ENGINEERING REPORT

INFRASTRUCTURE NEEDS STUDY FOR THE SUMMIT CITY AND AND RIDDLE ROAD AREAS

FOR

CITY OF SHASTA LAKE

(REPORT PREPARED WITH COMMUNITY DEVELOPMENT BLOCK GRANT PLANNING/TECHNICAL ASSISTANCE FUNDS)

MAY 1997

PACE ENGINEERING
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P.O. BOX 777
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JOB NO. 110.24

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Professional Associated Consulting Engineers Incorporated

June 3, 1997

110.24

Mr. Alan Harvey
City Manager
City of Shasta Lake
P.O. Box 777
Shasta Lake, CA 96019

Dear Mr. Harvey:

We are pleased to present our Engineering Report entitled:

INFRASTRUCTURE NEEDS STUDY
FOR THE SUMMIT CITY AND RIDDLE ROAD AREAS

This report contains the results of the City's surface water sampling survey, the results of the mail out questionnaire regarding sewage disposal and storm water drainage problems, and a preliminary storm drainage plan for the two study areas. It also includes preliminary layouts and preliminary cost estimates of sewage collection systems and storm drain improvements in both study areas.

A summary of the Income Survey that was conducted as part of this study is included in Appendix A.

PACE Engineering is very pleased to have performed this study for the City. At your convenience, we will be pleased to meet with you to discuss this report in detail.

Very truly yours,

Samuel L Smith

Samuel L. Smith
Principal Engineer

SLS/mlg
enclosures
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EXECUTIVE SUMMARY

SEWAGE DISPOSAL INFRASTRUCTURE NEEDS

SUMMIT CITY AREA: Based on the results of the Phase I—Initial Study and the property owner questionnaire, there appears to be a number of problems associated with on-site sewage disposal in the high density area of Summit City which consists primarily of single family residences on small lots and some commercial development. However, in order to qualify for grant funding it will probably be necessary to dye a number of the on-site systems during wet weather conditions to adequately document system failures. The timing of such dye testing is critical because most of the problems appear to be related to high groundwater and flooding associated with wet winter and springtime conditions.

If adequate documentation of pollution and/or a public health hazard can be obtained, it may be possible to secure up to 75 percent grant funding from Rural Development for the sewer system capital improvements costs. With a 75 percent grant, it is estimated that the total monthly cost for sewer service in the Summit City area would be about $37 per month per household equivalent in June 1997 dollars. Without grant funding, the total monthly cost would be about $95 per month.

Recommended Follow-up Action:

1. Set up a citizens advisory committee of Summit City residents to help develop a plan of action and to provide a link for communication between area residents and City staff.

2. Consult with the Shasta County Environmental Health Department and devise a plan for wet weather dye testing of septic systems in the Summit City area to ascertain, if a public health hazard does exist due to failing septic systems.

Typically a significant problem exists if 25 to 30 percent of the septic systems in an area are failing.

3. If a public health hazard is documented that can not be mitigated by reconstruction of septic systems to comply with current standards, then the City should consider adopting a building moratorium on the affected area. Input from the Shasta County Environmental Health Department should be obtained when evaluating the significance of the problem and determining whether a building moratorium is appropriate.

4. If a building moratorium is adopted, then the opportunity to obtain grant and loan funding will be greatly increased. The next step will be to prepare a Preliminary Engineering Report to develop the best apparent alternative to mitigate the public health hazard and apply to Rural Development, Community Development Block Grant and other grant/loan agencies for project funding.

RIDDLE ROAD AREA: Based upon the results of the property owner questionnaire, there appears to be a number of dwellings in the Riddle Road area that are having problems with their on-site sewage disposal systems. Since the lots in the Riddle Road area are one-half acre or larger, it may be possible to solve their septic system problems by installing alternative systems such as mounded systems. However, if the alternative systems are not feasible then the area can be connected to the city sewer system via a sewage collection system as shown on Figure 9. In order for a sewage collection system for the Riddle Road area to be grant eligible, adequate documentation of pollution and/or a public health hazard will need to be obtained as outlined above for the Summit City area.

If a 75 percent grant could be obtained for the sewer system capital improvement costs in the Riddle Road area then, it is estimated that the total monthly cost for sewer service in the Riddle Road area would be about $44 per month per household equivalent in June 1997 dollars. Without grant funding the total monthly cost would be about $125 per month.

Recommended Follow-up Action: Due to the relatively small size of the Riddle Road area, it is recommended that each property owner be contacted to determine the level of their problem and the interest in being connected to the city sewer system. If there is sufficient interest existing, then follow the same steps outlined above for Summit City area.

DRAINAGE INFRASTRUCTURE NEEDS

SUMMIT CITY AREA: The drainage structures along Churn Creek that are maintained by the city of Shasta Lake are adequate to carry the 100-year storm runoff with two exceptions. The 30-inch pipe and the 2-48" pipes crossing Lake Blvd. approximately 0.6 mile north of Shasta Dam Blvd. are too small. The cost to increase the capacity at these locations is approximately $25,500.

The highest priority should be given to the Summit City area east of Hill Blvd. and between Rose Avenue and Spruce Avenue.

Most of the drainage systems in this area are inadequate to carry the design storm. One solution is to construct a bypass north of Rose Avenue from Sacramento Street westerly to Churn Creek. The approximate cost is $245,000. In the area from Rose Avenue to Ranchera Road, plastic pipes could be inserted into the existing pipes as they rust out. The void between the pipes could be grouted with a cement slurry.

Another solution is to replace the existing pipes from Rose Avenue to Ranchera Road with larger pipes capable of carrying the design flow. The existing ditches would also need to be made deeper to carry the larger flow. The cost for this alternative is approximately $260,000, not including right-of-way costs, if necessary.

Recommended Follow-up Action:

1. Have the City maintenance crews inspect the condition of the existing culverts and drainage ditches to schedule and complete the necessary cleaning to restore their hydraulic capacity.

2. Replace the plugged 12-inch culverts near Beacon Street and Pine Avenue with 18-inch culverts and concrete inlet structures.

3. Prepare a topographic map and preliminary design for the Rose Avenue bypass to confirm the location and right-of-way needs and fine tune the construction cost estimate. The estimate cost of this preliminary work is estimated at $4,000.

4. Apply for a Community Development Block Grant or other funding to construct the Rose Avenue bypass.

RIDDLE ROAD AREA: The culverts across Indian Avenue and the small bridge across Arrowhead Avenue in the Riddle Road area are adequate for the existing gravel road conditions. However, they should be replaced with two 48-inch culverts if and when the roads are constructed to City standards and accepted by the City for maintenance.

INTRODUCTION

PURPOSE AND SCOPE OF STUDY

The initial purpose of this study was to determine if water quality problems and/or public health hazards exist in the unsewered Summit City and Riddle Road areas as a result of the existing on-site sewage disposal systems. After the surface water sampling survey did not indicate a major pollution problem the City shifted the emphasis of study from a detailed pollution study to a preliminary pollution study and a storm water drainage infrastructure assessment. The study included the surface water sampling survey; mail out questionnaire requesting information from the property owners on sewage disposal and storm drainage problems; and preparation of a preliminary storm drainage plan for the two study areas.

In order to provide a basis for evaluating the cost of future infrastructure improvements in the two study areas, preliminary layouts and preliminary cost estimates were prepared for possible sewage collection and storm drainage improvements in both study areas.

EXISTING DEVELOPMENT

Based on the Shasta County assessor's roll and the City's address map it is estimated that there are about 400 residences, several commercial businesses and one elementary school in the Summit City study area. The majority of the existing development is in the area south of Shasta Dam Blvd. and east of Churn Creek. The subdivision lot sizes vary from about 2,500 FT^2 in the central part of Summit City to about 1-acre in the Ranchera Pines Subdivision.

All of the existing development utilizes on-site sewage disposal systems. The on-site sewage disposal systems are regulated by the Shasta County Environmental Health Department even though the areas were incorporated as part of the City of Shasta Lake in July 1993.

PHASE I - INITIAL STUDY

REVIEW OF SOILS INFORMATION

The Soil Conservation Service (SCS) Soils Survey of Shasta County indicates basically six different soil types in the Summit City study area. The majority of the area consists of either the Auburn (AnB, AnD, AsD2, AtE2) or the Boomer (BkD, BkE) soil series. Auburn soils typically consist of about 5 inches of yellowish-red clay soil overlaying about 2 feet of yellowish-red gravelly clay loam. Weathered bedrock is generally at a depth of 15 to 32 inches. The SCS indicates severe limitations to septic systems because of shallow bedrock. Boomer soils typically consist of a surface layer of light brown gravelly loam about 3 inches thick overlaying about 11 inches of reddish-yellow gravelly sandy clay loam and about 30 inches of red gravelly clay loam, clay loam and silty clay loam. Red weathered and fractured green stone is normally encountered at depths of 40 inches to more than 60 inches. The SCS indicates severe limitation to septic systems due to moderately slow permeability.

