

PRELIMINARY WATER CAPACITY STUDY

Coyne Ranch at Sunbeam Lake

West of Bennett Road, and North of W Ross Road
Imperial County, CA

Prepared By

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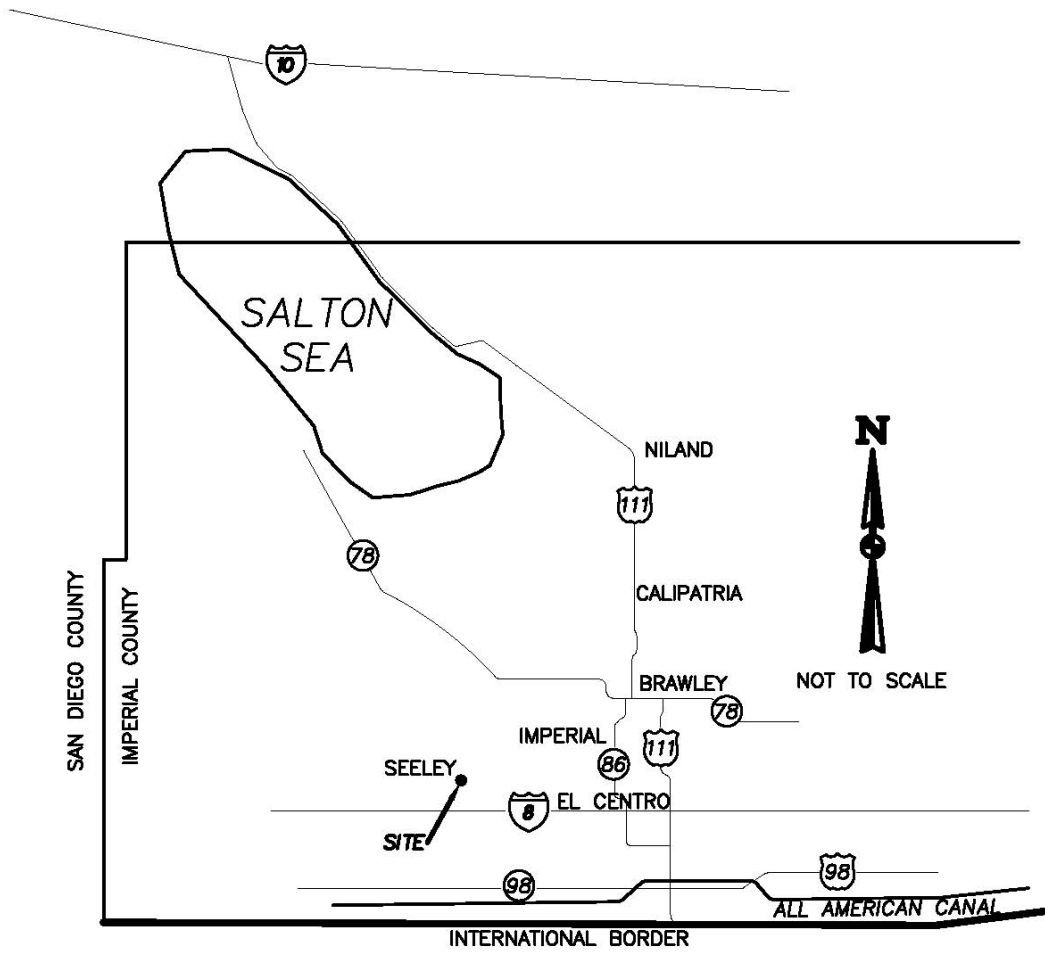


Figure 1 Vicinity Map

1.0 INTRODUCTION

This preliminary water capacity study is prepared per the Seeley County Water District and is intended to address the impact of the proposed project on the existing water system. This document is subject to revisions as needed by the engineer.

1.1 PROJECT SITE DESCRIPTION

The proposed project site is a rectangular shaped area west of Bennett Rd, and north of W Ross Road, Imperial County, CA. The site is approximately 0.6 miles north of Interstate 8 and approximately 0.9 miles southeast of Seeley, CA. The existing site consists of 128 acres of agricultural fields, irrigation delivery ditches, and tile drains.

The proposed development is a 450 lot residential subdivision, which includes residential streets and a large extended detention basin. 444 lots will be single-family residences and 6 lots will be multifamily residential developments. Please see Figure 1 above for a vicinity map.

