: AUGUST 1, 2000

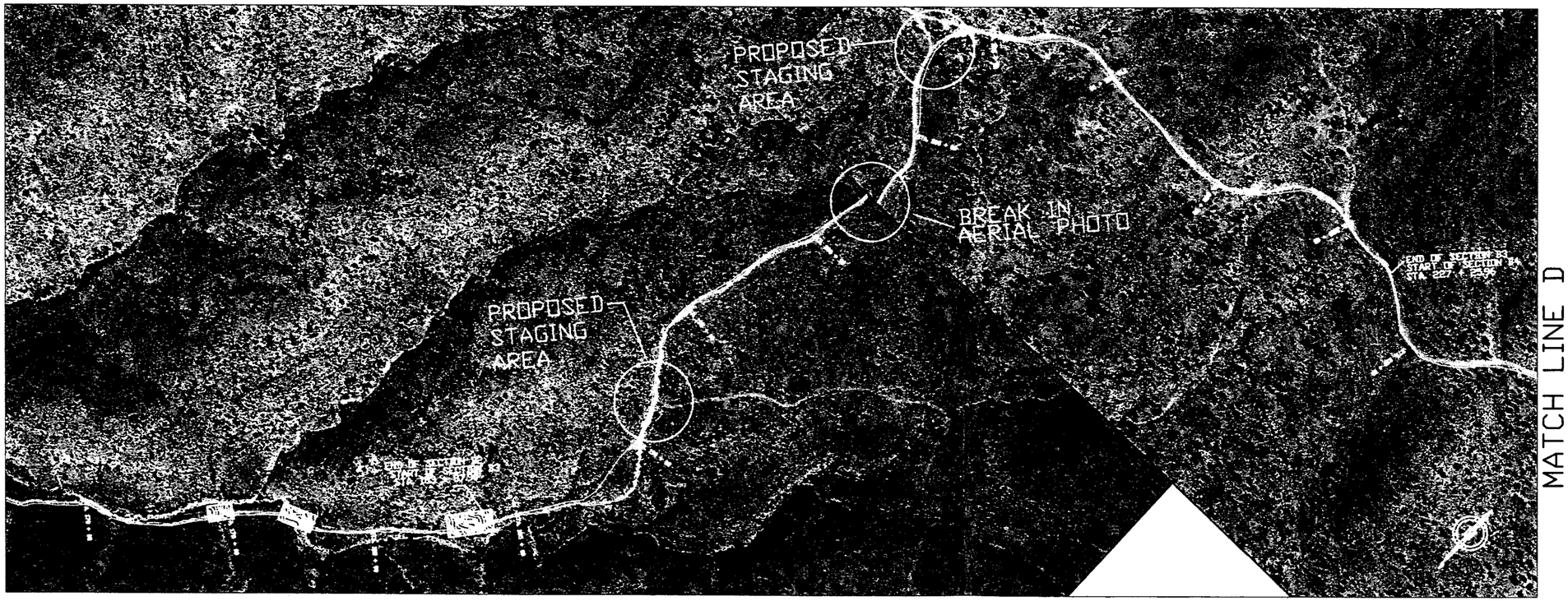
DWG #
3

MATCH LINE B



MATCH LINE C

MATCH LINE C



MATCH LINE D

LEGEND

- FENCE LINE
- ELEVATION LINE (METERS)
- CULVERT
- LIMITS OF ROAD SURFACE
- WATER LINE
- EASEMENT LINE
- CENTERLINE OF ROAD
- 6" STEEL GAS LINE
- 2" PE GAS LINE
- VALVE
- TEE
- CAP
- ELBOW
- REDUCER
- EXTRA WORKSPACE WITH F.S. APPROVAL

APPROXIMATE QUANTITIES

6" CS PIPE = 12000 LINEAR FEET
36 LOCKER BALL (BAG) = 1 PER TEST POINT AND ONE PER STUB OUT

CONSTRUCTION NOTES

1. STATIONING SHOWN ON PLANS ARE APPROXIMATE.
2. PIPE ALIGNMENT SHALL BE AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. OFFSETS FROM PROPERTY LINES TO THE PIPELINE REPRESENT THE BEST PLANNING PRIOR TO ACTUAL EXCAVATION.
3. CONCRETE SHALL BE 3000 PSI-28 DAY STRENGTH, WITH 5% AIR ENTRAINMENT AND 4" MAXIMUM SLUMP.
4. PLACE PIPELINE MARKERS AS CLOSE AS PRACTICAL OVER THE BURIED LINE. IT IS INTENDED TO PLACE MARKERS AT EACH SIDE OF ROAD CROSSINGS, FENCE, DITCH, OR CULVERT, AND NOT SPACED FURTHER THAN 1000' APART UNLESS CALLED OUT ON PLANS.
5. WELDED MITER JOINTS ARE NOT ALLOWED. ALL BENDS SHALL BE WITH WROUGHT STEEL FITTINGS OR IN ACCORDANCE WITH PIPE BENDING SPECIFICATIONS.
6. ALL BUTT WELDS TO 100% RADIOGRAPHED. WELDS FAILING SHALL BE GIVEN ONE REPAIR ATTEMPT, THEN TESTED AGAIN. WELDS FAILING THE SECOND TEST, SHALL BE CUT OUT AND REWELDED. WHEN REQUESTED BY THE ENGINEER, THE CONTRACTOR SHALL CUT OUT A WELDED JOINT FOR DESTRUCTIVE TESTS AND REWELD THE PIPELINE.
7. WELDERS OF STEEL PIPE MUST BE QUALIFIED IN ACCORDANCE WITH API 1104 AND COMPLY WITH DRUG TESTING AS REQUIRED BY DOT PART 192 PIPELINE SAFETY MANUAL. ALL WELDERS MUST HAVE CURRENT CITIZENS UTILITIES WELDING CERTIFICATION.
8. THE CONTRACTOR SHALL FURNISH HOLIDAY DETECTORS AND CHECK FOR HOLIDAYS IN THE PRESENCE OF THE INSPECTOR PRIOR TO LOWERING THE PIPE INTO THE TRENCH. ALL HOLIDAYS WILL BE REPAIRED AND RETESTED PRIOR TO INSTALLATION.
9. ALL STEEL PIPE HAS BEEN FACTORY TESTED ACCORDING TO API 5L. THE CONTRACTOR SHALL DEMONSTRATE TEST ALL STEEL PIPE.
10. PLACE WARNING TAPE 12" TO 18" ABOVE THE TOP OF ALL PIPE PLACED IN THE GROUND.
11. THE TRENCH SHALL BE CUT TO SUFFICIENT DEPTH TO PROVIDE A MINIMUM OF 48" FROM TOP OF PIPE. THE DEPTH OF TRENCH SHALL BE DEEPER IN UNDUE CONDITIONS UPON DIRECTION FROM THE ENGINEER.
12. RIGHT OF WAY MAPS ARE AVAILABLE AND CAN BE ACQUIRED FROM CITIZENS UTILITIES.
13. THE CONTRACTOR SHALL WORK WITHIN THE 30' TEMPORARY CONSTRUCTION EASEMENT AS STAKED IN THE FIELD.
14. FITTINGS ARE NOT TO SCALE.
15. THE INSTALLATION OF NATURAL GAS FACILITIES AND PIPING SHALL BE IN ACCORDANCE WITH WITH THE APPLICABLE CITIZENS UTILITIES CONSTRUCTION STANDARDS.
16. ALL EXISTING UTILITIES SHOWN ARE BASED OFF OF AS-BUILTS SOME UTILITIES ARE NOT SHOWN DUE TO LACK OF AS-BUILT. ALL UTILITIES ARE TO BE LOCATED IN THE FIELD PRIOR TO CONSTRUCTION, BY CALLING BLUE STAKE.
17. ALL EXISTING CULVERTS WILL REMAIN UNDISTURBED IN THE EXACT LOCATION PREVIOUS TO CONSTRUCTION.
18. CARE SHALL BE TAKEN TO KEEP THE WORK AREA TO THE MINIMUM WHICH IS NECESSARY. THE METHOD OF CLEARING THE WORK AREA SHALL TAKE INTO ACCOUNT MATTERS OF SOIL STABILITY, PROTECTION OF MATERIAL VEGETATION, ADJACENT RESOURCES AND MINIMAL DISRUPTION OF WALKS, ROADS, AND OTHER STRUCTURES IN THE AREA. CARE SHALL BE TAKEN DURING GROUND OPERATIONS TO MINIMIZE THE REMOVAL OF GROUND COVER (VEGETATION) AND/OR TOP SOIL OUTSIDE OF THE DITCH AREA. WHEN THIS DOES OCCUR, THE SURFACE SHALL BE STABILIZED TO AVOID EROSION, AS SOON AS POSSIBLE.
19. ALL PE FITTERS WILL HAVE CURRENT CITIZENS UTILITIES FUSION CERTIFICATION.
20. ALL PE FUSION WELDS SHALL PASS THE VISUAL TESTING PROCEDURE IN PIPELINE SAFETY PART 192.285. FUSIONS THAT FAIL VISUAL TEST SHALL BE CUT OUT AND REFUSED (WILL ISSUE). WHEN REQUESTED BY THE OWNER, THE CONTRACTOR SHALL CUT OUT A FUSION WELD FOR DESTRUCTIVE TESTS AND REFUSE THE PIPE.
21. GAS LINE SHOULD BE PLACED AT A MINIMUM OF 18" FROM ALL OTHER UTILITIES.
22. IF ADDITIONAL WORKSPACE IS NEEDED ON FOREST SERVICE LAND, BE SURE APPROVAL IS GOTTEN BY CONTACTING APPROPRIATE FOREST SERVICE PERSONNEL.
23. FOLLOW LANDSCAPE AND EROSION CONTROL PLAN IN ALL AREAS OF THE COCONINO NATIONAL FOREST.
24. ALL EQUIPMENT MUST BE PRESSURE WASHED PRIOR TO ENTERING FOREST SERVICE LANDS, DAVID SPECIAL ATTENTION TO THE UNDERCARRIAGES AND TIRES.

1-800-STAKE-IT

4

DWG #

DATE	REVISIONS	No.

DRAWN BY:	M. CONBOY
CHECKED BY:	M. CONBOY
APP. BY:	ROB FRANSON

SCALE: 1" = 200'

