Nevada County Sanitation District No. 1|Penn Valley Wastewater Treatment Plant Decommissioning

Groundwater Monitoring Well Destruction Workplan

Prepared by HydroScience Engineers

August 2024

HydroScience
Strategic Water Solutions

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Engineer's Seals and Signatures

	Wilson Zhu 8/7/2024 My license renewal date is 03/31/25

Section 1

Introduction & Background

This work plan presents the methods and procedures proposed for the destruction of seven monitoring wells as part of the Nevada County Sanitation District No. 1 (NCSD #1) decommissioning of its Penn Valley Wastewater Treatment Plant (PV WWTP). NCSD #1 has submitted a Groundwater Quality Evaluation Report with the recommendation that the monitoring wells are no longer needed and eligible for full destruction. Following the completed destruction of the monitoring wells, a Monitoring Well Abandonment Report will be prepared to document the activities.

A map of the general locations of the monitoring wells to be destroyed is depicted in Figure 1-1.

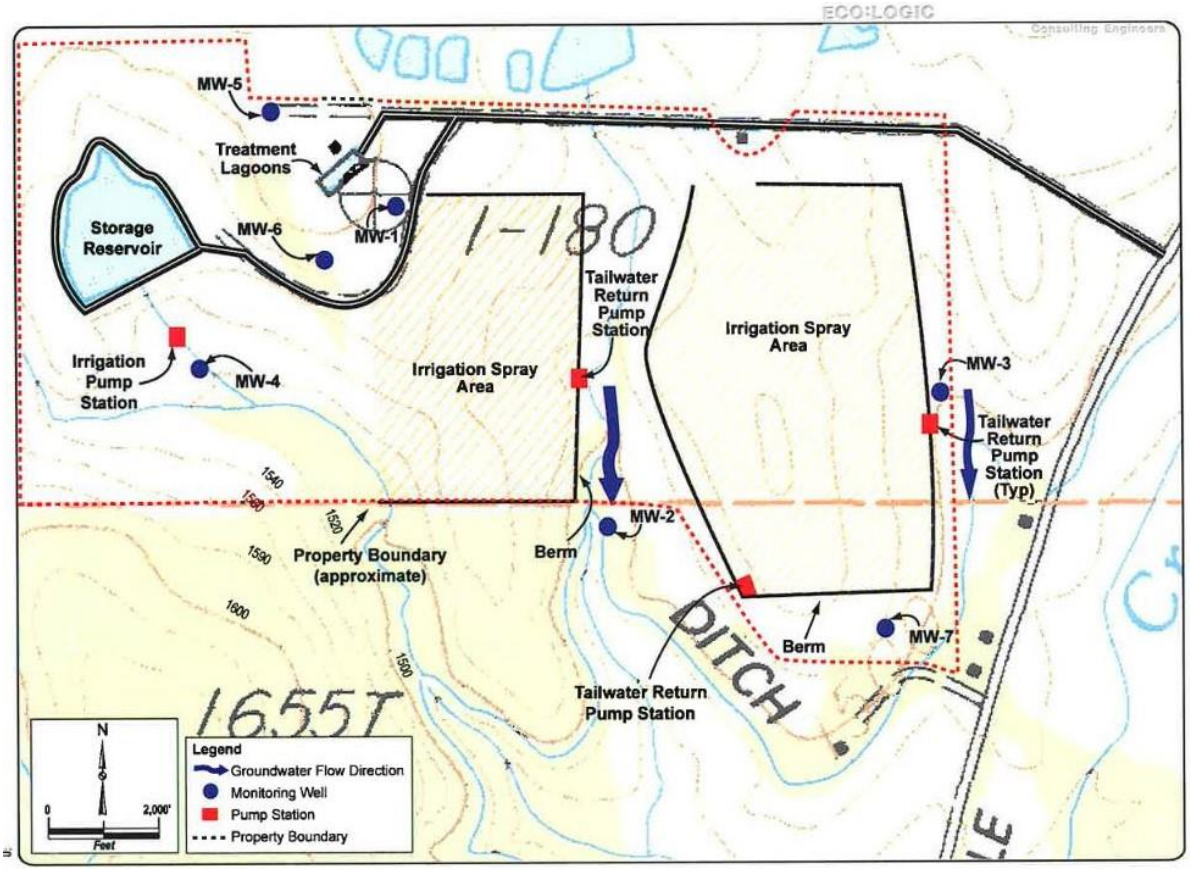


Figure 1-1
Monitoring Well Locations
Source: Kennedy/Jenks Consultants PV WWTP Facilities Improvement Design Report, December 20, 2011

Section 2

Monitoring Well Destruction Approach

2.1 SUMMARY OF MONITORING WELLS

Table 2-1 provides available construction details for each of the seven monitoring wells (MW) to be destroyed. Available construction information and details are included as Appendix A, however it is noted that field verification shall not be forgone as these are not record drawings/documents.

Table 2-1
Summary of Monitoring Well Construction

MW ID	Total Depth (feet BGS[1])	Top of Casing Elevation[2] (NAVD 88[3])	Slotted Casing/Screen Type, Depth Interval	Blank Casing Type, Depth Interval	Filter Pack Type, Depth Interval	Transition Seal Type, Depth Interval	Sanitary Seal Type, Depth Interval
MW 1	50	1578.3	6-inch Diameter 0.020-inch slotted PVC Pipe, ~30 - 50 feet BGS	6-inch Blank PVC, ~0-30 feet BGS	Clean Coarse Sand - 0.5 – 3.0 mm, ~30 – 50 feet BGS	Bentonite, ~28 – 30 feet BGS	Cement, ~0-28 feet BGS
MW 2	20	1500.44	6-inch Diameter 0.020-inch slotted PVC Pipe, ~10 - 20 feet BGS	6-inch Blank PVC, ~0-10 feet BGS	Clean Coarse Sand - 0.5 – 3.0 mm, ~10 – 20 feet BGS	Bentonite, ~8 – 10 feet BGS	Cement, ~0-8 feet BGS
MW 3	20	1502.57	6-inch Diameter 0.020-inch slotted PVC Pipe, ~0 - 20 feet BGS	6-inch Blank PVC, ~0-10 feet BGS	Clean Coarse Sand - 0.5 – 3.0 mm, ~10 – 20 feet BGS	Bentonite, ~8 – 10 feet BGS	Cement, ~0-8 feet BGS
MW 4	20	1526.40	6-inch Diameter 0.020-inch slotted PVC Pipe, ~0 - 20 feet BGS	6-inch Diameter Blank PVC, ~0-10 feet BGS	Clean Coarse Sand - 0.5 – 3.0 mm, ~10 – 20 feet BGS	Bentonite, ~8 – 10 feet BGS	Cement, ~0-8 feet BGS

