TO: BOARD OF DIRECTORS

FROM: BRUCE BUEL BSB

DATE: SEPT. 19, 2008

AGENDA ITEM
E-1
SEPT. 24, 2008

DRAFT PRESSURE REDUCTION TECHNICAL MEMORANDUM

ITEM

Consider options to reduce future water pressure to customers in Southern area and authorize Boyle to include changes in WIP Design [APPROVE RECOMMENDATION OR TAKE ALTERNATE ACTION].

BACKGROUND

Attached is Boyle's draft Technical Memorandum No. 9 regarding options to reduce customer water pressures in the Southern portion of the District. The TM evaluates five options and compares those options using pressure, fire flows, and cost as measures of performance. Also attached is an excerpt from the adopted Water and Sewer Master Plan illustrating the Water Main Upgrades necessary for adequate system fire flows and pressure (In Green, Blue and Red). The last attachment is Boyle's proposal to revise the WIP Final Design to accommodate Option 5 (Mr. Nunley will bring a proposal for Option 4 to the Board Meeting). Mike Nunley from Boyle is scheduled to present the Technical Memorandum, to explain the attached proposal, and to answer questions at the meeting. The SWP Committee on September 8, 2008 reviewed this matter but did not develop a recommendation (See Minutes under Agenda Item G).

Following is a listing of each of the five options evaluated along with a narrative describing the advantages and disadvantages of each:

OPTION 1 – This option assumes that each connection in the southern portion of the Water Service Area (See display in TM) would be equipped with an individual pressure reduction valve (PRV). Boyle estimates the cost for this Option at $3,580,200 and the existing Boyle Agreement includes funding for the design. The advantage of this option is that it is the least costly in terms of up-front installation. However, there are legal issues regarding the responsibility of the homeowners to maintain their respective valve and long term maintenance issues. This option does provide reasonably good fire flows, acceptable pressure at Joshua, and adequate flow from the City of Santa Maria to the Quad NCSD tanks.

OPTION 2 & 3 – Boyle modeled these two options but determined that they each had fatal flaws regarding fire flow and pressure at Joshua.

OPTION 4 – This option assumes that a large low pressure zone encompass most of the area South of Grande Avenue West of US 101 and the area around Amado on the East side of US 101 (See display in TM). This option extends the Orchard Road Water Main up to Grande; makes the Orchard Road, Southland Street and South Frontage Road Water Mains dedicated Mains; and removes the Amado-Division Freeway undercross from the high pressure grid. Boyle estimates the capital cost for this option at $4,157,400 with additional cost required for design. This Option does provide reasonably good fire flows, acceptable pressure at Joshua and adequate flow from the City of Santa Maria to the Quad Tanks. The major disadvantage of this option is that the Amado-Division undercrossing would be less functional in response to water related emergencies, since it would be inside the low pressure zone. An additional concern is

that the extension of the Frontage Road water main from Grande to Tefft would need to be relocated if the off-ramp or proposed development forces the relocation of Frontage Road.

OPTION 5 – This option assumes that a large low pressure zone encompass most of the area South of Grande Avenue West of US 101 and the area around Amado on the East side of US 101 (See display in TM). This option extends the Orchard Road Water Main up to Grande; makes the Orchard Road, Southland Street and South Frontage Road Water Mains dedicated Mains; and constructs a new freeway undercrossing at Grande. Boyle estimates the capital cost for this option at $4,449,900 with additional cost of $144,877 required for design (See attached Boyle Proposal). This Option does provide reasonably good fire flows, acceptable pressure at Joshua and adequate flow from the City of Santa Maria to the Quad Tanks. It also satisfies the Water and Sewer Master Plan directive to install a new freeway undercross South of Tefft Street. The disadvantage of this Option is cost, but it should be noted that the additional freeway undercrossing and the plumbing in South Oakglen are all high priority Master Plan upgrades. Finally, the upgrades in South Frontage from Grande to Tefft can be deferred until the alignment issues are resolved and much of the upgrade can be paid for by development.

The cost of the Technical Memorandum is included in Boyle's WIP Final Design Agreement ($920,830 to be spent over three fiscal years). The FY08-09 Budget includes $1,102,500 for WIP Design this year; plus $4.7 million in design and construction management in the succeeding two fiscal years and $21 million in construction funding.

RECOMMENDATION

Clearly there are tradeoffs among the options with Option 1 having the lowest initial capital cost but ongoing maintenance/legal issues; Option 4 having a moderate capital cost but limiting the responsiveness of the water system to emergencies and Option 5 having the highest capital cost but the most utility. Staff recommends that the Board select Option 5 and authorize execution of an amendment to the Boyle Agreement based on the attached proposal. Staff believes that the benefits incorporated into Option 5 outweigh the extra cost.

ATTACHMENT

- Boyle Technical Memorandum
- Excerpt from Water and Sewer Master Plan
- Boyle Proposal for Option 5 Design

T:\BOARD MATTERS\BOARD MEETINGS\BOARD LETTER\2008\WIP PRV TM.DOC

Boyle Engineering
1194 Pacific Street, Suite 204, San Luis Obispo, CA 93401
T 805.542.9840 F 805.542.9990 www.boyle.aecom.com

Memorandum

Date:	September 18, 2008
To:	Peter Sevcik, PE
	Bruce Buel, General Manager
From:	Josh Reynolds, PE
	Eileen Shields, EIT
Subject:	NCSD Waterline Intertie Project Technical Memorandum No. 9: System Pressure Reduction Study

Introduction

The Waterline Intertie Project Preliminary Engineering Memorandum (PEM) (Boyle, May 2008) evaluates project alternatives for the transport and delivery of supplemental water from the City of Santa Maria to Nipomo's water distribution system. Two improvement phases were developed based on supplemental water inflow rates. Phase I improvements provide capacity for 1,300 gpm, and Phase II improvements were developed for 1,860 gpm (the maximum allowance from the City of Santa Maria per the 2005 Memo of Understanding).

Figure 1 displays the recommended Phase I and Phase II improvements as presented in the PEM. These improvements will afford the system capacity to handle 1,860 gpm. However, the introduction of supplemental water at the recommended point-of-connection (POC) (Orchard Road and Southland Street) increases already high pressures in the area.

To improve capacity and reduce pressures in the NCSD system, the PEM recommends improvements including upgrading the following water lines to a 12-inch diameter line: Southland Street, Orchard Street from Southland to Division, and Frontage Road from Southland to Tefft. To isolate customers from increased pressures, pressure regulators on individual service connections in the southern portion of Nipomo's water distribution system (Area A) are also recommended. For the purposes of this memorandum, this set of recommended improvements will be referred to as Option 1 (Figure 2).

Alternative Improvement Plan for NCSD System

As requested, Boyle has performed a preliminary hydraulic analysis to investigate an alternative improvement approach for reducing pressures in Area A. A separate pressure zone was evaluated instead of individual pressure regulators on the Area A service connections and the pipeline improvements recommended in the PEM were reevaluated with the new pressure zone in place. The

same NCSD WaterCAD model as used for the Preliminary Engineering Memorandum was utilized to evaluate the feasibility of the new pressure zone. Two alternative boundaries for the pressure zone were developed and modeled separately as Option 2 and Option 3. Two additional alternatives, Options 4 and 5, utilize dedicated pipelines in addition to a new pressure zone.

Option 2. A parallel waterline along Orchard Road from Southland to Division Streets and four valves were added to the model to isolate Area B (Figure 3). An isolation valve was placed on Orchard and Southland to close the connection between the parallel and existing waterline. Two pressure reducing valve (PRV) stations were positioned: 1) on Frontage Road between Division Street and Martita Place, and 2) on the existing Orchard Road waterline between Story and Grande. Both PRV stations were set at a hydraulic grade of 520 ft (83 psi and 87 psi, respectively). A closed isolation valve was placed along the 6-inch waterline that runs across Belanger Dr. and Avenida Montecito Verde between Division and Story Streets.