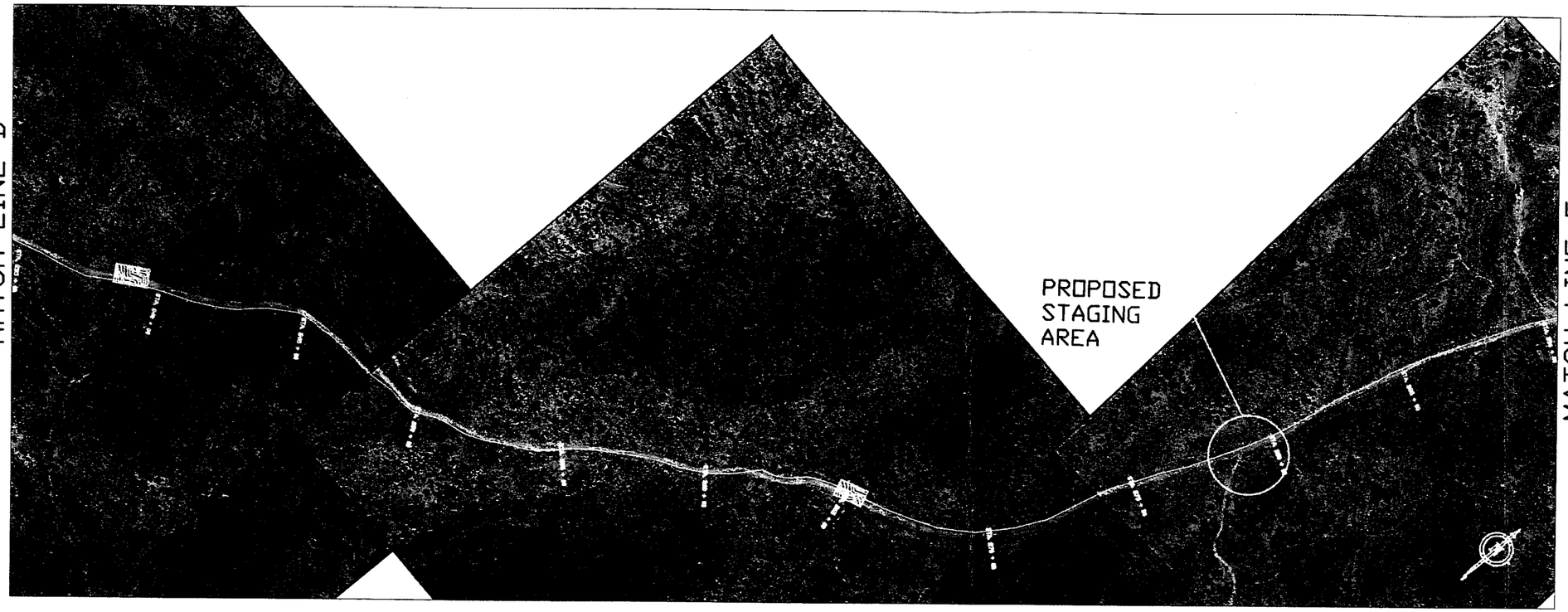
VILLAGE OF OAK CREEK
GAS SUPPLY LINE

DATE: AUGUST 1, 2000

DWG #

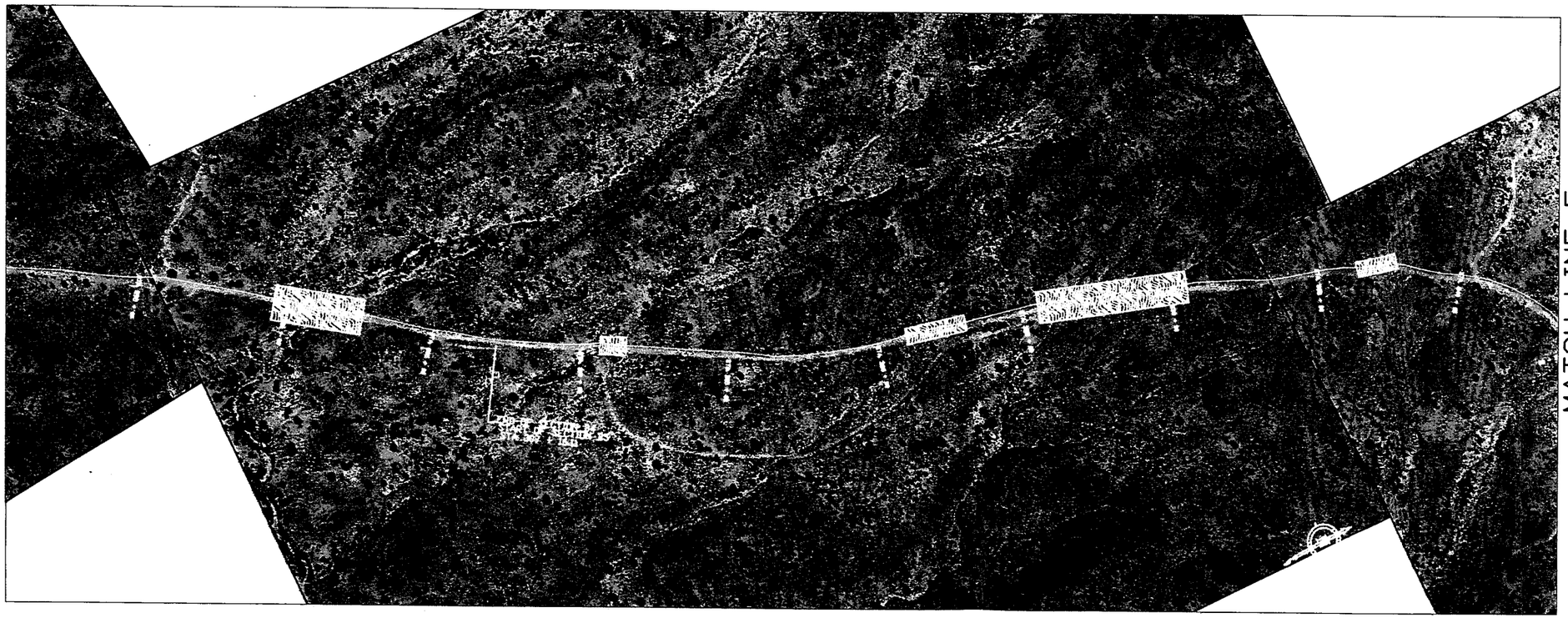
4

MATCH LINE D



MATCH LINE E

MATCH LINE E



MATCH LINE F

LEGEND

- FENCE LINE
- ELEVATION LINE (METERS)
- CULVERT
- LIMITS OF ROAD SURFACE
- WATER LINE
- EASEMENT LINE
- CENTERLINE OF ROAD
- 8" STEEL GAS LINE
- 2" PE GAS LINE
- VALVE
- TEE
- CAP
- ELBOW
- REDUCER
- EXTRA WORKSPACE WITH F.S. APPROVAL

APPROXIMATE QUANTITIES

8" CS PIPE = 10550 LINEAR FEET

3M LOCATOR BALL (BAG) = 1 PER TEST POINT AND ONE PER STUB OUT

CONSTRUCTION NOTES

1. STATIONING SHOWN ON PLANS ARE APPROXIMATE.
2. PIPE ALIGNMENT SHALL BE AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. OFFSETS FROM PROPERTY LINES TO THE PIPELINE REPRESENT THE BEST PLANNING PRIOR TO ACTUAL EXCAVATION.
3. CONCRETE SHALL BE 3000 PSI-28 DAY STRENGTH, WITH 5% AIR ENTRAINMENT AND 4" MAXIMUM SLUMP.
4. PLACE PIPELINE MARKERS AS CLOSE AS PRACTICAL OVER THE BURIED MAIN. IT IS INTENDED TO PLACE MARKERS AT EACH SIDE OF ROAD CROSSINGS, FENCE, DITCH, OR CULVERT, AND NOT SPACED FURTHER THAN 1000' APART UNLESS CALLED OUT ON PLANS.
5. WELDED MITER JOINTS ARE NOT ALLOWED. ALL BENDS SHALL BE WITH WROUGHT STEEL FITTINGS OR IN ACCORDANCE WITH PIPE BENDING SPECIFICATIONS.
6. ALL BUTT WELDS 100% RADIOGRAPHED. WELDS FAILING SHALL BE GIVEN ONE REPAIR ATTEMPT, THEN TESTED AGAIN. WELDS FAILING THE SECOND TEST, SHALL BE CUT OUT AND REWELDED. WHEN REQUESTED BY THE ENGINEER, THE CONTRACTOR SHALL CUT OUT A WELDED JOINT FOR DESTRUCTIVE TESTS AND REWELD THE PIPELINE.
7. WELDING OF STEEL PIPE MUST BE QUALIFIED IN ACCORDANCE WITH API 1104 AND COMPLY WITH DOT PART 192 AS REQUIRED BY DOT PART 192 PIPELINE SAFETY MANUAL. ALL WELDERS MUST HAVE CURRENT CITIZENS UTILITIES WELDING CERTIFICATION.
8. THE CONTRACTOR SHALL FURNISH HOLIDAY DETECTORS AND CHECK FOR HOLIDAYS IN THE PRESENCE OF THE INSPECTOR PRIOR TO LOWERING THE PIPE INTO THE TRENCH. ALL HOLIDAYS WILL BE REPAIRED AND RETESTED PRIOR TO INSTALLATION.
9. ALL STEEL PIPE HAS BEEN FACTORY TESTED ACCORDING TO API 5L. THE CONTRACTOR SHALL HYDROSTATIC TEST ALL STEEL PIPE.
10. PLACE WARNING TAPE 12" TO 16" ABOVE THE TOP OF ALL PIPING PLACED IN THE GROUND.
11. THE TRENCH SHALL BE CUT TO SUFFICIENT DEPTH TO PROVIDE A MINIMUM OF 48" FROM TOP OF PIPE. THE DEPTH OF TRENCH SHALL BE DEEPER IN UNIQUE CONDITIONS UPON DIRECTION FROM THE ENGINEER.
12. RIGHT OF WAY MAPS ARE AVAILABLE AND CAN BE ACQUIRED FROM CITIZENS UTILITIES.
13. THE CONTRACTOR SHALL WORK WITHIN THE 50' TEMPORARY CONSTRUCTION EASEMENT AS STAKED IN THE FIELD.
14. FITTINGS ARE NOT TO SCALE.
15. THE INSTALLATION OF NATURAL GAS FACILITIES AND PIPING SHALL BE IN ACCORDANCE WITH WITH THE APPLICABLE CITIZENS UTILITIES CONSTRUCTION STANDARDS.
16. ALL EXISTING UTILITIES SHOWN ARE BASED OFF OF AS-BUILTS SOME UTILITIES ARE NOT SHOWN DUE TO LACK OF AS-BUILT. ALL UTILITIES ARE TO BE LOCATED IN THE FIELD PRIOR TO CONSTRUCTION, BY CALLING BLUE STAKE.
17. ALL EXISTING CULVERTS WILL REMAIN UNDISTURBED IN THE EXACT LOCATION PREVIOUS TO CONSTRUCTION.
18. CARE SHALL BE TAKEN TO KEEP THE WORK AREA TO THE MINIMUM WIDTH NECESSARY. THE METHOD OF CLEARING THE WORK AREA SHALL TAKE INTO ACCOUNT MATTERS OF SOIL STABILITY, PROTECTION OF WATERWAYS, VEGETATION, ADJACENT RESOURCES AND MINIMAL DISRUPTION OF WALKS, ROADS, AND OTHER STRUCTURES IN THE AREA. CARE SHALL BE TAKEN DURING GRADING OPERATIONS TO MINIMIZE THE REMOVAL OF GROUND COVER (VEGETATION) AND/OR TOP SOIL OUTSIDE OF THE DITCH AREA. WHEN THIS DOES OCCUR, THE SURFACE SHALL BE STABILIZED TO AVOID EROSION, AS SOON AS POSSIBLE.
19. ALL PE FITTERS WILL HAVE CURRENT CITIZENS UTILITIES FUSION CERTIFICATION.
20. ALL PE FUSION WELDS SHALL PASS THE VISUAL TESTING PROCEDURE IN PIPELINE SAFETY PART 192.285. FUSIONS FAILING THE VISUAL TEST SHALL BE CUT OUT AND REFUSED UNTIL PASSING. WHEN REQUESTED BY THE OWNER, THE CONTRACTOR SHALL CUT OUT A FUSION WELD FOR DESTRUCTIVE TESTS AND REFUSE THE PIPE.
21. GAS LINE SHOULD BE PLACED AT A MINIMUM OF 18" FROM ALL OTHER UTILITIES.
22. IF ADDITIONAL WORKSPACE IS NEEDED ON FOREST SERVICE LAND, BE SURE APPROVAL IS GOTTEN BY CONTACTING APPROPRIATE FOREST SERVICE PERSONNEL.
23. FOLLOW LANDSCAPE AND EROSION CONTROL PLAN IN ALL AREAS OF THE COCONINO NATIONAL FOREST.
24. ALL EQUIPMENT MUST BE PRESSURE WASHED PRIOR TO ENTERING FOREST SERVICE LANDS, GIVING SPECIAL ATTENTION TO THE UNDERCARRIAGES AND TIRES.

1-800-STAKE-IT

5

DWG #

DATE	REVISIONS	No.

