

TO: BOARD OF DIRECTORS
FROM: BRUCE BUEL *BB*
DATE: MARCH 23, 2007

**AGENDA ITEM
E-1
MARCH 28, 2007**

RE-PLUMB BLACK LAKE WELL #4

ITEM

Authorize staff to re-plumb Black Lake Well #4.

BACKGROUND

As discussed at previous Board Meetings, staff proposes to re-plumb Black Lake Well #4 this Spring so that the District can use its production capability this Summer and Fall when we experience peak demands. Attached is an engineering review of options and operational scenarios from Boyle Engineering. As detailed in the review, staff proposes to re-plumb Black Lake Well #4 with a smaller pump, discharge the flow from Well #4 (and Well #3) into the existing reservoir, abandon the old booster station and hydro-pneumatic tank, install a new booster pump immediately adjacent to the tank, construct a new line from the new booster pump to the Town side of the large inter-tie with Black Lake (operating scenario #1), and valve the new line so that water supply can be diverted directly into the Black Lake system using the existing small inter-tie (operating scenario #2). Staff has prepared a Notice of Exemption in compliance with CEQA, and will file that Notice if your Honorable Board authorizes the proposed upgrade.

Staff is NOT requesting authority at this time to construct the Pressure Reducing Interconnection described in Boyle's review at this time. Staff also proposes to wait on coating of the existing reservoir or testing of the old hydro-pneumatic tank until Cannon completes their Water and Sewer Master Plan.

Mike Nunley from Boyle will attend the Board meeting to answer questions on the Review.

RECOMMENDATION

Staff requests Board authority to order the respective pumps and to install the proposed works on a force account basis.

ATTACHMENT

* **BOYLE ENGINEERING REVIEW**

MEMORANDUM

TO: Bruce Buel, General Manager

March 22, 2007

FROM: Joshua Reynolds, PE

SUBJECT: Blacklake Interconnection Schematic

This memorandum and the attached Figures 1 and 2, describe the two anticipated operating scenarios for the Blacklake and Town water system merger, discusses the proposed infrastructure improvements required to effectively merge the systems, and presents the system and pump curve for the proposed transfer pump.

To effectively merge the Town and Blacklake water systems a method for transferring water from the Blacklake wells must be devised and installed. There are two methods for achieving this goal A) upgrade the well pumps and plumb the wells directly into the Town system; or B) install a new transfer pump and continue to use the Blacklake Storage Tank. District Staff have identified Option B as the preferred method. There are several reasons for this selection, but the primary factor is the inability of Well #4 to readily accept a pump with a large enough pressure rating to deliver water directly into the Town system. Well #4 is not physically large enough to fit a high-pressure pump and motor. This limitation effectively eliminates Option A as an alternative.

The pump in Well #4 is being replaced as part of normal operations and maintenance of the system. The new well pump will be more efficient and will operate at an operating point that more closely matches system demands, allowing the existing motor to be downsized from 60-hp to 50-hp. The new well pump will deliver water directly to the Blacklake Tank. This pump will be upgraded regardless of the proposed Blacklake/Town System Merge, and is not included as a merger infrastructure improvement.

Infrastructure Requirements

To convey water from the Blacklake Tank, which is filled by the Blacklake wells, a transfer pump must be constructed which is capable of delivering water from the existing storage tank to the town system. Water will be conveyed from the transfer pump through a proposed 150-ft long 6-in diameter main to the existing 14-in diameter town system main located in Willow Road.

Pressure reducing interconnection #2 must be constructed to increase system reliability. The construction of the second interconnection is dependant upon a main extension in Pomeroy, which is recommended in the Water Master Plan. See the attached system schematic for planned facilities.

Summary of Required Facilities to Allow Merge:

1. Transfer Pump Station - 50-hp vertical turbine pump rated at 400-gpm at 130-psi
2. 150-ft long 6-in water main
3. Pressure Reducing Interconnection #2

The existing Blacklake Booster Station can be salvaged or left for emergency use; this includes the pumps, controls, piping, hydropneumatic tank, and other appurtenances. The emergency generator can be salvaged for use elsewhere, or can be wired to provide backup power for the transfer pump.