Option 3. This option uses a parallel waterline along Orchard Road, running from Southland to Grande Avenue, with three PRV stations and three isolation valves to isolate Area C (Figure 4). The PRV stations were placed in the following locations: 1) on the existing Orchard Road waterline, north of Division Street 2) on Frontage Road South of Grande, and 3) on South Oakglen, between Darby Lane and Amado Street. The PRV stations were set to a hydraulic grade of 532 feet (78, 82, and 82 psi, respectively). Isolation valves were placed in the following positions: 1) at Orchard and Southland to close the connection between the parallel and existing waterline, 2) on Nopal Way, between Harrier Lane and Fir Place, and 3) on Avenida de Amigos.

Option 4. Option 4 utilizes the same improvements as Option 3, along with two 12-inch dedicated pipelines, a waterline improvement along Frontage Road from Grande to Tefft, and a fourth PRV station (Figure 5). One dedicated 12-inch pipeline runs parallel to the existing waterline in Southland Street. The second dedicated pipeline runs parallel to the existing Frontage Road waterline and ties in to the system at Grande Avenue. Both new pipelines were modeled to operate outside the new pressure zone (Area C). An existing 8-inch waterline in Frontage Road between Hill St and Tefft St will be replaced with a 12-inch pipeline, extending to Grande Avenue. A PRV station was added between the existing and dedicated lines along Southland, between Drumm Lane and Honey Grove Lane. All PRV stations were modeled at a hydraulic grade setting of 532 feet (78, 82, 82, and 94 psi, respectively).

Option 5. Option 5 is similar to Option 4, but uses a different route to tie into the Tefft St waterline (Figure 6) and delays the Frontage Street waterline replacement from Grande Ave to Tefft St. Instead, dedicated lines will run along Southland and Frontage Rd to Grande, then from the intersection of Grande and Frontage a dedicated line crosses Highway 101 to South Oakglen and runs along South Oakglen to the 16-inch waterline in Tefft Street. PRV stations and isolation valves are modeled in the same locations and settings as in Option 4 to create the Area C pressure zone.

Model Conditions

All system improvement options were modeled under steady-state conditions with all wells off and tanks 75 % full. Two demand scenarios were run: average day demands[1] (2.67 mgd) for typical conditions, and 10 % of average day demands (0.27 mgd) to mimic low flow periods when pressures in the system are highest. Since NCSD system pressures are typically lower during times of higher demands, maximum and peak demand scenarios were not evaluated for this study. Based on recent correspondence between NCSD and the City of Santa Maria, a supplemental water inflow rate of 2,000-gpm was modeled. All Options were modeled with the existing water system infrastructure, except for the addition of the improvements discussed (i.e., no Master-planned improvements were added).

Model Results

The improvement options were evaluated based on resultant pressures in the PRV Zone and near Joshua and Orchard which is where the supplemental water pipeline from the pump station would connect to the existing line in Orchard Road. Pressure at Joshua and Orchard is indicative of the pressure required at the Waterline Intertie Project pump station.

For Option 1, service-side pressures in Area A will be dictated by the settings on the individual service pressure regulators. Options 2, 3, and 4 provide the advantage of also protecting pipelines within the separate pressure zones from elevated pressures.

Results indicate that Options 2 and 3 required higher pressures at Joshua and Orchard to deliver flow into the system than required for Option 1. The existing 12-inch pipeline - along Orchard Road between Joshua and Southland Streets - was designed to be constructed with Pressure Class 150 AWWA C900 PVC pipe. Option 2 increased the required pressure at Joshua and Orchard from 146 to 153 psi. In addition, Option 2 increased pressures in the residential area between Division Street, Jessica Place, and Beverly Drive by approximately 10 psi to levels between 96 and 105 psi. Option 3 reduced the pressures in the residential area, but required 160 psi at Joshua and Orchard to deliver flow into the system. The additional dedicated pipelines in Option 4 cause a reduction in pressure at Joshua and Orchard to 144 psi, near what is required in Option 1, and maintained residential area pressures to levels near or below existing. Option 5 provides similar residential pressures as with Option 4, and a slightly higher pressure requirement at Joshua and Orchard (147 instead of 144 psi). Table 1 summarizes the model results for each improvement scenario under ADD conditions and Table 2 summarizes results for 10 % ADD conditions.

[1] Average day demands as defined in the Water and Sewer Master Plan Update (Cannon, December 2007).

Table 1. Comparison of Pressure Ranges (psi)
for NCSD Water System Improvement Options under existing ADD

	Existing (Static Pressures)	Option 1 Individual pressure regulators	Option 2 PRV Zone B	Option 3 PRV Zone C	Option 4 PRV Zone C + dedicated lines & 4th sta.	Option 5 PRV Zone C + 4th sta. & dedicated lines to Tefft
Area A	93 – 100	98 – 107	–	–	–	–
Area B	85 – 100	–	77 – 91	–	–	–
Area C	64 – 100	–	–	61 – 97	61 – 97	61 – 97
Joshua & Orchard	105	146	153	160	144	147

Notes:

Option 1: Service-side pressures would be dictated by individual pressure regulator settings.
Option 2: Pressures calculated with PRVs set at hydraulic grade of 520 ft (83 & 87 psi).
Option 3: Pressures calculated with PRVs set at hydraulic grade of 532 ft (78, 82, & 82 psi).
Options 4 & 5: Pressures calculated with PRVs set at hydraulic grade of 532 ft (78, 82, 82, & 94 psi).

Table 2. Comparison of Pressure Ranges (psi)
for NCSD Water System Improvement Options under 10% existing ADD

	Existing Static Pressures	Option 1 Individual pressure regulators	Option 2 PRV Zone B	Option 3 PRV Zone C	Option 4 PRV Zone C + dedicated lines	Option 5 PRV Zone C + 4th sta. & dedicated lines to Tefft
Area A	96 – 103	100 – 109	–	–	–	–
Area B	88 – 103	–	77 – 91	–	–	–
Area C	66 – 103	–	–	61 – 98	61 – 98	61 – 98
Joshua & Orchard	107	148	158	165	150	151

Notes:

Option 1: Service-side pressures would be dictated by individual pressure regulator settings.
Option 2: Pressures calculated with PRVs set at hydraulic grade of 520 ft (83 & 87 psi).
Option 3: Pressures calculated with PRVs set at hydraulic grade of 532 ft (78, 82, & 82 psi).
Options 4 & 5: Pressures calculated with PRVs set at hydraulic grade of 532 ft (78, 82, 82, & 94 psi).

Fire Flow Analysis

A fire flow analysis was run to compare the fire flow availability under the preferred improvement options (Option 1, Option 4, and Option 5), with existing fire flow availability, and with the availability under improvements as recommended in the Water and Sewer Master Plan Update (Cannon Associates, December 2007). The analysis was conducted on the nodes contained in the new pressure zone created in Options 4 and 5 (Area C). The minimum required fire flow for the area is 1,500 gpm. A minimum residual pressure criterion of 20 psi was applied to the entire system except the nodes immediately adjacent to the Quad Tanks. Each scenario was modeled under steady-state conditions with maximum day demands[2] (4.53 mgd), all wells off, no supplemental water inflow, and tanks 75% full.

Fire Flow Results

The fire flow analysis indicated that during existing conditions 7 out of the 128 nodes tested in Area C fail to meet fire flow criteria. Under the Master-planned improvement scenario, one node failed to meet fire flow criteria. Under Option 1, three nodes failed. Under Option 4, five nodes failed, and 4 nodes failed under Option 5. These results are summarized in Table 3, below. All nodes failing fire flow criteria are at dead-ends.