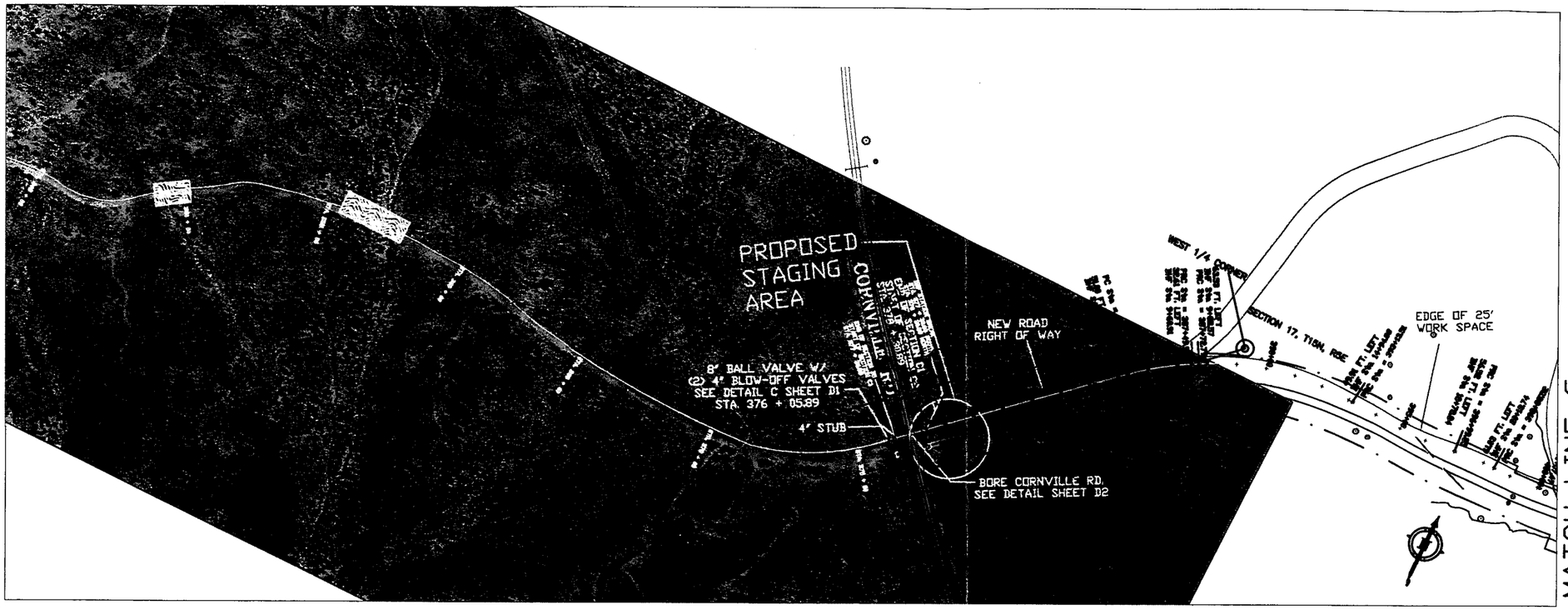
DRAWN BY: M. CONBOY
CHECKED BY: M. CONBOY
APP. BY: ROB FRANSON

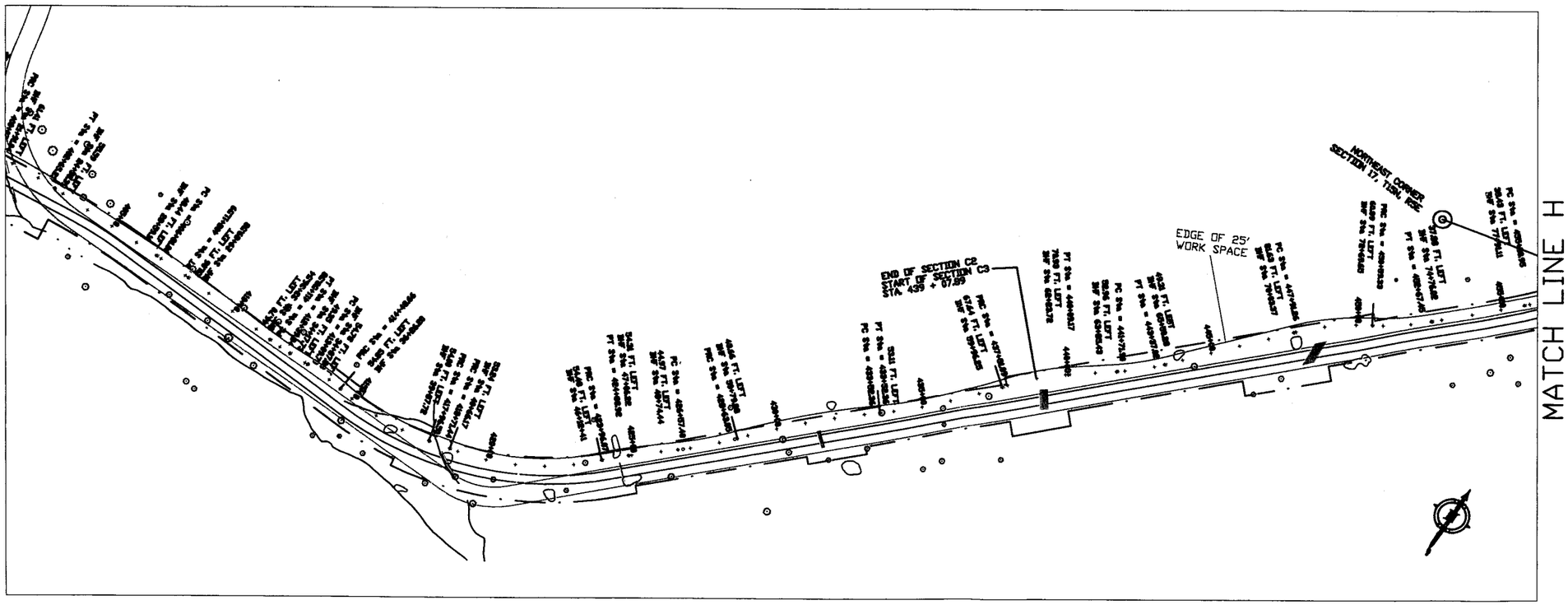
SCALE: 1" = 200'

VILLAGE OF OAK CREEK
GAS SUPPLY LINE

DATE: AUGUST 1, 2000

DWG #
5





LEGEND

- FUTURE ROAD RIGHT OF WAY LINE
- EXISTING ROAD RIGHT OF WAY LINE
- FENCE LINE
- ELEVATION LINE
- CULVERT
- LIMITS OF ROAD SURFACE
- WATER LINE
- EASEMENT LINE
- CENTERLINE OF ROAD
- 8" STEEL GAS LINE
- 2" PE GAS LINE
- VALVE
- EXTRA WORKSPACE WITH F.S. APPROVAL

APPROXIMATE QUANTITIES

10" CS CASING = 105 LINEAR FEET	.75" x 4.5" STUDS W/ 2 NUTS = 32 EACH
8" CS PIPE = 11537 LINEAR FEET	3M LOCKER BALL (GAS) = 1 PER TEST POINT AND ONE PER STUB OUT
8" x 4" STEEL TEE = 3 EACH	
8" STEEL BALL VALVE = 1 EACH	
4" CS PIPE = 38 LINEAR FEET	
4" STEEL END CAP = 1 EACH	
4" STEEL WELD END FLANGE = 2 EACH	
4" STEEL SLIP FLANGE = 2 EACH	
4" STEEL PLUG VALVE = 2 EACH	
4" STEEL BALL VALVE = 1 EACH	
1/4" NIPPLE (3" LENGTH) = 2 EACH	
1/4" NEEDLE VALVE = 3 EACH	
1/4" PLUG = 2 EACH	
4" GASKET = 4 EACH	

CONSTRUCTION NOTES

1. STATIONING SHOWN ON PLANS ARE APPROXIMATE.
2. PIPE ALIGNMENT SHALL BE AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. OFFSETS FROM PROPERTY LINES TO THE PIPELINE REPRESENT THE BEST PLANNING PRIOR TO ACTUAL EXCAVATION.
3. CONCRETE SHALL BE 3000 PSI-28 DAY STRENGTH, WITH 5% AIR ENTRAINMENT AND 4" MAXIMUM SLUMP.
4. PLACE PIPELINE MARKERS AS CLOSE AS PRACTICAL OVER THE BURIED WALL. IT IS INTENDED TO PLACE MARKERS AT EACH SIDE OF ROAD CROSSINGS, FENCE, DITCH, OR CULVERT, AND NOT SPACED FURTHER THAN 1000' APART UNLESS CALLED OUT ON PLANS.
5. WELDED MITER JOINTS ARE NOT ALLOWED. ALL BENDS SHALL BE WITH WROUGHT STEEL FITTINGS OR IN ACCORDANCE WITH PIPE BENDING SPECIFICATIONS.
6. ALL BUTT WELDS TO 100% RADIOGRAPHED WELDS FAILING SHALL BE GIVEN ONE REPAIR ATTEMPT, THEN TESTED AGAIN. WELDS FAILING THE SECOND TEST, SHALL BE CUT OUT AND REWELDED. WHEN REQUESTED BY THE ENGINEER, THE CONTRACTOR SHALL CUT OUT A WELDED JOINT FOR DESTRUCTIVE TESTS AND REWELD THE PIPELINE.
7. WELDERS OF STEEL PIPE MUST BE QUALIFIED IN ACCORDANCE WITH API 1104 AND COMPLY WITH DRUG TESTING AS REQUIRED BY 49 CFR PART 192 PIPELINE SAFETY MANUAL. ALL WELDERS MUST HAVE CURRENT CITIZENS UTILITIES WELDING CERTIFICATION.
8. THE CONTRACTOR SHALL FURNISH HOLIDAY DETECTORS AND CHECK FOR HOLIDAYS IN THE PRESENCE OF THE INSPECTOR PRIOR TO LOWERING THE PIPE INTO THE TRENCH. ALL HOLIDAYS WILL BE REPAIRED AND RETESTED PRIOR TO INSTALLATION.
9. ALL STEEL PIPE HAS BEEN FACTORY TESTED ACCORDING TO API 5L. THE CONTRACTOR SHALL HYDROSTATIC TEST ALL STEEL PIPE.
10. PLACE WARNING TAPE 12" TO 18" ABOVE THE TOP OF ALL PIPING PLACED IN THE GROUND.
11. THE TRENCH SHALL BE CUT TO SUFFICIENT DEPTH TO PROVIDE A MINIMUM OF 48" FROM TOP OF PIPE. THE DEPTH OF TRENCH SHALL BE DEEPER IN UNSOLE CONDITIONS UPON DIRECTION FROM THE ENGINEER.
12. RIGHT OF WAY MAPS ARE AVAILABLE AND CAN BE ACQUIRED FROM CITIZENS UTILITIES.
13. THE CONTRACTOR SHALL WORK WITHIN THE 50' TEMPORARY CONSTRUCTION EASEMENT AS STAKED IN THE FIELD.
14. FITTINGS ARE NOT TO SCALE.
15. THE INSTALLATION OF NATURAL GAS FACILITIES AND PIPING SHALL BE IN ACCORDANCE WITH THE APPLICABLE CITIZENS UTILITIES CONSTRUCTION STANDARDS.
16. ALL EXISTING UTILITIES SHOWN ARE BASED OFF OF AS-BUILTS SOME UTILITIES ARE NOT SHOWN DUE TO LACK OF AS-BUILT. ALL UTILITIES ARE TO BE LOCATED IN THE FIELD PRIOR TO CONSTRUCTION, BY CALLING BLUE STAKE.
17. ALL EXISTING CULVERTS WILL REMAIN UNDISTURBED IN THE EXACT LOCATION PREVIOUS TO CONSTRUCTION.
18. CARE SHALL BE TAKEN TO KEEP THE WORK AREA TO THE MINIMUM WIDTH NECESSARY. THE METHOD OF CLEARING THE WORK AREA SHALL TAKE INTO ACCOUNT MATTERS OF SOIL STABILITY, PROTECTION OF MATERIAL, VEGETATION, ADJACENT RESOURCES AND MINIMAL DISRUPTION OF WALKS, ROADS, AND OTHER STRUCTURES IN THE AREA. CARE SHALL BE TAKEN DURING GROUND OPERATIONS TO AVOID THE REMOVAL OF GROUND COVER (VEGETATION) AND/OR TOP SOIL OUTSIDE OF THE DITCH AREA. WHERE THIS DOES OCCUR, THE SURFACE SHALL BE STABILIZED TO AVOID EROSION, AS SOON AS POSSIBLE.
19. ALL PE FITTERS WILL HAVE CURRENT CITIZENS UTILITIES FUSION CERTIFICATION.
20. ALL PE FUSION WELDS SHALL PASS THE VISUAL TESTING PROCEDURE IN PIPELINE SAFETY PART 192.285. FUSIONS FAILING THE VISUAL TEST, SHALL BE CUT OUT AND REFUSED (WITH FUSIONS). WHEN REQUESTED BY THE OWNER, THE CONTRACTOR SHALL CUT OUT A FUSION WELD FOR DESTRUCTIVE TESTS AND REFUSE THE PIPE.
21. GAS LINE SHOULD BE PLACED AT A MINIMUM OF 18" FROM ALL OTHER UTILITIES.
22. IF ADDITIONAL WORKSPACE IS NEEDED ON FOREST SERVICE LAND, BE SURE APPROVAL IS GOTTEN BY CONTACTING APPROPRIATE FOREST SERVICE PERSONNEL.
23. FOLLOW LANDSCAPE AND EROSION CONTROL PLAN IN ALL AREAS OF THE COCONINO NATIONAL FOREST.
24. ALL EQUIPMENT MUST BE PRESSURE WASHED PRIOR TO ENTERING FOREST SERVICE LANDS, GIVING SPECIAL ATTENTION TO THE UNDERCARRIAGES AND TIRES.