Merged System Operating Scenarios (for Option B)

Of the two options discussed in the introduction, Option B (install a new transfer pump and continue to use the Blacklake Storage Tank) has been selected by the District, because the well pump in Well #4 cannot be upsized to produce enough pressure to deliver water directly into the Town System. The following sections describe the ways the proposed system can be operated to allow flexible delivery of water to the Town system or directly to Blacklake in an emergency.

Operating Scenario 1 – Water Transferred to Town System

In this scenario water will be pumped from the Blacklake wells into the Blacklake Tank via a dedicated tank supply line. This water will then be boosted by a new transfer pump into the town system via a new 6-in diameter transfer main connected on the Town system side of the existing 8-in Interconnection #1 (see Figures 1 and 2 for schematics). Interconnection #1 is tapped to the 14-in main located in Willow Road. Water boosted by the transfer pump will be able to flow into the rest of the town system distribution network and ultimately fill the Standpipe and Quad Tanks. This will be the normal operating scenario.

The transfer pump will need to operate at a sufficient pressure to force water from the Blacklake Tank into the town system tanks. The system pressure is expected to range from a high of about 120-psi to a low of about 95-psi.

Operating Scenario 2 – Water Transferred to Blacklake System

Should need arise water could be diverted from the Blacklake Tank directly into the Blacklake distribution system using the existing 4-in pressure reducing interconnection. The 4-in interconnection is located inside the fence at the booster station and will not rely on the water main in Willow Road to convey water to the Blacklake system. Flow will be limited by the capacity of the transfer pump. This will provide enough flow to serve an emergency situation, but will not be adequate for normal operating conditions.

Water will be pumped from the Blacklake wells into the existing Blacklake Water Storage Tank via a dedicated tank supply line. This water will then be boosted by a new transfer pump into the existing 4-in pressure reducing interconnection and then directly into the Blacklake distribution system.

March 22, 2007

Transfer Pump – System Curve Boundary Conditions

Calculation of the attached system curve for the proposed transfer pump is based on the following assumptions:

Elevation of Point of Connection to Interconnection #1: 330-ft
Tank Base Elevation: 338-ft
Tank High Level: 357-ft
Tank Low Level: 339-ft
High Town System Pressure: 120-psi
Low Town System Pressure: 95-psi

8-in Suction Line from Tank to Transfer Pump
150-ft long 6-in Discharge Main from Transfer Pump to Town System

The system curve shows that the proposed pump will operate at 475-gpm at 120-psi.

The District will install a pump control valve to keep the pump operating within its best efficiency range, and to allow the pump to better interface with the changing pressures of the downstream Town System.

Well #4 Pump – System Curve Boundary Conditions

Calculation of the attached system curve for the proposed pump replacement at Well #4 is based on the following conditions:

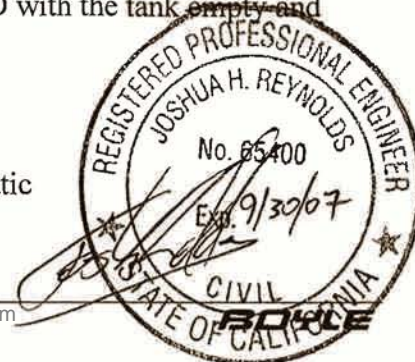
Ground Elevation at Wellhead: 300-ft
Static Groundwater Surface Elevation: 30-ft (270-ft below ground)
Pumping Groundwater Surface Elevation: -20-ft (320-ft below ground)
Tank High Level: 357-ft
Tank Low Level: 339-ft

