DOCKETED	
Docket Number:	23-OPT-01
Project Title:	Fountain Wind Project
TN #:	257471
Document Title:	fwp_well_location_memo
Description:	N/A
Filer:	Caitlin Barns
Organization:	Stantec Consulting Services, Inc.
Submitter Role:	Applicant Consultant
Submission Date:	6/27/2024 1:28:30 PM
Docketed Date:	6/27/2024

Stantec

Memo

To:	Lon Payne California Energy Commission	From:	Caitlin Barns Stantec Consulting Services, Inc.
Project/File:	Fountain Wind Project	Date:	June 27, 2024

Dear Mr. Payne,

On behalf of Fountain Wind, LLC (Applicant), I am writing to provide supplemental information and responses to the CEC's water-supply-related data requests docketed June 12, 2024 (TN 256818), regarding the Fountain Wind Project (Project). Below is the text of the data request and the Applicant's response.

CEC DATA REQUEST:

"BACKGROUND: Water Supply

Applicant's response to CEC staff water supply report data requests (TN 256385) was not complete. Data request WATER-2 from CEC staff communication of April 16, 2024 (TN 255722) stated:

Please identify the location, or locations, where groundwater would be extracted for project water supply.

In response to data requests WATER-1 and WATER-2, the following was stated:

Nonetheless, the applicant has obtained a letter of intent to supply water required for construction and operations from Hat Creek Construction & Materials, Inc. (HCC), located at 24339 State Hwy 89, Burney, California, 96013. This supplier draws water from existing private wells owned and operated by it within the Burney Creek Valley Groundwater Basin.

The identified water purveyor HCC is located along Hwy 89, close to Burney Falls, approximately 7.7 miles north-northeast of the town of Burney. If the wells to be used are located at the HCC facility, groundwater would be extracted from near the Lake Britton Area groundwater basin (5.046), rather than the Burney Creek Valley groundwater basin (5.048) according to Department of Water Resources Bulletin 118. The Lake Britton Area groundwater basin was not evaluated in the most recent version of the Water Supply Report (TN 256386).

DATA REQUEST:

WATER-5: Please provide documentation to verify that the groundwater extraction wells are located in the Burney Creek Valley groundwater basin. If these wells are located at the HCC facility, please revise the Water Supply Report to include an evaluation of the Lake Britton Area groundwater basin."

Reference: Updated Water Supply Information for Fountain Wind Project

APPLICANT RESPONSE TO CEC DATA REQUEST WATER-5:

The Hat Creek Construction (HCC) property is located at 24339 CA Hwy 89 Burney, CA 96013 and the three wells proposed to supply the Fountain Wind Project during construction are located at this address. Since docketing the latest revision of the Water Supply Report, the applicant has confirmed with HCC that those three wells are located on the property at that address. The property is located outside the Burney Creek Valley Groundwater Basin (approximately 4.6 miles northeast) and outside the Lake Britton Groundwater Basin (approximately 1.3 miles west)(see Figure 1).

Based on analysis by Stantec hydrogeologist Thomas Regan (resume in Appendix A), HCC's wells withdraw groundwater from one or more fractured volcanic rock aquifers beneath the property (Figure 1), separated from the Lake Britton Area and Burney Creek Valley groundwater basins by numerous faults (Figure 2) including the Holocene active Rocky Ledge fault zone which borders the HCC property on the east and unnamed Holocene active faults on the west[1]. These faults collectively act as barriers to groundwater flow and laterally confine the underlying aquifer along these geologic structures. The aquifer underlying the HCC property and adjacent area is not located within a Department of Water Resources (DWR) Bulletin 118-designated groundwater basin. As described in the Water Supply Report (TN 256385), aquifers such as this one do not meet the threshold for prioritization under California Statewide Groundwater Elevation Monitoring or the Sustainable Groundwater Management Act. As a result, groundwater elevation monitoring and preparation of a Groundwater Sustainability Plan are not required. As a result, aquifer characterization and groundwater level data are generally lacking with the exception of well completion reports.

Well completion reports are available for the three HCC wells are attached to this response (Appendix B). Further, a 2014 report prepared on behalf of Shasta County entitled *Alternative Groundwater Monitoring Evaluation and Report for SBX7-6 CASGEM Elevation Monitoring - 2014 Update* (Appendix C)[2] investigated groundwater conditions in six very low priority groundwater basins near the HCC property including the Lake Britton Area groundwater basin. This report provides information about groundwater conditions in those groundwater basins and notes that deep percolation of water in the area is estimated to exceed groundwater extraction. The report attributes this condition to the presence of high-permeability surface rocks and low-permeability rocks at depth, significant amounts of rain and snowfall in the area, sparse population and little human activity such as agriculture resulting in deep percolation of applied water that exceeds groundwater extraction.