1-800-STAKE-IT

6

DWG #

No.	REVISIONS	DATE

DRAWN BY: M. CONBOY
CHECKED BY: M. CONBOY
APP. BY: ROB FRANSON

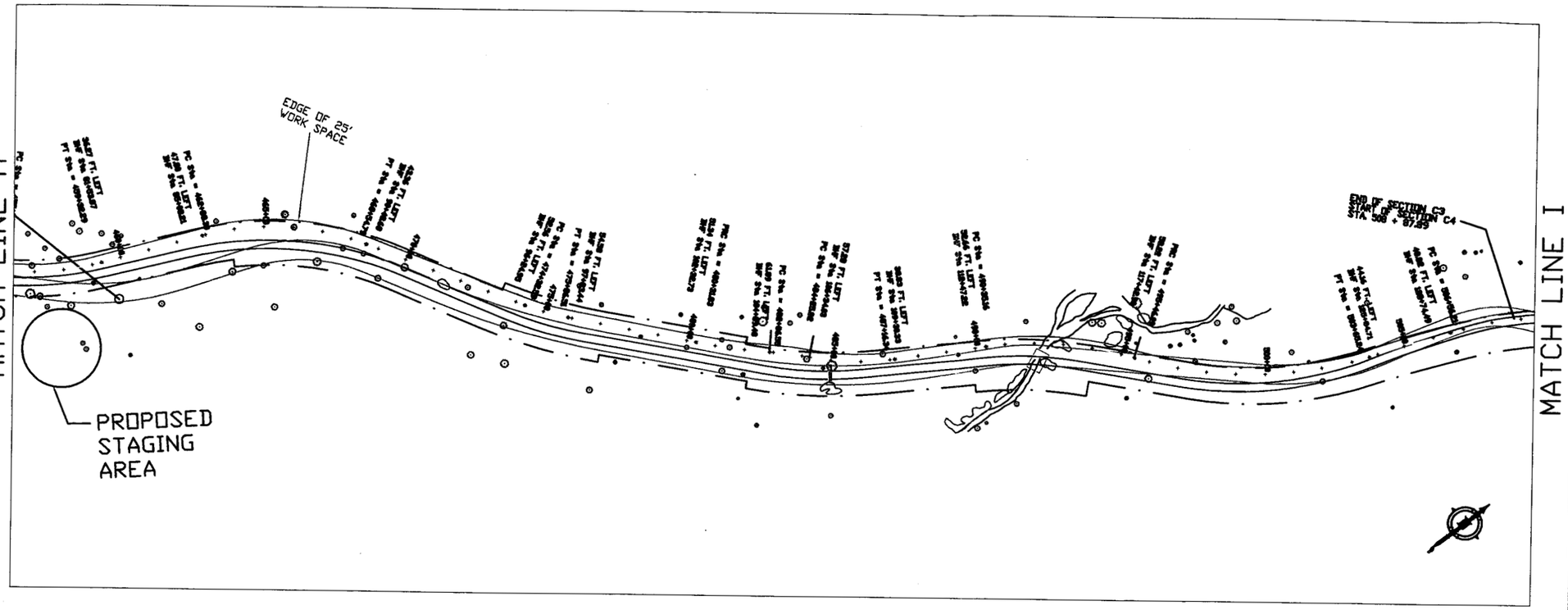
VILLAGE OF OAK CREEK
GAS SUPPLY LINE

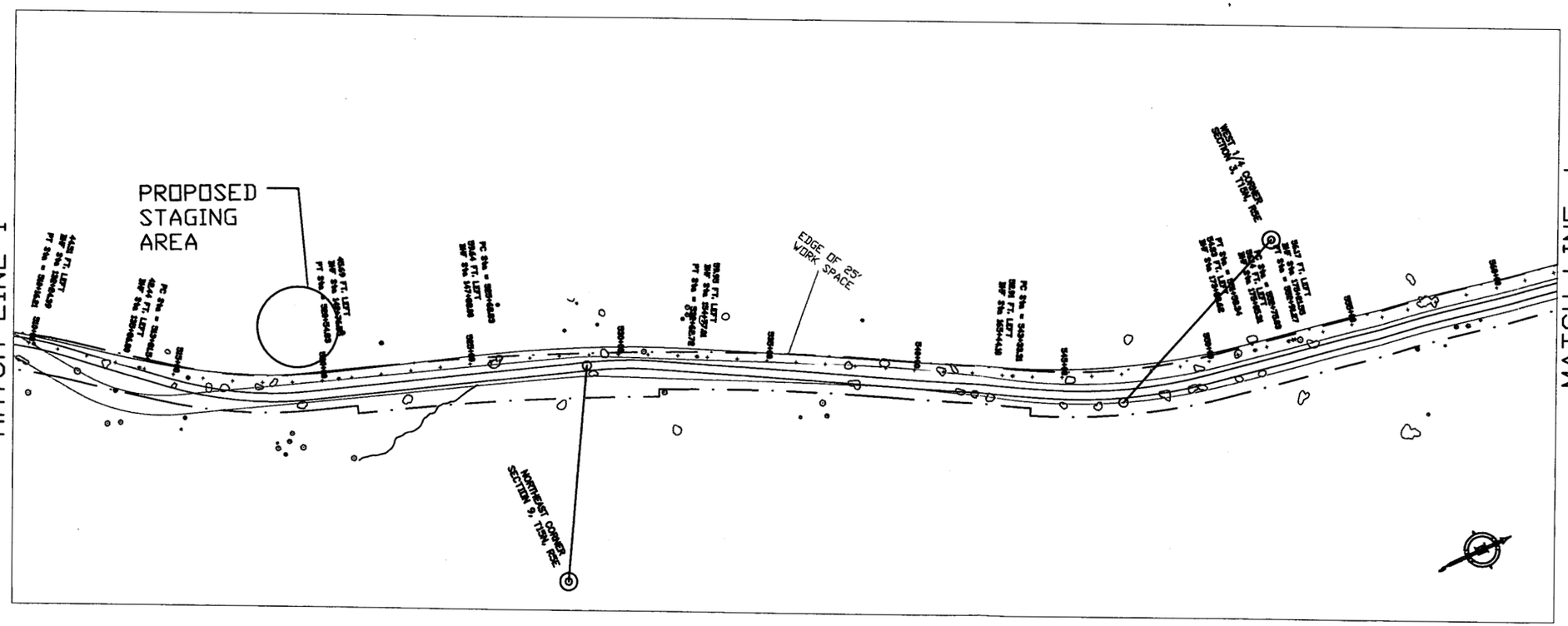
SCALE: 1" = 200'

DATE: AUGUST 1, 2000

DWG #

6





LEGEND

- FUTURE ROAD RIGHT OF WAY LINE
- EXISTING ROAD RIGHT OF WAY LINE
- FENCE LINE
- ELEVATION LINE
- CULVERT
- LIMITS OF ROAD SURFACE
- WATER LINE
- EASEMENT LINE
- CENTERLINE OF ROAD
- 6" STEEL GAS LINE
- 2" PE GAS LINE
- VALVE
- EXTRA WORKSPACE WITH F.S. APPROVAL

APPROXIMATE QUANTITIES

6" CS PIPE = 10000 LINEAR FEET
3M LOCATOR BALL (BAG) = 1 PER TEST POINT AND ONE PER STUB OUT

CONSTRUCTION NOTES

1. STATIONING SHOWN ON PLANS ARE APPROXIMATE.
2. PIPE ALIGNMENT SHALL BE AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. OFFSETS FROM PROPERTY LINES TO THE PIPELINE REPRESENT THE BEST PLANNING PRIOR TO ACTUAL EXCAVATION.
3. CONCRETE SHALL BE 3000 PSI-28 DAY STRENGTH, WITH 5% AIR ENTRAINMENT AND 4" MAXIMUM SLUMP.
4. PLACE PIPELINE MARKERS AS CLOSE AS PRACTICAL OVER THE BURIED MAIN. IT IS INTENDED TO PLACE MARKERS AT EACH SIDE OF ROAD CROSSING, FENCE, DITCH, OR CULVERT, AND NOT SPACED FURTHER THAN 1000' APART UNLESS CALLED OUT ON PLANS.
5. WELDED MITER JOINTS ARE NOT ALLOWED. ALL BENDS SHALL BE WITH WROUGHT STEEL FITTINGS OR IN ACCORDANCE WITH PIPE BENDING SPECIFICATIONS.
6. ALL BUTT WELDS TO 100% RADIOGRAPHED
   WELDS FAILING SHALL BE GIVEN ONE REPAIR ATTEMPT, THEN TESTED AGAIN. WELDS FAILING THE SECOND TEST, SHALL BE CUT OUT AND REWELDED. WHEN REQUESTED BY THE ENGINEER, THE CONTRACTOR SHALL CUT OUT A WELDED JOINT FOR DESTRUCTIVE TESTS AND REWELD THE PIPELINE.
7. WELDERS OF STEEL PIPE MUST BE QUALIFIED IN ACCORDANCE WITH API 1104 AND CONDUCT WRITTEN TESTING AS REQUIRED BY DOT PART 192 PIPELINE SAFETY MANUAL. ALL WELDERS MUST HAVE CURRENT CITIZENS UTILITIES WELDING CERTIFICATION.
8. THE CONTRACTOR SHALL FURNISH HOLIDAY DETECTORS AND CHECK FOR HOLIDAYS IN THE PRESENCE OF THE INSPECTOR PRIOR TO LOWERING THE PIPE INTO THE TRENCH. ALL HOLIDAYS WILL BE REPAIRED AND RETESTED PRIOR TO INSTALLATION.
9. ALL STEEL PIPE HAS BEEN FACTORY TESTED ACCORDING TO API 5L. THE CONTRACTOR SHALL HYDROSTATIC TEST ALL STEEL PIPE.
10. PLACE WARNING TAPE 12" TO 18" ABOVE THE TOP OF ALL PIPING PLACED IN THE GROUND.
11. THE TRENCH SHALL BE CUT TO SUFFICIENT DEPTH TO PROVIDE A MINIMUM OF 48" FROM TOP OF PIPE. THE DEPTH OF TRENCH SHALL BE DEEPER IN UNROCK CONDITIONS UPON DIRECTION FROM THE ENGINEER.
12. RIGHT OF WAY MAPS ARE AVAILABLE AND CAN BE ACQUIRED FROM CITIZENS UTILITIES.
13. THE CONTRACTOR SHALL WORK WITHIN THE 50' TEMPORARY CONSTRUCTION EASEMENT AS STAKED IN THE FIELD.
14. FITTINGS ARE NOT TO SCALE.
15. THE INSTALLATION OF NATURAL GAS FACILITIES AND PIPING SHALL BE IN ACCORDANCE WITH WITH THE APPLICABLE CITIZENS UTILITIES CONSTRUCTION STANDARDS.
16. ALL EXISTING UTILITIES SHOWN ARE BASED OFF OF AS-BUILTS SOME UTILITIES ARE NOT SHOWN DUE TO LACK OF AS-BUILT. ALL UTILITIES ARE TO BE LOCATED IN THE FIELD PRIOR TO CONSTRUCTION, BY CALLING BLUE STAKE.
17. ALL EXISTING CULVERTS WILL REMAIN UNDISTURBED IN THE EXACT LOCATION PREVIOUS TO CONSTRUCTION.
18. CARE SHALL BE TAKEN TO KEEP THE WORK AREA TO THE MINIMUM WIDTH POSSIBLE. THE METHOD OF CLEARING THE WORK AREA SHALL TAKE INTO ACCOUNT MATTERS OF SOIL STABILITY, PROTECTION OF MATERIAL VEGETATIONS, ADJACENT RESOURCES AND MINIMAL DISRUPTION OF WALKS, ROADS, AND OTHER STRUCTURES IN THE AREA. CARE SHALL BE TAKEN TO PRESERVE VEGETATIONS TO MINIMIZE THE REMOVAL OF GROUND COVER (VEGETATION) AND/OR TOP SOIL OUTSIDE OF THE DITCH AREA. WHEN THIS DOES OCCUR, THE SURFACE SHALL BE STABILIZED TO AVOID EROSION, AS SOON AS POSSIBLE.
19. ALL PE FITTERS WILL HAVE CURRENT CITIZENS UTILITIES FUSION CERTIFICATION.
20. ALL PE FUSION WELDS SHALL PASS THE VISUAL TESTING PROCEDURE IN PIPELINE SAFETY PART 192.285. FUSIONS FAILING THE VISUAL TEST SHALL BE CUT OUT AND REFUSED UNTIL PASSING. WHEN REQUESTED BY THE ENGINEER, THE CONTRACTOR SHALL CUT OUT A FUSION WELD FOR DESTRUCTIVE TESTS AND REFUSE THE PIPE.
21. GAS LINE SHOULD BE PLACED AT A MINIMUM OF 18" FROM ALL OTHER UTILITIES.
22. IF ADDITIONAL WORKSPACE IS NEEDED ON FOREST SERVICE LAND, BE SURE APPROVAL IS GIVEN BY CONTACTING APPROPRIATE FOREST SERVICE PERSONNEL.
23. FOLLOW LANDSCAPE AND EROSION CONTROL PLAN IN ALL AREAS OF THE COCONINO NATIONAL FOREST.
24. ALL EQUIPMENT MUST BE PRESSURE WASHED PRIOR TO ENTERING FOREST SERVICE LANDS, GIVING SPECIAL ATTENTION TO THE UNDERCARRIAGES AND TIRES.