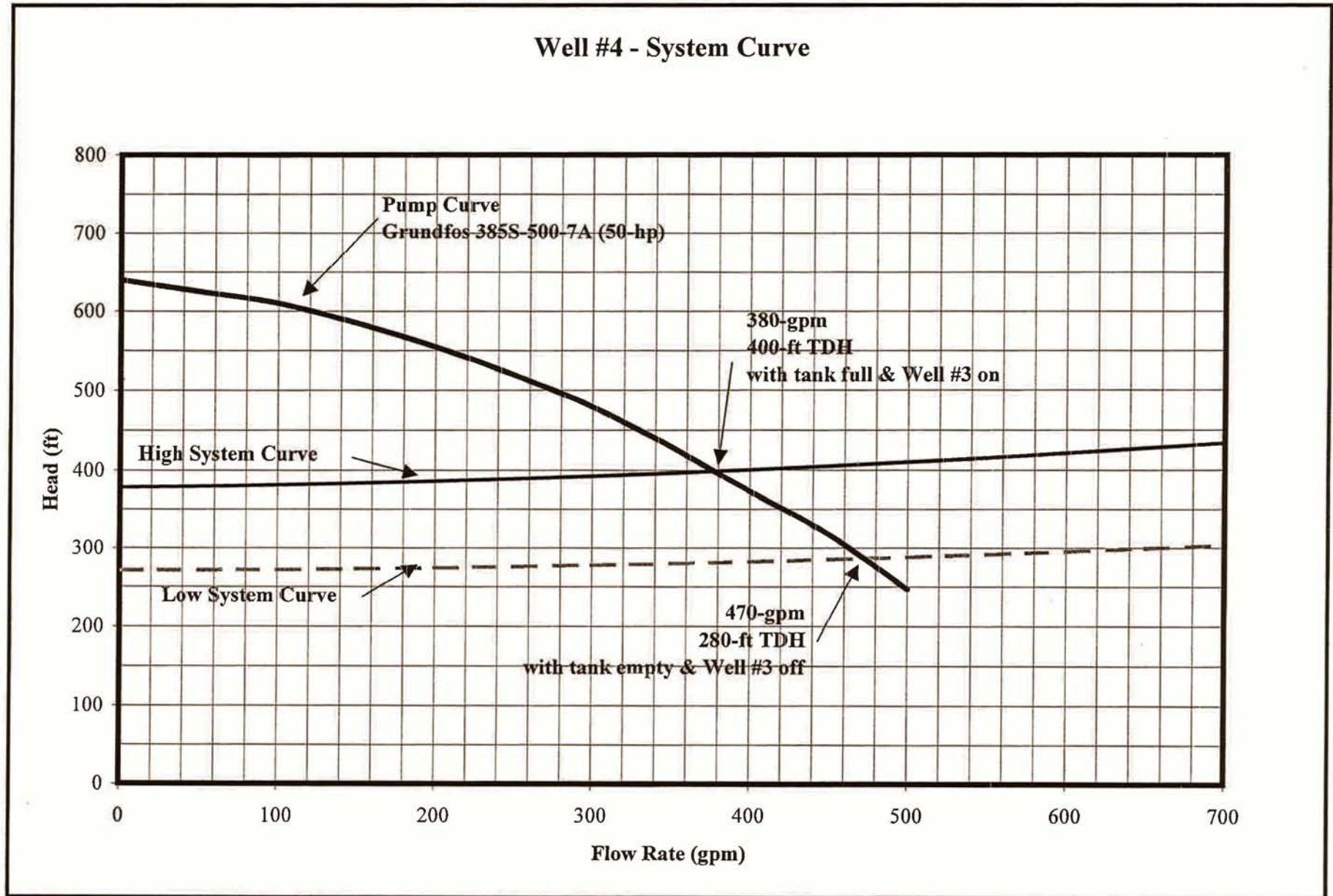
3,400-ft long 8-in well supply line connecting the well to the tank.

For the high total dynamic head (TDH) calculation, 100-gpm is added to the well supply line to account for water from Well #3. The low TDH calculation assumes Well #3 will be turned off.