As noted previously, the aquifer underlying the HCC property and adjacent area is likely comprised of fractured volcanic rock that is largely recharged by local precipitation including rainfall and snowmelt. Other sources of recharge include on-site septic systems and landscape irrigation return flow. Groundwater production at the HCC property and adjacent area is limited to pumping from the three onsite wells. To our knowledge, demand for water

[1] California Geological Survey 2024. DOCMaps Data Viewer. Accessed June 26, 2024. Available at: https://maps.conservation.ca.gov/cgs/DataViewer/.
[2] The Source Group, Inc. 2014. Alternative Groundwater Monitoring Evaluation and report for SBX7-6 CASGEM Elevation Monitoring – 2014 UPDATE. Prepared for Shasta County Water Agency. Bulletin No. 01-SHC-003. November 18, 2014. No updates to this 2014 Report can be located after diligent search.

from this aquifer is limited to a small number of private domestic wells at residential properties; the closest residence is located approximately 3,000 feet northwest of the closest HCC production well and west of Highway 89. The aquifer does not provide water supplies to any municipal water system.

HCC and its predecessors have been extracting groundwater from the three wells since the mid-1950s and no available information suggests that HCC's usage has had any adverse impact on these domestic wells. It can be reasonably anticipated that, like the surrounding groundwater basins examined in *Alternative Groundwater Monitoring Evaluation and Report for SBX7-6 CASGEM Elevation Monitoring - 2014 Update*, groundwater recharge in the aquifer exceeds extraction for the same reasons that apply to the groundwater basins examined in the report, namely that the presence of high-permeability surface rocks and low-permeability rocks at depth, significant amounts of rain and snowfall in the area, sparse population, and little human activity (such as agriculture) results in limited groundwater extraction.

In addition, HCC has confirmed in its Notice of Intent letter that the amount of water being requested for Project construction is "a small fraction of our output capacity" and that it also anticipates, should it be necessary, having sufficient water to supply water for operational purposes for the life of the Project (TN 256385). HCC indicates that one of its wells has a capacity of 4,000 gallons per minute. In addition, HCC confirmed that the amount of water being requested for the Project is minimal compared to the HCC facility's typical annual usage such that the demand from this Project will create no material increase in extraction on a year over year basis[3].

Based on available data and best professional judgment, it is reasonable to conclude that the wells on the HCC property have more than an adequate water supply to serve the Project and other sources of demand.

[3] Perry Thompson, Hat Creek Construction, personal communication with Henry Woltag, June 12, 2024.