[1] BGS – Below Ground Surface
[2] Source from quarterly GW monitoring reports prepared by Cranmer Engineering, Inc. Survey of top of casing elevations was completed in 2006.
[3] NAVD 88 – North American Vertical Datum 1988

MW ID	Total Depth (feet BGS[1])	Top of Casing Elevation[2] (NAVD 88[3])	Slotted Casing/Screen Type, Depth Interval	Blank Casing Type, Depth Interval	Filter Pack Type, Depth Interval	Transition Seal Type, Depth Interval	Sanitary Seal Type, Depth Interval
MW 5	40	1606.72	4-inch Diameter 0.020-inch slotted SCH[4] 40 PVC pipe, 24.5 - 40 feet BGS	4-inch Diameter SCH 40 Blank PVC, 1.5 AGS[5] - 24.5 feet BGS	Precleaned #3 Sand, 22 – 40 feet BGS	Bentonite Chips, 20 – 22 feet BGS	Cement-Bentonite 0.5 feet BGS – 20 feet BGS
MW 6	55	1579.82	4-inch Diameter 0.020-inch slotted SCH 40 PVC pipe, 40 - 55 feet BGS	4-inch Diameter SCH 40 Blank PVC, 1.5 AGS - 40 feet BGS	Precleaned #3 Sand, 38 – 55 feet BGS	Bentonite Chips, 36 – 38 feet BGS	Cement-Bentonite 0.5 feet BGS – 36 feet BGS
MW 7	36	1525.09	4-inch Diameter 0.020-inch machine slotted SCH 40 PVC well screen, 24.5 -40 feet BGS	4-inch diameter SCH 40 Blank PVC, 1.5 AGS - 22 feet BGS	Precleaned #3 Sand, 20 – 36 feet BGS	Bentonite Chips, 17 – 20 feet BGS	Cement-Bentonite 0.5 feet BGS – 17 feet BGS

2.2 WELL DESTRUCTION WORKPLAN

All wells will be destroyed in accordance with the requirements outlined in the California Department of Water Resources (DWR) Bulletin 74 series for minimum statewide standards for wells, including Bulletins 74-81 and 74-90. Necessary permits from local environmental health agencies will be obtained prior to commencement of work. All MW destruction work shall be performed by a licensed C-57 Contractor.

Destruction work will either include simple pressure grouting/sealing of the well, or a combination of overdrilling and sealing. The simple pressure grouting/seal method will be reserved for wells that are assumed to have been constructed to meet DWR well standards. Other wells not meeting the DWR well standards will be overdrilled and sealed. Work for all wells will include removing any well boxes and concrete at the top. If the well casing is left in place, a hole will be excavated around the well casing to a depth of up to 5 feet below ground surface after sealing operations have been completed and the sealing material has adequately set and cured. The exposed well casing will be cut and removed, following which, the excavated pit will be backfilled.

2.2.1 PRELIMINARY WORK

The wells will be investigated before it is destroyed to determine its condition and details of its construction. The well will be sounded immediately before it is destroyed, with an appropriate measuring device capable of

[4] SCH – Schedule
[5] AGS – Above Ground Surface

reaching the bottom of the well casing and having measuring marks with an accuracy of at least 0.01 feet, to make sure no obstructions exist that will interfere with filing and sealing.

2.2.2 DESTRUCTION OF MW5 THROUGH MW7

MW1 through MW4 will be destroyed in accordance with standards outlined in Bulletin 74-90 Section 19(A)(2)(a), whereas Section 19 is titled "Requirements for Destroying Monitoring Wells and Exploration Holes". The referenced section prescribes minimum standards/protocols for placement of sealing material, acceptable sealing material, and other considerations that shall be followed.

2.2.3 DESTRUCTION OF MW1 THROUGH MW4

MW1 through MW4 are constructed with annular seals less than 20 feet in depth, so it is proposed that the destruction method include drilling/overdrilling and sealing as outlined in Bulletin 74-90 Section 19(A)(2)(b). A brief summary the work includes removing all material within original boreholes, including the well casing, filter pack and annular seal, and sealing the remaining drill hole by backfilling via a tremie pipe.

In the scenario where overdrilling is not allowed or deemed inappropriate by the local enforcing agency, the well materials will be left in place during sealing operations following perforation/puncturing of the well casing. Sealing material will then be pressure grouted to 25 pounds per square inch and held at that pressure for a period sufficient to force the grout through the perforations and into the filter pack and set. The setting of the grout should be able to be accomplished within 24 hours of placement.