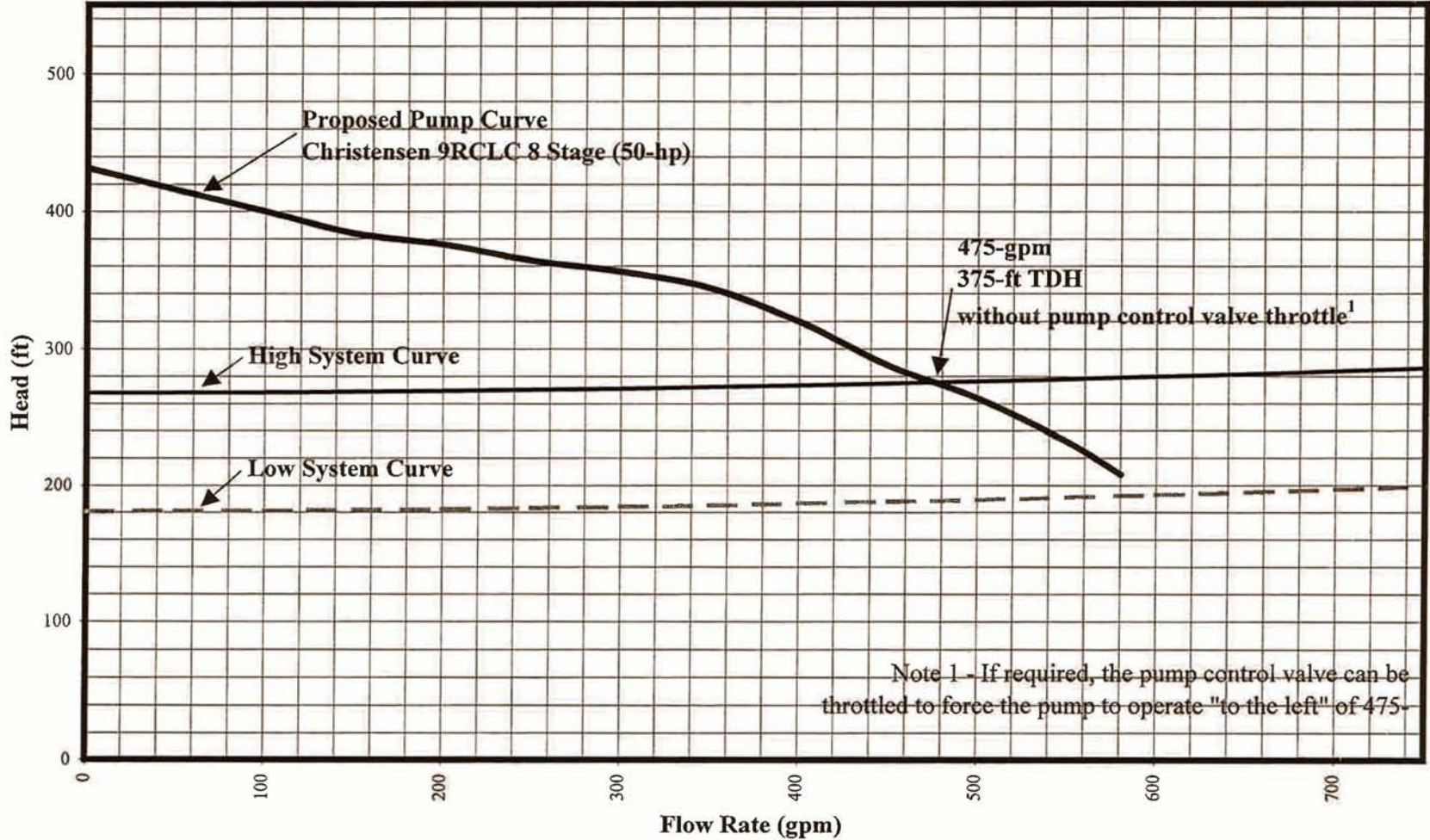
The system curve shows that the proposed well pump will operate between 380-gpm @ 400-ft TDH with the tank full and Well #3 on; and 470-gpm @ 280-ft THD with the tank empty and Well #3 off.

Enclosures: Transfer Pump System Curve
Well #4 System Curve
Figure 1 – Merged Blacklake Water System Schematic
Figure 2 – Interconnection System Schematic