1-800-STAKE-IT

DRAWN BY:	M. CONBOY
CHECKED BY:	M. CONBOY
APP. BY:	ROB FRANSON

No.	REVISIONS	DATE

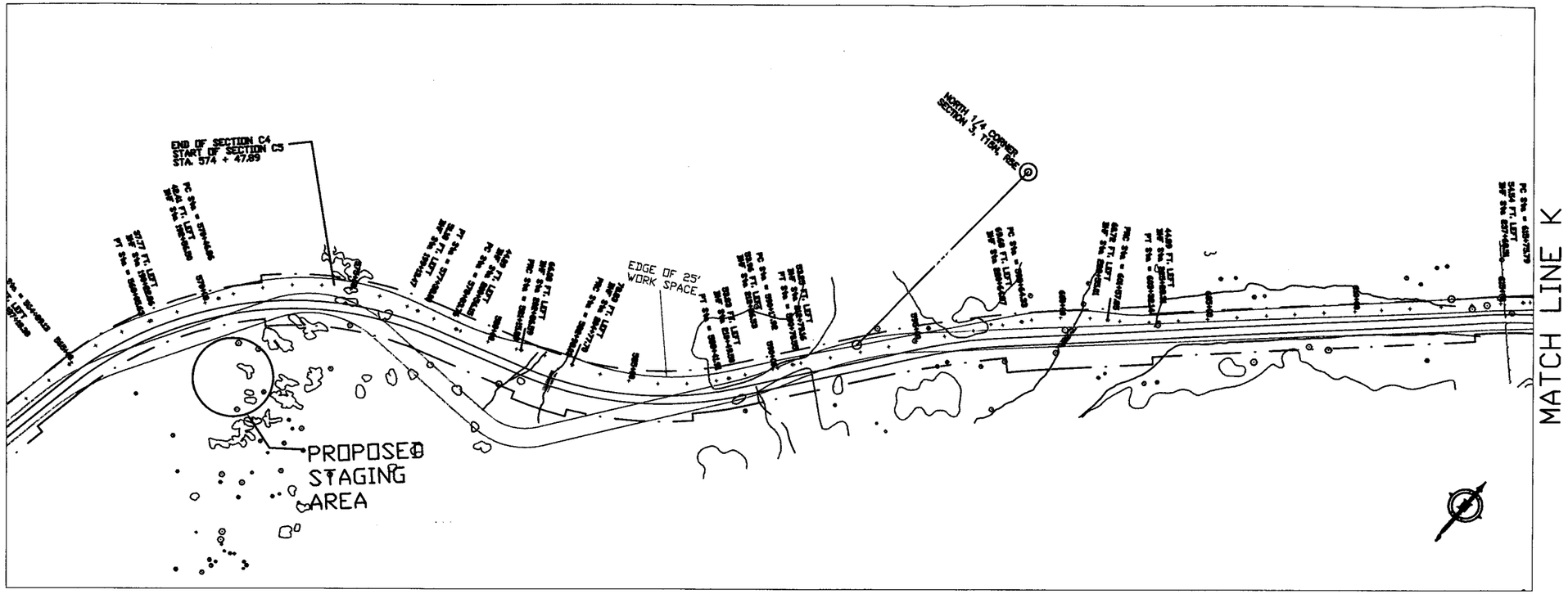
7
DWG #

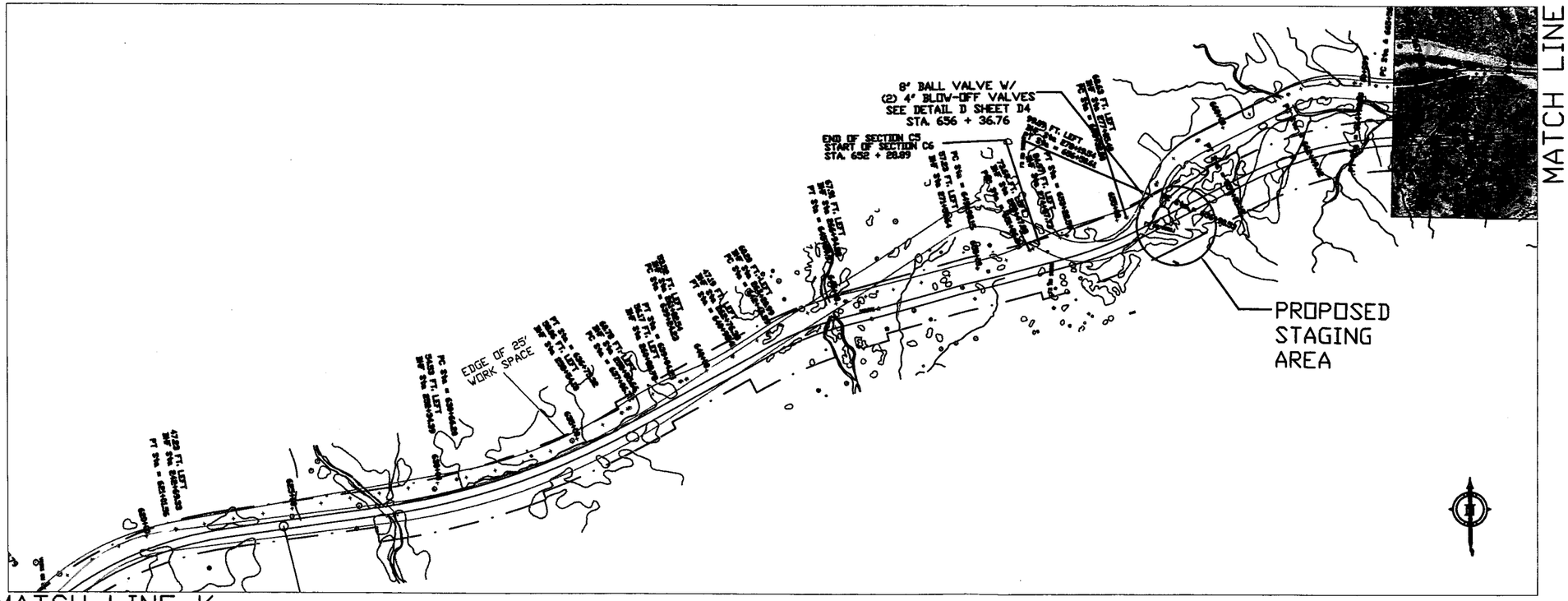
VILLAGE OF OAK CREEK
GAS SUPPLY LINE

SCALE: 1" = 200'

DATE: AUGUST 1, 2000

DWG #
7





LEGEND

- FUTURE ROAD RIGHT OF WAY LINE
- EXISTING ROAD RIGHT OF WAY LINE
- FENCE LINE
- ELEVATION LINE
- CULVERT
- LIMITS OF ROAD SURFACE
- WATER LINE
- EASEMENT LINE
- CENTERLINE OF ROAD
- 6" STEEL GAS LINE
- 2" PE GAS LINE
- VALVE
- EXTRA WORKSPACE WITH F.S. APPROVAL

APPROXIMATE QUANTITIES

6" CS PIPE = 10604 LINEAR FEET
6" x 4" STEEL TEE = 3 EACH
6" STEEL 90° ELBOW = 4 EACH
6" STEEL BALL VALVE = 1 EACH
4" CS PIPE = 22 LINEAR FEET
4" STEEL WELD END FLANGE = 2 EACH
4" STEEL BLIND FLANGE = 2 EACH
4" STEEL PLUG VALVE = 2 EACH
1/4" NIPPLE (2" LENGTH) = 3 EACH
1/4" NEEDLE VALVE = 2 EACH
1/4" PLUG = 2 EACH
4" GASKET = 4 EACH
.75" x 4.5" STUDS W/ 2 NUTS = 32 EACH

38 LOCKING BALL CHKS = 1 PER TEST POINT AND ONE PER DRIP OUT

CONSTRUCTION NOTES

1. STATIONING SHOWN ON PLANS ARE APPROXIMATE.
2. PIPE ALIGNMENT SHALL BE AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. OFFSETS FROM PROPERTY LINES TO THE PIPELINE REPRESENT THE BEST PLANNING PRIOR TO ACTUAL EXCAVATION.
3. CONCRETE SHALL BE 3000 PSI-28 DAY STRENGTH, WITH 5% AIR ENTRAINMENT AND 4" MAXIMUM SLUMP.
4. PLACE PIPELINE MARKERS AS CLOSE AS PRACTICAL OVER THE BURIED MAIL. IT IS INTENDED TO PLACE MARKERS AT EACH SIDE OF ROAD CROSSINGS, FENCE, DITCH, OR CULVERT, AND NOT SPACED FURTHER THAN 1000' APART UNLESS CALLED OUT ON PLANS.
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7. WELDERS OF STEEL PIPELINES MUST BE QUALIFIED IN ACCORDANCE WITH API 1104 AND COMPLY WITH QUALIFICATIONS REQUIRED BY DOT PART 192 PIPELINE SAFETY MANUAL. ALL WELDERS MUST HAVE CURRENT CITIZENS UTILITIES WELDING CERTIFICATION.
8. THE CONTRACTOR SHALL FURNISH HOLIDAY DETECTORS AND CHECK FOR HOLIDAYS IN THE PRESENCE OF THE INSPECTOR PRIOR TO LOWERING THE PIPE INTO THE TRENCH. ALL HOLIDAYS WILL BE REPAIRED AND RETESTED PRIOR TO INSTALLATION.
9. ALL STEEL PIPE HAS BEEN FACTORY TESTED ACCORDING TO API 5L. THE CONTRACTOR SHALL HYDROSTATIC TEST ALL STEEL PIPE.
10. PLACE WARNING TAPE 12" TO 18" ABOVE THE TOP OF ALL PIPING PLACED IN THE GROUND.
11. THE TRENCH SHALL BE CUT TO SUFFICIENT DEPTH TO PROVIDE A MINIMUM OF 48" FROM TOP OF PIPE. THE DEPTH OF TRENCH SHALL BE DEEPER IN ROCK CONDITIONS UPON DIRECTION FROM THE ENGINEER.
12. RIGHT OF WAY MAPS ARE AVAILABLE AND CAN BE ACQUIRED FROM CITIZENS UTILITIES.
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1-800-STAKE-IT

8

DWG #

DATE			
REVISIONS			
No.			
DRAWN BY:	M. CONBOY		
CHECKED BY:	M. CONBOY		
APP. BY:	ROB FRANSON		

SCALE: 1" = 200'

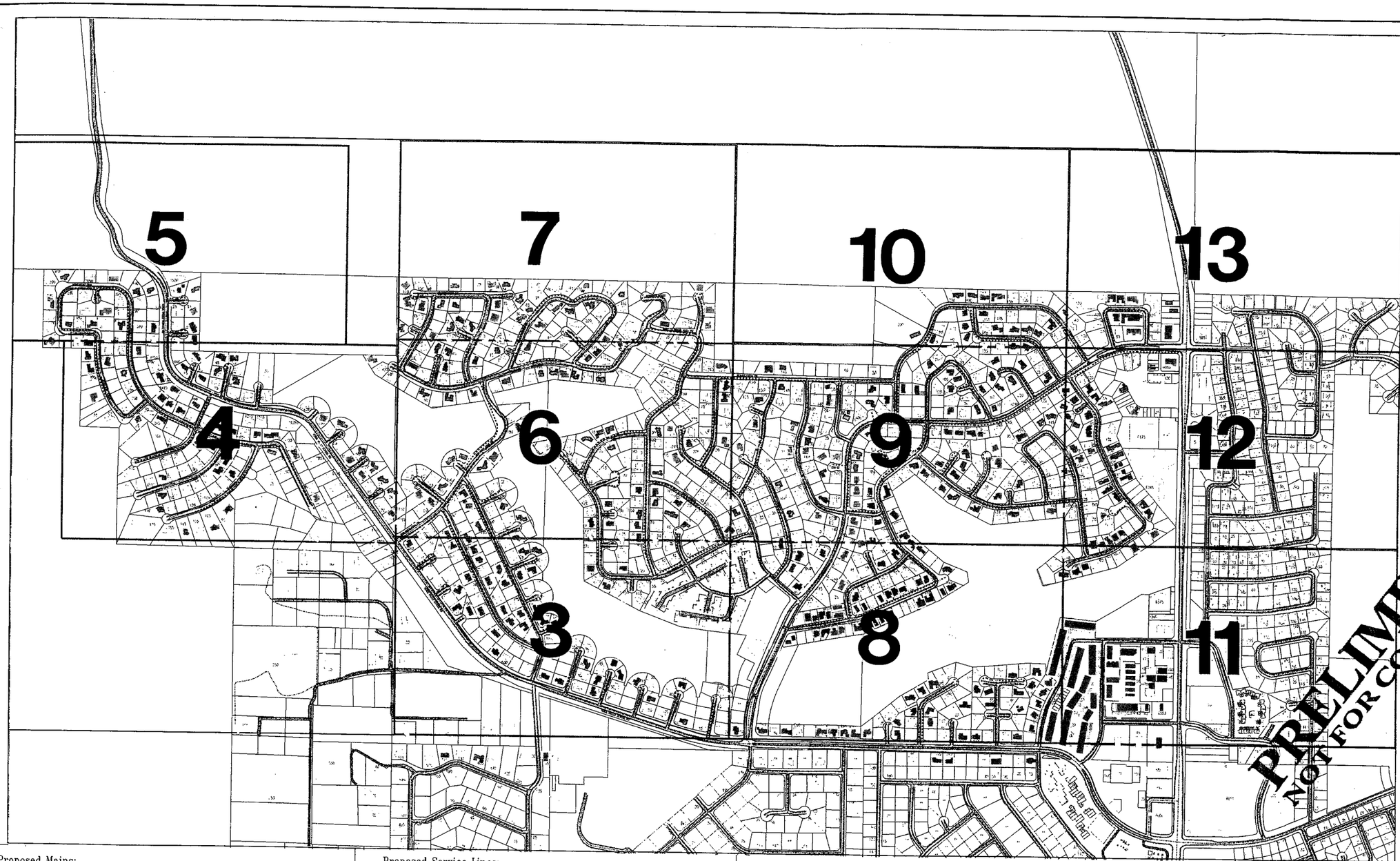
VILLAGE OF OAK CREEK
GAS SUPPLY LINE

DATE: AUGUST 1, 2000

DWG #

8

Appendix E



Before digging, Call: 1-800-782-5348

Notes:

Sheet #

12/22/99

From:

To:

VOC -PHASE II

District: Prescott

Town: VILLAGE OF OAK CREEK

CITIZENS energy services

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

Sheet #

Proposed Mains:

43-1114 2" PE : 65679 ft (449) 43-1118 4" PE : 10515 ft (58)

Total= 76194 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (71)
43-0318 4" PE End Cap (1)
43-0506 2" PE 90 Elbow (12)
43-0516 4" PE 90 Elbow (1)
43-1317 4 X 2" PE Reducer (19)
43-1918 2" PE Tee (75)
43-1922 4" PE Tee (21)

Before digging, Call: 1-800-782-5348

Notes:

Sheet # 3

12/16/99

From:

To:

Scale: 1" = 100'

VOC -PHASE II

District: Prescott

Town:

CITIZENS energy services

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

2" and Smaller Plastic Main
2"-4" Plastic Main
4"-6" Plastic Main
Greater than 6" Plastic Main
2" and Smaller Metal Main
4" Metal Main
4"-6" Metal Main
6"-8" Metal Main
Transmission Pipeline
Service Line

Low Pres Siphon
Drip
Fusion Weld
Flange
Transition
Hot Tap
End Cap
Tee
90D Elbow
45D Elbow
Reducer

Line Stopper
Ins Mech Fitting
Non-Ins Mech Flg
Insulated Tap
Clamp
Unknown Fitting
Curb Cock
Needle Valve
Ins Gate Valve
Non-Ins Gate Valve