Section 3

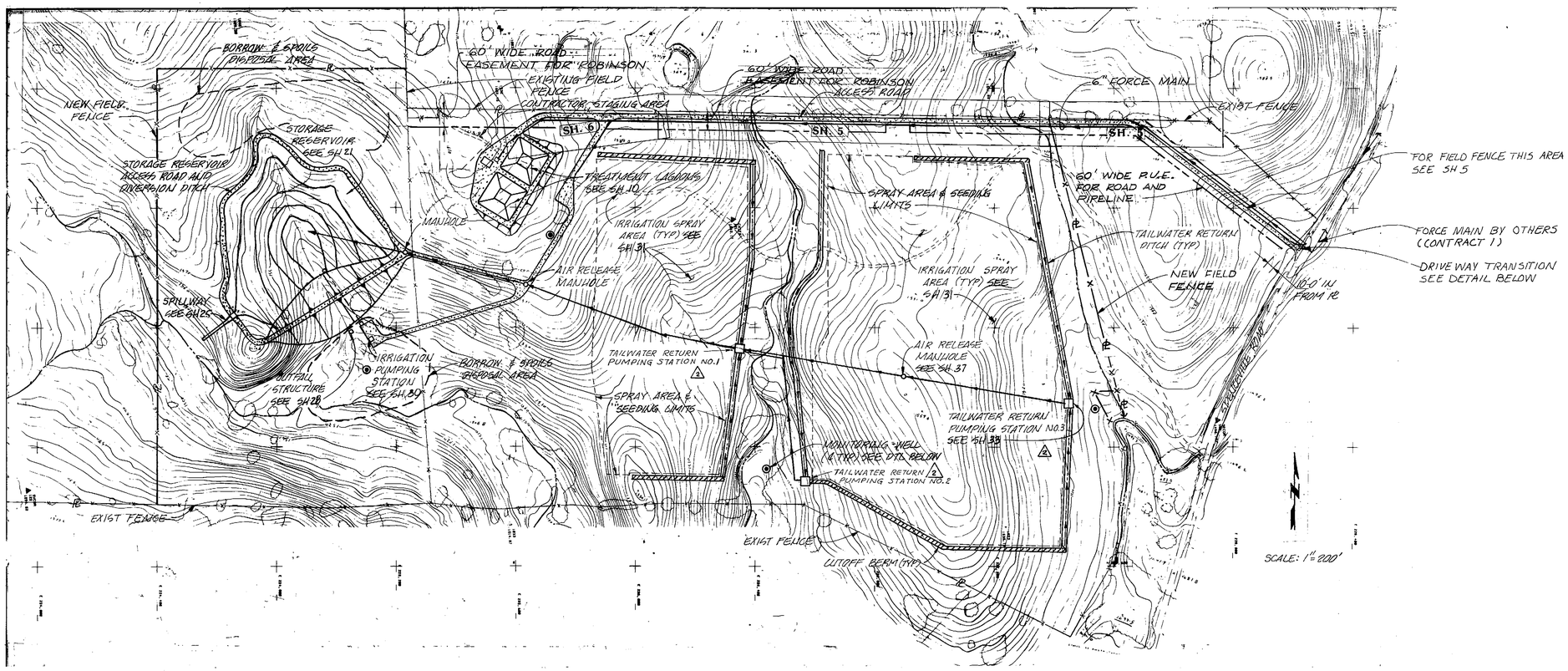
Workplan Schedule

Upon receiving approval of this workplan, NCSD #1 will work diligently to solicit and secure the services of a contractor to complete the well destruction. Within 60 days following the complete destruction of the 7 monitoring wells, NCSD #1 will prepare and submit a Monitoring Well Abandonment Report which will summarize the destruction activities.

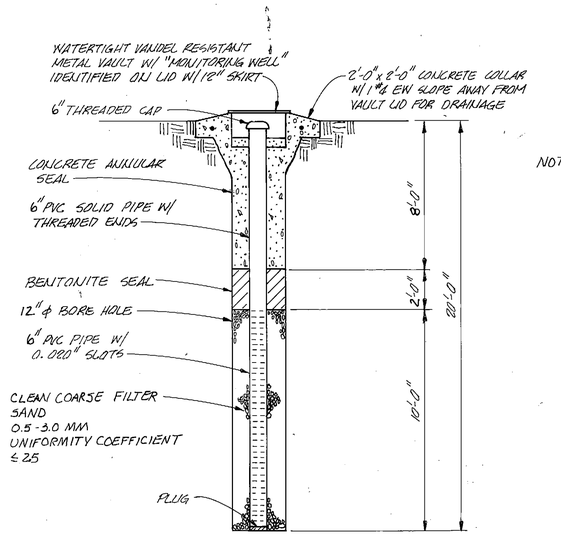
APPENDICES

Appendix A

GROUNDWATER MONITORING WELL CONSTRUCTION DOCUMENTS



SITE PLAN

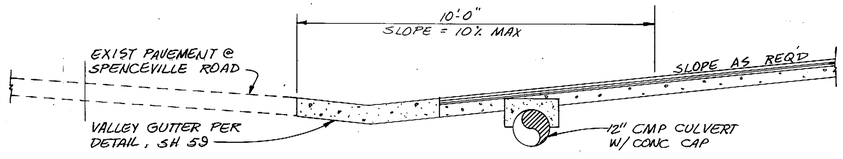


NOTE: NOTIFY CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD 48 HRS PRIOR TO MONITORING WELL INSTALLATION, (916) 361-5660

For Monitoring Wells 1- 4

MONITORING WELL DETAIL

NTS



DRIVEWAY TRANSITION DETAIL PROFILE

1/2" = 1'-0"

CULP • WESNER • CULP
CONSULTING ENGINEERS
CAMERON PARK, CA SANTA ANA, CA
DENVER, CO EDMONDS, WA

CWC

H D R
CWC-HDR, Inc.
An HDR Engineering, Inc. Company

Job No. 128.19.41
Designed JBG
Drawn RLL
Checked DJR
Approved JBG
Date 6-27-88

No.	By	Revision Description	Date
1	PK	AS BUILT	11/91

11/91

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

PENN VALLEY
WASTEWATER FACILITIES
CONTRACT II
TREATMENT AND DISPOSAL FACILITIES
COUNTY OF NEVADA

GENERAL SITE PLAN

Sheet
4

21-07420
45-01420

NEVADA COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH

950 Maidu Ave
Nevada City, CA 95959
(530) 265-1452
FAX (530) 265-7056

10075 Levone Ave., Suite 105
Truckee, CA 96161
(530) 582-7884
FAX (530) 582-0712

JOB NUMBER: 45-01420
APN: 51 – 310 – 35
PERMIT NUMBER
№ 6896
Both Assessor's Parcel Number and Permit Number must show on Well Driller's Report.

APPLICATION/PERMIT TO CONSTRUCT, REPAIR OR DESTROY A WELL

Property Owner: Nevada County S.D. Owner's Mailing Address: 950 Maidu Ave, N.C. Calif
Job Site Address: Penn Valley WWTP City: Penn Valley Zip: 95946
Nearest Cross Street: 12382 Spenceville Rd Parcel Acreage:
PROPOSED WORK: ☒New Well x 3 ☐Deepening ☐Destruction *(Include diagram of proposal)*
☐Repair or Modification: *(proposed work)*
(Include diagram of proposal)
TYPE OF WELL: ☐Class I ☐Class II ☒Monitoring **PROPOSED USE:** 3 Monitorig
Angular Seal Depth Proposed:
CASING TYPE: ☑Plastic ☐Steel Diameter 4" Wall Thickness or Gauge Sch 40
SEALING MATERIAL: ☒Bentonite ☒Concrete ☐Other *(please specify)*
Sealing Application: ☒Pumped/Tremie ☐Dropped into Water
PROPOSED SEAL DATE AND TIME: Date Tremie TBD / week of Sept 15 Time
WELL CONTRACTOR: Peters Drilling & Pump C-57 License No. 456136
Business Address: PO Box 1546 Grass Valley, CA Phone: 273-8136

I hereby certify that the work described in this application will be done in accordance with the provisions of the Nevada County Land Use and Development Code, Chapter X, pertaining to well construction, repair, modification, deepening, and destruction. Within 90 days of completion of work, I will furnish the Nevada County Department of Environmental Health a complete and accurate copy of the water well "Driller's Report"; DWR form No. 188.