The soils in the Riddle Road study area are primarily Auburn (AnB) soils as described above.

SURFACE WATER QUALITY SURVEY

In April and May of 1996, the City of Shasta Lake developed a stream sampling program that was conducted in conjunction with the Adopt-A-Watershed Program (Americorp) with the assistance of students from Central Valley High School. On April 4, April 18, May 18, and May 29, 1996, surface water samples were collected at the 22 monitoring locations shown on Figure 1 and 5 sites on Churn Creek at locations downstream of Ashby Road. The students tested the samples for temperature, pH, dissolved oxygen, conductivity, total dissolved solids,

and chlorides. In addition, a separate sample was sent to a commercial laboratory for total coliform, fecal coliform and ammonia concentration analyses. The testing results for total coliform and fecal coliform are shown in Table 1. As one can see the total coliform levels varied from a low 4 MPN/100 ml to 160,000 MPN/100 ml while the fecal coliform levels varied from a low of less than 2 MPN/100 ml to a high of 90,000 MPN/100 ml. While total coliform organisms are fairly widespread in the soil, the fecal coliform is an indicator organism for the potential presence of disease organisms. Water bodies with concentrations of 200 MPN/100 ml or greater of fecal coliform are considered unsafe for general human contact. While the high fecal coliform values obtained at sampling locations 8B, 8C and 11A may be indicative of failing septic systems in the area, it would be necessary to perform wet weather dye testing of the septic systems to confirm such failures.

The surface water testing results for ammonia and chlorides are shown in Table 2. While one might expect elevated concentrations of ammonia and chlorides in surface waters contaminated with septic tank effluent, the potential for dilution in the surface water body can cause a wide variation in the actual values. While a comparison of the fecal coliform test results in Table 1 with the ammonia and chloride test results in Table 2 does indicate a general correlation of higher ammonia and chloride concentrations when high fecal coliform concentrations were present, the results are not consistent. Therefore, no definite conclusions can be made without dye testing.

MAIL OUT QUESTIONNAIRE

In March 1997, the City mailed out a questionnaire to every property owner in the Summit City (578 total parcels) and Riddle Road (24 total parcels) study areas. The questionnaire requested information regarding their on-site sewage disposal system, storm drainage problems and household income levels. As of April 20, 1997, a total 230 of the questionnaires had been returned.

SUMMIT CITY AREA RESPONSE: Based upon a review of the current Shasta County assessor's roll, approximately 416 of the 578 parcels in the Summit City area have improvements on them, although some of the improvement values are very low. After discussing the situation with the County Assessor's Office, it is estimated that about 400 parcels are actually developed at this time. A total of 223 questionnaires were returned. An analysis of the returned questionnaires indicated a total of 182 residential dwellings, 3 commercial establishments, and 38 being either vacant or providing no response as to the status of the parcel. Therefore, it is estimated that approximately 185 of the developed parcels or about 46 percent responded by completing the questionnaire.

The following is a summary of the responses regarding the status of their on-site sewage disposal systems:

Category	Number of Premises
Septic System Without Problems	154
Septic System with Problems (such as slow drainage, odors, liquid on surface or frequent pumping)	13
SUBTOTAL OF RESPONDING PREMISES	167
Approximate Total Number of Premises	400
Approximate Number of Premises Not Responding	233

Of the 167 existing premises that responded regarding the status of their septic systems, about 92 percent indicated that they did not have any problems and about 8 percent indicated that they did have problems. The majority of the premises with septic system problems indicated that the problems occur primarily during the heavy rainfall periods.

In addition to the 13 premises that indicated they had septic system problems, a total of 21 premises indicated that their neighbors have septic system problems. When all of this information was plotted on a map of the area, it was found that a majority of the reported septic system problems were on the small lots east of Lake Blvd., between Rose Avenue on the

north and Oak Avenue on the south. This area is also a tributary to surface water sampling locations 8C and 11A which indicated the presence of relatively high fecal coliform concentrations.

With regard to the question related to existing storm water drainage problems, a total of 29 of the Summit City area property owners indicated problems with periodic flooding of their property and 150 indicated no problems. Thirteen of the parcels with storm water drainage problems were in the area of small lots that indicated the highest percentage of septic system problems.

RIDDLE ROAD AREA RESPONSE: Based upon a review of the current Shasta County assessor's roll, approximately 20 of the 24 parcels in the Riddle Road area have improvements on them, although some of the improvement values are very low. An analysis of the questionnaires received indicated a total of 5 residential dwellings, 1 commercial establishment, and 2 vacant parcels responded to the survey. Therefore, it is estimated that approximately 30 percent of the developed parcels responded by completing the questionnaire.

The following is a summary of the responses regarding the status of their on-site sewage disposal systems:

Category	Number of Premises
Septic System Without Problems	2
Septic System with Problems (such as slow drainage, odors, liquid on surface or frequent pumping)	4
SUBTOTAL OF RESPONDING PREMISES	6
Approximate Total Number of Premises	20
Approximate Number of Premises Not Responding	14

Of the 6 existing premises that responded regarding the status of their septic systems, one-third indicated that they did not have any problems and two-thirds indicated that they did have

problems. The majority of the premises with septic system problems indicated that the problems occur primarily during the heavy rainfall periods.

With regard to the question related to existing storm water drainage problems, one-third of the Riddle Road area property owners indicated problems with periodic flooding of their property and two-thirds indicated no problems.

PHASE II - PRELIMINARY STORM DRAINAGE STUDY

INTRODUCTION

The purpose of this preliminary storm drainage study is to evaluate the condition of the storm drain systems in the Summit City and Riddle Road areas. The scope of work includes calculating the flow rates at critical points along the major drainages, such as a pipe crossing a city street. Generally, only areas that were large enough to require a 24-inch or larger pipe were evaluated. However, additional review was made in the Summit City area west of Hill Blvd. and between Rose Avenue and Spruce Avenue. By identifying the areas with the biggest problems, and the greatest potential for property damage, drainage improvement projects can be prioritized and budgeted.

This preliminary drainage study does not determine the water surface profiles or the extent of flooding. Not all alternatives were evaluated. For example, piping the drainage from Rose Avenue to Spruce Avenue would be an effective but expensive alternative that could also be considered.

This report includes preliminary cost estimates to provide an approximate cost of the various improvements. These estimates can be used to establish priorities. Cost estimates based on a preliminary design should be completed prior to preparing grant applications.

DESCRIPTION

The Churn Creek watershed upstream from the Southern Pacific railroad track in Summit City is approximately 4.3 square miles. It begins in the hills adjacent to Lake Blvd. near the turn-off to the Centimudi boat launch at Shasta Lake. The creek runs along Lake Blvd. through

most of the study area before turning southeasterly under Hill Street and the railroad tracks at the southern end of the drainage area (see Figure 2). Two significant drainages, Rich Gulch and Little Churn Creek, enter Churn Creek from the west at the southern end of the study area. Approximately half of the runoff comes from these two creeks.

The soil survey of Shasta County classifies the soils in the area as predominately "gravelly clay loam" and "clay loam." These soils have moderate to moderately slow permeability with medium to rapid rates of runoff (see Figure 3).

Most of the area north of Shasta Dam Blvd. and west of Lake Blvd. is either owned by the federal government or is zoned for very low density development (parcels larger than 5 acres). Most of the area south of Shasta Dam Blvd. and east of Lake Blvd. is zoned for medium density residential development at a density ranging from 1 to 4 units per acre. There is also a small commercial area near the intersection of these two roads. (See Figures 4 and 5.) Most of the undeveloped areas in the watershed are covered with oaks, pines, and dense brush including chaparral, manzanita, buck brush, etc.

The Riddle Road area has one major drainage that crosses Indian Avenue and Arrowhead Avenue. The tributary area is approximately 113 acres. The area begins on the ridge north of Windsor Estates Subdivision and flows from north to south (see Figure 6). Both Riddle Road and Arrowhead Avenue are narrow gravel roads that cross the main drainage course.

The soils within this drainage have moderate permeability and medium to rapid rates of runoff.

The existing land use in most of this watershed is low density (2 to 5 acre parcels). The future land use plan is for medium density development of approximately 3 units/acre.

HYDROLOGY

Flow rates were calculated for the 25-year storm and the 100-year storm for two levels of development: (1) 1997 land use based on current development (See Figure 4) and (2) future land use based on current zoning (see Figure 5). The 25-year storm was used for sizing culverts for areas less than 160 acres. The 100-year storm was used for areas larger than 160 acres.