Table 3. Summary of Fire Flow Availability for Nodes Failing to meet Fire Flow Criteria

Nodes with Fire Flow Availability Under 1500 gpm		Fire Flow Availability (gpm)				
		NCSD Water Distribution System Improvement Scenario				
WaterCAD Node Label	Location	Existing System	Master-Planned	Option 1	Option 4	Option 5
J-610	January St & Juno Ct	**1,497**	1,637	1,521	**1,485**	1,501
J-1325	Ashland Ln	**1,348**	1,646	1,628	**1,451**	**1,464**
J-1586	End of Drumm Ln	**1,446**	1,966	1,992	1,791	1,811
J-4457	End of Juno Ct	**1,383**	1,503	**1,403**	**1,373**	**1,387**
J-5200	Division St @ January St	**1,391**	1,508	**1,411**	**1,381**	**1,395**
J-5277	End of Ashland Ln	**1,252**	**1,484**	**1,464**	**1,333**	**1,344**
J-6138	End of Widow Ln	**1,488**	2,059	2,076	1,833	1,854

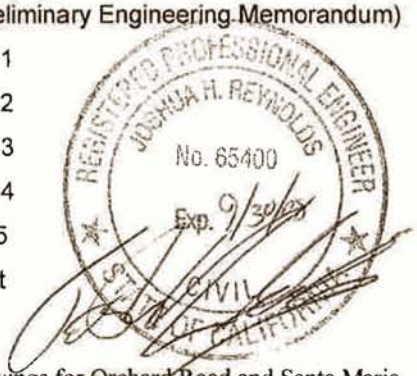
[2] Maximum day demands as defined in the Water and Sewer Master Plan Update (Cannon, December 2007).

Conclusions

The introduction of supplemental water to the southern region of NCSD water distribution system increases already high pressures. One mitigation option is to add pressure regulators to approximately 200 individual services, as recommended in the Preliminary Engineering Memorandum. Another option is to isolate the high pressure area using valves and create a separate pressure zone. Though Option 2 effectively reduces pressures within the separate pressure zone, it causes an increase in pressures (to levels greater than 100 psi) between the northern zone boundary and Division Street. Therefore Option 3 was investigated as an expanded pressure zone to include Area B and the influenced area to the north. Because Options 2 and 3 require higher pump discharge pressures at Orchard and Joshua, the fourth Option included two dedicated waterlines along Southland and Frontage and an additional PRV station. Option 5 was investigated as a means to delay improvements along the section of Frontage between Division and Tefft, until plans to realign Frontage Road are formalized.

The modeling indicates that a separate pressure zone is feasible and has the potential to protect infrastructure from increased pressures due to the inflow of supplemental water at Orchard and Southland. Under Option 1, the pressure at Orchard and Joshua ranges from 146 - 148 (when modeled with conditions as described). Pressures at Orchard and Joshua are increased with Options 2 and 3 (153 – 165 psi), causing increased electricity requirements at the pump station and high pressures for the existing Orchard Road waterline, which is rated for 150 psi[3]. The improvements modeled as Options 4 and 5 reduce pressures at Orchard and Joshua (144 – 151 psi) and protect services from high pressures, similar to the Option 1 improvements recommended in the PEM. However, the fire flow analysis indicates a higher number of nodes failing fire flow criteria under Options 4 and 5 improvements, than under Master-planned or Option 1 improvements. Five nodes under Option 4 and four nodes under Option 5 have less than 1,500 gpm fire flow available, as opposed to three nodes under Option 1, or one node under master-planned improvements. All of these nodes are located at the ends of 6-inch water lines. When 8-inch pipe is added to the model to loop these dead ends, results indicate that all nodes in Area C meet minimum fire flow criteria for Options 1, 4 and 5. Less than 800-feet total of 8-inch pipe to loop these dead ends would be required, but is not included in the cost opinion. Since the nodes are close to meeting the fire flow requirements, the District needs to determine if the projects are warranted. An opinion of probable construction cost for improvements under Options 1, 4, and 5 is summarized in Table 4, attached. Life-cycle costs would be similar because of the similar pressure conditions experienced at the pump station under all three Options (Tables 1 and 2).

Attachments: Figure 1. Project Components and Phasing (Preliminary Engineering Memorandum)
Figure 2. NCSD System Improvements Option 1
Figure 3. NCSD System Improvements Option 2
Figure 4. NCSD System Improvements Option 3
Figure 5. NCSD System Improvements Option 4
Figure 6. NCSD System Improvements Option 5
Table 4. Opinion of Probable Construction Cost



[3] The Orchard Road waterline pressure rating is based on Record Drawings for Orchard Road and Santa Maria Vista Waterlines (12-12-05). The pressure rating should be reevaluated, and perhaps tested, to ensure the Orchard Road waterline can sustain increased pressures from the supplemental water.

DWG: W:\Nipomo CSD (19996)\Waterline Intertie Project 19996.12\Phase 4 - UPDATE to Draft Prelim Engr Memo\CAD\Exhibits\Figure ES-1-rev.dwg USER: eshields
DATE: Aug 26, 2008 3:08pm XREFS: IMAGES: img20600389 Aerial Photo-LITE-SMALL.jpg