WELL CONTRACTOR X DATE 8/25/03

PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUE

DEPARTMENT USE ONLY—Do Not Write Below This Line

PERMIT REQUIREMENTS: Maintain All County Set-Back Requirements Including 25 Feet Minimum From Well to Waste Plumbing Within A Structure.

Permit Issued By Greg Powell **Date** 9-17-03

SEAL: Date 9-17-03 Depth N/A Inspector Greg Powell

COMPLETED WELL: Date Completed 9-17-03 Total Depth 40 - 5 MW / 53 - 6 / 56 - 7 Yield* N/A

Construction Final Approval By Greg Powell **Date**

*NOTE: This rate is provided by the well driller and is stated solely for the purpose of obtaining clearance for a building permit. For this purpose, this well yield is valid for one (1) year from date of well completion. Well yield can change over time.

White – Office Yellow – Contractor Pink – Owner

.../FORMS/well.1 Nov96

COUNTY OF NEVADA COMMUNITY DEVELOPMENT AGENCY
ENVIRONMENTAL HEALTH DEPARTMENT
950 MAIDU AVENUE, NEVADA CITY, CA 95959-8617
(530) 265-1222 FAX (530) 265-7056 www.mynevadaco.com
10075 LEVON AVENUE, SUITE 105, TRUCKEE, CA 96161
(530) 582-7884 FAX (530) 582-0712

MW-7

WELL SEAL INSPECTION FORM

Well Seal Time: — Time In: 10:30

Owner's Name: Penn Valley WWTP Job #: 45-21-7420

APN: ___ - ___ - ___ Permit #: 6896 Date: 9-17-03

Well Company: Peters

Location: Spenceville RD

Depth of Well: 36' Approximate Yield: N/A

Depth of Casing: 36' Casing Material: ☒ PVC ☐ Steel

Annular Seal Depth: — Thickness: — No. of Bags: 4 ½

Sealing Material: ☐ Cement ☒ Bentonite (1 bag) ☒ Grout How Applied: ☒ Dropped ☒ Tremie

Hardrock: 20' Packer Type: Sand #

First Water: 25' Size of Bit: 6"

Static Level: — Perforations: 35'-20' ✓ SLOTS

X Well drilled in approved location.

___ Well NOT drilled in approved location.

✓ Well location has not received final approval pending Department review of permit application.

Comments:

Driller: Rick Helper: John

Inspector: Greg Powell

COUNTY OF NEVADA COMMUNITY DEVELOPMENT AGENCY
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10075 LEVON AVENUE, SUITE 105, TRUCKEE, CA 96161
(530) 582-7884 FAX (530) 582-0712

MW-6

WELL SEAL INSPECTION FORM

Well Seal Time: N/A Start Time: 12:10

Owner's Name: Penn Valley WWTP Job #: 21-7420

APN: ___ - ___ - ___ Permit #: 6896 Date: 9-17-03

Well Company: Peters

Location: Spenceville Rd

Depth of Well: 55' Approximate Yield: N/A

Depth of Casing: 55' Casing Material: ☒ PVC ☐ Steel

Annular Seal Depth: N/A Thickness: — No. of Bags: 8

Sealing Material: ☐ Cement ☒ Bentonite 1 bag ☒ Grout How Applied: ☒ Dropped ☐ Tremie

Hardrock: 20' Packer Type: Sand

First Water: 45' Size of Bit: 6"

Static Level: — Perforations: —

---

^ Well drilled in approved location.

_____ Well NOT drilled in approved location.

_____ Well location has not received final approval pending Department review of permit application.

Comments:

Driller: Rick Helper: John

Inspector: Greg Powell

F:kh/Forms/Well Seal Inspection Rev 1-30-03

COUNTY OF NEVADA COMMUNITY DEVELOPMENT AGENCY
ENVIRONMENTAL HEALTH DEPARTMENT
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(530) 265-1222 FAX (530) 265-7056 www.mynevadaco.com
10075 LEVON AVENUE, SUITE 105, TRUCKEE, CA 96161
(530) 582-7884 FAX (530) 582-0712

MW-5

WELL SEAL INSPECTION FORM

Well Seal Time: — Time In: 2:30

Owner's Name: Penn Valley WWTP Job #: 21-7420

APN: ___ - ___ - ___ Permit #: 6896 Date: 9-17-03

Well Company: PeTers

Location: Spenceville RD

Depth of Well: 40' Approximate Yield: N/A

Depth of Casing: 40' Casing Material: ☒ PVC ☐ Steel

Annular Seal Depth: — Thickness: — No. of Bags: ~~5~~ 6

Sealing Material: ☒ Cement ☒ Bentonite ☒ Grout How Applied: ☒ Dropped ☒ Tremie

Hardrock: 18' Packer Type: Sand

First Water: 30' Size of Bit: 6"

Static Level: — Perforations: —

✓ Well drilled in approved location.