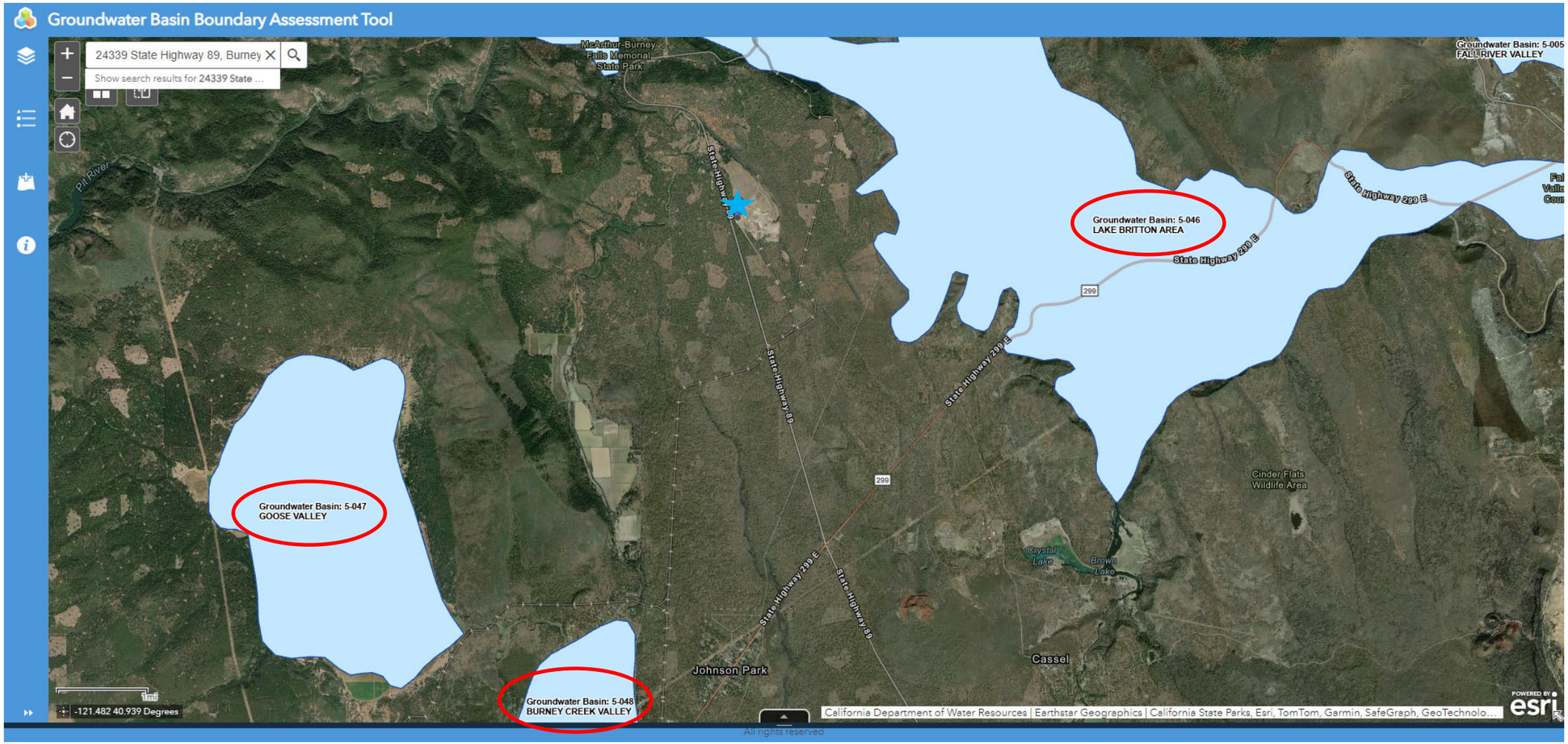

Figure 1. Location of Hat Creek Construction property (blue star) on which the three wells proposed to supply Project construction water are located compared to the locations of the three adjacent groundwater basin boundaries (Goose Valley, Burney Creek Valley, and Lake Britton, circled in red).

Source: California Department of Water Resources. 2019. Groundwater Basin Boundary Assessment Tool. Accessible at: https://gis.water.ca.gov/app/bbat/. Accessed June 18, 2024.