1.2 EXISTING CONDITIONS

Currently, there are no existing water mains in the immediate vicinity of the project. The Seeley County Water District (SCWD) has an existing water system to the northwest of the project. They also have an existing water treatment plant, which supplies all flows to Seeley. The system consists of water mains varying in size from 4" to 12".

1.3 PROPOSED CONDITIONS

It is currently envisioned that sewer and water will be provided by the Seeley County Water District, although other options are being considered including but not limited to on-site services either under contract or through the formation of another district. For the purpose of this study it is assumed that domestic water service will be provided by SCWD and demand calculations and system modeling are made in accordance with SCWD standards.

For fire service it is assumed that a separate fire service line will be constructed for the project. The fire line will draw water from Sunbeam Lake. Preliminary design of the fire line and associated infrastructure is beyond the scope of this study. As such, fire demand loading within the proposed development is not included in this study.

A private onsite water main is proposed for the project, serving all of the lots. The system will be an underground 8" within the project limits. Domestic water service for the project will connect to the SCWD water system via 16" PVC main to the north and connect at the south end of Holt Avenue near West Evan Hewes Highway. An 8" PVC main will run from the southwest portion of the project site and connect to the SCWD water system at the intersection of West Ross Road and Drew Road.

2.0 METHODOLOGY AND CRITERIA

2.1 INTRODUCTION

Water demand criteria used for the Coyne Ranch project were taken from the City of Brawley Urban Water Management Plan (2010), based on discussions with Dynamic Consulting Engineers (DCE), then-contract engineer for the SCWD. Fire flow demand on the existing system of 1,000 gpm was taken from the WaterCAD model of the existing system done by DCE. Fire flow demand for all future improvements is not included as it is assumed that the project fire service will be provided by separate system drawing water from Sunbeam Lake.

2.2 DEMAND AND POPULATION ESTIMATES

For the project demand estimates, a daily demand of 120 gallons per day per capita was used. For the single-family houses, a unit density of 4 persons per dwelling unit was assumed at one dwelling unit per lot. For the multi-family lots, a unit density of 3.3 persons per dwelling unit was assumed at 29 dwelling units per acre. This yields a population of 2,499 persons, and an average water demand of 299,880 gallons per day. See Table 2 and Table 3 for estimates summary.

Table 2-POPULATION ESTIMATE

Description	Density (DU)	Unit Density (persons/DU)	Units	Population
Single-Family	1 per Lot	4	444 Lots	1,776
Multi-Family	29 Per Acre	3.3	7.55 Acres	723
Total				2,499

Table 3-AVERAGE DAILY DEMAND-COYNE RANCH

Population	Demand per capita (gpcd)	Total Average Daily Demand (gal/day)
2,499	120	299,880

2.3 WATER TREATMENT PLANT

The SCWD currently operates a water treatment plant (WTP), which has an existing capacity of 1.0 MGD. The current demand on the plant is approximately 0.3 MGD. These estimates were provided by representatives of JHK Consulting (JHK), current contract engineer for SCWD. It is understood that the plant requires an increase in capacity if demand exceeds 80% of existing capacity. As a result of the Coyne Ranch project, the total demand on the WTP would be 0.6 MGD. Therefore the Coyne Ranch project does not result in any necessary upgrades to the plant.

3.0 HYDRAULIC ANALYSIS

3.1 INTRODUCTION

An analysis of the overall water system was conducted to evaluate the capacity of the water system with the corresponding peak flows from the demand on the system with the proposed Coyne Ranch project.

3.2 PEAK DEMAND-COYNE RANCH

For an analysis of peak demands on this system, different peak factors were applied. A factor of 1.5 is applied to the average day demand (ADD) to calculate a peak day demand (PDD). A factor of 1.8 is applied to the peak day demand to calculate the peak hour demand (PHD). See Figure 4 below for peak demand estimates.

Table 5- PEAK HOUR DEMAND-COYNE RANCH

Population	Demand per capita (gpcd)	Total Average Daily Demand (gal/day)	Peak Daily Demand (gal/day)	Peak Hour Demand (gal/min)
2,499	120	299,880	449,820	562.3

3.3 CALCULATIONS AND RESULTS

The water system analysis was modeled using WaterCAD V8i (Bentley software). A WaterCAD model of the existing system was previously done by DCE, which was included as a basis in our model to analyze needed upgrades to the existing system. This model included a water tank and a 2,000 gpm pump. After discussions with the SCWD, this proved to be accurate, as they currently have a series of smaller pumps that turn on as needed for fire flows, with a maximum flow rate of 2,000 gpm. For modeling purposes, all existing pipes were considered to be at an elevation of 0'. This is consistent with the model received from DCE as well and considering the flat terrain of Seeley. The proposed project is approximately 5' (maximum) higher than Seeley. Thus, all proposed pipes in the project were set to an elevation of 5'.