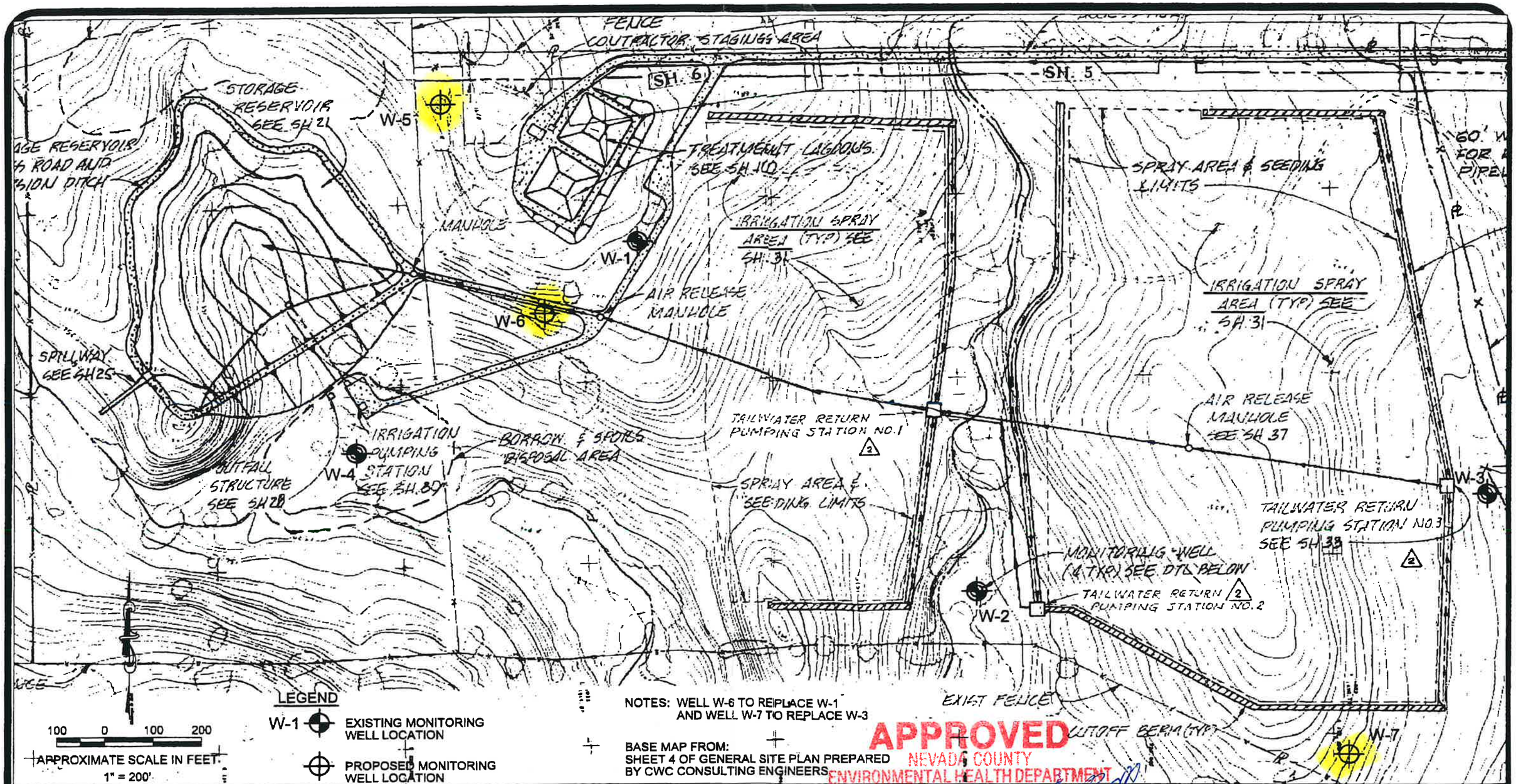
_____ Well NOT drilled in approved location.

_____ Well location has not received final approval pending Department review of permit application.

Comments:

Driller: Rick Helper: John

Inspector: Greg Powell



APPROVED
NEVADA COUNTY
ENVIRONMENTAL HEALTH DEPARTMENT
DATE: 9-17-03 BY:
FOR: Monitoring wells @ 6896 & 7428

1572-01-FIG2

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
792 SEARLS AVENUE
NEVADA CITY, CA 95959
(530) 478-1305 FAX 478-1019

SITE PLAN

PENN VALLEY WASTE WATER TREATMENT PLANT

PENN VALLEY, CALIFORNIA

DRAWN BY: DFD	CHECKED BY: CDR
PROJECT NO.: 1572-01	
DATE: SEPTEMBER 2002	
FIGURE NO.: 2	

Well installs from sch. for Wed Sept. 17

Contact Chris Rossitto at H+K

facsim
TRANSMIT

HOLDREGE & KULL
792 SEARLS AVENUE
NEVADA CITY, CA 95959
(530) 478-1305
FAX (530) 478-1019

DATE:

FAX NUMBER: 463 — 1056

COMPANY NAME: NCDEH

ATTENTION: DAVE HUFF

FROM: Chris Rossitto

SUBJECT: PVWWTP

MESSAGE: Attached is workplan for well installation as discussed. Drilling starts Wed Sept 17

NUMBER OF PAGES INCLUDING COVER SHEET: Many

HARD COPY WILL _____/ WILL NOT _____ FOLLOW VIA MAIL

COPIES FAXED TO: _____

IF YOU EXPERIENCE ANY PROBLEMS WITH THIS FAX, PLEASE ☎ (530) 478-1305

TABLE OF CONTENTS

WORKPLAN

The purpose of this workplan is to present the methodologies and procedures necessary for completing the proposed well installation and destruction activities as required for approval by the California Regional Water Quality Control Board (RWQCB) and Nevada County Department of Environmental Health (NCDEH).

Background Information

As previously mentioned, an evaluation of the existing monitoring well network was recently completed by H&K on behalf of Nevada County Department of Transportation and Sanitation (NCDOTS) as required in the waste discharge requirements (WDRs) for Penn Valley Waste Water Treatment Plant (PVWWTP). A brief summary is presented in the following paragraphs.

The current groundwater monitoring network consists of four groundwater monitoring wells, W-1 through W-4. Well W-1 is located approximately 150 feet downslope and southeast of the treatment lagoons, W-2 is located near a drainage basin, downstream and between the south portions of two irrigation spray field areas, W-3 is located approximately 100 feet east of the easternmost irrigation spray field area, and W-4 is located approximately 250 feet downslope and southeast of the storage reservoir dam.

Well W-1 was installed to a depth of 50 feet below ground surface (bgs). Wells W-2, W-3 and W-4 were installed to depths of 20 feet bgs. Groundwater beneath the site is present in fractured granite and metasedimentary rock. Based on our observations during a site visit and our review of drilling logs and well details, the wells appear to be in good condition and appropriately screened to intercept groundwater.