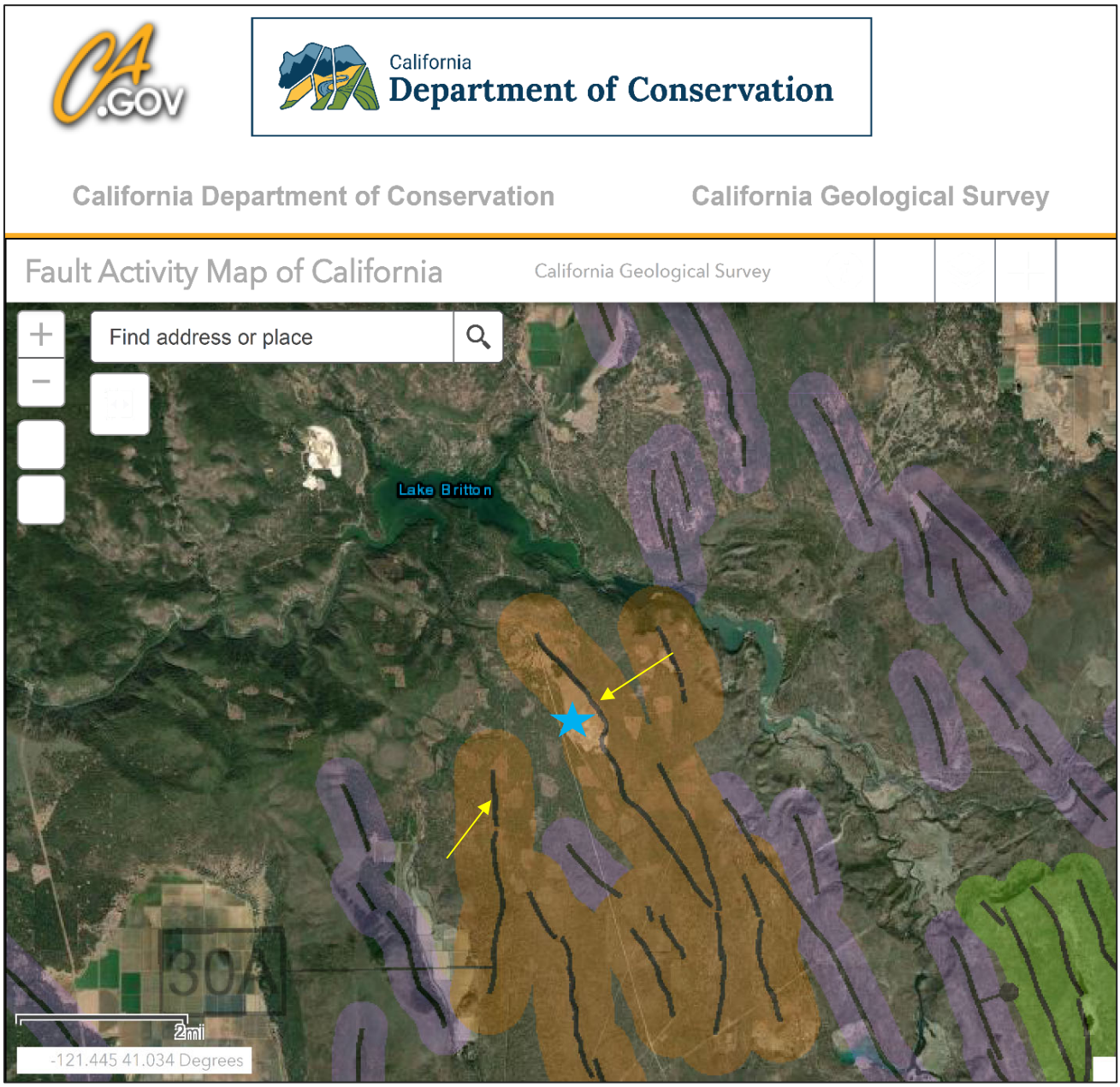

Figure 2. Location of Hat Creek Construction property (blue star) and bounding fault lines (indicated by yellow arrows).

Source: California Geological Survey. 2024. Fault Activity Map of California Online Web Mapper. Accessible at: https://maps.conservation.ca.gov/cgs/fam/app/. Accessed June 18, 2024.

Reference: Updated Water Supply Information for Fountain Wind Project

Appendix A. Thomas Regan Resume

Thomas Regan PG, CEG, CHG

Senior Hydrogeologist/Technical Lead

41 years of experience

Tom has experience in groundwater resources management, development, and protection. His responsibilities have included groundwater resources development, feasibility of groundwater development, groundwater basin analysis, aquifer characterization, development of regional and basin-wide hydrologic inventories/water balances, and development of hydrogeologic conceptual models. He has provided analysis of groundwater contamination impacting water supply wells, evaluation of coastal seawater barriers and seawater intrusion, well siting feasibility, well and well field siting, well design and construction oversight, well evaluation, well rehabilitation design and oversight, hydrogeologic and geochemical investigations related to the siting of new and expansion of existing groundwater recharge facilities, analysis of recycled water travel times from groundwater recharge operations using storm water, imported water and recycled water, analysis of pumping test data and well interference effects. Tom's experience also includes the design and implementation of drilling, soil sampling, aquifer testing, and field-testing programs related to groundwater recharge and development.

EDUCATION

BA, Geological Sciences, University of California Santa Barbara, Santa Barbara, California

REGISTRATIONS

Certified Engineering Geologist #1655, California Board for Professional Engineers, Land Surveyors, and Geologists

Professional Geologist #5203, California Board for Professional Engineers, Land Surveyors, and Geologists

Certified Hydrogeologist #327, California Board for Professional Engineers, Land Surveyors, and Geologists

MEMBERSHIPS

Member, National Ground Water Association

Member, Groundwater Resources Association of California

AWARDS

2020 AYSO Region 88 Hall of Fame

PROJECT EXPERIENCE

GROUNDWATER

Big Valley Groundwater Sustainability Plan | Lake County, California | Hydrogeologist

Tom prepared the hydrogeologic conceptual model (HCM) for the recently submitted Big Valley Groundwater Sustainability Plan (GSP). He prepared the HCM text, including eight geologic cross-sections to explain the geologic and hydrogeologic conditions affecting groundwater recharge, discharge, and movement within the basin. The GSP was prepared in record time—nine months—and submitted on-time to the Department of Water Resources.

Basin Boundary Modification Request, Sustainable Groundwater Management Act | Ventura County, California, United States | Hydrogeologist

For this project, Tom prepared geologic cross-sections and recommended basin boundary modifications of the Arroyo Santa Rosa groundwater basin in support of a basin boundary modification request (BBMR) which supported a forthcoming Groundwater Sustainability Plan. The BBMR was submitted to DWR and approved.

Sustainable Groundwater Management Act Technical Support | Kern County, California, United States | Hydrogeologist

Tom reviewed draft chapters of numerous Groundwater Sustainability Plans for up to 17 groundwater sustainability agencies (GSA) in Kern, southern Monterey, and western Kings Counties. His reviews focused on chapters describing hydrogeologic conceptual models, undesirable results, minimum thresholds, and measurable objectives.

Verdugo Basin Groundwater Evaluation and Monitoring | Los Angeles County, California | Hydrogeologist

Tom managed and performed a groundwater evaluation and monitoring project under the Department of Water Resources-administered AB 303 Local Groundwater Assistance Funding Program for small water systems to identify potential new production well sites, provide information to stakeholders regarding the Verdugo groundwater basin to enhance balanced management of local groundwater and imported water supplies, provide additional geologic and hydrogeologic data to DWR to update DWR Bulletin 118, and provide new groundwater level and quality data to optimize groundwater resources development in the Verdugo basin. The study entailed the drilling and installation of three monitoring wells to crystalline bedrock, nine months of groundwater level and quality monitoring, a preliminary estimate of safe yield, data analysis, and final report preparation.