The Soil Conservation Service (SCS) hydrology method was used for calculating flow rates. Soil type, ground cover, and the land use are variables used to calculate a runoff coefficient called the Curve Number (CN). The time it takes for the water to travel through a drainage area is called the Time of Concentration (Tc). The Tc for overland flow is a function of the slope of the ground and the ground cover. The Tc for pipe or channel flow is a function of the slope and roughness of the pipe or channel. The maximum rainfall in 24 hours for a given return period (25 years or 100 years) is called P_{24}. Rainfall data from Shasta Dam was used to determine a P_{24} of 8.4 inches for the 25-year storm and 10.2 inches for the 100-year storm. Flowrates were calculated using these variables and a unit hydrograph based upon rainfall patterns typical for the area. These flows are summarized in Table 3 and Table 4.

In the Riddle Road area the P_{24} was also determined to be 8.4 inches for the 25-year storm and 10.2 inches for the 100-year storm using the isoplurial maps in the Shasta County Development Standards. The flows are summarized in Table 5.

HYDRAULICS AND COST ESTIMATES

Table 6 summarizes the existing facilities at the point of concentration (P.O.C.) for each subbasin and the recommended improvements. New culverts between two of these points should be sized based on the flow at the downstream P.O.C.

All culverts are sized based on the free flow of water through the culverts. The affect of backwater caused by inadequate culverts or partially blocked culverts was not analyzed.

Churn Creek flows through several culverts under private driveways north of Shasta Dam Blvd. Their adequacy was not evaluated. These culverts are privately owned and are maintained by the property owners.

The culverts at P.O.C. 1 and P.O.C. 2 are too small to carry the design flows. Additionally, the culverts at P.O.C. 2 (2-48" CMP's) are rusted out and need to be replaced. The rest of the City maintained culverts along Churn Creek are adequate to carry the 100-year storm. However, some of the reinforced concrete boxes are partially filled with sand and gravel. The City should establish a schedule to periodically inspect and maintain the storm drain system.

East of Hill Blvd. in Summit City, the storm drain system has more problems. There are two main drainages south of Rose Avenue that join together about 200 feet south of Oak Street on the east side of Lassen Street. The system typically has culvert pipes at the street and driveway crossings and an open ditch between the culverts. The system is difficult and expensive to maintain because it flows across private property as well as under and between buildings for much of its route. Even when the ditch is adjacent to the roadway, the presence of water throughout the year causes vegetation to grow rapidly, restricting the flow of water.

The inadequate existing culvert pipes between Rose Avenue and Ranchera Road (from P.O.C. 14 to 15 and P.O.C. 18 to 22) could be upgraded to the appropriate size for approximately $260,000. However, if right-of-way needs to be acquired to enlarge the existing pipes and ditches, the cost could be considerably higher.

An alternative to replacing most of the pipes between Rose Avenue and Ranchera Road is to construct a bypass on the north side of Rose Avenue. Beginning at P.O.C. 18, a new pipe or a combination of pipes and an open channel could be constructed from P.O.C. 18 to Churn Creek on the west side of Lake Blvd. Most of the property is presently owned by the City of

Shasta Lake. The approximate cost for this bypass is $245,000. This would divert about 125 cfs that would normally flow through the residential area during a 25-year storm. The Churn Creek drainage structures downstream of this diversion are capable of carrying the additional flows.

The bypass would make the existing pipes south of Rose Avenue adequate in size but does not take into account replacement of the pipes that are rusted out. This problem could probably be solved cost effectively by installing a smaller plastic pipe, such as high density polyethylene (HDPE) pipe, into the existing pipe and grouting the void.

The ditches would continue to be a maintenance expense, but with less water flowing through them, they should flood less frequently.

A third alternative would be to install curbs, gutters, catch basins and a complete underground storm drain system. The cost of this alternative was not determined, but it would be substantially more expensive.

To help identify and verify drainage problem areas, a questionnaire was mailed to the residents in the study area under the initial phase of the study. Many of the drainage problems identified in the mail-out questionnaire were localized problems not directly related to the storm drain system. For example, the fire station has problems with high groundwater coming up through the floors of some of the rooms. This problem is probably not caused by an inadequate area wide drainage system, but appears to be caused by inadequate local drainage around the building. The ground slopes towards the building in some areas rather than away from the building. If groundwater is the source of flooding, a french drain could be designed to pipe the groundwater to the ditch east of the fire station.

There were a few complaints about flooding near Beacon Street and Pine Avenue. Although the drainage area is small, the 12-inch pipes are plugged with sediment forcing the water to

flood across the streets. These small pipes plug easily and require regular maintenance. They should be replaced with 18-inch pipes with concrete inlet structures.

The two 48-inch culverts across Indian Avenue (P.O.C. 1) and the small bridge across Arrowhead Avenue (P.O.C. 2) in the Riddle Road area are adequate hydraulically; but, they are not long enough to provide a standard roadway width and the existing culverts are not installed low enough to properly channel the flow. Both roads are narrow gravel roads. When flows exceed the capacity of the culverts or bridge, it appears that the water would flow over the road without damaging nearby houses. Erosion damage to the roadway is repaired when the high water subsides. If and when the roads are constructed to City standards and accepted by the City for maintenance, both crossings should be replaced with two new 48-inch culverts.

CONCEPTUAL SEWAGE COLLECTION SYSTEMS

SUMMIT CITY AREA

A preliminary layout for a conventional gravity sewage collection system to serve most of the Summit City study area is shown on Figure 7. The 15-inch interceptor sewer and main pump station to the existing City wastewater treatment plant would be sized to handle the entire flow from the potential sewered area boundary which is slightly larger than the study area. Collection sewers are also shown to serve most of the existing parcels in the study area.

The total estimated capital project cost for this conceptual sewer system layout to serve most of the Summit City Area is $6,470,000 (excluding financing cost) as shown in Table 7. If one assumes that the cost of this collection system is uniformly spread over 500 household equivalents, then the cost per household equivalent would be about $13,000. In addition, each household equivalent would need to pay the City's sewer connection fee which is currently about $2,800. Thus, the total capital cost per household equivalent would be about $15,800. Assuming that sufficient documentation can be obtained in the future for the project to qualify for a 75 percent grant the capital cost per household could be reduced to about $4,000. Based upon a Rural Development 5 percent loan for 40 years, the annual debt service on $4,000 would be about $232 per year or about $19.30 per month. When the monthly debt service is added to the City's existing monthly service charge for operation and maintenance the total monthly cost would be about $36.60 per month in 1997 dollars. Without any grant funding, the total monthly cost would be about $95.00 per month.

As an alternative to sewering the entire area, initially the sewage collection system could be configured as shown on Figure 8 to serve the higher density small parcel size areas. The 15-inch interceptor would still allow for ultimately sewering the entire study area if necessary. The total estimated capital project cost for this conceptual sewer system layout to serve the high density portion of the Summit City Area is $4,436,000 as shown in Table 8. If one

assumes that the cost of this initial collection system is uniformly spread over the about 350 household equivalents that it would serve, then the cost per household equivalent would be about the same as the cost indicated for the sewer system that would serve most of the service area. If additional areas are connected in the future then they could be required to contribute for their share of the main line sewers that they would tie into.

RIDDLE ROAD AREA

A preliminary layout for a conventional gravity sewage collection system to serve the Riddle Road study area is shown on Figure 9.

The total estimated capital project cost for this conceptual sewer system layout to serve the Riddle Road Area is $466,000 (excluding financing cost) as shown in Table 9. If one assumes that the cost of this collection system is uniformly spread over 24 household equivalents, then the cost per household equivalent would be about $19,400. In addition, each household equivalent would need to pay the City's connection fee which is currently about $2,800. Thus, the total capital cost per household equivalent would be about $22,200. Assuming that sufficient documentation can be obtained in the future for the project to qualify for a 75 percent grant the capital cost per household could be reduced to about $5,550. Based upon a Rural Development 5 percent loan for 40 years, the annual debt service on $5,500 would be about $322 per year or about $27.00 per month. When the monthly debt service is added to the City's existing monthly service charge for operation and maintenance the total monthly cost would be about $44.30 per month in 1997 dollars. Without any grant funding, the total monthly cost would be about $125.00 per month.