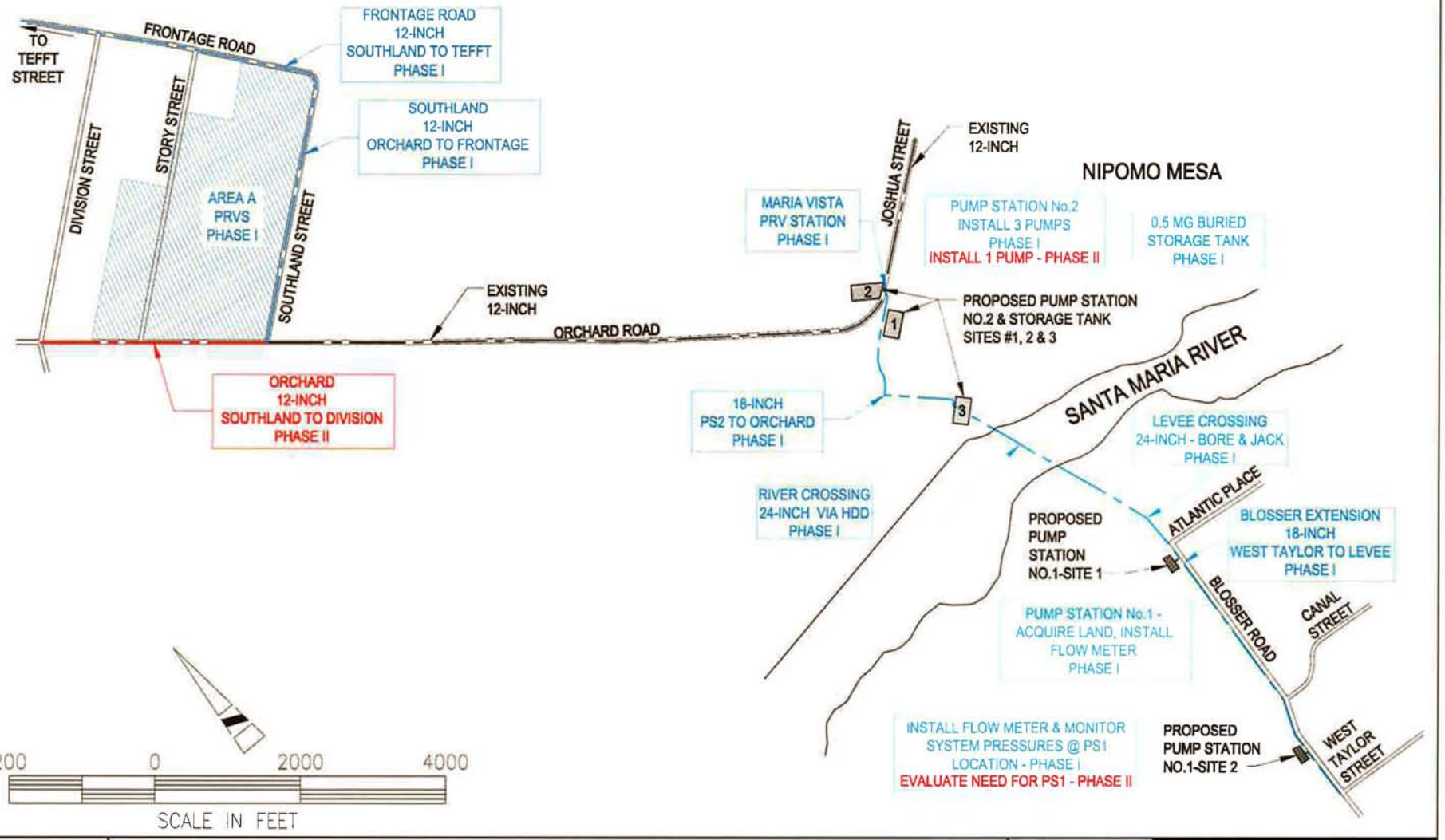


FIGURE		
1	**NCSD WATERLINE INTERTIE** **PROJECT COMPONENTS AND PHASING**	BEC PROJECT NO. 19996.12

BOYLE ENGINEERING CORPORATION

Figure 2: NCSD System Improvements Option 1

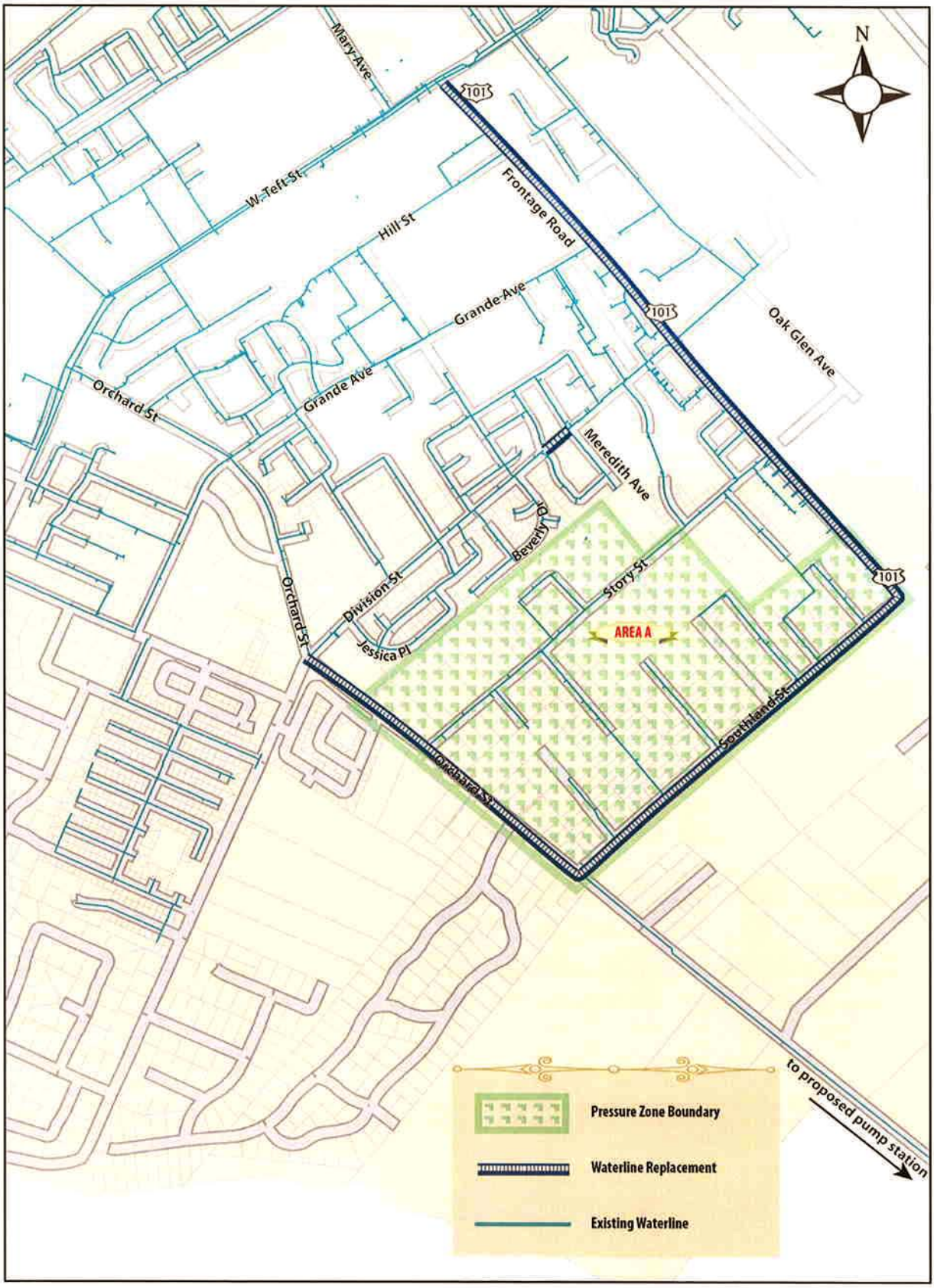