Calleguas Creek Watershed Study | Ventura County, California, United States | Project Hydrogeologist

For this project, Tom managed and conducted hydrogeologic studies and subsurface investigations on

behalf of the Calleguas Municipal Water District related to the planning and implementation of the LARWQCB mandated Calleguas Creek Watershed Study in southeastern Ventura County. As project manager for the Groundwater Element, Tom conducted and managed a variety of planning and investigative studies related to groundwater supply in the seven groundwater basins comprising the watershed as well as the hydraulic and water quality impacts of treated wastewater effluent flows and excess irrigation runoff on groundwater in these basins. Tom also developed and implemented a groundwater monitoring program in accordance with a study area-specific work plan prepared by the writer. In this role, Tom also prepared and submitted various reports to Calleguas MWD and LARWQCB and provided presentations regarding the work performed and results therein to Calleguas MWD staff and other interested parties, specifically, local wastewater treatment plant managers (i.e., dischargers in the watershed basins).

Groundwater Recharge Feasibility Study | Kern County, California, United States | Project Manager

Tom managed a multi-disciplinary preliminary groundwater banking study under the Department of Water Resources-administered Proposition 13 Grant Funding Program to determine the technical feasibility of developing a full-scale conjunctive-use project in the White Wolf Basin in the southern San Joaquin Valley. The study involved seven tasks. Task 1 involved detailed review of available published and unpublished geologic and hydrogeologic data and of oil-field geologic and geophysical data from the nearby Tejon Oil Field. Task 2 involved a preliminary geotechnical investigation, including surficial soil mapping followed by shallow subsurface drilling and laboratory soil testing and percolation tests to identify potential groundwater recharge areas. A pilot recharge basin was then constructed in a representative area and equipped with various climate and vadose zone monitoring equipment, the latter, to track the wetting front as raw State Water Project water percolated in the pilot recharge basin. The pilot recharge basin was tested using various wet and dry cycles to determine optimum recharge rates. Task 3 involved the drilling of three deep exploratory borings to maximum depths of 1,700 feet to characterize subsurface geologic and hydrogeologic conditions. As part of this work, a number of fine-grained sedimentary layers (potential aquitards) that may impede recharge in certain areas were identified in the subsurface. In addition, methane gas from the nearby Tejon Oil Field was observed in certain portions of the underlying aquifer.

Geologic and Groundwater Resources Evaluations, Diamond Valley Reservoir | Hemet, California, United States | Project Hydorgeologist

Tom's task as project hydrogeologist, was to perform geologic and groundwater resources evaluations of three separate groups of undeveloped properties on behalf of the Metropolitan Water District of Southern California in support of condemnation proceedings respecting the construction of Diamond Valley Reservoir in Riverside County. Tom reviewed existing published and unpublished geologic maps, identified areas for subsurface exploration for on-site septic systems, supervised percolation testing where warranted by subsurface conditions, identified potential domestic water well sites and, on one group of properties, retained County of Riverside Department of Environmental Health personnel to conduct an environmental assessment of potential asbestos-containing materials in a former magnesite mine. Tom was responsible for preparing technical reports regarding the evaluations and analyses performed for each group of properties and provided expert witness testimony, via depositions, all of which resulted in plaintiff settlements prior to trial.

Hydrogeologic Conceptual Site Model | Western Kern County, California | Hydrogeologist

Tom prepared a regulatory-agency-directed hydrogeologic conceptual site model of an operating oil field in western Kern County. He conducted research and compiled considerable data regarding historic site operations, geology, and groundwater water levels and quality conditions. He also prepared the HCM.

GROUNDWATER SUPPLY / WELLS

Well Drilling and Construction Support Services | San Fernando Valley, California | Project Hydrogeologist

Tom provided field hydrogeologic services for the drilling, construction, and development of five high-capacity water supply wells in South Los Angeles as part of the Manhattan Well Improvement Project. Services included pilot hole reaming lithologic sampling and logging to depths of 1,580 feet, geophysical and caliper log review, well construction oversight, and airlift and swabbing development and airlift testing oversight. Tom also provided field hydrogeologic services for the Groundwater System Improvement Study in the eastern San Fernando Groundwater Basin. Services included pilot hole drilling and pilot hole reaming oversight, including lithologic sampling and logging; collecting discrete-depth Simulprobe groundwater and soil samples; recording penetration rates and drilling fluid properties; monitoring and reviewing geophysical logging of the pilot hole and reamed borehole; triple-completion monitoring well construction to depths of 880 feet; well development; monitoring of bio-fouling treatment and redevelopment of most wells; groundwater sampling; and ZIST pump installation, optimization, and compliance testing activities. Additional field work involved groundwater sampling from a variety of production and monitoring wells in Burbank, Pacoima, and San Fernando using submersible pumps and ZIST purging methods.