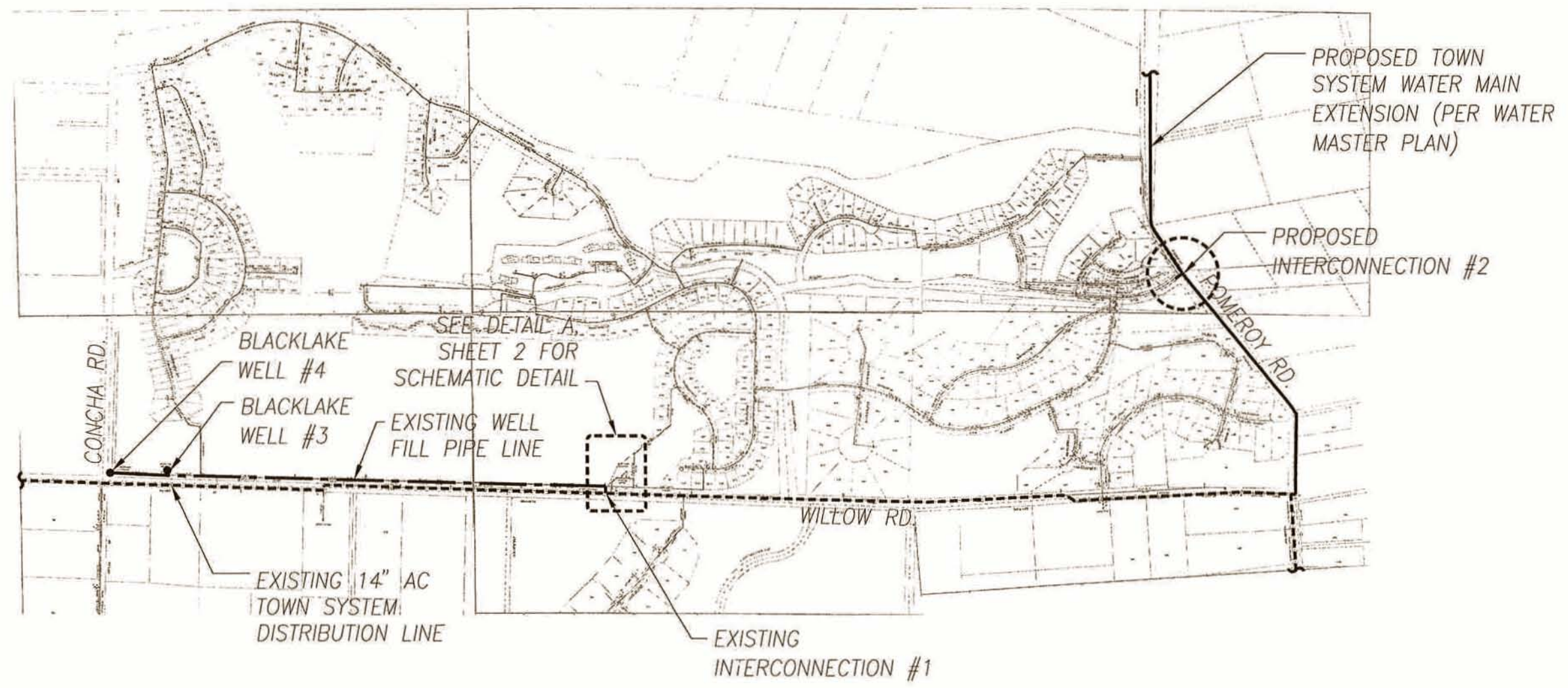


Black Lake Transfer Pump - System Curve




Note 1 - If required, the pump control valve can be throttled to force the pump to operate "to the left" of 475-

D:\NIPOMO_CSD\19856\Blacklake_Schematic\InPlan\PLAN\PIUMP_PLAN.dwg
 USER: jfreedrich
 NAME: Blacklake system
 DATE: Mar 21, 2007 4:31pm
 XREFS: 2AC
 E-PPES
 Blacklake system
 BlacklakeDist_001.dwg
 BlacklakeDist_002.dwg
 BlacklakeDist_003.dwg
 BlacklakeDist_004.dwg
 BlacklakeDist_005.dwg
 BlacklakeDist_006.dwg