Figure 3: NCSD System Improvements Option 2

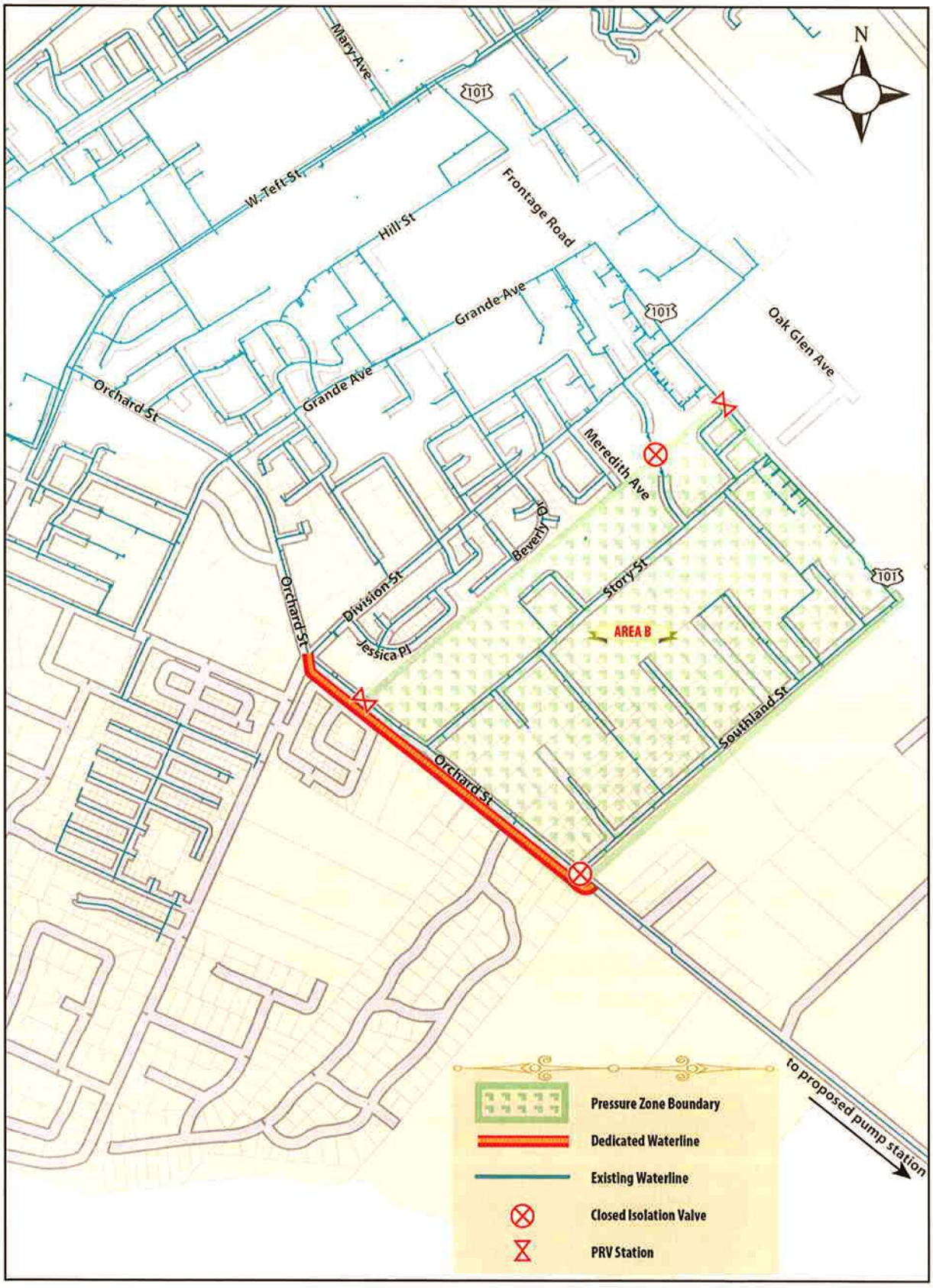


Figure 4: NCSD System Improvements Option 3

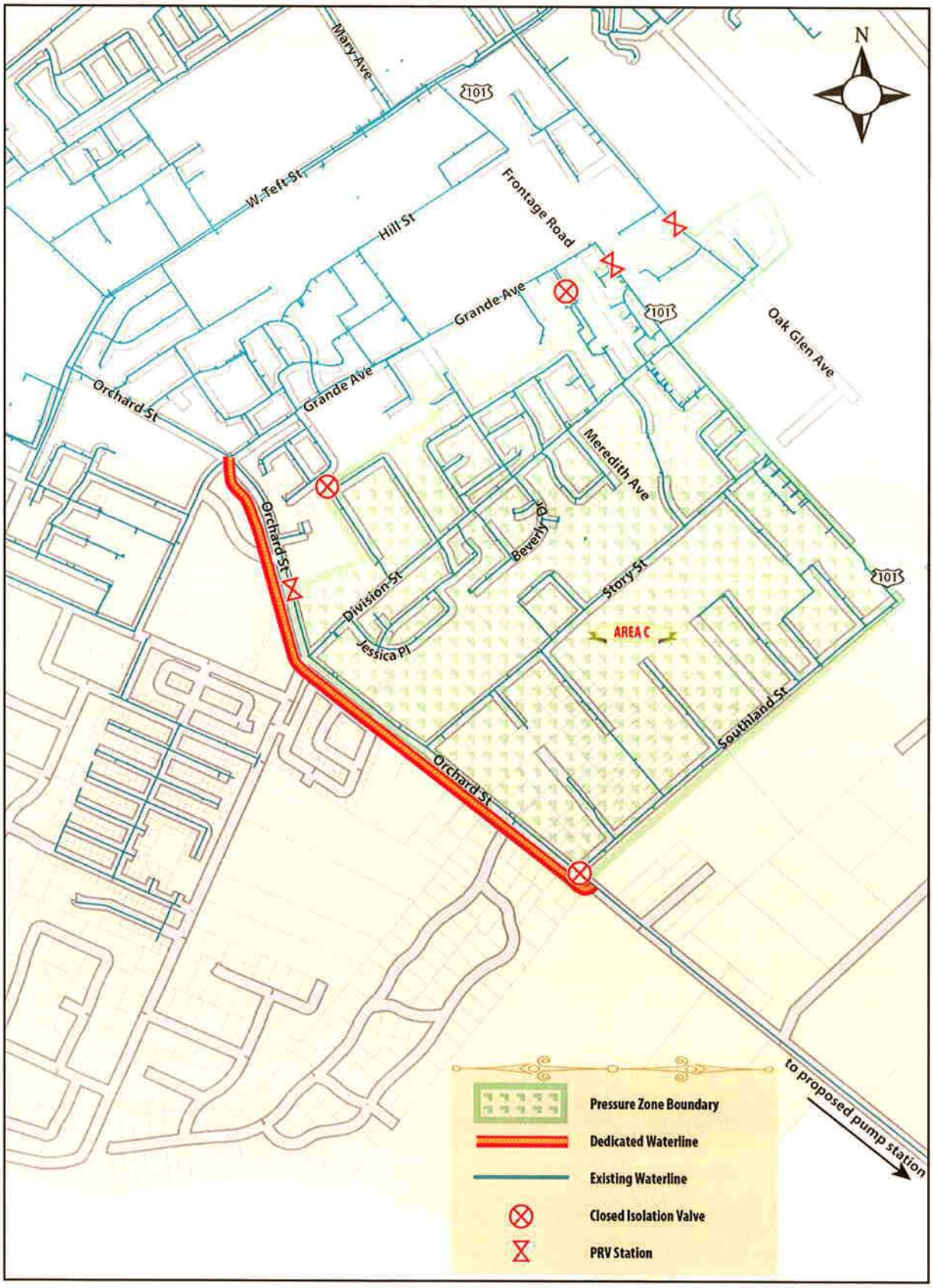


Figure 5: NCSD System Improvements Option 4

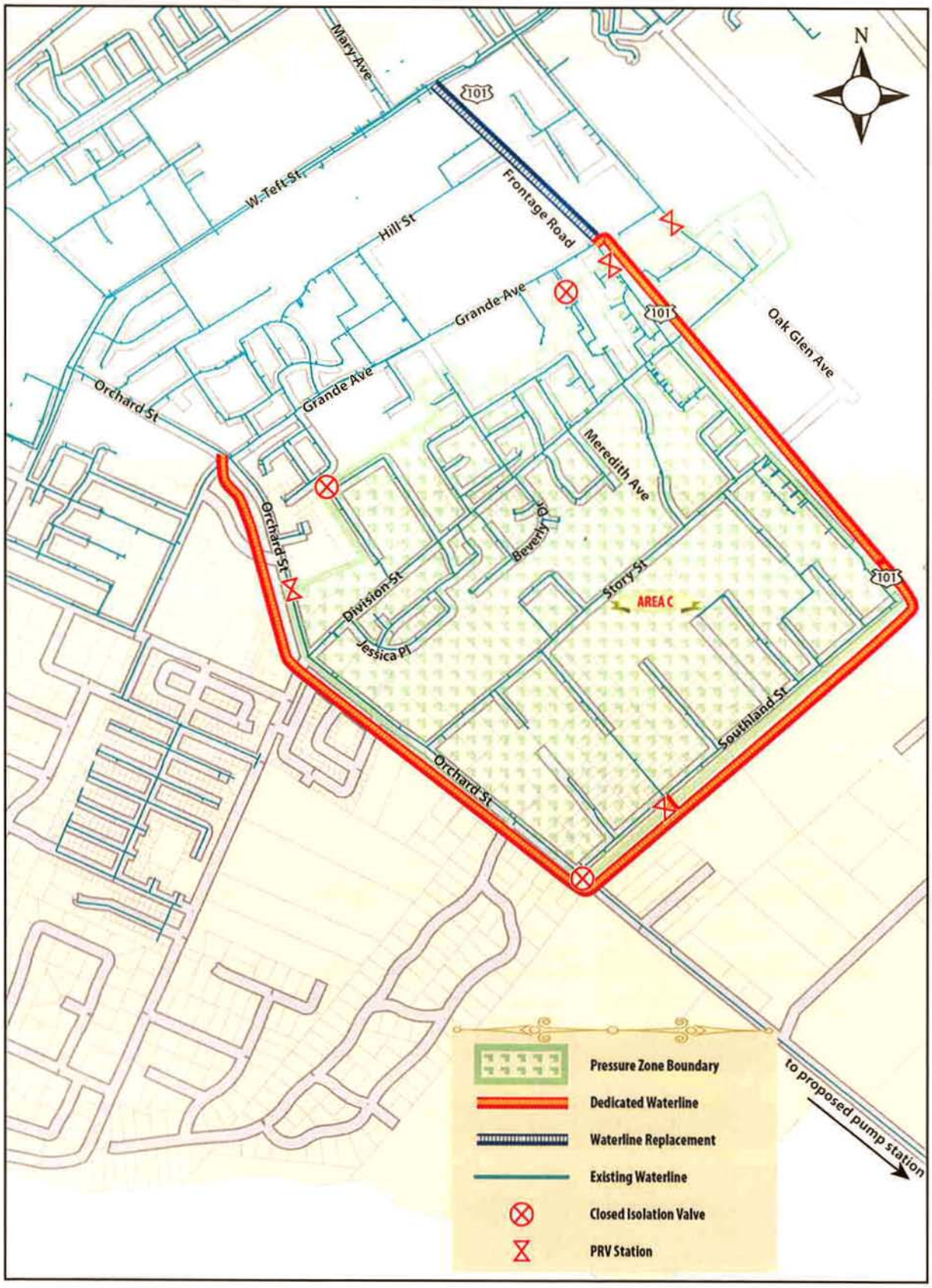