Ins Auto Valve
Non-Ins Auto
Ins Ball Valve
Non-Ins Ball
Ins R-Check Valve
Non-Ins R-Check
Ins L-Check Valve
Non-Ins L-Check
Unknown Valve
Ins Plug Valve
Non-Ins Plug

Storm Drain
Culvert
CATV
Forced Sewer
Gas Line (FCU)
Electric (FCU)
Manhole
Pole (FCU)
Sewer Line
Storm Sewer
Water Hydrant

Fence
Tel. Line
Tel. Ped
Valve (FCU)
Water Line
Easement
Canal
Crossing
Ground Rod
Rectifier
Anode

Proposed Mains:

43-1114 2" PE : 6588 ft (57)
43-1118 4" PE : 3623 ft (22)

Total= 10211 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (12)
43-0506 2" PE 90 Elbow (2)
43-1317 4 X 2" PE Reducer (9)
43-1918 2" PE Tee (8)
43-1922 4" PE Tee (9)

Sheet # 3

Before digging, Call: 1-800-782-5348

Notes:

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

Sheet # 4

12/16/99

From:

To:

Scale: 1" = 100'

VOC -PHASE II

District: Prescott

Town:

CITIZENS energy services

Sheet # 4

2" and Smaller Plastic Main	Low Pres Siphon	Line Stopper	Inc Auto Valve	Storm Drain	Fence
2"-4" Plastic Main	Drip	Inc Mech Fitting	Non-Inc Auto	Culvert	Tel. Line
4"-6" Plastic Main	Fixture Weld	Non-Inc Mech Flg	Inc Ball Valve	CATV	Tel. Ped
Greater than 6" Plastic Main	Flange	Industrial Tap	Non-Inc Ball	Forced Sewer	Valve (FCU)
2" and Smaller Weld Main	Transition	Clamp	Inc R-Check Valve	Gas Line (FCU)	Water Line
-4" Weld Main	Hot Tap	Unknown Fitting	Non-Inc R-Check	Electric (FCU)	Easement
4"-6" Weld Main	End Cap	Curb Cock	Inc L-Check Valve	Manhole	Casing
6"-8" Weld Main	Tee	Needle Valve	Non-Inc L-Check	Pole (FCU)	Crossing
Transmission Pipeline	90D Elbow	Inc Gate Valve	Unknown Valve	Sewer Line	Ground Bed
Service Line	45D Elbow	Non-Inc Gate Valve	Inc Plug Valve	Storm Sewer	Rectifier
	Reducer		Non-Inc Plug	Water Hydrant	Anode

Proposed Mains:

43-1114 2" PE : 7440 ft (49)
43-1116 4" PE : 2989 ft (23)

Total= 10429 ft

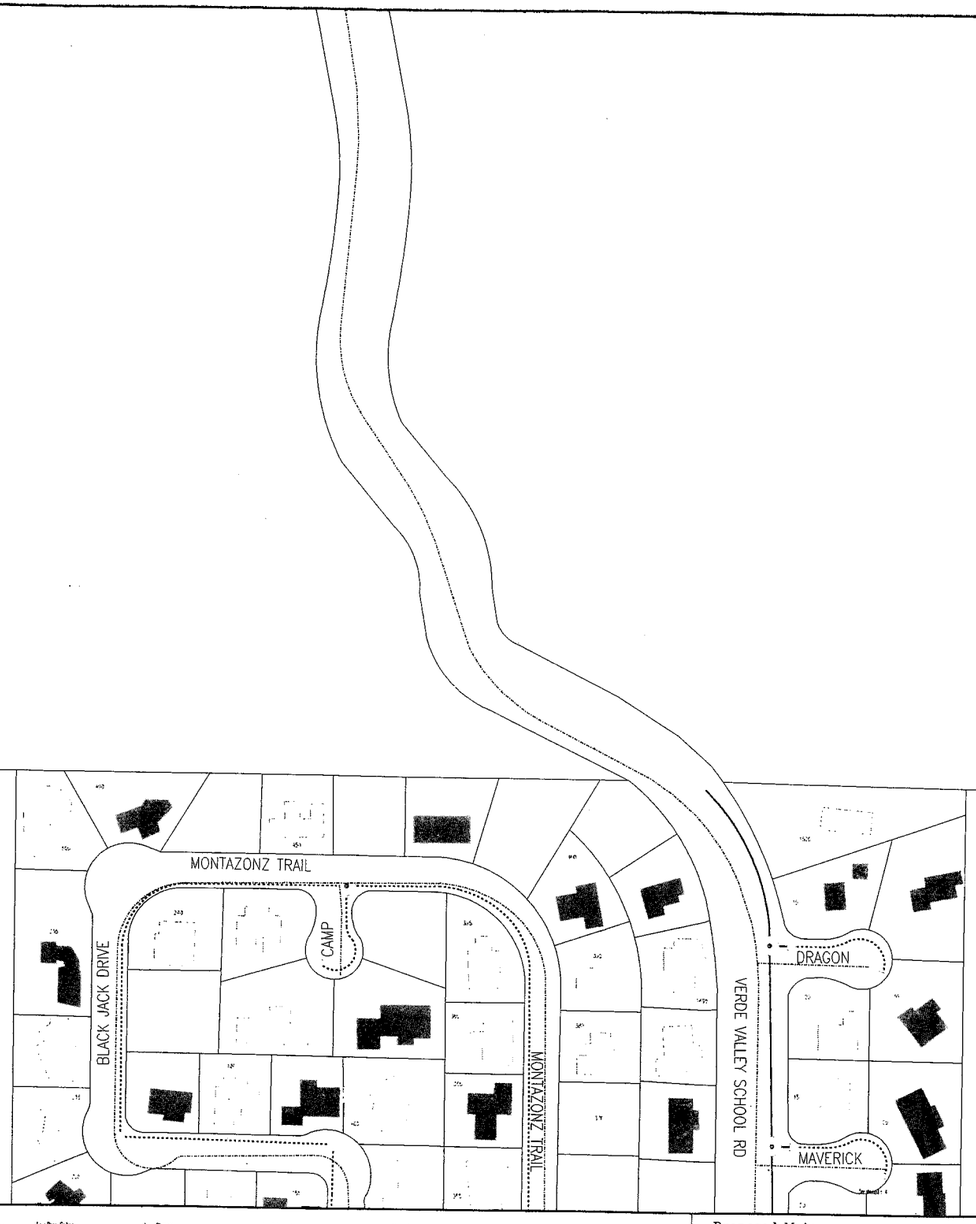
Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (12)
43-0506 2" PE 90 Elbow (2)
43-1317 4 X 2" PE Reducer (8)
43-1918 2" PE Tee (4)
43-1922 4" PE Tee (8)



PRELIMINARY
NOT FOR CONSTRUCTION

Before digging, Call: 1-800-782-5348

Notes:

Sheet # 5

12/16/99

From:

To:

Scale: 1" = 100'

VOC -PHASE II

District: Prescott

Town:

CITIZENS energy services

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

2" and Smaller Plastic Main	Low Pres Siphon	Line Stopper	Irs Auto Valve	Storm Drain		Fence	
2"-4" Plastic Main	Drip	Irs Mech Fitting	Non-Irs Auto	Culvert		Tel. Line	T T T
4"-6" Plastic Main	Fusion Weld	Non-Irs Mech Flg	Irs Ball Valve	CATV	CTV CTV	Tel. Ped	T
Greater than 6" Plastic Main	Flange	Insulated Tap	Non-Irs Ball	Forced Sewer	FS FS	Valve (FCU)	
2" and Smaller Metal Main	Tronebon	Clamp	Irs R-Check Valve	Gas Line (FCU)	G G G	Water Line	W W W
2"-4" Metal Main	Hot Tap	Unknown Fitting	Non-Irs R-Check	Electric (FCU)	E E E	Easement	
4"-6" Metal Main	End Cap	Curb Cock	Irs L-Check Valve	Manhole	MH	Casing	
6"-8" Metal Main	Tee	Needle Valve	Non-Irs L-Check	Pole (FCU)		Crossing	
Transmission Pipeline	90D Elbow	Irs Gate Valve	Unknown Valve	Sewer Line	S S S	Ground Rod	
Service Line	45D Elbow	Non-Irs Gate Valve	Irs Plug Valve	Storm Sewer	SS SS SS	Rectifier	
	Reducer		Non-Irs Plug	Water Hydrant		Anode	A

Proposed Mains:

43-1114 2" PE : 2149 ft (18)
43-1118 4" PE : 679 ft (6)

Total= 2827 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (3)
43-0318 4" PE End Cap (1)
43-0506 2" PE 90 Elbow (2)
43-1317 4 X 2" PE Reducer (2)
43-1918 2" PE Tee (1)
43-1922 4" PE Tee (2)

Sheet # 5

Before digging, Call: 1-800-782-5348

Notes:

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

2" and Smaller Plastic Main
2"-4" Plastic Main
4"-6" Plastic Main
Greater than 6" Plastic Main
and Smaller Weld Main
4" Metal Main
4"-6" Metal Main
6"-8" Metal Main
Transmission Pipeline
Service Line

Low Pres Spkcn
Drp
Fusion Weld
Flange
Transition
Hot Tap
End Cap
Tee
90D Elbow
45D Elbow
Reducer

Line Stopper
Ins Mech Fitting
Non-Ins Mech Flg
Insulated Tap
Clamp
Unknown Fitting
Curb Cock
Needle Valve
Ins Gate Valve
Non-Ins Gate Valve

Ins Auto Valve
Non-Ins Auto
Ins Ball Valve
Non-Ins Ball
Ins R-Check Valve
Non-Ins R-Check
Ins L-Check Valve
Non-Ins L-Check
Unknown Valve
Ins Plug Valve
Non-Ins Plug

Storm Drain
Culvert
CATV
Forced Sewer
Gas Line (FCO)
Electric (FCO)
Manhole
Pole (FCO)
Sewer Line
Storm Sewer
Water Hydrant

Fence
Tel. Line
Tel. Ped
Valve (FCO)
Water Line
Easement
Casing
Crossing
Ground Bed
Rectifier
Anode

Proposed Mains:

43-1114 2" PE : 14317 ft (112)

Total= 14317 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (10)
43-0506 2" PE 90 Elbow (2)
43-1918 2" PE Tee (22)

Sheet # 6

12/16/99

From:

To:

Scale: 1" = 100'

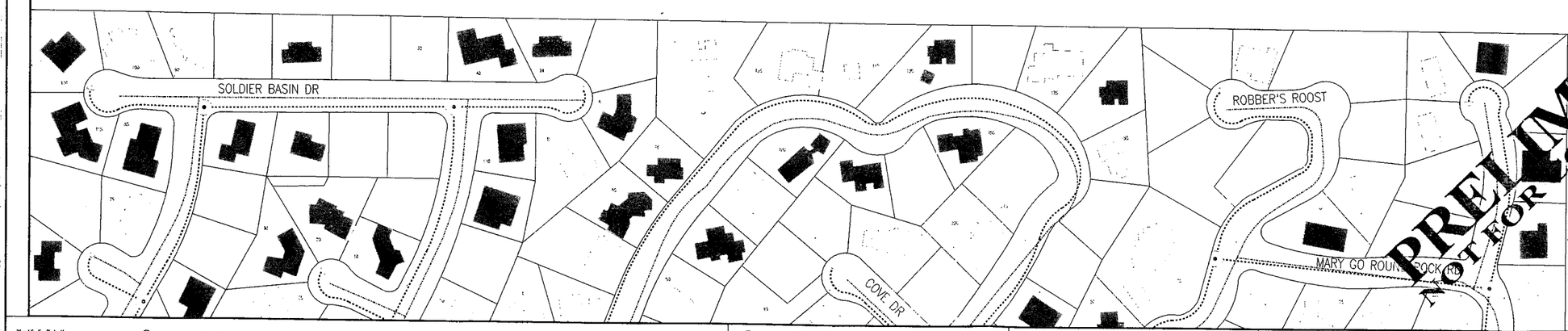
VOC -PHASE II

District: Prescott

Town:

CITIZENS energy services

Sheet # 6



Before digging, Call: 1-800-782-5348

Notes:

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

2" and Smaller Plastic Main
2"-4" Plastic Main
4"-6" Plastic Main
Greater than 6" Plastic Main
2" and Smaller Metal Main
2"-4" Metal Main
4"-6" Metal Main
6"-8" Metal Main
Transmission Pipeline
Service Line
Low Pres Siphon
Drop
Fusion Weld
Flange
Transition
Hot Tap
End Cap
Tee
90D Elbow
45D Elbow
Reducer
Line Stopper
Inc Mech Fitting
Non-Inc Mech Flg
Industrial Tap
Clamp
Unknown Fitting
Curb Cock
Needle Valve
Inc Gate Valve
Non-Inc Gate Valve
Inc Auto Valve
Non-Inc Auto
Inc Ball Valve
Non-Inc Ball
Inc R-Check Valve
Non-Inc R-Check
Inc L-Check Valve
Non-Inc L-Check
Unknown Valve
Inc Plug Valve
Non-Inc Plug
Storm Drain
Culvert
CATV
Forced Sewer
Gas Line (FCU)
Electric (FCU)
Manhole
Pole (FCU)
Sewer Line
Storm Sewer
Water Hydrant
Fence
Tel. Line
Tel. Ped
Valve (FCU)
Water Line
Easement
Casing
Crossing
Ground Bed
Rectifier
Anode

Proposed Mains:

43-1114 2" PE : 5210 ft (49)