Hydrogeologic Technical Support | Inyo County, California, United States | Hydrogeologist

Tom provided hydrogeologic services to support a variety of projects, including the Owens Lake Recharge Study, George Wellfield Hydrogeologic Evaluation, and Owens Valley Groundwater Management Plan chapter regarding evaluation of in-valley groundwater storage and maintenance plan for well assets". In the former study, Tom researched available hydrogeologic, geologic, geophysical, well construction and production data to assess the hydraulic characteristics of the underlying aquifers. The results of the investigation yielded information regarding changes in aquifer hydraulic conductivity that were used to recommend locations and preliminary designs for higher-capacity production wells.

In the latter study, Tom reviewed available well construction, operation and historical production data for more than 100 production wells in the Owens Valley, and prepared the “Maintenance Plan for Well Assets” chapter in the Groundwater Management Plan. The chapter provided a detailed water level monitoring, well inspection, rehabilitation and replacement schedule, and flow chart to address deficiencies in the current data collection program and prioritize wells for rehabilitation and replacement. He has also been involved in several other studies related to groundwater recharge and recovery of surplus Los Angeles Aqueduct water in the Owens Valley groundwater basin and in other basins in Los Angeles and Kern counties adjacent to the Los Angeles Aqueduct.

Water Well and Groundwater Supply Study | Kern County, California, United States | Project Hydrogeologist

Tom provided hydrogeologic services to support the water supply planning for four proposed solar energy projects near California City and Boron, California. The projects included conducting a well canvass of all water wells in the project areas, preparing well inventory reports that provided details of the well canvass, and developing companion groundwater well inspection and testing work plans to assess the physical condition and operational characteristics of selected wells that could potentially meet the water supply demands of the projects. Detailed well inspection and testing flow charts were developed to provide the methodology for the assessments.

Monitoring Well Construction and Destruction Oversight | Palm Springs, California, United States | Hydrogeologist

Tom managed the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB)-requested modifications to the City of Palm Springs’ Wastewater Treatment Plant groundwater monitoring network. He prepared a work plan, technical specifications, and bid documents to construct three monitoring wells, destroy one monitoring well, and equipping five monitoring wells with low-purge submersible pumps. Tom managed drilling, design, construction, and development of new monitoring wells; equipping new and existing monitoring wells; and destruction of the monitoring well. A final report documenting the work performed was submitted to the CRBRWQCB.

Hydrogeologic Services | Los Angeles, California, United States | Project Manager

Tom managed and performed a variety of hydrogeologic studies and investigations at Los Angeles County Fire Department (LACFD) Camps 14 (Santa Clarita/Saugus) and 19 (Azusa) from 2013 through 2019. Initial work involved drilling and installing three, shallow, alluvial aquifer monitoring wells at LACFD Camp 14 to monitor up- and down-gradient water quality conditions adjacent to a new, on-site wastewater treatment and disposal system with multiple active and abandoned leach fields. Additionally, three older monitoring wells in the underlying sedimentary bedrock that contained high-salinity groundwater were decommissioned. Tom also evaluated the single, operating water supply wells at LACFD Camps 14 and 19. The evaluation reports indicated the LACFD Camp 14 well was improperly constructed, the well casing was severely damaged, and the well needed to be replaced. The California Department of Fish and Game and U.S. Army Corps of Engineers also advised LACFD that the wells at both facilities needed to be relocated because they were in a 100-year flood zone and environmentally sensitive habitats. In response, Tom conducted well siting studies and exploratory drilling at one location at LACFD Camp 19 and three locations at LACFD Camp 14. He worked with the client to select replacement well sites; prepared well construction technical specifications and bid documents; and provided hydrogeologic oversight for the drilling, design, construction, and testing of three potable wells at the two fire camps. He also recommended design pump settings and discharge rates for each well.

Well Siting Evaluation | Pasadena, California, United States | Project Hydrogeologist

Tom managed and conducted a municipal well siting evaluation related to volatile organic compound (VOC), perchlorate, and nitrate contamination. The evaluation included a review and analysis of historic municipal well operations, monitoring well and municipal well VOC, perchlorate and nitrate data, monitoring well and municipal well lithologic data, geologic and hydrogeologic data, municipal well dynamic spinner log data, and groundwater model and capture zone analysis. The results of the evaluation were presented in a technical memorandum with recommendations for a preferred well site.

Well Drilling and Construction Support Services, KB Homes Wells 4-76 and 4-77 and KHovnanian Homes Well 4-90 | Lancaster, California, United States | Project Hydrogeologist

Tom managed and provided hydrogeologic services to support the planning, drilling, design, construction, development, and testing of three municipal water supply wells with aquifer storage and recovery (ASR) capabilities at two residential development projects. Technical services included conductor and pilot hole drilling, lithologic logging, discrete-depth aquifer testing and analysis, well design, well construction observation, and development and aquifer testing of the three wells to assess and provide design production rates for each well. He prepared and submitted well completion reports to KHovnanian Homes and LACWWD 40, the agency taking over the wells' operation. Tom is currently coordinating with LACCWD 40 to rehabilitate and test KHovnanian Homes Well 4-90.