Figure 6: NCSD System Improvements Option 5

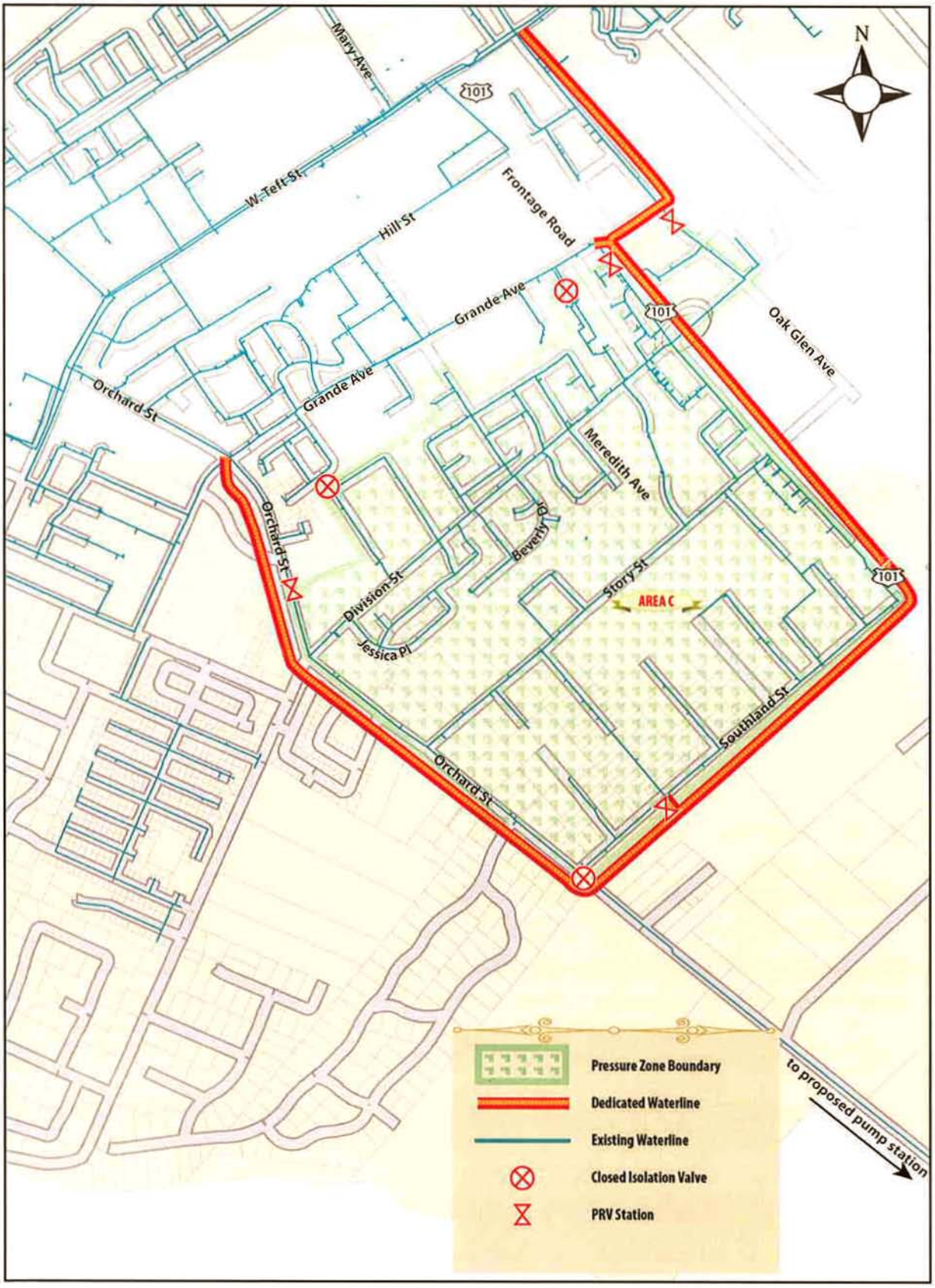


Table 4
Nipomo Community Services District
WATERLINE INTERTIE PROJECT
NCSD Water Distribution System Improvements
OPINION OF PROBABLE CONSTRUCTION COST