TABLES

TABLE 1

SUMMIT CITY AREA SURFACE WATER QUALITY MONITORING DATA
TOTAL COLIFORM AND FECAL COLIFORM TEST RESULTS

TOTAL COLIFORM (MPN/100ml)					FECAL COLIFORM (MPN/100ml)			
Station Number	4/4/96	4/18/96	5/18/96	5/29/96	4/4/96	4/18/96	5/18/96	5/29/96
R-1	900	900	93	>1600	23	50	43	130
R-2	90	500	240	>1600	30	50	43	220
R-3	280	500	>2400	1600	70	130	93	70
R-4	170	500	460	>1600	80	130	93	220
R-5	110	500	>2400	900	50	80	150	30
6A	300	900	1100	280	27	70	23	23
6B	>1600	500	1100	>1600	>1600	500	460	>1600
7	70	1600	460	300	23	50	9	8
7A	500	900	1100	1600	17	130	9	23
7B	4	300	23	900	>2	13	9	23
7C	21	280	N/A	900	4	280	N/A	240
8	900	900	75	>1600	40	30	23	60
8A	500	>1600	150	500	80	500	43	130
8B	900	>1600	>2400	3000	900	1600	120	500
8C	220	900	>2400	1600	80	300	>2400	50
9	500	900	460	300	13	60	4	240
9A	170	300	1100	170	11	50	15	4
9B	300	12	43	120	13	<2	<3	2
10	500	240	460	900	50	50	9	90

TABLE 1 (Continued)

SUMMIT CITY AREA SURFACE WATER QUALITY MONITORING DATA
TOTAL COLIFORM AND FECAL COLIFORM TEST RESULTS

TOTAL COLIFORM (MPN/100ml)					FECAL COLIFORM (MPN/100ml)			
10A	17	30	>2400	220	<2	<2	15	7
11	>1600	300	>2400	500	500	30	7	70
11A	>1600	>1600	>2400	160000	>1600	>1600	>2400	90,000
11B	50	170	>2400	1600	2	8	233	70
11C	23	300	1100	280	4	50	9	110
12	500	300	1100	140	13	13	23	13
12A	900	500	>2400	N/A	130	80	240	N/A
13	4	8	13	50	<2	<2	<3	<2

TABLE 2

SUMMIT CITY AREA SURFACE WATER QUALITY MONITORING DATA
AMMONIA AND CHLORIDE TEST RESULTS

	AMMONIA (mg/L or N)			CHLORIDES (mg/L)			
Station Number	4/4/96	4/18/96	5/29/96	4/4/96	4/18/96	5/18/96	5/24/96
R-1	n	n	0.35	3.5	3.8	4.0	3.7
R-2	n	n	0.12	8.6	6.1	3.8	2.2
R-3	n	n	0.11	7.8	6.5	3.6	2.9
R-4	n	0.11	n	7.5	6.7	4.1	2.7
R-5	n	n	0.36	7.7	7.2	5.9	5.6
6A	n	n	0.22	3.3	2.7	2.7	2.9
6B	n	n	0.23	1.1	0.6	1.3	1.1
7	n	0.12	n	3.3	---	3.3	1.4
7A	n	n	0.12	3.0	1.8	2.7	1.6
7B	n	n	n	1.3	0.7	1.7	1.2
7C	n	n	0.33	0.7	1.4	dry	0.2
8	n	n	0.46	2.9	2.8	2.9	1.5
8A	n	n	0.18	4.7	7.2	4.7	4.6
8B	n	n	0.81	4.6	6.8	1.6	4.5
8C	n	n	0.33	3.1	2.2	2.3	---
9	n	n	0.23	1.5	1.6	1.5	0.8
9A	n	n	0.12	0.9	1.0	1.0	0.3
9B	n	n	0.31	0.8	0.6	0.8	0.4
10	n	n	n	1.7	1.4	2.0	0.9
10A	n	n	0.06	0.8	---	0.9	0.1
11	n	n	0.19	---	1.8	1.9	1.2
11A	n	0.49	0.11	2.5	2.6	3.8	0.7
11B	n	n	0.12	0.9	0.7	1.8	0.3
11C	n	n	0.07	2.7	2.3	2.2	3.3
12	n	n	0.13	1.4	2.7	1.5	---
12A	n	0.09	---	1.8	3.5	2.2	---
13	n	0.35	0.13	0.6	0.5	0.9	0.5

n = nondetectable @ 0.05 mg/L detection limit

TABLE 3
CALCULATED FLOWS
FOR SUMMIT CITY
1997 LAND USE

Subbasin Number	Area in Acres		Time of Concentration Tc (Min.)	Curve Number CN	Peak Flows in cfs	
	Subbasin	Cumulative			25-Year	100-Year
1	109		44	66	84	118
2	380		51	74	364	486
Combine		489	51		447	605
3	125		50	78	141	184
4	163		59	76	153	203
Combine		777	59		736	987
5	90		64	69	68	94
Combine		867	64		802	1079
6	29		69	80	29	38
Combine		896	69		830	1114
7	18		24	78	24	31
8	16		28	80	22	29
Combine		34	28		46	60
9	9		71	80	9	12
Combine		939	71		876	1174
10	511		67	67	362	506
11	930		81	71	697	952
12	32		81	80	31	40
Combine		2412	81		1918	2607
13	7		22	78	9	12
14	17		26	77	22	29
Combine		24	26		31	41
15	17		30	84	26	33
Combine		41	30		57	74
16	26		31	78	34	45
17	13		20	66	12	17
18	37		34	62	25	37
Combine		76	34		71	97
19	32		39	74	34	46
Combine		108	39		105	143
20	27		43	70	24	33
Combine		176	43		184	247
21	10		45	68	8	12
Combine		186	45		192	258
22	39		51	68	31	43
Combine		225	51		220	298
23	85		91	62	43	63
Combine		2722	91		2133	2908

TABLE 4
CALCULATED FLOWS
FOR SUMMIT CITY
FUTURE LAND USE

Subbasin Number	Area in Acres		Time of Concentration Tc (Min.)	Curve Number CN	Peak Flows in cfs	
	Subbasin	Cumulative			25-Year	100-Year
1	109		44	66	84	118
2	380		51	74	364	486
Combine		489	51		447	605
3	125		50	79	144	188
4	163		59	77	158	207
Combine		777	59		744	995
5	90		64	70	71	97
Combine		867	64		812	1089
6	29		69	85	32	41
Combine		896	69		843	1128
7	18		24	84	27	35
8	16		28	85	25	31
Combine		34	28		52	66
9	9		71	84	10	13
Combine		939	71		895	1193
10	511		67	68	375	521
11	930		81	71	697	952
12	32		81	81	32	41
Combine		2412	81		1948	2640
13	7		22	81	10	13
14	17		26	84	26	33
Combine		24	26		36	46
15	17		30	84	26	33
Combine		41	30		62	76
16	26		31	79	35	46
17	13		20	75	17	21
18	37		34	72	37	50
Combine		76	34		89	116
19	32		39	78	38	50
Combine		108	39		126	165
20	27		43	75	28	37
Combine		176	43		214	278
21	10		45	68	8	12
Combine		186	45		222	289
22	39		51	68	31	43
Combine		225	51		250	329
23	85		91	64	47	67
Combine		2722	91		2191	2970

SHASTA DAM BLVD

TABLE 5
CALCULATED FLOWS
FOR RIDDLE ROAD AREA
1997 AND FUTURE LAND USE

Sub-basin Name	Area Acres	1997 Land Use Peak Flows in CFS 25 Year	100-Year	Future Land Use Peak Flows in CFS 25-Year	100-Year
Indian Avenue	91	108	141	144	181
Arrowhead Avenue	113	127	167	178	225

TABLE 6
FOR SUMMIT CITY AREA
FACILITY EVALUATION

P.O.C No.	Cross Street	Existing Facility	Comments	Approx. Capacity	Level of Protection	Design Flow (CFS)	Recommended Improvements	Approx. Cost
1	Lake Blvd	30" CMP		35	25	84	Add a 42" RCP	$9,000
2	Lake Blvd	2-48" CMP	Bottom rusted out	230	100	605	8'x4' RCB	$16,500
3	Lake Blvd	10", 15", 24" 48" CMP		115	25	144	Add a 24" RCP	$6,000
4	Duval Drive	Double 10'x6' RCB	Partially filled with gravel	1150	100	995	None needed	
5	Shasta Dam Blvd	12' CMP		1800	100	1089	None needed	
6	Buckeye Street	Triple 10'x5' RCB		2700	100	1128	None needed	
7	Shasta Dam Blvd	36" CMP & 12" CMP		60	25	27	None needed	
8	Hill Blvd	42"x29" CMPA		55	25	52	None needed	
9	Lake Blvd	Double 8'x6' RCB		1700	100	1193	None needed	
10	Lake Blvd	Triple 8'x4' RCB	Partially filled with gravel	1500	100	521	None needed	
11	Lake Blvd	Double 8'x6' RCB	Partially filled with gravel	1700	100	952	None needed	
12	Hill Blvd	Double 12'x8' RCB		2900	100	2640	None needed	
13	Shasta Dam Blvd	12" CMP		5	25	10	18" RCP	$5,000
14 to 15	Rose Ave.-Lassen St.	24" CMP's		18	25	36	Replace w/36" RCP's	$92,000
15	Lassen Street	42"x29" CMPA		65	25	62	None needed	
16	Shasta Dam Blvd	2 - 18" CMP		24	25	35	Add a 18" RCP	$5,000
17	Shasta Dam Blvd	30" CMP		35	25	17	None needed	
18 to 19	Rose Ave.-Beacon St.	36" CMP's		55	25	89	Replace w/48" RCP's	$83,000
19 to 20	Beacon Street-Spruce Ave.	48" CMP & 30"CMP	Bottom rusted out	160	25	126	Replace existing pipes	$25,000
20	Spruce Avenue	2-48" CMP	Bottom rusted out	230	100	278	Replace w/2-54" RCP	$30,000
21	Ranchera Road	2-64"x43" CMPA		300	100	289	None needed	
22	Ranchera Road	1-48" CMP		115	100	329	Replace w/2-54" RCP	$30,000
23	SP Railroad	15'x15' concrete parabolic arch		3000±	100	2970	None needed	