Total= 5210 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (7)
43-1918 2" PE Tee (4)

Sheet # 7

12/16/99

From:

To:

Scale: 1" = 100'

VOC -PHASE II

District: Prescott

Town:

CITIZENS energy services

Sheet # 7

Before digging, Call: 1-800-782-5348

Notes:

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

Sheet # 8

12/16/99

From:

To:

Scale: 1" = 100'

VOC -PHASE II

District: Prescott

Town:

CITIZENS energy services

Sheet # 8

2" and Smaller Plastic Main
2"-4" Plastic Main
4"-6" Plastic Main
Greater than 6" Plastic Main
2" and Smaller Metal Main
2"-4" Metal Main
4"-6" Metal Main
6"-8" Metal Main
Transmission Pipeline
Service Line

Low Pres. Siphon
Drip
Fusion Weld
Flange
Transition
Hot Tap
End Cap
Tee
90D Elbow
45D Elbow
Reducer

Line Stopper
Ins. Mech. Fitting
Non-Ins. Mech. Flg.
Industrial Tap
Clamp
Unknown Fitting
Curb Cock
Needle Valve
Ins. Gate Valve
Non-Ins. Gate Valve

Ins. Auto Valve
Non-Ins. Auto
Ins. Ball Valve
Non-Ins. Ball
Ins. R-Check Valve
Non-Ins. R-Check
Ins. L-Check Valve
Non-Ins. L-Check
Unknown Valve
Ins. Plug Valve
Non-Ins. Plug

Storm Drain
Culvert
CATV
Forced Sewer
Gas Line (FCU)
Electric (FCU)
Manhole
Pole (FCU)
Sewer Line
Storm Sewer
Water Hydrant

Fence
Tel. Line
Tel. Ped
Valve (FCU)
Water Line
Easement
Casing
Crossing
Ground Bed
Rectifier
Anode

Proposed Mains:

43-1114 2" PE : 5978 ft (46)
43-1118 4" PE : 1107 ft (3)

Total= 7085 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (8)
43-1918 2" PE Tee (7)

Before digging, Call: 1-800-782-5348

Notes:

Sheet # 9

12/16/99

From:

To:

VOC -PHASE II

District: Prescott

Town:

Scale: 1" = 100'

CITIZENS energy services

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

2" and Smaller Plastic Main
2"-4" Plastic Main
4"-8" Plastic Main
Greater than 8" Plastic Main
2" and Smaller Metal Main
2"-4" Metal Main
4"-8" Metal Main
8"-8" Metal Main
Transmission Pipeline
Service Line

Low Pres Siphon
Drip
Fusion Weld
Flange
Trans/Con
Hot Tap
End Cap
Tee
90D Elbow
45D Elbow
Reducer

Line Stopper
Inc Mech Fitting
Non-Inc Mech Flg
Insulated Tap
Clamp
Unknown Fitting
Curb Cock
Needle Valve
Inc Gate Valve
Non-Inc Gate Valve

Inc Auto Valve
Non-Inc Auto
Inc Ball Valve
Non-Inc Ball
Inc R-Check Valve
Non-Inc R-Check
Inc L-Check Valve
Non-Inc L-Check
Unknown Valve
Inc Plug Valve
Non-Inc Plug

Storm Drain
Culvert
CATV
Forced Sewer
Gas Line (FCU)
Electric (FCU)
Manhole
Pole (FCU)
Sewer Line
Storm Sewer
Water Hydrant

Fence
Tel. Line
Tel. Ped
Valve (FCU)
Water Line
Easement
Casing
Crossing
Ground Bed
Recloser
Anode

Proposed Mains:

43-1114 2" PE : 15891 ft (106)

Total= 15891 ft

Proposed Service Lines:

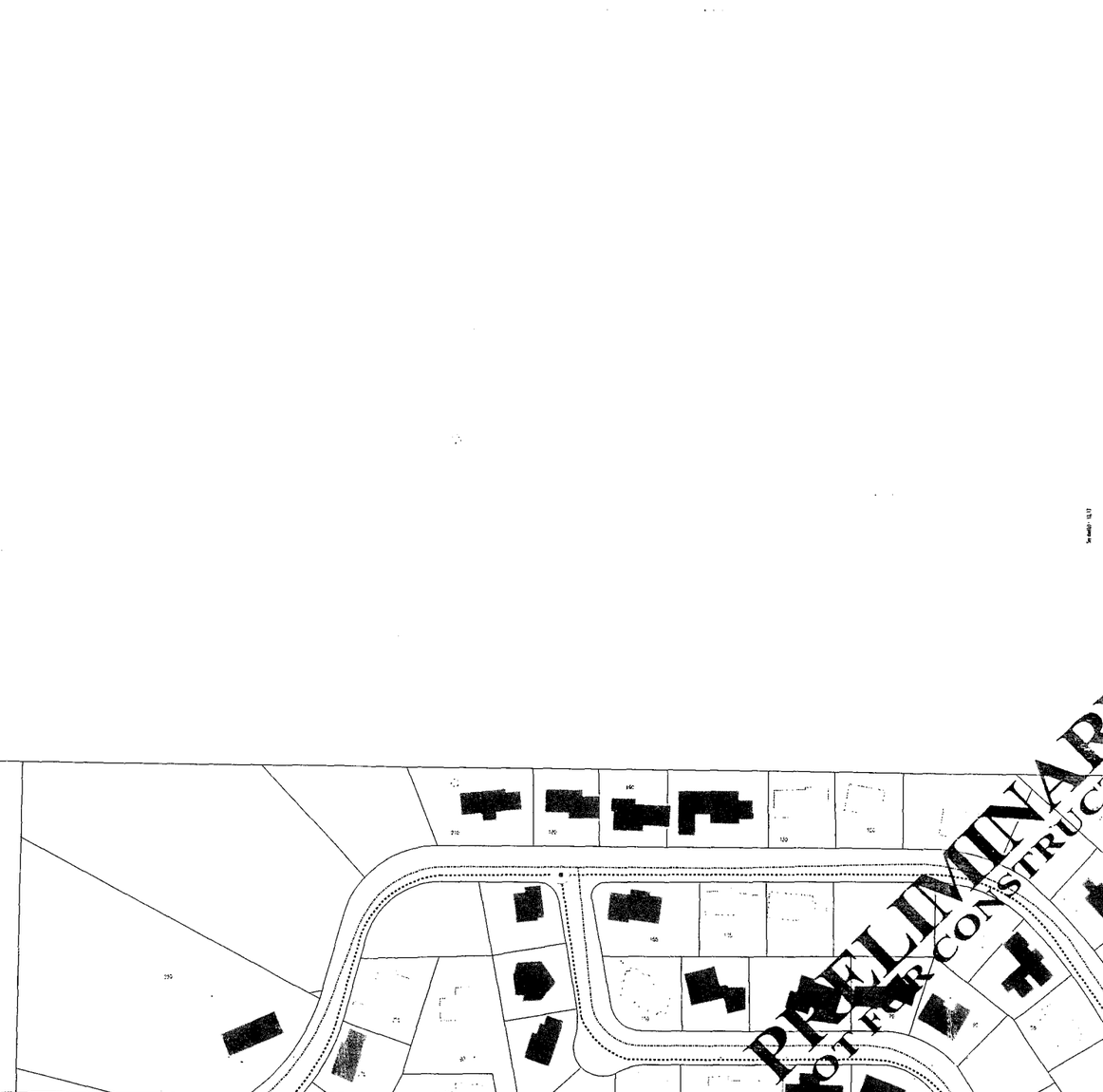
Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (15)
43-0506 2" PE 90 Elbow (2)
43-1918 2" PE Tee (21)

Sheet # 9



Before digging, Call: 1-800-782-5348

Notes:

Job Number: 2
Drawn By: FRED COWAN
Checked By:
App. By:

Sheet # 10

12/16/99

From:
To:

VOC -PHASE II

District: Prescott
Town:

Scale: 1" = 100'

CITIZENS energy services

Sheet # 10

2" and Smaller Plastic Main	Low Pres Splice	Line Stopper	Ins Auto Valve	Storm Drain	Fence		
2"-4" Plastic Main	Drip	Ins Mech Fitting	Non-Ins Auto	Culvert	Tel. Line		
4"-6" Plastic Main	Forced Weld	Non-Ins Mech Flg	Ins Ball Valve	CATV	Tel. Ped		
Greater than 6" Plastic Main	Flange	Industrial Tap	Non-Ins Ball	Forced Sewer	Valve (FCU)		
2" and Smaller Weld Main	Transition	Clamp	Ins R-Check Valve	Gas Line (FCU)	Water Line		
2"-4" Weld Main	Hot Tap	Unknown Fitting	Non-Ins R-Check	Electric (FCU)	Easement		
4"-6" Weld Main	End Cap	Curb Cock	Ins L-Check Valve	Manhole	Casing		
6"-8" Weld Main	Tee	Needle Valve	Non-Ins L-Check	Pole (FCU)	Crossing		
Transmission Pipeline	90D Elbow	Ins Gate Valve	Unknown Valve	Sewer Line	Ground Bed		
Service Line	45D Elbow	Non-Ins Gate Valve	Ins Plug Valve	Storm Sewer	Rectifier		
	Reducer		Non-Ins Plug	Water Hydrant	Anode		

Proposed Mains:

43-1114 2" PE : 2296 ft (11)

Total= 2296 ft

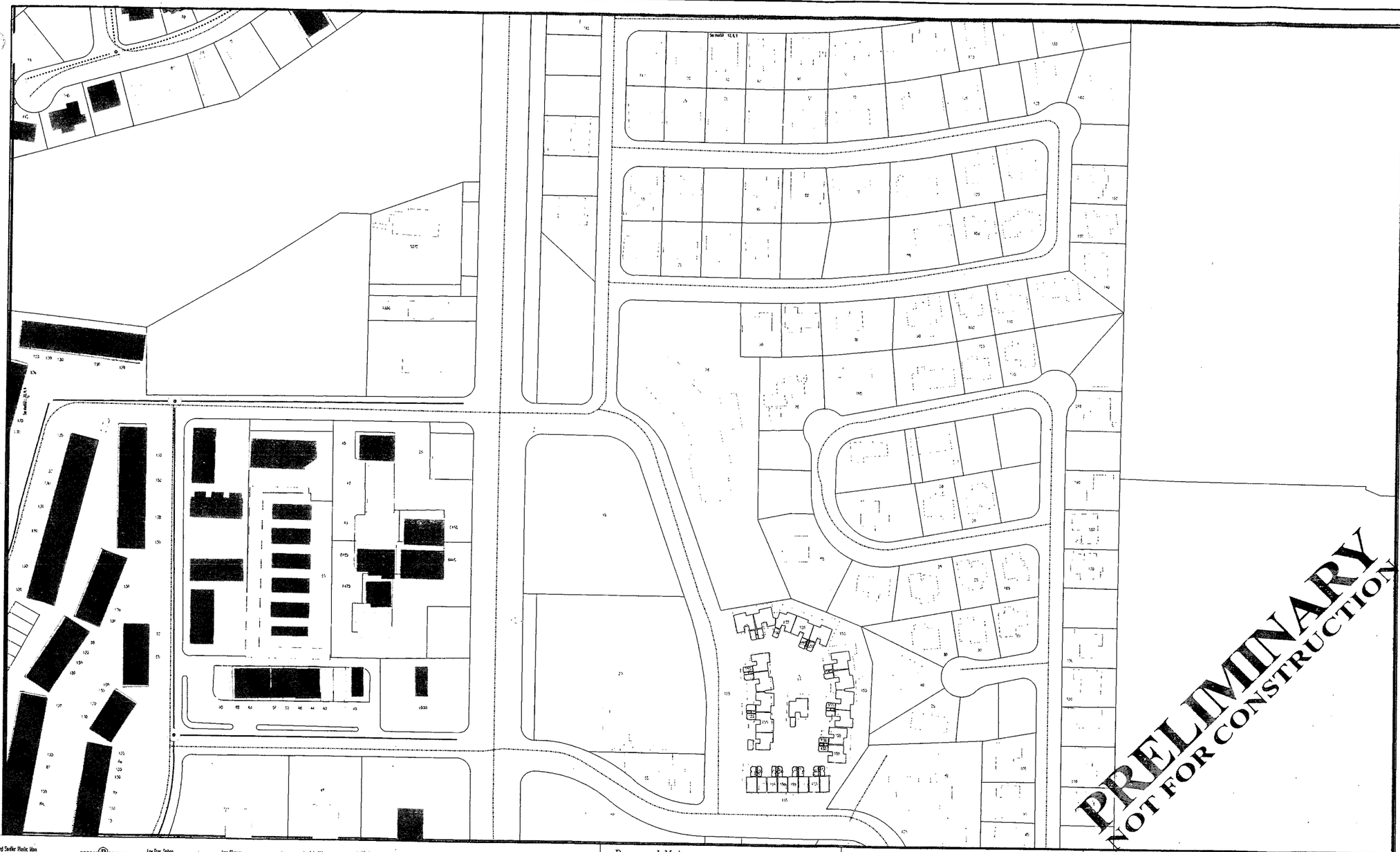
Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-1918 2" PE Tee (1)



Before digging, Call: 1-800-782-5348

Notes:

Sheet # 11

12/16/99

From:

To:

VOC -PHASE II

District: Prescott

Town:

Scale: 1" = 100'