We reviewed depth to groundwater data measured by NCDOTS for wells W-1, W-2 and W-4 in October 2001, February 2002 and May 2002 and calculated groundwater gradient and flow direction. No measurements are obtained from W-3 because the ground water from this well rises above the casing and flows onto the ground surface (artesian well). Several springs are present at the subject property, particularly in the vicinity of W-3. Based on the water level data of W-1, W-2 and W-4, and assuming that the wells are hydraulically connected, the calculated groundwater flow direction at the site was nearly due south, with a hydraulic gradient of 0.1 feet per foot for each of the three events.

The locations of W-2 (downgradient of the irrigation fields) and W-4 (downgradient of the storage reservoir) appear to be sufficient for compliance monitoring. Wells W-1 (near the two treatment lagoons) and W-3 (near the eastern irrigation spray field) are not located immediately downgradient and may not be sufficient for compliance monitoring. Also, based on the WDRs, at least one upgradient well is required for background monitoring. No upgradient wells are present at the site.

The results of the well evaluation are summarized further in our September 12, 2002 letter report. In our report, we recommended the following:

- Installing three additional wells, hereinafter referred to as W-5, W-6 and W-7, at the site. We proposed installing one background well (W-5) upgradient and approximately 300 feet northwest of the treatment lagoons. We proposed installing one compliance monitoring well (W-6) downgradient of the lagoons, approximately 250 feet southwest of W-1, and one compliance monitoring well (W-7) downgradient of the eastern irrigation spray field, approximately 650 feet southwest of W-3;

- Correcting the well elevations of wells W-2 and W-4 so that the top-of-casing is used as the reference elevation rather than the top-of-cap during future quarterly monitoring events;

- Obtaining depth to water measurements in each well using the top rim of the well casing as the reference point and elevation during future quarterly monitoring events;

- Removing three well volumes during purging of each well prior to obtaining samples (to remove stagnant water in the well and allow fresh groundwater from the surrounding formation to replace it) during future quarterly monitoring events;

- Installing a fence around W-2 to reduce the potential for surface contamination from the cattle to enter the well and installing a berm or trench upslope of the well to redirect storm water runoff away from the well; and

- Destroying wells W-1 and W-3 in accordance with California Department of Water Resources Water Well Standards. The proposed down-gradient wells W-6 and W-7 will replace W-1 and W-3, respectively, for compliance monitoring of these areas.

- Preparing this workplan as required in the WDRs for submittal to the RWQCB executive officer and NCDEH for approval.

Purpose and Scope of Services

The purpose of the scope of service is to modify the current monitoring well network to satisfy the WDRs for the site.

The proposed scope of service includes: (1) drilling and installing three new groundwater monitoring wells (W-5, W-6 and W-7); (2) destroying two existing groundwater monitoring wells (W-1 and W-3), which will be replaced by proposed wells W-6 and W-7; (3) developing the three new wells; (4) surveying top of casing elevation of the three new wells; (5) re-surveying the top of casing elevations of the existing wells W-2 and W-4; and (6) preparing a report summarizing the results of well installation and well destruction activities.

The initial sampling event for the new wells shall be performed to coincide with the quarterly monitoring and reporting schedule for the site. The results of the initial sampling shall be presented in the quarterly monitoring report under separate cover from the well installation report.

Field Preparation Activities

Prior to performing field activities, a site specific Health and Safety Plan (HSP) shall be prepared for use during field activities. The HSP shall comply with applicable federal and California Occupational Safety and Health Administration (OSHA) guidelines. Subcontractors shall prepare a health and safety plan for their work. A well permit shall also be obtained from NCDEH prior to start of field activities.

Prior to drilling, a site meeting shall be conducted with NCDOTS to verify that the proposed well locations are clear of subsurface utilities.

Drilling and Well Installation

Three new wells (W-5, W-6 and W-7) shall be drilled and installed at the site. One background well (W-5) shall be installed upgradient and approximately 300 feet northwest of the treatment lagoons. One compliance monitoring well (W-6) shall be installed downgradient of the lagoons, approximately 250 feet southwest of W-1, and

one compliance monitoring well (W-7) shall be installed downgradient of the eastern irrigation spray field, approximately 650 feet southwest of W-3. Figure 2 is a site plan showing the locations of the three proposed wells and four existing wells.

The well borings shall be drilled to a depth of approximately 10 feet below the first encountered groundwater. Based on previous drilling and well installation at the site, the depth of first encountered groundwater at the proposed locations is anticipated to be between approximately 40 feet below ground surface (bgs) and 60 feet bgs. Because the site is underlain by rock, an air rotary drill rig will be required for drilling and well installation. The air rotary rig shall drill a 6-inch to 8-inch diameter boring.

Samples of air rotary cuttings shall be obtained at approximate 5-foot intervals and (if possible) at the interface between soil/rock and groundwater during drilling to document lithology. The borings shall be logged from the air rotary cuttings under the supervision of a California registered geologist or licensed engineer. Because the drilling requires the use of an air rotary rig, no samples will be obtained for laboratory analysis.

To avoid cross contamination, the drilling equipment shall be decontaminated prior to arriving on site and between borings. The equipment shall be decontaminated by hot water pressure-washing or washing with a solution of non-phosphate detergent and potable water and rinsing with potable water. The soil and rock cuttings generated during drilling shall be stockpiled next to each boring. The decontamination rinse water generated during drilling shall be temporarily contained in drums then introduced to the waste water treatment plant for disposal.

Following drilling, each borehole shall be converted to a groundwater monitoring well. The wells shall be constructed of 2-inch diameter, flush-threaded, schedule 40 polyvinyl chloride (PVC) casing and 0.020-inch machine slotted well screen. A 15-foot section of well screen shall be installed to intersect the top of groundwater. Blank casing shall be installed from the top of the well screen to just below ground surface. A threaded PVC cap shall be placed at the bottom of the well screen. Centralizers shall be attached to the well casing at approximately every 20 to 30 feet to help center the casing in the boring. The annular space between the casing and borehole shall be filled from the bottom of the borehole to approximately 3 feet above the top of the screen with pre-washed Number 3 sand. An approximate 3-foot thick bentonite pellet seal shall be placed above the sand filter pack and bentonite-cement grout shall be placed above the bentonite pellet seal to near the top of well casing. Actual well construction details shall be determined in the field based on results of the drilling.