File: TABLE-7
Date rev.5/28/97

TABLE 7
PRELIMINARY COST ESTIMATE
SEWAGE COLLECTION SYSTEM TO SERVE
MOST OF THE SUMMIT CITY AREA

NO.	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	ENR 5250 TOTAL COST
1	6 - inch sewer	33000	l.f.	$50.00	$1,650,000.00
2	8 - inch sewer	5700	l.f.	$55.00	$313,500.00
3	10 - inch sewer	2300	l.f.	$70.00	$161,000.00
4	12 - inch sewer	5300	l.f.	$75.00	$397,500.00
5	15 - inch sewer	5600	l.f.	$80.00	$448,000.00
6	Bore & Jack Railroad	60	l.f.	$450.00	$27,000.00
7	Manholes	120	each	$2,200.00	$264,000.00
8	Rod holes	20	each	$560.00	$11,200.00
9	4 - inch lateral	17000	l.f.	$25.00	$425,000.00
10	Pump Station No. 1 (Without Standby Power)	1	l.s.	$75,000.00	$75,000.00
11	Pump Station No. 2 (Without Standby Power)	1	l.s.	$75,000.00	$75,000.00
11	Pump Station No. 3 (Without Standby Power)	1	l.s.	$75,000.00	$75,000.00
12	Main Pump Station (With Standby Power)	1	l.s.	$470,000.00	$470,000.00
13	4 - inch force main	1600	l.f.	$25.00	$40,000.00
14	12 - inch force main	1400	l.f.	$40.00	$56,000.00
15	Easement and Land Acquisitions	1	l.s.	$200,000.00	$200,000.00
	TOTAL ESTIMATED CONSTRUCTION COSTS				$4,688,200.00
	Contingency Allowance (15%)				$703,200.00
	TOTAL ESTIMATED IMPROVEMENT COST INCLUDING CONTINGENCY ALLOWANCE				$5,391,400.00
	Indirect Costs and Engineering (20%)				$1,078,300.00
	TOTAL ESTIMATED CAPITAL PROJECT COST MAY 1997 DOLLARS (excluding financing cost)				$6,469,700.00

File: TABLE-8
Date rev.5/28/97

TABLE 8
PRELIMINARY COST ESTIMATE
SEWAGE COLLECTION SYSTEM TO SERVE
THE HIGH DENSITY PORTION OF SUMMIT CITY AREA

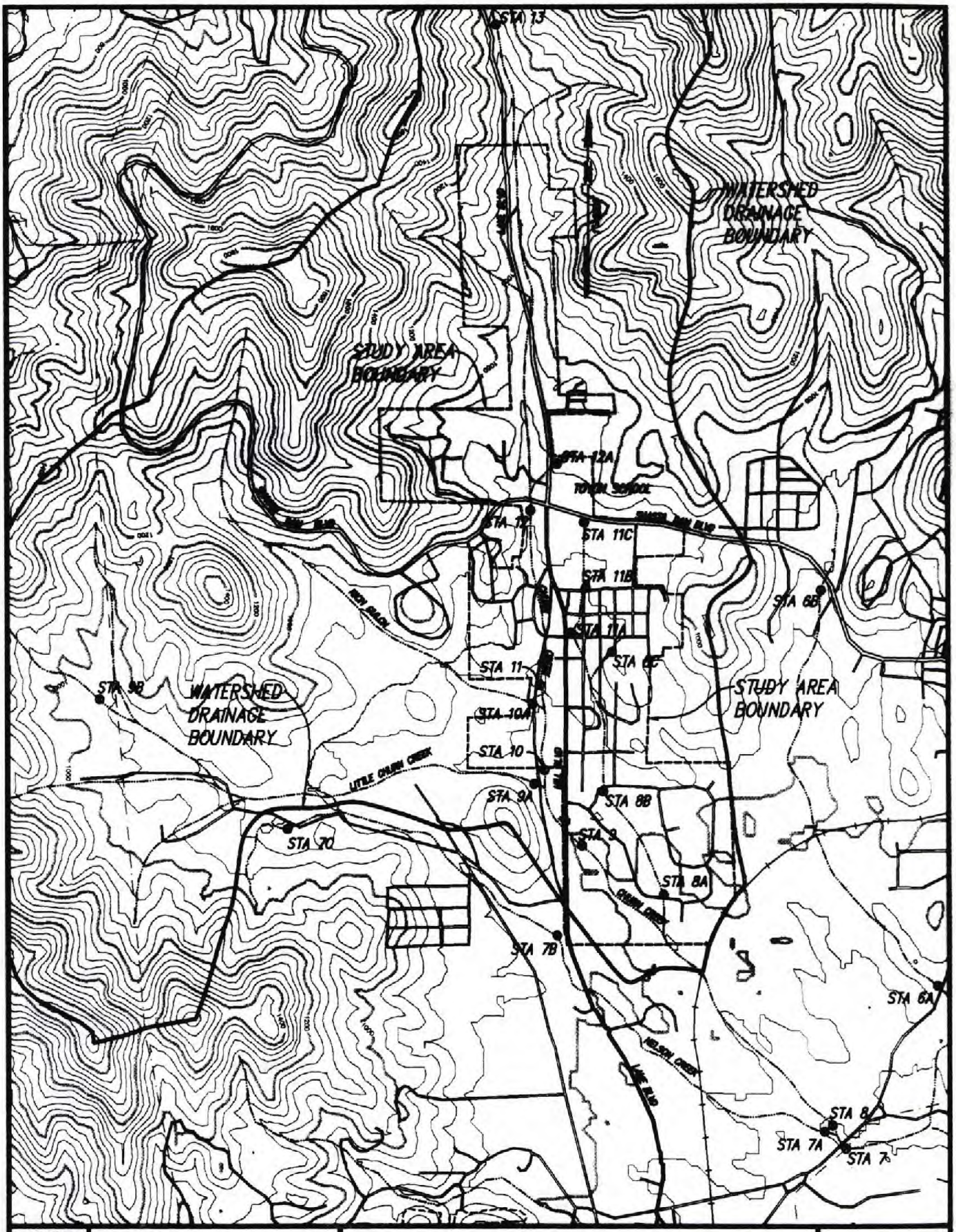
NO.	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	ENR 5250 TOTAL COST
1	6 - inch sewer	11700	l.f.	$50.00	$585,000.00
2	8 - inch sewer	3100	l.f.	$55.00	$170,500.00
3	10 - inch sewer	2300	l.f.	$70.00	$161,000.00
4	12 - inch sewer	4900	l.f.	$75.00	$367,500.00
5	15 - inch sewer	5600	l.f.	$80.00	$448,000.00
6	Bore & Jack Railroad	60	l.f.	$450.00	$27,000.00
7	Manholes	86	each	$2,200.00	$189,200.00
8	Rod holes	16	each	$560.00	$9,000.00
9	4 - inch lateral	12700	l.f.	$25.00	$317,500.00
10	Pump Station No. 1 (Without Standby Power)	1	l.s.	$75,000.00	$75,000.00
11	Pump Station No. 2 (With Standby Power)	1	l.s.	$175,000.00	$175,000.00
11	Pump Station No. 3	0	l.s.	$0.00	$0.00
12	Main Pump Station (With Standby Power)	1	l.s.	$400,000.00	$400,000.00
13	4 - inch force main	600	l.f.	$25.00	$15,000.00
14	8 - inch force main	1300	l.f.	$30.00	$39,000.00
15	12 - inch force main	1400	l.f.	$40.00	$56,000.00
16	Easement and Land Acquisitions	1	l.s.	$180,000.00	$180,000.00
	TOTAL ESTIMATED CONSTRUCTION COSTS				$3,214,700.00
	Contingency Allowance (15%)				$482,200.00
	TOTAL ESTIMATED IMPROVEMENT COST INCLUDING CONTINGENCY ALLOWANCE				$3,696,900.00
	Indirect Costs and Engineering (20%)				$739,400.00
	TOTAL ESTIMATED CAPITAL PROJECT COST MAY 1997 DOLLARS (excluding financing cost)				$4,436,300.00