Well Drilling and Construction Support Services for John Latorraca Correctional Center Well 5 | Merced County, California | Hydrogeologist

Tom provided hydrogeologic support services for the drilling, design, construction, development, and testing of a replacement water supply well to provide a reliable source of water for the John Latorraca Correctional Center. Services included pilot hole lithologic and geophysical log review; soil sample selection and review of sieve analysis; well design; well construction observation; review of development logs; planning, review, and analysis of step-drawdown and constant rate pumping tests; and preparation of a well completion report with recommendations for a design discharge rate and

pump setting.

Vacaville Hydrogeologic Services | Vacaville, California | Hydrogeologist

As part of land development mitigation measures for a residential development company, Tom conducted a water well siting feasibility study on the mitigation lands; developed a preliminary well design; prepared well construction specifications and bid documents for a new irrigation well; conducted a pre-bid job walk with prospective drilling contractors; provided bid review; helped the client select the drilling contractor; and oversaw the drilling, discrete-depth zone sampling, design, and construction of a 2400-foot- deep, high-capacity irrigation well in an area where the deepest wells were less than 500 feet and produced marginal quality groundwater. He provided recommendations for a design discharge rate, 1800 gpm, and pump setting. The water quality was considered excellent to irrigate historically grown crops and was approved by UC Davis' Division of Agriculture and Natural Resources.

Well Drilling and Construction Support Services for Lahontan National Fish Hatcheries Complex Well4R | Gardnerville, Nevada | Hydrogeologist

Tom provided hydrogeologic services on behalf of a government contractor for the drilling, design, construction, development, and testing of a replacement water supply well to provide a reliable source of supply for the fish hatchery. Services included pilot hole lithologic and geophysical log review; soil sample selection and sieve analysis review; well design; well construction observation; development logs review; and planning, review, and analysis of step-drawdown and constant rate pumping tests. He also provided recommendations for design discharge rates of 900 and 1200 GPM.

COMMUNITY INVOLVEMENT

Volunteer Coach and Referee/Region 88 and Area 1C Board Member, American Youth Soccer Organization (AYSO), Glendale, CA, USA 1998 - 2020

Volunteer Coach and Referee Region 716, American Youth Soccer Association (AYSO), Nipomo, California, USA 2021-Present

PUBLICATIONS & WHITEPAPERS

Saez, J., T. Regan, and P. Stoppelmann. Geohydrology Investigation Using Direct Push, Geochemical and Geotechnical Techniques at Paiute Ponds Near Lancaster Water Reclamation Plant, Mojave Desert, California . *Ground Water*, 2000.

Brose, R., R. Shatz, and T. Regan. An Alternative Method of Lysimeter and Silica Flour Pack Placement in Deep Boreholes. *Ground Water*, 1986.

PRESENTATIONS

Geohydrology Investigation Using Direct Push, Geochemical and Geotechnical Testing Techniques at Paiute Ponds Near Lancaster Water Reclamation Plant, Mojave Desert, California . *National Groundwater Association 2000 Annual Meeting and Conference, "Ground Water: A Transboundary, Strategic and Geopolitical Resource"*, 2000.

Out of Sight and Out of Mind: Treating Your Well as an Asset. *American Water Works Association Annual Fall Conference 2020*, 2020.

Appendix B. Well Completion Reports

LOCATION NOT CHECKED

ORIGINAL

File Original, Duplicate and Triplicate with the REGIONAL WATER POLLUTION CONTROL BOARD No. 5
(Insert appropriate number)

WATER WELL DRILLERS REPORT
(Sections 7076, 7077, 7078, Water Code)

STATE OF CALIFORNIA

CONFIDENTIAL

Do Not Fill In

Nº 15662

State Well No. ____
Other Well No. 36/3E-10

(2) LOCATION OF WELL:
County SHASTA. Owner's number, if any— #1
R. F. D. or Street No.
Township #36 N. Range 3 E.
Mer. MDB&M. Sect. 10.

(3) TYPE OF WORK (check):
New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:
Rotary ☐
Cable ☒
Dug Well ☐

(6) CASING INSTALLED:
SINGLE ☒ DOUBLE ☐

From	ft. to	ft.	Diam.	Gage or Wall	If gravel packed: Diameter of Bore	from ft.	to ft.
0	9		16	10			
0	205		14 in	3/8 wall			

Type and size of shoe or well ring ____ Size of gravel: ____
Describe joint ____

CONFIDENTIAL
Section 7076.1, Water Code

(7) PERFORATIONS:
Type of perforator used TORCH.
Size of perforations 1/4 - 4 in., length, by — in.
From 80 ft. to 124 ft. 8 Perf. per row 5 Rows per ft.
133 205 " "
96 feet perforated.