***NOT FOR CONSTRUCTION

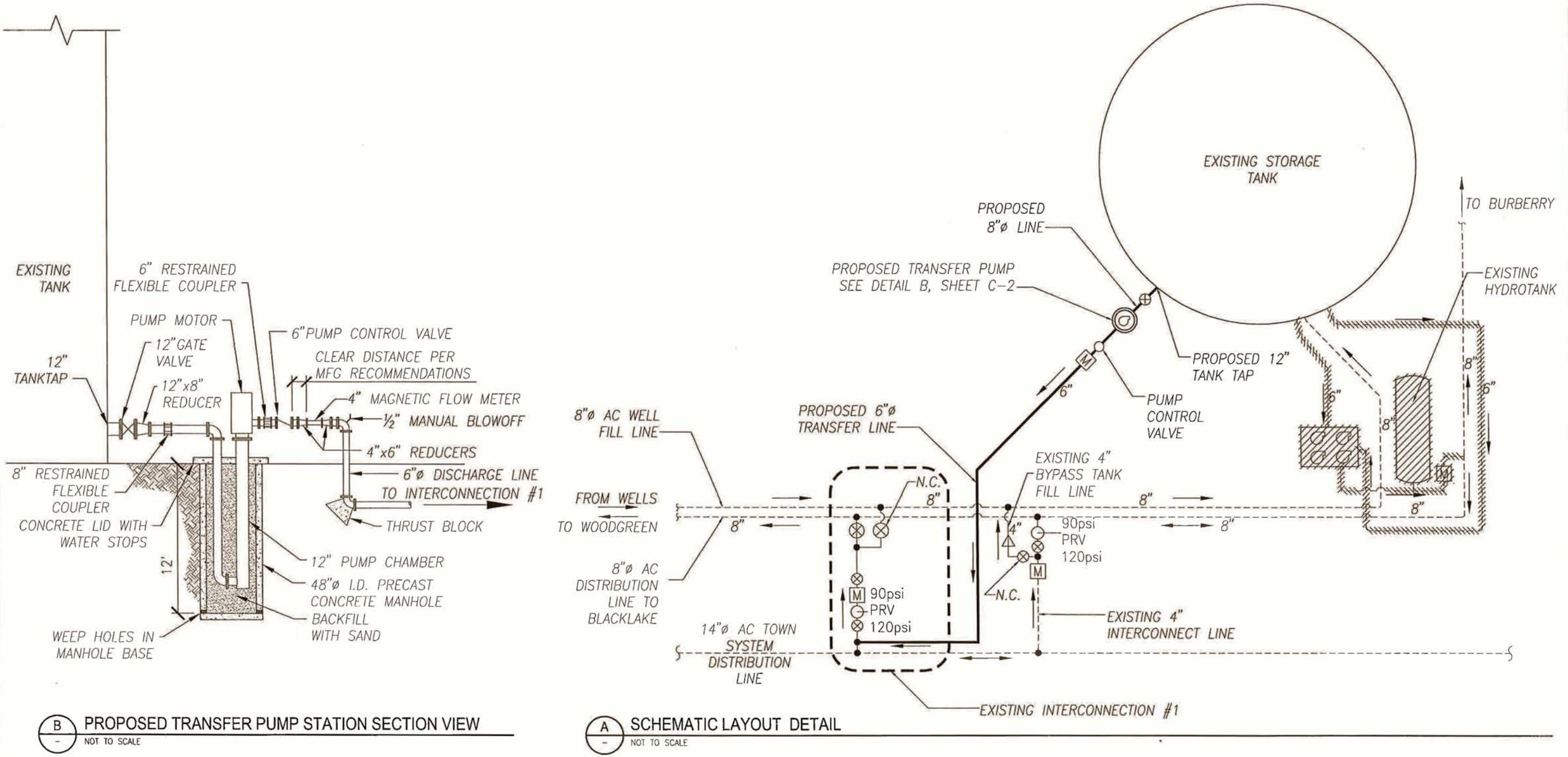

 NOT TO SCALE

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NIPOMO COMMUNITY SERVICE DISTRICT
 MERGED BLACKLAKE WATER SYSTEM SCHEMATIC

BEC PROJECT NO.	FIGURE
000	1

USER: jfroelicher
 DWG: W:\nipomo CSD (19996)\Blacklake Schematic\Interic\CAO\Design\PUMP PLAN.dwg
 DATE: Mar 21, 2007 4:31pm
 IMAGES: Blacklake system
 E-PIPES
 BlacklakeDist_001.dwg
 BlacklakeDist_002.dwg
 BlacklakeDist_003.dwg
 BlacklakeDist_004.dwg
 BlacklakeDist_005.dwg
 BlacklakeDist_006.dwg



B PROPOSED TRANSFER PUMP STATION SECTION VIEW
NOT TO SCALE

A SCHEMATIC LAYOUT DETAIL
NOT TO SCALE

LEGEND:

→	DIRECTION OF FLOW	⊖	PRV PRESSURE REDUCING VALVE
---	EXISTING PIPING	⊗	GATE VALVE (NOT ALL VALVES SHOWN)
—	PROPOSED PIPING	⊳	CHECK VALVE
M	METER		TO BE REMOVED OR ABANDONED
N.C.	NORMALLY CLOSED		

***NOT FOR CONSTRUCTION

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NIPOMO COMMUNITY SERVICE DISTRICT	BEC PROJECT NO.	FIGURE
INTERCONNECTION SYSTEM SCHEMATIC	000	2