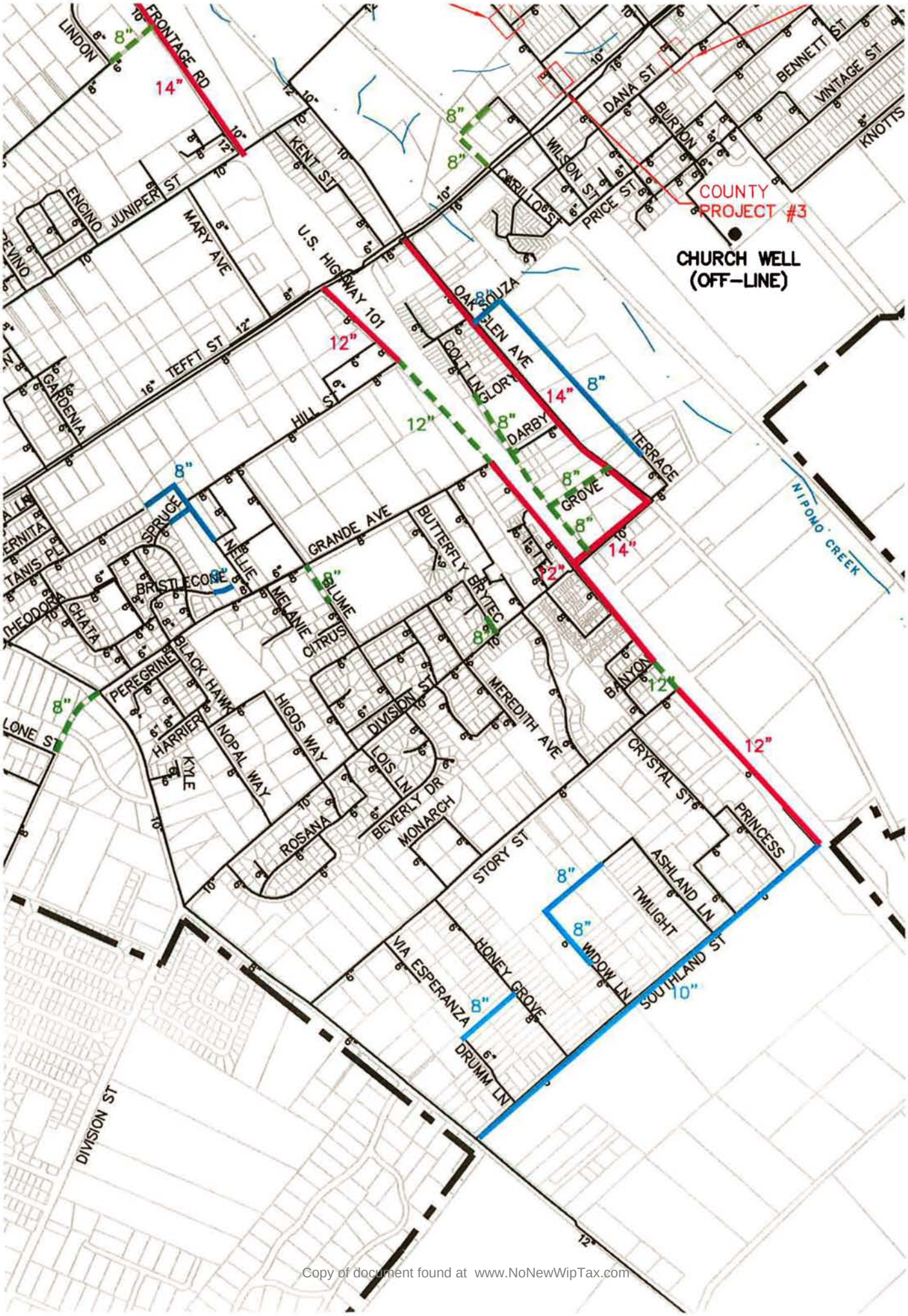
Item	Description	Quantity	Unit	Unit Price	Amount
Supplemental Inflow Rate = 2,000 gpm					
Option 1. As recommended in Preliminary Engineering Memorandum (Boyle, May 2008)					
1	Pressure regulators on individual services in Area A	200	EA	$200	$40,000
2	Southland St Incremental Upgrade 10" to 12"	3900	LF	$40	$156,000
3	Orchard Rd 12" Upgrade (Southland to Division)	3200	LF	$145	$464,000
4	Traffic Control for Orchard Rd	3200	LF	$7	$22,400
5	AC Pavement Overlay on Orchard Rd (assume 12-ft lane)	4267	YD^2	$36	$153,600
	Option 1 Subtotal				$836,000
	Master Planned Improvements *				
7	Southland St 10" Upgrade (Frontage to Orchard) *	3900	LF	$160	$624,000
8	Frontage Rd 12" Upgrade (Southland to Tefft) *	6470	LF	$200	$1,294,000
	Master planned Improvements Subtotal				$1,918,000
	Option 1 Adjusted Subtotal				$2,754,000
	Contingency	30%			$826,200
	Option 1 Total				$3,580,200
Option 4. PRV Zone with Dedicated Lines and Frontage Rd Improvements					
1	Parallel Orchard Rd waterline 12" (Southland to Grande)	5200	LF	$145	$754,000
2	Traffic Control	5200	LF	$7	$36,400
3	AC Pavement Overlay (assume 12-ft lane)	6933	YD^2	$36	$249,600
4	Parallel Southland St waterline 12"	3900	LF	$145	$565,500
5	Traffic Control	3900	LF	$7	$27,300
6	AC Pavement Overlay (assume 12-ft lane)	5200	YD^2	$36	$187,200
7	Parallel Frontage Rd waterline 12" (Southland to Tefft)	6470	LF	$145	$938,150
8	Traffic Control	6470	LF	$7	$45,290
9	AC Pavement Overlay (assume 12-ft lane)	8627	YD^2	$36	$310,560
10	Pressure Reducing Valve Station to isolate zone	4	EA	$18,000	$72,000
11	Isolation Valves to isolate zone	3	EA	$4,000	$12,000
	Option 4 Subtotal				$3,198,000
	Contingency	30%			$959,400
	Option 4 Total				$4,157,400

Notes:
Engineering and administration costs not included
Mobilization costs not included
Pipeline to loop dead-end waterlines not included
Pipeline to loop dead-end waterlines not included
Division Street upgrade (from Preliminary Engineering Memorandum) removed from Option 1, as determined already complete
* The Master Planned project costs presented in this table have been modified from the Master Plan and the Preliminary Engineering Memorandum to reflect Boyle's opinion of costs and to be consistent with the unit costs used in this comparative analysis. These unit costs include traffic control and pavement overlay for these Master Plan projects, whereas these items are separate in the other opinions.

Table 4
Nipomo Community Services District
WATERLINE INTERTIE PROJECT
NCSD Water Distribution System Improvements
OPINION OF PROBABLE CONSTRUCTION COST

Item	Description	Quantity	Unit	Unit Price	Amount
Supplemental Inflow Rate = 2,000 gpm					
Option 5. PRV Zone with Dedicated Lines (no Frontage Rd. Improvements)					
1	Parallel Orchard Rd waterline 12" (Southland to Grande)	5200	LF	$145	$754,000
2	Traffic Control	5200	LF	$7	$36,400
3	AC Pavement Overlay (assume 12-ft lane)	6933	YD^2	$36	$249,600
4	Parallel Southland St waterline 12"	3900	LF	$145	$565,500
5	Traffic Control	3900	LF	$7	$27,300
6	AC Pavement Overlay (assume 12-ft lane)	5200	YD^2	$36	$187,200
7	Parallel Frontage Rd waterline 12" (Southland to Grande)	4400	LF	$145	$638,000
8	Traffic Control	4400	LF	$7	$30,800
9	AC Pavement Overlay (assume 12-ft lane)	5867	YD^2	$36	$211,200
10	Highway crossed with jacked casing & 12" carrier pipe	190	LF	$600	$114,000
11	Parallel Darby Ln (cross 101) waterline 12"	525	LF	$145	$76,125
12	Traffic Control	525	LF	$7	$3,675
13	AC Pavement Overlay (assume 12-ft lane)	700	YD^2	$36	$25,200
14	Parallel S. Oakglen Ave waterline 12"	2100	LF	$145	$304,500
15	Traffic Control	2100	LF	$7	$14,700
16	AC Pavement Overlay (assume 12-ft lane)	2800	YD^2	$36	$100,800
17	Pressure Reducing Valve Station to isolate zone	4	EA	$18,000	$72,000
18	Isolation Valves to isolate zone	3	EA	$4,000	$12,000
	Option 5 Subtotal				$3,423,000
	Contingency	30%			$1,026,900
	Option 5 Total				$4,449,900

Notes:
Engineering and administration costs not included
Mobilization costs not included
Pipeline to loop dead-end waterlines not included
Pipeline to loop dead-end waterlines not included
Division Street upgrade (from Preliminary Engineering Memorandum) removed from Option 1, as determined already complete
* The Master Planned project costs presented in this table have been modified from the Master Plan and the Preliminary Engineering Memorandum to reflect Boyle's opinion of costs and to be consistent with the unit costs used in this comparative analysis. These unit costs include traffic control and pavement overlay for these Master Plan projects, whereas these items are separate in the other opinions.



Bruce Buel
General Manager
NIPOMO CSD
148 S. Wilson
Nipomo, CA 93444

September 17, 2008

Dear Bruce,

Subject: NCSD Waterline Intertie Project
Budget Revision #1
Revised NCSD System Improvements

The NCSD Waterline Intertie Project is being developed to provide a means for purchasing and transporting potable water from the City of Santa Maria to the NCSD's water distribution system. The Preliminary Engineering Memorandum (Boyle, May 2008) presents a basis for design and recommendations for improvements. To provide sufficient capacity in the District's system for receiving supplemental water, several pipeline upgrades were recommended. In addition, approximately 200 pressure regulators were recommended to protect service lines from increased pressure near the point of connection.

At the request of the District, Boyle performed additional analysis of alternative improvements to the District's water distribution system. This work is summarized in Technical Memorandum #9 (dated August 28, 2008). The Technical Memorandum examines alternatives to installing individual pressure regulators by creating a separate pressure zone. Using hydraulic modeling, various configurations were evaluated to find the hydraulically favorable alternative.

The alternative preferred by District staff and the Supplemental Water Committee is described below:

1. Do not construct a new waterline on Frontage Road from Grande to Tefft;

2. Construct a new 12" waterline from Orchard from Division to Grande (approximately 2135 lineal feet); 12" waterline along Oakglen from Tefft to Amado (approximately 3120 lineal feet); 12" waterline along Amado Street (approximately 700 lineal feet); and bore-and-jack crossing at HWY 101 from the HWY 101 right-of-way at Amado Street to Frontage Road (approximately 200 lineal feet). These mains would be dedicated mains constructed to convey water from the Intertie Project Pumping Station to the mains along Tefft Street without increasing pressures within Area C (see Memorandum).