The wellhead shall be completed with a locking water-tight cap within a traffic rated well vault set in concrete. The wells shall be designated as W-5, W-6 and W-7 for the locations previously identified.

Well Development

A minimum of 48 hours following construction, the wells shall be developed through continuous purging to sort the sand filter pack and remove sediment prior to the initial sampling event. Well development shall be performed by surging and bailing or surging and pumping. During development, the pH, temperature and conductivity parameters of the purge water shall be monitored and the data recorded. Purging shall continue until at least ten well volumes are removed or parameters stabilize. Prior to development, the water levels in the wells shall be measured using an electronic water level sounder. The sounder shall be cleaned with a solution of non-phosphate detergent and deionized water and then rinsed with deionized water before use in each well. Development water and decontamination rinse water generated during purging shall be temporarily contained in drums then introduced to the to the waste water treatment plant for disposal.

Well Surveying

The monitoring wells shall be surveyed for top-of-casing reference elevations. The elevations shall be measured to an accuracy of 0.01 foot referenced to mean sea level and correlated with the existing wells. The elevations shall be used to calculate groundwater elevations and, assuming the wells are hydraulically connected, calculate groundwater gradient.

Groundwater Sampling

The initial sampling event for the new wells shall be performed to coincide with the quarterly monitoring and reporting schedule for the site. The results of the initial sampling shall be presented in the quarterly monitoring report under separate cover from the well installation report. Methods and procedures for sampling are provided below.

Groundwater samples shall not be collected from the three new monitoring wells until at least 48 hours after development. Water levels in wells W-2, W-4, W-5, W-6 and W-7 shall be measured before sampling and converted to groundwater elevations.

Water level measurements shall be obtained using an electronic water level sounder. The sounder shall be cleaned with a solution of non-phosphate detergent and deionized water and then rinsed with deionized water before use in each well.

Prior to sampling, the wells shall be purged. During purging, the pH, temperature and conductivity parameters of the purge water shall be monitored and the data recorded. Purging shall continue until a minimum of three well volumes are removed and parameters stabilize. Purge water and decontamination rinse water generated during sampling shall be temporarily contained in drums then introduced to the to the waste water treatment plant for disposal. Following well purging, a groundwater sample shall be collected from each well using disposable bailers. The samples shall be transferred to the appropriate laboratory sample containers using a bottom draining bailer stopcock. The sample containers shall be labeled and placed in a chilled ice chest for transportation to the project laboratory.

Laboratory Analyses

The groundwater samples shall be submitted under chain-of-custody documentation to a California certified analytical laboratory for analysis. The groundwater samples shall be analyzed for the parameters specified for the groundwater monitoring program in the WDRs for the site.

Destruction of Well W-1 and W-3

Prior to conducting field work, a well destruction permit shall be obtained from NCDEH. Wells W-1 and W-3 shall then be destroyed in accordance with applicable state and local guidelines. Well destruction shall consist of removing the well box and concrete around the top of the wells. The top three to five feet of well casing shall also be removed. Each well shall be grouted by placing neat cement in the remaining casing through a tremie pipe from the bottom of the casing to approximately one foot above the casing. After the cement has set, soil shall be placed above the cement grout to the elevation of the surrounding surface. The RWQCB and NCDEH shall be notified at least 72 hours prior to conducting well destruction.

Report of Well Installation and Destruction

After completing the field work, a report shall be prepared summarizing the results well installation and well destruction activities. The report shall include the following:

- Site plan with the monitoring well locations and general site features;

- Boring logs for the new wells, including monitoring well construction details;
- Summary of methods and procedures used for drilling, well installation, well development, well surveying and well destruction;
- Summary of subsurface conditions encountered during drilling;
- Conclusions and recommendations for further action, if necessary.

Reports shall be prepared quarterly, which summarize the findings of each quarterly monitoring event. Quarterly groundwater monitoring reports shall include the information required for the groundwater monitoring program in the WDRs for the site.