File: TABLE-9
Date rev.5/28/97

TABLE 9
PRELIMINARY COST ESTIMATE
SEWAGE COLLECTION SYSTEM TO SERVE
THE RIDDLE ROAD AREA

NO.	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	ENR 5250 TOTAL COST
1	6 - inch sewer (class A1 trench)	800	l.f.	$50.00	$40,000.00
2	6 - inch sewer (class A4 trench)	2850	l.f.	$35.00	$99,800.00
3	6 - inch sewer (class C trench)	2100	l.f.	$20.00	$42,000.00
4	Manholes	18	each	$2,000.00	$36,000.00
5	Rod holes	1	each	$560.00	$600.00
6	4 - inch lateral	250	l.f.	$15.00	$3,800.00
7	Individual Pump System	1	l.s.	$5,000.00	$5,000.00
8	1.5 - inch force main	300	l.f.	$10.00	$3,000.00
9	Pump Station (Without Standby Power)	1	l.s.	$75,000.00	$75,000.00
10	4 - inch force main	800	l.f.	$25.00	$20,000.00
11	Easement and Land Acquisitions	1	l.s.	$28,000.00	$28,000.00
	TOTAL ESTIMATED CONSTRUCTION COSTS				$353,200.00
	Contingency Allowance (10%)				$35,300.00
	TOTAL ESTIMATED IMPROVEMENT COST INCLUDING CONTINGENCY ALLOWANCE				$388,500.00
	Indirect Costs and Engineering (20%)				$77,700.00
	TOTAL ESTIMATED CAPITAL PROJECT COST MAY 1997 DOLLARS (excluding financing cost)				$466,200.00

FIGURES



DATE 5/97	PACE ENGINEERING REDDING, CALIFORNIA	WATER QUALITY SAMPLING STATION LOCATIONS	FIGURE 1 JOB # 110.24

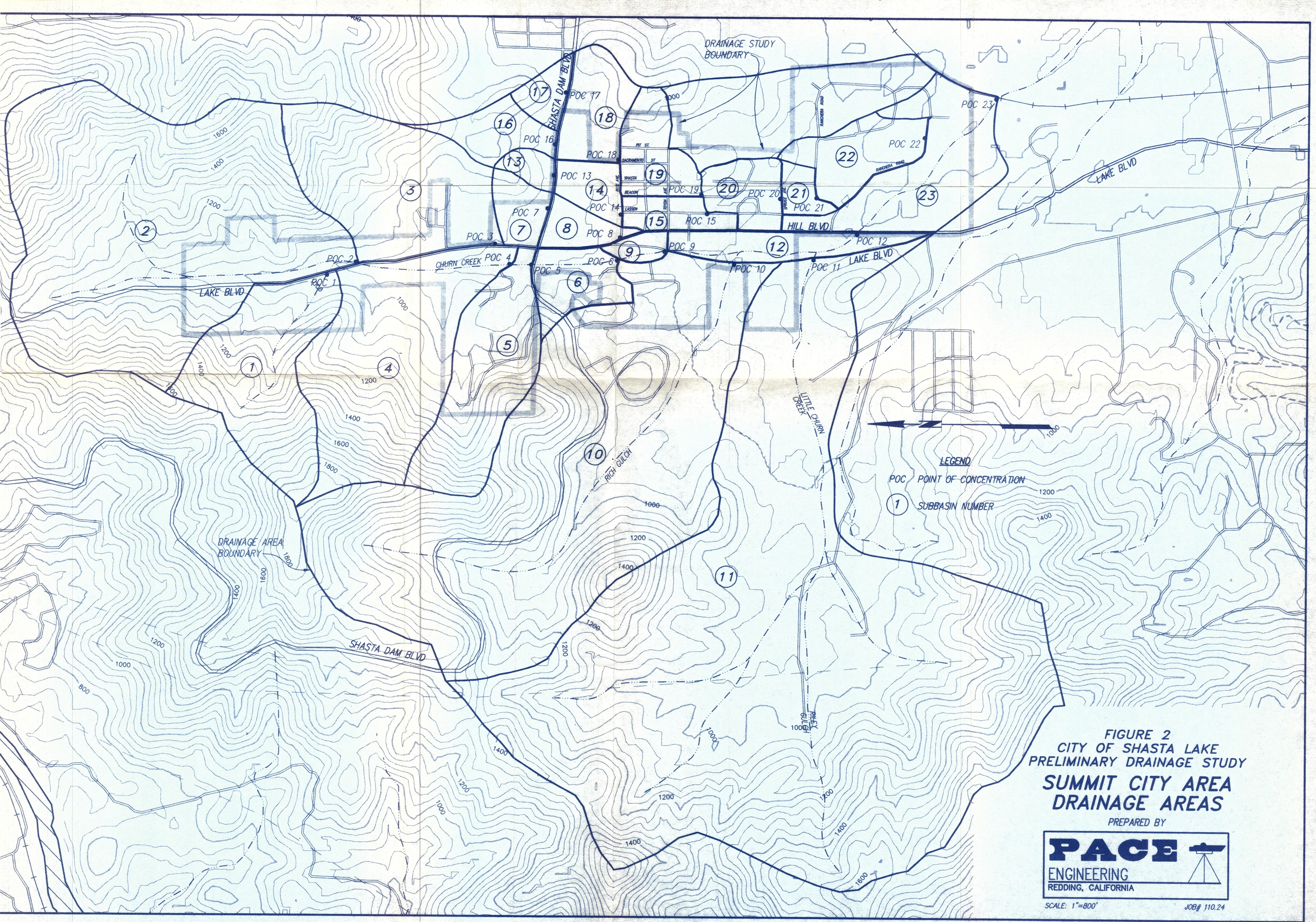


FIGURE 2
CITY OF SHASTA LAKE
PRELIMINARY DRAINAGE STUDY

SUMMIT CITY AREA DRAINAGE AREAS

PREPARED BY

PACE ENGINEERING
REDDING, CALIFORNIA

SCALE: 1"=800'

JOB# 110.24

DRAINAGE STUDY BOUNDARY

SHASTA DAM BLVD

LAKE BLVD

HILL BLVD

CHURN CREEK

RICH GULCH

CATTLE CANYON CREEK

RILEY GULCH

DRAINAGE AREA BOUNDARY

SHASTA DAM BLVD

POC 1 POC 2 POC 3 POC 4 POC 5 POC 6 POC 7 POC 8 POC 9 POC 10 POC 11 POC 12 POC 13 POC 14 POC 15 POC 16 POC 17 POC 18 POC 19 POC 20 POC 21 POC 22 POC 23

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

SOIL LEGEND

- SOIL GROUP "B"
- SOIL GROUP "C"
- SOIL GROUP "D"
- POC POINT OF CONCENTRATION
- (1) SUBBASIN NUMBER

FIGURE 3
CITY OF SHASTA LAKE
PRELIMINARY DRAINAGE STUDY

SUMMIT CITY AREA SOIL CLASSIFICATIONS

PREPARED BY

PACE ENGINEERING
REDDING, CALIFORNIA

SCALE: 1"=800'

JOB# 110.24

DRAINAGE STUDY BOUNDARY

DRAINAGE AREA BOUNDARY

SHASTA DAM BLVD

LAKE BLVD

HILL BLVD

RANCHERA ROAD

CHURN CREEK

RICH GULCH

RILEY GULCH

BATTLE CREEK

POC 1 POC 2 POC 3 POC 4 POC 5 POC 6 POC 7 POC 8 POC 9 POC 10 POC 11 POC 12 POC 13 POC 14 POC 15 POC 16 POC 17 POC 18 POC 19 POC 20 POC 21 POC 22 POC 23

PIT ST. SACRAMENTO ST. SHASTA BEACON LASSEN ROSS AVE. TRINITY AVE. SPRUCE AVE.

LAND USE LEGEND

- VERY LOW DENSITY over 5ac
- LOW DENSITY 2 to 5ac parcels
- MEDIUM DENSITY 3 un/ac
- COMMERCIAL
- OPEN SPACE
- POC POINT OF CONCENTRATION
- (1) SUBBASIN NUMBER

FIGURE 4
CITY OF SHASTA LAKE
PRELIMINARY DRAINAGE STUDY

SUMMIT CITY AREA 1997 LAND USE

PREPARED BY

PACE ENGINEERING
REDDING, CALIFORNIA

SCALE: 1"=800'

JOB# 110.24

DRAINAGE STUDY BOUNDARY

SHASTA DAM BLVD

LAKE BLVD

HILL BLVD

CHURN CREEK

CATTLE CHURN CREEK

RICH GULCH

RILEY GULCH

RANCHERIA ROAD

SACRAMENTO ST.

SHASTA AVE.

BEACON AVE.

LASSEN AVE.