For fire flows, the existing model showed a 1,000 gpm requirement. This existing system satisfied this requirement, with any one fire hydrant in operation, for all nodes except for three. These three nodes are at the end of a long dead end line extending from Evan Hewes Highway down Drew Road and serve the RV Park south of Sunbeam Lake.

For the proposed project scenario, a fire flow of 1,000 gpm within the existing service of Seeley was assumed, with the requirement to maintain a 20-psi residual pressure. For the project fire flow will be served through a separate system drawing from Sunbeam Lake. Note that even though the project will have a separate fire water system, the fire flow of 1,000 gpm must be supported through the proposed pipe network to support fire flow demand within the overall SCWD system.

With no upgrades to the existing SCWD system, and a 16" main connection from the project to the existing system to the north and an 8" main connection to the west, these fire flow requirements were met with the proposed project considered. It is concluded that the existing pumps located at the WTP will have capacity to provide enough pressure to the water system with the addition of the proposed project. In the proposed scenario, the same three nodes that currently do not meet the fire-flow requirement remain the same under the proposed condition. See Attachment A for water model results. See Attachment B for the node exhibit.

4.0 SUMMARY AND CONCLUSIONS

With the existing model received from DCE, the existing system meets the fire-flow requirements of 1,000 gpm except for three nodes in the RV Park south of Sunbeam Lake. For the proposed project, Coyne Ranch at Sunbeam Lake, no upgrades to the SCWD system are required. The project proposes to connect to the SCWD system with a 16" main connection from the project to the existing system to the north and an 8" main connection to the west. With these connections, the minimum pressure of the proposed project, under the peak flow scenario, exceeds the minimum requirement of 20-psi within the project as well as throughout the SCWD system, except for the same three nodes that currently do not meet the minimum pressure under existing conditions.