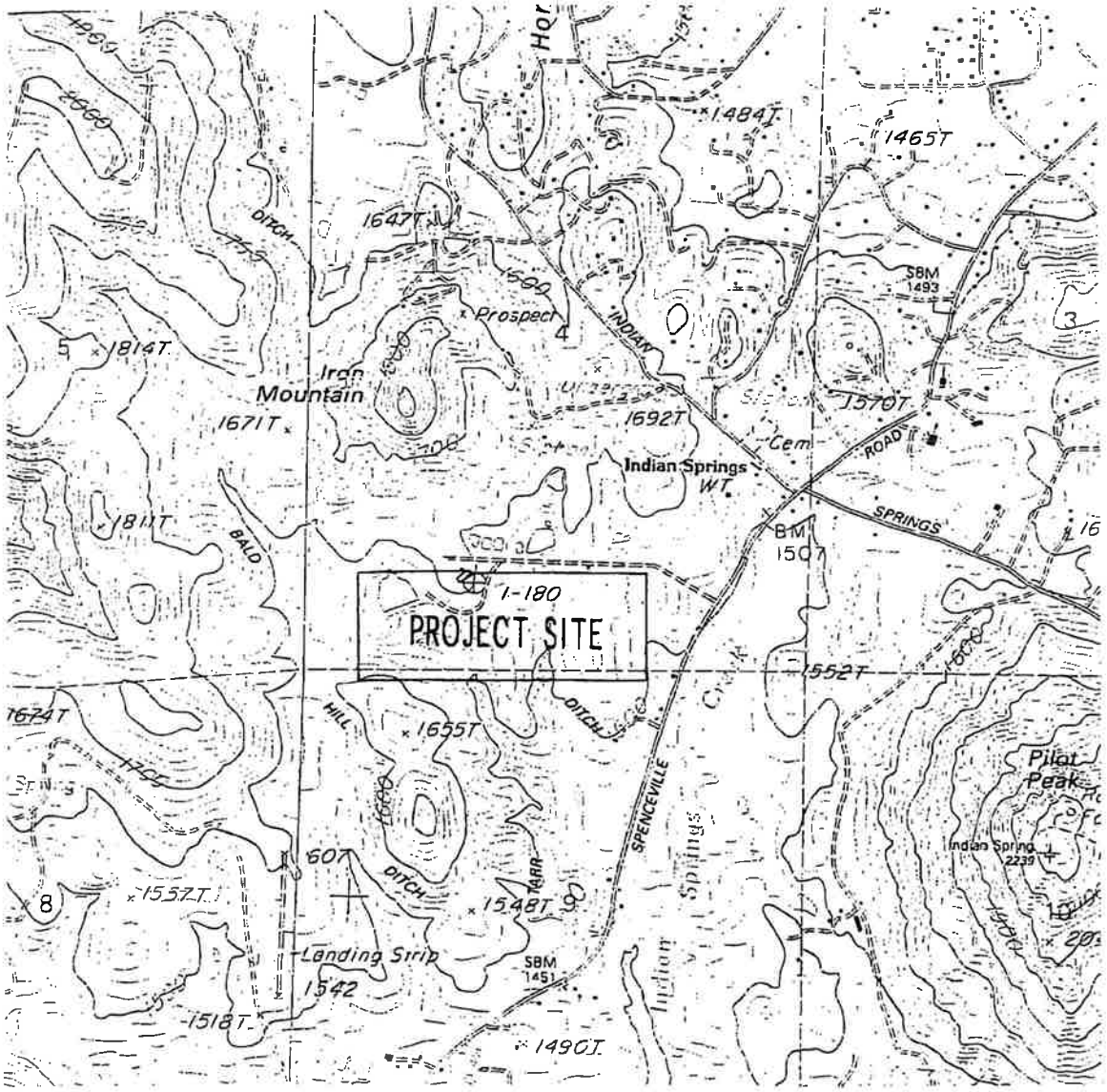
FIGURES

Figure 1 **Site Location Map**

Figure 2 **Site Plan**

Figure 3 **Typical Monitoring Well Detail**

SCALE: 1" = 2000'



SOURCE: ROUGH AND READY QUADRANGLE MAP (USGS, PROVISIONAL EDITION, 1995)

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SITE LOCATION MAP

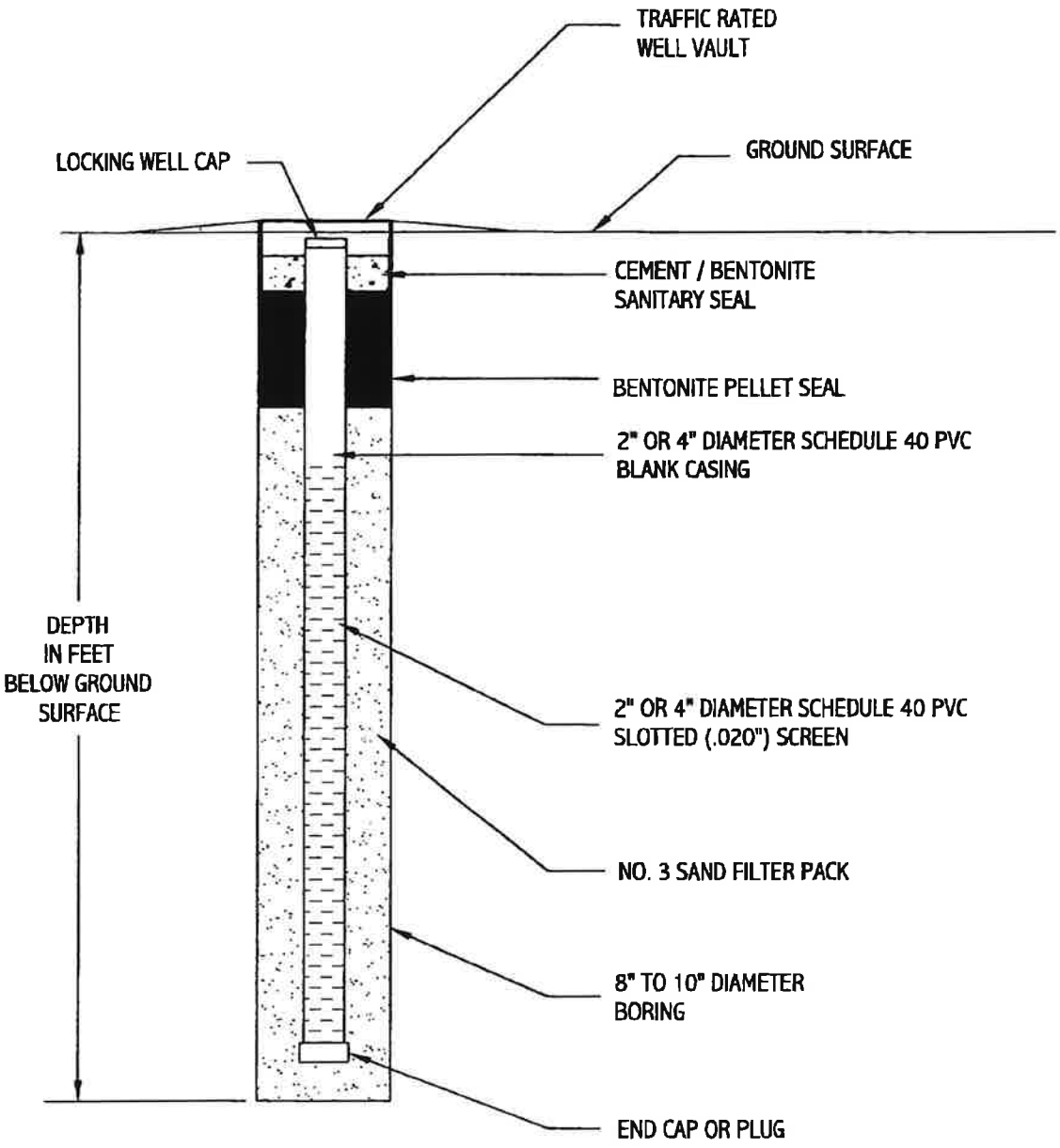
PENN VALLEY WTP

PENN VALLEY, CALIFORNIA

PROJECT NO. 1572-01

SEPTEMBER 2002

FIGURE 1



HOLDREGE & KULL CONSULTING ENGINEERS • GEOLOGISTS 792 SEARLS AVENUE NEVADA CITY, CA 95959 (530) 478-1305 FAX 478-1019	TYPICAL MONITORING WELL DETAIL PENN VALLEY WASTE WATER TREATMENT PLANT PENN VALLEY CALIFORNIA	PROJECT NO.: 1572-01 DATE: SEPT 2002 FIGURE NO.: 3