POC 1 POC 2 POC 3 POC 4 POC 5 POC 6 POC 7 POC 8 POC 9 POC 10 POC 11 POC 12 POC 13 POC 14 POC 15 POC 16 POC 17 POC 18 POC 19 POC 20 POC 21 POC 22 POC 23

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

DRAINAGE AREA BOUNDARY

SHASTA DAM BLVD

LAND USE LEGEND

- VERY LOW DENSITY
- LOW DENSITY
- MEDIUM DENSITY
- COMMERCIAL
- OPEN SPACE
- POC POINT OF CONCENTRATION
- (1) SUBBASIN NUMBER

FIGURE 5
CITY OF SHASTA LAKE
PRELIMINARY DRAINAGE STUDY

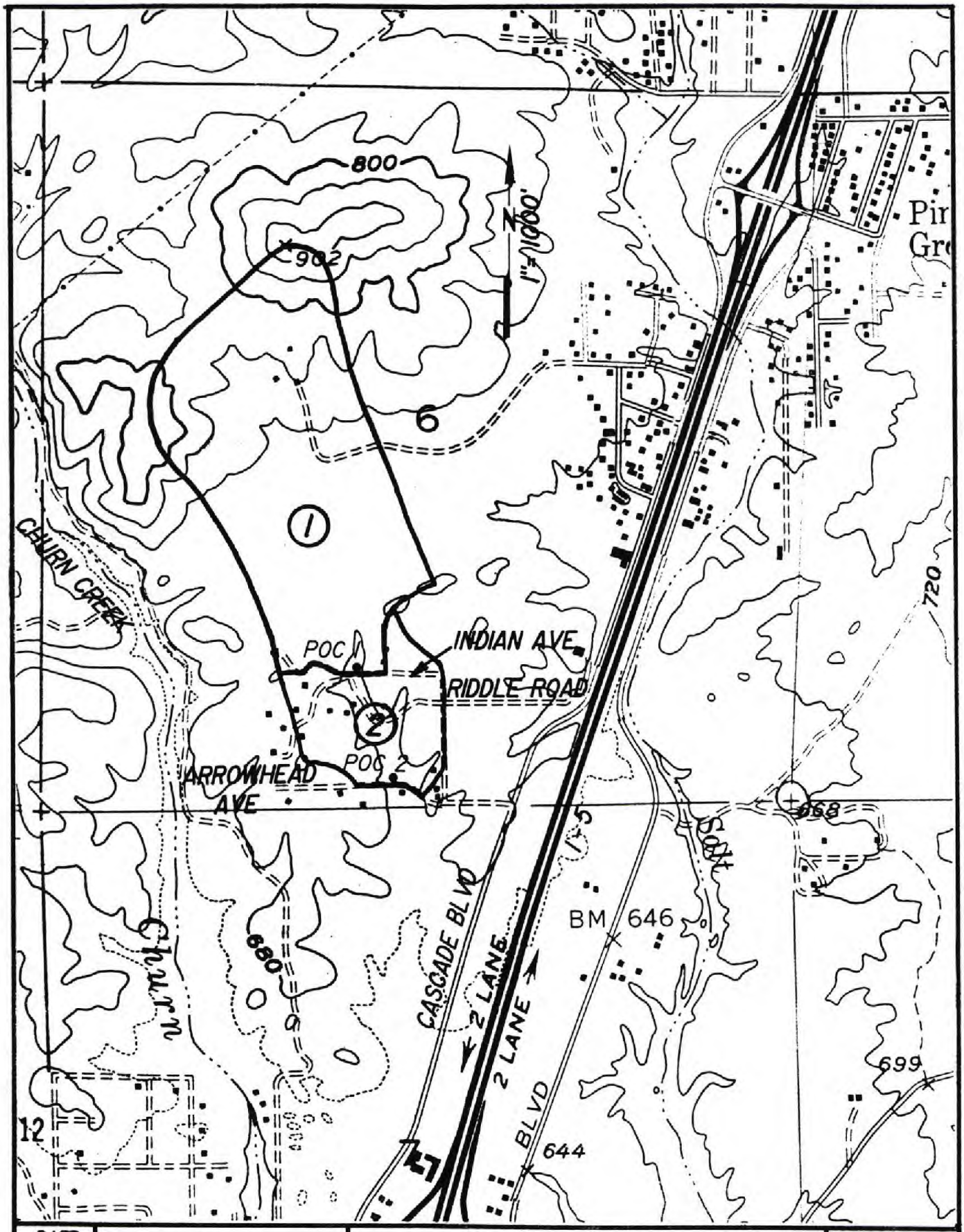
SUMMIT CITY AREA FUTURE LAND USE

PREPARED BY:

PACE ENGINEERING
REDDING, CALIFORNIA

SCALE: 1"=800'

JOB# 110.24



DATE 5/97	PACE ENGINEERING REDDING, CALIFORNIA	CITY OF SHASTA LAKE PRELIMINARY DRAINAGE STUDY RIDDLE ROAD AREA DRAINAGE AREAS	FIGURE 6 JOB # 110.24

CITY OF SHASTA LAKE
WASTEWATER
TREATMENT PLANT

MAIN PUMP
STATION

12" FM

1"=1000'

STUDY
BOUNDARY

POTENTIAL SEWERED
AREA BOUNDARY

PUMP STATION
NO. 2

PUMP STATION
NO. 3

SHASTA DAM BLVD

LAKE BLVD

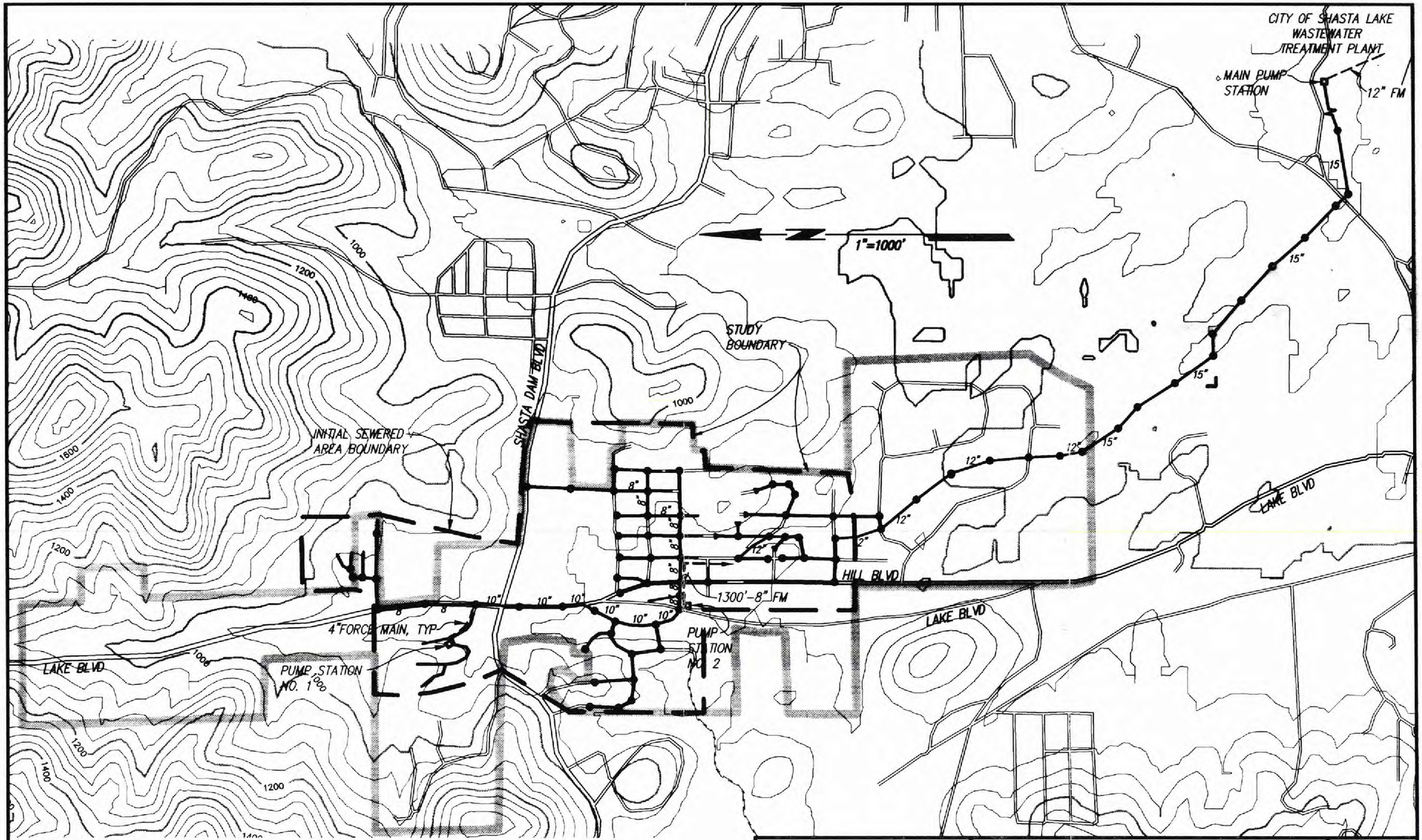
HILL BLVD

4" FORCE MAIN, TYP

PUMP STATION
NO. 1

1000
1200
1400
1600

PACE ENGINEERING, REDDING, CALIFORNIA	PRELIMINARY SEWAGE COLLECTION SYSTEM LAYOUT TO SERVE MOST OF SUMMIT CITY AREA
	FIGURE 7
	DATE 05/27/97
	JOB # 110.24