5.0 APPENDICES

Attachment A Water Model Results

Attachment B Node Exhibit

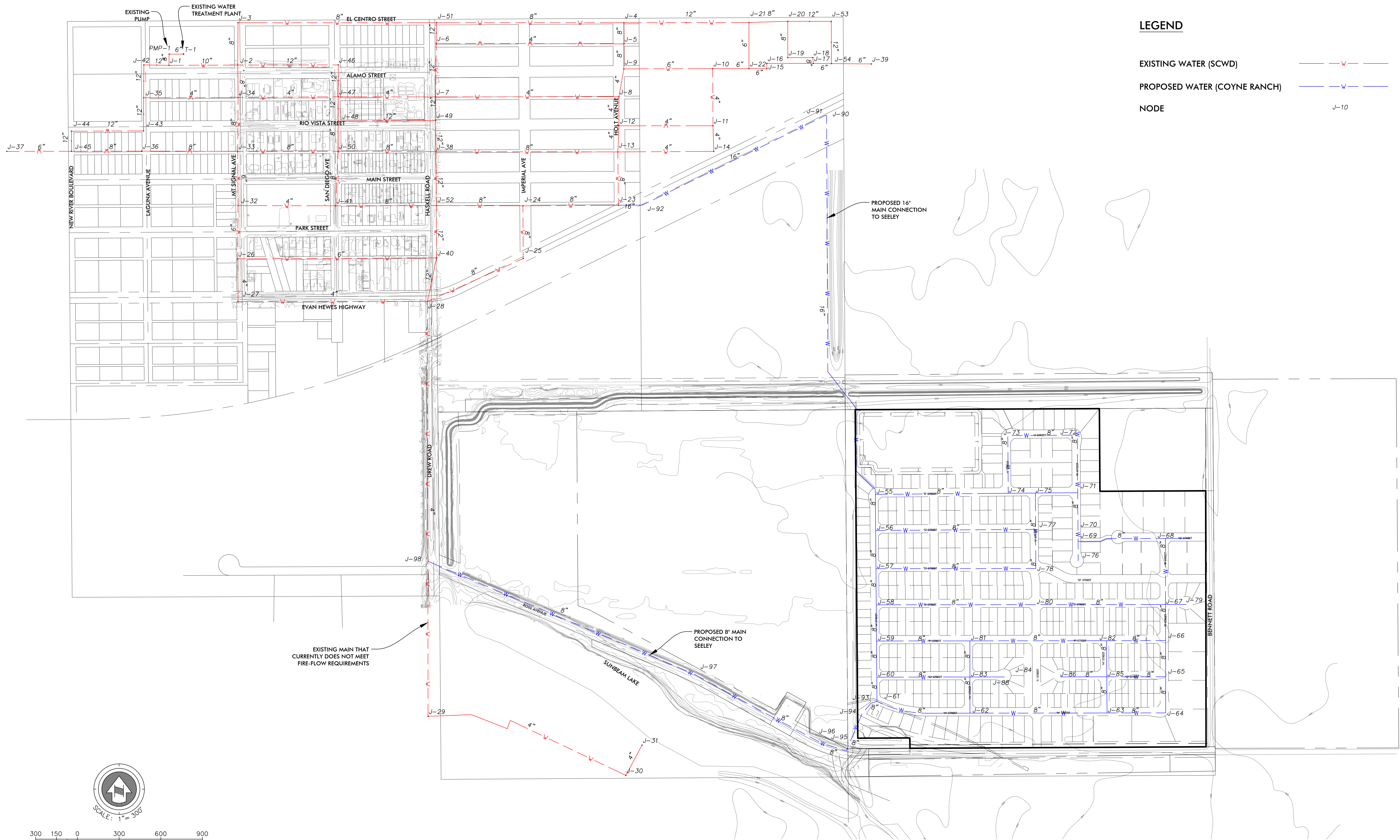
ATTACHMENT A
WATER MODEL RESULTS

ATTACHMENT A
WATER MODEL RESULTS

Label	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-1	TRUE	1000	1005	1000	1005	20	64.7
J-2	TRUE	1000	1005	1018	1023	20	62.7
J-3	TRUE	1000	1005	1000	1005	20	61.5
J-4	TRUE	1000	1005	1000	1005	20	56.7
J-5	TRUE	1000	1005	1048	1053	20	56.4
J-6	TRUE	1000	1005	1000	1005	20	61.1
J-7	TRUE	1000	1005	1036	1041	20	61.3
J-8	TRUE	1000	1005	1000	1005	20	49.3
J-9	TRUE	1000	1005	1000	1005	20	56
J-10	TRUE	1000	1005	1024	1029	20	45.5
J-11	TRUE	1000	1005	1036	1041	20	38.5
J-12	TRUE	1000	1005	1000	1005	20	50.2
J-13	TRUE	1000	1005	1000	1005	20	58.3
J-14	TRUE	1000	1005	1036	1041	20	29.4
J-15	TRUE	1000	1005	1000	1005	20	35.5
J-16	TRUE	1000	1005	1000	1005	20	35.1
J-17	TRUE	1000	1005	1000	1005	20	33.9
J-18	TRUE	1000	1005	1000	1005	20	33.9
J-19	TRUE	1000	1005	1000	1005	20	33.9
J-20	TRUE	1000	1005	1036	1041	20	34.1
J-21	TRUE	1000	1005	1000	1005	20	34.1
J-22	TRUE	1000	1005	1000	1005	20	37.6
J-23	TRUE	1000	1005	1022	1027	20	57.9
J-24	TRUE	1000	1005	1019	1024	20	59.6
J-25	TRUE	1000	1005	1013	1019	20	59.3
J-26	TRUE	1000	1005	1018	1023	20	55.9
J-27	TRUE	1000	1005	1000	1005	20	27.6
J-28	TRUE	1000	1005	1010	1015	20	60.6
J-29	FALSE	1000	360	1000	360	20	22.6
J-30	FALSE	1000	214	1075	289	20	20
J-31	FALSE	1000	206	1000	206	20	20.1
J-32	TRUE	1000	1005	1000	1005	20	58.2
J-33	TRUE	1000	1005	1000	1005	20	62.1
J-34	TRUE	1000	1005	1009	1014	20	62.3
J-35	TRUE	1000	1005	1025	1030	20	64.1
J-36	TRUE	1000	1005	1000	1005	20	62.3
J-37	TRUE	1000	1005	1000	1005	20	50.3
J-38	TRUE	1000	1005	1036	1041	20	61.3
J-39	TRUE	1000	1005	1004	1009	20	22
J-40	TRUE	1000	1005	1010	1015	20	60.8
J-41	TRUE	1000	1005	1000	1005	20	60.8
J-42	TRUE	1000	1005	1000	1005	20	64.4
J-43	TRUE	1000	1005	1000	1005	20	63.9
J-44	TRUE	1000	1005	1000	1005	20	63.6
J-45	TRUE	1000	1005	1000	1005	20	63.5
J-46	TRUE	1000	1005	1000	1005	20	62
J-47	TRUE	1000	1005	1000	1005	20	61.8