3. Construct four additional Pressure Reducing Valve stations (including tying them into the District's SCADA system) to protect system pressures within Area C, as well as the proposed Orchard Road PRV Station included in the original project budget.

The following tasks and budget are proposed to revise the engineering services for the Waterline Intertie Project Design. The original scope of work and budget are described in Supplemental Water Project Design Services Proposal dated June 10, 2008 (Proposal). A credit for work related to the originally proposed

improvements is included below. The subconsultants' fees are based on extending project area as required to design and construct the separate pressure zone and already incorporate any credits for work not yet performed for the section of Frontage Road between Grande and Tefft.

Task Group 1 - Preliminary Engineering

1.1 Coordination Meeting – Boyle will meet with District staff to review results from Technical Memorandum No. 9, walk the route along Oakglen and Amado with the District Engineer, and discuss the approach and scope for the revised NCSD system improvements.

1.2 Utility Research – Boyle will contact pertinent utility companies to request utility location information for the revised project area. It should be noted that much of the utility research for the original project was conducted during the Preliminary Engineering phase of the WIP, prior to the beginning of the design phase. That work must be performed for this additional study area.

1.3 Pipeline Alignment Technical Memorandum – The preliminary pipeline and PRV station designs will be developed and potential challenges will be identified. Specifics for the proposed pipeline alignment and PRV station locations will be identified and the preliminary design will be discussed, including length and diameter, material, valves and meters, corrosion control (if needed), thrust anchors or joint restraint, fittings to connect to the existing system, and air and vacuum release valve type and placement (if needed). This work will likely include some hydraulic analysis to verify PRV settings and for assistance in establishing parameters for anticipated dual-PRV station design.

1.4 Concept Design Report – Findings from the Technical Memorandum will be integrated into the Draft and Final Concept Design Report, described as Task 112 in the Proposal (ibid). A set of 30-percent plans will be submitted for the District's review and comment.

1.5 Caltrans Encroachment Permit – Boyle will meet with Caltrans staff to acquire permission to construct a new pipeline across HWY 101. This will include preparation of a permit application and exhibits for their review and approval.

1.6 Survey and Base Map – Survey and base map preparation will include aerial mapping by Central Coast Aerial Mapping; ground survey; property line, right-of-way, and easement re-establishment and mappings; and mapping of utility markers and accessible structures.

1.7 Geotechnical Investigation – Fugro will perform a geotechnical investigation and provide subsurface characterization and trench details to aid in the design and construction of the NCSD system improvements. This will include deep borings (over 40 feet) and special testing for the proposed jack-and-bore crossing at HWY 101.

Task 2 – Construction Documents

Boyle will prepare bid documents in the District's standard format, including contract documents and technical specifications. The bid sheets described here will replace Bid Package 2 of Task 301 in the Proposal. The remainder of the tasks described in the proposal will remain the same. Bid documents and cost opinions will be issued at the 60, 95, and 100-percent levels.

2.1 Construction Plans for Bid Package 2 – NCSD System Pipeline Improvements

- G1, G2: Title & Notes (2 sheets)
- C1 – C18: Pipeline Plan & Profile (18 sheets)
- C19 – C22: Highway 101 Jack & Bore (4 sheets)
- C23 – C27: PRV Stations (5 sheets – Site Plans, Details, and Controls/Instrumentation)

- C28 – C31: Details (4 sheets)

Optional Geotechnical Task – Proposed exploratory borings along Frontage Road between Division Street and Southland Street could be deepened to approximately 30 feet to gather information for the proposed sewer line replacement. This task can be performed for an additional $4,212 (not included in the attached budget sheet). Collecting this data while the geotechnical team is performing work for the waterline replacement will allow the District to

Budget

If the District desires to pursue this project, we would recommend authorizing Boyle to perform this work on a time and materials basis, with a budget revision to the original contract amount as shown below:

Original Contract Amount	**$920,830**
Credit for Design of Previously Planned NCSD System Improvements (Bid Package 2)	$-58,709
Additional Survey Services	$30,267
Additional Geotechnical Services	$28,274
30% Plans, Caltrans Permit Coordination, and Amended Pipeline Technical Memorandum	$36,180
Final Plans, Specifications, and Cost Opinions	$94,721
Total Budget Revision Request	**$144,877**
Proposed Revised Budget	**$1,065,707**
Optional Expansion of Geotechnical Analysis along Frontage Road for Future Sewer Trunk Main Replacement	$4,212
Total Budget Revision with Optional Geotechnical Expansion	**$1,069,919**

I would be pleased to respond to any questions you may have about this request. As always, we will work with the District to identify cost-saving approaches (shorter pipeline alignments, etc.) during our Preliminary Engineering phase and if these are feasible, we will reevaluate this budget at that time.

Yours Sincerely

Mike Nunley, PE
Project Manager

Attachment: Budget Breakdown

Project Budget

Engineering Services for SWP — **Nipomo CSD**
Budget Revision #1 - Revised NCSD Improvements

Task Description	Personnel Hours								Budget				
	Principal	Senior II	Senior I	Associate	Assistant	Drafter	Administration	Total Hours	Labor	Non-Labor Fee	Subconsultants	Total Non-Labor	Total
Credit for Previously Planned Improvements													
NCSD System Pipeline Improvements Plans (20 sheets)	(8)	(60)			(100)	(300)		(468)	$ (49,820)	$ (3,986)		$ (3,986)	$ (53,806)
NCSD System Pipeline Improvements Specifications	(2)	(16)			(16)			(34)	$ (4,540)	$ (363)		$ (363)	$ (4,903)
								-	$ -			$ -	$ -
Subtotal	**(10)**	**(76)**	**-**	**-**	**(116)**	**(300)**	**-**	**(502)**	**$ (54,360)**	**$ (4,349)**	**$ -**	**$ (4,349)**	**$ (58,709)**
Task Group 1 - Preliminary Engineering													
Planning Meeting	2				4			6	$ 800	$ 64		$ 64	$ 864
Utility Research					24	40		64	$ 6,320	$ 506		$ 506	$ 6,826
Pipeline Alignment Technical Memorandum	4	16			40	8		68	$ 8,200	$ 656		$ 656	$ 8,856
Concept Design Report (30 % Plans)	8	24			24	60		116	$ 13,460	$ 1,077		$ 1,077	$ 14,537
Caltrans Encroachment Permit and Coordination	8				16	16		40	$ 4,720	$ 378		$ 378	$ 5,098
Survey & Base Map (Wallace Group)	4				4			8	$ 1,180	$ 94	$ 28,993	$ 29,087	$ 30,267
Geotechnical Investigation (Fugro)	4				4			8	$ 1,180	$ 94	$ 27,000	$ 27,094	$ 28,274
								-	$ -			$ -	$ -
Subtotal	**30**	**40**	**-**	**-**	**116**	**124**	**-**	**310**	**$ 35,860**	**$ 2,869**	**$ 55,993**	**$ 58,861**	**$ 94,721**
Task Group 2 - Construction Documents													
NCSD System Pipeline Improvements Plans (33 sheets)	16	80			200	600		896	$ 93,440	$ 7,475		$ 7,475	$ 100,915
NCSD System Pipeline Improvements Specifications	8	16			32			56	$ 7,360	$ 589		$ 589	$ 7,949
								-	$ -			$ -	$ -
Subtotal	**24**	**96**	**-**	**-**	**232**	**600**	**-**	**952**	**$ 100,800**	**$ 8,064**		**$ 8,064**	**$ 108,864**
Total	**44**	**60**	**-**	**-**	**232**	**424**	**-**	**760**	**$ 82,300**	**$ 6,584**	**$ 55,993**	**$ 62,577**	**$ 144,877**