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

CITIZENS energy services

2" and Smaller Plastic Main
2"-4" Plastic Main
4"-6" Plastic Main
Greater than 6" Plastic Main
2" and Smaller Metal Main
1" Metal Main
1"-2" Metal Main
6"-8" Metal Main
Transmission Pipeline
Service Line

Low Pnts Spoon
Drip
Fusion Weld
Flange
Transition
Hot Tap
End Cap
Tee
90D Elbow
45D Elbow
Reducer

Line Stopper
Ins Mech Fitting
Non-Ins Mech Flg
Insulated Tap
Clamp
Unknown Fitting
Curb Cock
Needle Valve
Ins Gate Valve
Non-Ins Gate Valve

Ins Auto Valve
Non-Ins Auto
Ins Ball Valve
Non-Ins Ball
Ins R-Check Valve
Non-Ins R-Check
Ins L-Check Valve
Non-Ins L-Check
Unknown Valve
Ins Plug Valve
Non-Ins Plug

Storm Drain
Culvert
CATV
Forced Sewer
Gas Line (FCU)
Electric (FCU)
Manhole
Pole (FCU)
Sewer Line
Storm Sewer
Water Hydrant

Fence
Tel. Line
Tel. Ped
Valve (FCU)
Water Line
Easement
Casing
Crossing
Ground Rod
Rectifier
Anode

Proposed Mains:

43-1114 2" PE : 532 ft (3)
43-1118 4" PE : 2625 ft (8)

Total= 3157 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (1)
43-0516 4" PE 90 Elbow (1)
43-1918 2" PE Tee (1)
43-1922 4" PE Tee (2)

Sheet # 11

Before digging, Call: 1-800-782-5348

Notes:

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

2" and Smaller Plastic Main
2"-4" Plastic Main
4"-6" Plastic Main
Greater than 6" Plastic Main
2" and Smaller Metal Main
2"-4" Metal Main
4"-6" Metal Main
6"-8" Metal Main
Transmission Pipeline
Service Line

Low Pres Siphon
Drip
Fusion Weld
Flange
Transition
Hot Tap
End Cap
Tee
90D Elbow
45D Elbow
Reducer

Line Stopper
Ins Mech Fitting
Non-Ins Mech Flg
Industrial Tap
Clamp
Unknown Fitting
Curb Cock
Needle Valve
Ins Gate Valve
Non-Ins Gate Valve

Ins Auto Valve
Non-Ins Auto
Ins Ball Valve
Non-Ins Ball
Ins Z-Check Valve
Non-Ins R-Check
Ins L-Check Valve
Non-Ins L-Check
Unknown Valve
Ins Plug Valve
Non-Ins Plug

Storm Drain
Culvert
CATV
Forced Sewer
Gas Line (FCU)
Electric (FCU)
Manhole
Pole (FCU)
Sewer Line
Storm Sewer
Water Hydrant

Fence
Tel. Line
Tel. Ped
Valve (FCU)
Water Line
Easement
Casing
Crossing
Ground Bed
Rectifier
Anode

Proposed Mains:

43-1114 2" PE : 4257 ft (29)

Total= 4257 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (2)
43-0506 2" PE 90 Elbow (1)
43-1918 2" PE Tee (6)

Sheet # 12

12/16/99

From:

To:

VOC -PHASE II

District: Prescott

Town:

Scale: 1" = 100'

CITIZENS energy services

Sheet # 12

Before digging, Call: 1-800-782-5348

Notes:

Job Number: 2

Drawn By: FRED COWAN

Checked By:

App. By:

Sheet # 13

12/16/99

From:

To:

VOC -PHASE II

District: Prescott

Town:

Scale: 1" = 100'

CITIZENS energy services

Sheet # 13

2" and Smaller Plastic Main		Low Pres Spoon		Line Stopper		Ins Auto Valve		Storm Drain		Fence	
2"-4" Plastic Main		Drip		Ins Mech Fitting		Non-Ins Auto		Culvert		Tel. Line	
4"-6" Plastic Main		Fusion Weld		Non-Ins Mech Flg		Ins Ball Valve		CATV		Tel. Ped	
Greater than 6" Plastic Main		Flange		Industrial Tap		Non-Ins Ball		Forced Sewer		Valve (FCU)	
2" and Smaller Weld Main		Transition		Clamp		Ins R-Check Valve		Gas Line (FCU)		Water Line	
2"-4" Weld Main		Hot Tap		Unknown Fitting		Non-Ins R-Check		Electric (FCU)		Easement	
4"-6" Weld Main		End Cap		Curb Cock		Ins L-Check Valve		Manhole		Casing	
6"-8" Weld Main		Tee		Needle Valve		Non-Ins L-Check		Pole (FCU)		Crossing	
Transmission Pipeline		90D Elbow		Ins Gate Valve		Unknown Valve		Sewer Line		Ground Bed	
Service Line		45D Elbow		Non-Ins Gate Valve		Ins Plug Valve		Storm Sewer		Rectifier	
		Reducer				Non-Ins Plug		Water Hydrant		Anode	

Proposed Mains:

43-1114 2" PE : 1014 ft (5)

Total= 1014 ft

Proposed Service Lines:

Total= 0 ft

Proposed Valves:

Proposed Fittings:

43-0310 2" PE End Cap (1)
43-0506 2" PE 90 Elbow (1)

BUILD-OUT GLOSSARY OF TERMS

A

Asphalt: A composite material made from mineral aggregate bonded together by bitumen.

Auger Bore: A technique for forming a bore from a drive pit to a reception pit, by means of a rotating cutting head. Spoil is removed back to the drive shaft by helically wound auger flights rotating in a steel casing. The equipment may have limited steering capability.

B

Back Bone Line: A reinforcement line or loop line used to strengthen the integrity of the overall system.

Backhoe: An excavating machine having a bucket that is attached to a rigid bar hinged to a boom and that is drawn toward the machine in operation.

Biological Survey: A survey, usually required by the Forest Service, which outlines and lists all potential impacts to the biological environment.

Blue-Stake: Arizona Blue-Stake was established as a one-call notification system by underground facility owners to assist excavators with the statutory requirements to notify underground facility owners prior to excavation. This damage prevention service is provided free of charge to any individual or company planning to excavate.

Bore: A generally horizontal hole produced underground primarily for the purpose of installing services.

C

Carrier Pipe: The tube, which carries the product being transported, and which may go through casings at highways and railroad crossings. It may be made from steel, concrete, clay; glass fiber reinforced polyester, plastic, ductile iron, or other materials. On occasion it may be bored direct under highways and railroads.

Casing Pipe: A pipe installed as external protection to a product pipe or carrier pipe.

Categorical Exclusion: A number of categories of action have been determined from experience and analysis to result in no significant impact to the environment. If a proposed action falls into one of these categories, and if no extraordinary circumstances exist that might cause a significant impact in the specific case, these actions can be "categorically excluded" from documentation in an Environmental Assessment (EA) or Environmental Impact Statement (EIS). Unlike an EA or EIS, there is no formal predecision comment period with a categorical exclusion (except for scoping). Examples of categorical exclusions are roadwork, some small timber sales, and trail maintenance.

Class 3 location: Determined by 49 C.F.R. Chapter 1, part 192.

Concrete: An artificial stone-like material used for various structural purposes. It is made by mixing cement and various aggregates, such as sand, pebbles, gravel, shale, etc., with water and allowing the mixture to harden by hydration.

Condemnation: Process of taking private property for public use through the power of eminent domain. "Just compensation" must be paid to owner for taking of such.

Construction Standards: Minimum expectations an individual, company, corporation, or government agency will require the project or job to be built to prior to final approval. The standards govern and detail all facets of the construction of a particular object, job, or project.

Cultural Survey: A survey, usually required by the Forest Service, identifying cultural demographics surrounded by the proposed job or project.

D

Directional Bore: A routable system for installation of pipes, conduits and cables in a shallow arc using a surface launched drilling rig. Traditionally the term applies to most crossings in which a fluid-filled pilot bore is drilled using a fluid-driven motor at the end of a bent-sub, and back reamed to the size required for the product pipe. The required deviation during pilot boring is provided by the positioning of the bent-sub. Tracking of the drill string is achieved by the use of a walkover system or a down hole survey tool.

Distribution Line: A distributor is a gas main which functions solely to deliver gas from a source of supply, such as a feeder main or a distributor-feeder main, to the services connected to it.

E

Easement: A right of use over the property of another. Traditionally the permitted kinds of uses were limited, the most important being rights of way and rights concerning flowing waters. A right in the owner of one parcel of land, by reason of such ownership, to use the land of another for a special purpose not inconsistent with a general property in the owner. An interest which one person has in the land of another. An interest in land in and over which it is to be enjoyed, and is distinguishable from a "license" which merely confers personal privilege to do some act on the land.

Easement Acquisition: The process used to acquire an easement or right-of-way. The process may include many different techniques and forms used to facilitate the acquisition of the subject easement or right-of-way depending on the type of owner (government land, trust land, corporation, etc.).

Environmental Assessment: An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Impact Statement (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and cites alternative actions.

F

Federal Energy Regulatory Commission (FERC): An independent regulatory agency within the U.S. Department of Energy that has jurisdiction over interstate electricity sales, wholesale electricity rates, gas/oil pipeline rates, and gas pipeline certification. It also licenses and inspects private, municipal and state hydroelectric projects and oversees related environmental matters.

Federal Register: The Federal Register, published daily, is the medium for making available to the public federal agency regulations and other legal documents of the executive branch. These documents cover a wide range of Government activities. An important function of the Federal Register is that it includes proposed changes (rules, regulations, standards, etc.) of governmental agencies. Each proposed change published carries an invitation for any citizen or group to participate in the consideration of the proposed regulation through the submission of written data, views, or arguments, and sometimes by oral presentations. Such regulations and rules as finally approved appear thereafter in the Code of Federal Regulations.

FONSI: Acronym for the finding of no significant impact (environmental). A document describing the reasons why the impacts of a proposed federal action are not significant. Required by NEPA after an environment assessment when a federal agency is not preparing an environmental impact statement.

Franchise: A special privilege to do certain things conferred by government on individual or corporation, and which does belong to citizens generally of common right: *e.g.* right granted to offer natural gas service.

I

Inspection: To examine; scrutinize; investigate; look into; check over; or view for the purpose of ascertaining the quality, authenticity or conditions of an item, product, document, residence, business, etc. Word has broader meaning than just looking, and means to examine carefully or critically, investigate and test officially, especially a critical investigation or scrutiny.

Insurance: A contract whereby, for a stipulated consideration, one party undertakes to compensate the other for loss on a specified subject by specified perils. A contract whereby one undertakes to indemnify another against loss, damage, or liability arising from an unknown or contingent event and is applicable only to some contingency or act to occur in the future.

L

Landscape/Erosion Control Plan: A plan, usually required by the Forest Service, outlining and detailing all aspects associated with erosion and the potential thereof pertaining to the purposed job or project. This plan also outlines the specific details associated with the landscape restoration requirements and concerns regarding the job or project.

M

M.A.G.: An acronym for Maricopa Association of Governments. MAG was formed in 1967 to provide regional planning and policy decisions in areas of transportation, air quality, environment analysis, regional development, and social services. MAG also formed a general set of construction specifications and details that have been adopted by must governmental agencies within the State of Arizona.

M.A.O.P.: Maximum allowable operating pressure.

N

NEPA Process: NEPA is the acronym for the National Environmental Policy Act of 1970. The Act requires public disclosure of the environmental consequences of implementing a management action. The process goes through the following stages: Scoping, Issue Identification, Development of Alternatives, Analysis of Environmental Consequences, Significance of Impacts, Decision.

Notice to Proceed: A written form of communication used to officially notify contractor that he/she can start work on the project. The official notice to proceed is usually made part of the contract for the job or project.

P

Payment Bond: Surety bond, which guarantees that contractor will fully perform contract and guarantees against breech of contract.

P.E.: Polyethylene.

Proctor Test: Testing procedure for determining maximum dry density of soil, backfill, etc.

Project Manager: An individual appointed to oversee and manage a specific project. These individual duties may include overseeing the financials and budget of a project, scheduling, planning, contract writing, conflict resolution, etc.

P.S.I.G.: Pressure standard instrumental gauge.

Public Meeting: A meeting usually with a specific topic or topics located within the general area associated with the purposed project or job. Generally the meeting is open to all people relating to or being affected from the purposed project or job and not limited or restricted to any particular class of the community.

R

Restoration: The backfilling, compaction, and resurfacing of any excavation in order to restore the surface and underlying structure to enable it to perform its original function.

Road Base: A term used to describe crushed rock or natural gravel used in road construction. Typically installed under the asphalt as a base.

S

Service Line: A gas service line is a lateral main supplying gas directly from the street main to the consumer's meter.

Slurry: A thin mixture of a liquid, especially water, and any of several finely divided substances, such as cement, plaster of paris, or clay particles.

Storm Water Discharge Permit: A permit required by the Environmental Protection Agency outlining and detailing the aspect of storm water discharge and how it might negatively impact the environment with regards to the proposed job or project.

Supply Line: Usually referred to as a feeder line. A feeder is a gas main that functions solely to deliver gas from a principal source, such as a district regulator, or holder, to distributor or distributor-feeder mains connected to it. Technically, it does not supply gas to services.

T

Top Soil: The layer of soil moved in cultivation. Frequently designated as the Ap layer or Ap horizon. Presumably fertile soil material used to top dress road banks, gardens, and lawns.