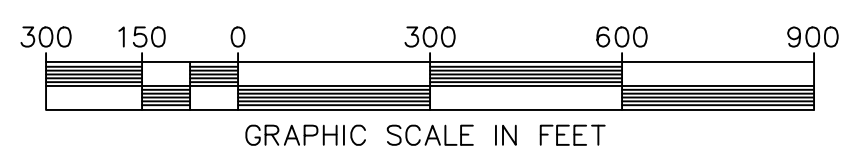
Label	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
J-48	TRUE	1000	1005	1000	1005	20	61.8
J-49	TRUE	1000	1005	1000	1005	20	61.4
J-50	TRUE	1000	1005	1000	1005	20	61.6
J-51	TRUE	1000	1005	1000	1005	20	61.1
J-52	TRUE	1000	1005	1000	1005	20	61
J-54	TRUE	1000	1005	1000	1005	20	30.2
J-55	TRUE	1000	1005	1016	1021	20	54.2
J-56	TRUE	1000	1005	1020	1025	20	53
J-57	TRUE	1000	1005	1020	1025	20	52.4
J-58	TRUE	1000	1005	1020	1025	20	51.7
J-59	TRUE	1000	1005	1014	1019	20	51.2
J-60	TRUE	1000	1005	1016	1021	20	50.8
J-61	TRUE	1000	1005	1000	1005	20	50.8
J-62	TRUE	1000	1005	1022	1027	20	50.7
J-63	TRUE	1000	1005	1037	1042	20	50.3
J-64	TRUE	1000	1005	1067	1072	20	49.9
J-65	TRUE	1000	1005	1027	1032	20	50.3
J-66	TRUE	1000	1005	1027	1032	20	50.7
J-67	TRUE	1000	1005	1014	1019	20	51
J-68	TRUE	1000	1005	1009	1014	20	51
J-69	TRUE	1000	1005	1000	1005	20	52
J-70	TRUE	1000	1005	1007	1012	20	52.2
J-71	TRUE	1000	1005	1009	1014	20	52.2
J-72	TRUE	1000	1005	1011	1016	20	51.5
J-73	TRUE	1000	1005	1012	1017	20	51.6
J-74	TRUE	1000	1005	1015	1020	20	52.5
J-75	TRUE	1000	1005	1007	1012	20	52.4
J-76	TRUE	1000	1005	1006	1011	20	51.1
J-77	TRUE	1000	1005	1020	1025	20	52.5
J-78	TRUE	1000	1005	1018	1023	20	51.8
J-79	TRUE	1000	1005	1006	1011	20	50.1
J-80	TRUE	1000	1005	1029	1034	20	49.9
J-81	TRUE	1000	1005	1022	1027	20	50.8
J-82	TRUE	1000	1005	1019	1024	20	50.5
J-83	TRUE	1000	1005	1013	1018	20	50.8
J-84	TRUE	1000	1005	1008	1013	20	48.9
J-85	TRUE	1000	1005	1009	1014	20	50.4
J-86	TRUE	1000	1005	1008	1013	20	48.3
J-88	TRUE	1000	1005	1000	1005	20	49
J-90	TRUE	1000	1005	1000	1005	20	57.3
J-91	TRUE	1000	1005	1000	1005	20	57.3
J-92	TRUE	1000	1005	1000	1005	20	57.8
J-96	TRUE	1000	1005	1000	1005	20	52.9
J-97	TRUE	1000	1005	1000	1005	20	52.6
J-98	TRUE	1000	1005	1000	1005	20	51.9
J-99	TRUE	1000	1005	1000	1005	20	51.5
J-100	TRUE	1000	1005	1000	1005	20	49.6
J-101	TRUE	1000	1005	1000	1005	20	47.3

**ATTACHMENT B
NODE EXHIBIT**



LEGEND

- EXISTING WATER (SCWD) - - - W - - -
- PROPOSED WATER (COYNE RANCH) - - - W - - -
- NODE J-10



ATTACHMENT B
COYNE RANCH AT SUNBEAM LAKE
NODE EXHIBIT
SEELEY, CA