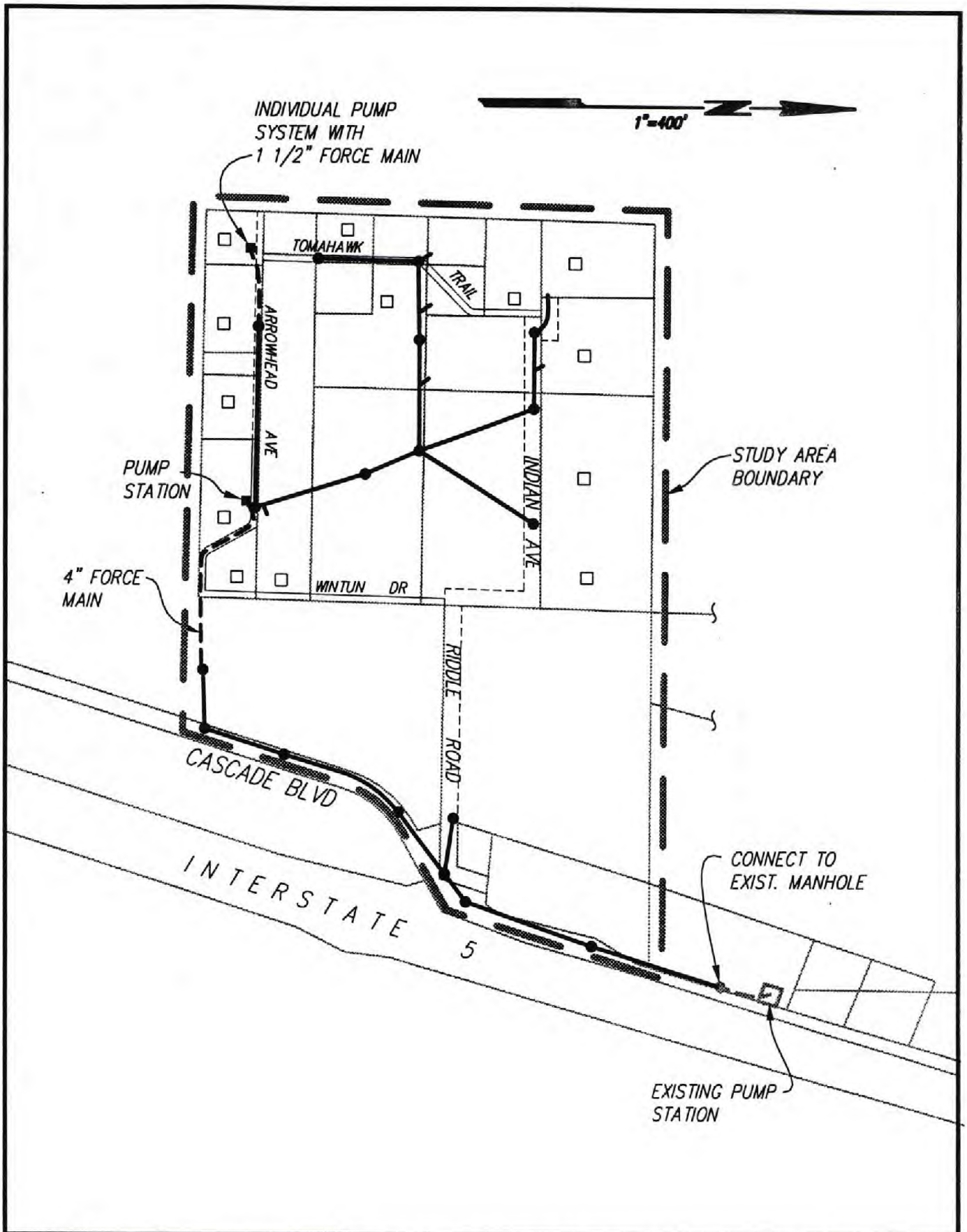
PAGE ENGINEERING
REDDING, CALIFORNIA

PRELIMINARY SEWAGE COLLECTION SYSTEM
LAYOUT TO SERVE HIGH DENSITY PORTION
OF SUMMIT CITY AREA

FIGURE 8

DATE 05/27/97

JOB # 110.24



DATE			
5/97	PACE ENGINEERING REDDING, CALIFORNIA	PRELIMINARY SEWAGE COLLECTION SYSTEM LAYOUT FOR RIDDLE ROAD AREA	FIGURE 9
			JOB # 110.24

APPENDIX

APPENDIX A
INCOME SURVEY

During the Infrastructure Needs Study, a questionnaire was mailed out to all of the parcels of land in the two study areas. An income survey form (see copy attached at the end of this appendix) was attached to the questionnaire and most of the people that returned the questionnaire also responded to the income survey questions.

SUMMIT CITY AREA RESPONSE:

There are a total of 578 parcels of land in the Summit City study area and it is estimated that only about 400 are occupied with either a residence or commercial building.

The following is a summary of the data obtained from the 163 residential property owners that responded to the survey:

	Number of Residences	
• Income Level A	37	or 22.7%
• Income Level B	91	or 55.8%
• Income greater than Level B or no response	35	or 21.5%

- HEAD OF HOUSEHOLD BREAKDOWN

Own their home	139	or 85%
Rentals	11	or 7%
Females	60	
Over 62	66	
Males	122	
White	125	
American Indian	8	
Spanish/Hispanic	5	
Handicapped	20	

The Target Income Levels A and B represent 78.5 percent of the total responses which yields a standard deviation of 0.41. Based upon the sample size of 163 households the standard error is calculated at 3 percent, which is less than a standard error of 5 percent required for a valid random sampling process. Therefore, it appears that 78.5 percent of the Summit City area household incomes are equal to or less than the target income levels.

RIDDLE ROAD AREA RESPONSE:

There are a total of 24 parcels of land in the Riddle Road study area and it is estimated that only about 20 are occupied with either a residence or commercial building.

The following is a summary of the data obtained from the four residential property owners with improvements on their property that responded to the survey:

	Number of Residences	
• Income Level A	1	or 25%
• Income Level B	2	or 50%
• Income greater than Level B or no response	1	or 25%

- HEAD OF HOUSEHOLD BREAKDOWN

Own their home	1
Rentals	2
Females	0
Over 62	1
Males	2
White	0
American Indian	1
Spanish/Hispanic	0
Handicapped	2

The Target Income Levels A and B represent 75 percent of the total responses which yields a standard deviation of 0.43. Based upon the sample size of 4 households the standard error is

calculated at 22 percent, which is greater than a standard error of 5 percent required for a valid random samplings. Therefore, the questionnaire income survey is not considered to be a valid sampling. Because of the low number of households in the Riddle Road area, income information will need to be obtained from all households in order to have a valid survey.

CITY OF SHASTA LAKE
SUMMIT CITY STUDY AREA
INCOME SURVEY

1. How many persons live in your household? _____

2. Calculate the total income in the last 12 months or the income claimed in the most recent Federal income tax filing of all the persons who currently live in you household and check whether your income falls into Range A or B of the chart below. ☐ **A** ☐ **B**

(Total income includes: wages before deductions, public assistance, unemployment benefits, social security, pensions, alimony, child support, net income from owning or operating a farm or business, any other source of income received regularly.)

	NUMBER OF PESONS LIVING IN HOUSEHOLD							
Income Range	1	2	3	4	5	6	7	8
A	$0-$12,400	$0-$14,150	$0-$15,950	$0-$17,700	$0-$19,100	$0-$20,550	$0-$21,950	$0-$23,350
B	$12,401-$19,800	$14,151-$22,550	$15,951-$25,500	$17,701-$28,300	$19,101-$30,600	$20,551-$32,850	$21,951 $35,100	$23,351-$37,400

3. Are your living quarters: ☐ Owned by you ☐ Rented
Name and address of owner:_____
_____

4. If living quarters are owned, do all persons holding title to the property reside here? ☐ Yes ☐ No

5. Is the head of household: (Check all that apply)

☐ Female
☐ Over 62 years of age
☐ Male
☐ Other

☐ White
☐ Black
☐ Asian/Pacific Islander

☐ American Indian or Alaskan Native
☐ Spanish/Hispanic

6. Do any physically or mentally handicapped people reside in this household? ☐ Yes ☐ No

NOTE: Replies to this income survey are confidential. Confidentiality is protected by not including names on the form. We need a high response to have a chance of getting funded. Addresses are on the "Infrastructure Needs Study" questionnaire so we can make follow-up contacts if no questionnaire is received and we need more questionnaires returned. When we get your questionnaire and income survey in the mail, we will check off your address and remove the income survey from the questionnaire. No identifying information will be kept with the income surveys and the income surveys will be tallied as a group.

Any questions or comments, please contact John Pedri, City Engineer, at 916/275-7422.