(8) CONSTRUCTION:
Was a surface sanitary seal provided? ☒ Yes ☐ No To what depth 9 ft.
Were any strata sealed against pollution? ☐ Yes ☒ No If yes, note depth of strata
From 0 ft. to 9 ft. Drove 16 in to seal surface
Method of Sealing Drove 16 in 16 gage Washed Rock

(9) WATER LEVELS:
Depth at which water was first found 40 ft.
Standing level before perforating 18 ft.
Standing level after perforating 18 ft.

(10) WELL TESTS: 50 ft. Andriel 255 gal mi 9766 gal per ft Draw down
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Davidson and Myers
Yield: gal./min. with ft. draw down after hrs.
Temperature of water Cold. Was a chemical analysis made? ☐ Yes ☐ No
Was electric log made of well? ☐ Yes ☐ No

(11) WELL LOG:
Total depth 205 ft. Depth of completed well 205 ft.
Formation: *Describe by color, character, size of material, and structure.*

0 ft. to 6 ft. Top soil and Boulders
6 25. Broken loose.
25 40. Sand and Broken lava
40. 50. M. loose.
tested at 50 ft. 255 gal mi. 20 ft Draw down.
50. 85. lava Brown Gray.
85. 115. Broken lava.
115. 137. Hard Gray lava.
137 156. Hard Gray lava.
156 180. Hard Gray lava.
180 186 Gray lava and sand.
186 195. Gray lava.
195 200. Black sand and Gravel.
200 205 Black sand and Gravel some Gray lava. Bailer to be falling in from 35 ft level. Sand Washes off.
Standing water level before test 18 ft.
after test 18
Pumping 1400 gal per mi.
Well Drawed 9 inches.
4300 gal per mi with a 3 ft Draw down.

Work started Oct. 25 1955. Completed Nov. 6 1955

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Davidson and Myers
(Person, firm, or corporation) (Typed or printed)
Address Box 804 - 604
Burney Calif.
[SIGNED] C C Davidson
Well Driller

[redacted] Dated Nov. 6, 1955

95689 3-54 50M QUIN SPO DWR FORM NO. 246 (REV. 3-54)

ORIGINAL
File Original, Duplicate and Triplicate with the REGIONAL WATER POLLUTION CONTROL BOARD No. 5
(Insert appropriate number)

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

STATE OF CALIFORNIA

LOCATION NOT CHECKED
Do Not Fill In
No. 15667
State Well No.
Other Well No. 6/3E-10

(2) LOCATION OF WELL:

County S Hasta Owner's number, if any #2
R. F. D. or Street No. 4 mi East Bonny. 4 mi North Jonny Mill Site.

(3) TYPE OF WORK (*check*):

New well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (*check*):

Domestic ☐ Industrial ☐ Municipal ☑
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary ☐
Cable ☑
Dug Well ☐

(6) CASING INSTALLED:

SINGLE ☑ DOUBLE ☐

From ft.	to ft.	Diam.	Gage or Wall
0	16	16	1/4
0	186	14	1/4

Type and size of shoe or well ring HX56
Describe joint Cut. Weld.

If gravel packed

Diameter of Bore	from ft.	to ft.

Size of gravel:

(7) PERFORATIONS:

Type of perforator used TORCH.
Size of perforations 4 in., length, by 1/2 in.

From ft.	to ft.	Perf. per row	Rows per ft.
30	80	2	2
136	186	2	2

(8) CONSTRUCTION:

Was a surface sanitary seal provided? ☑ Yes ☐ No To what depth 16 ft.
Were any strata sealed against pollution? ☐ Yes ☑ No If yes, note depth of strata
From 6 ft. to — ft.
Method of Sealing DROVE Pipe to Bottom

(9) WATER LEVELS:

Depth at which water was first found 32 ft.
Standing level before perforating ft.
Standing level after perforating 10 ft. Flow ft.

(10) WELL TESTS:

Was a pump test made? ☑ Yes ☐ No If yes, by whom? Davidson Myers
Yield: 1400 gal./min. with 9 in. drawdown after 4 hrs.
Temperature of water 73° Was a chemical analysis made? ☐ Yes ☑ No
Was electric log made of well? ☐ Yes ☑ No

(11) WELL LOG:

Total depth ft. Depth of completed well ft.
Formations: Describe by color, character, size of material, and structure.

ft.	to ft.	Formation
0	16	Top Soil Boulders
16	32	Coarse gravel
32	37	Coarse Sand water
37	98	Grey Lava Rock
98	146	Grey Lava Rock
146	170	Dark Grey Lava
170	190	Dark Grey Lava
190	206	Black Sand Gravel Water

Total Depth 206

CONFIDENTIAL
Section 7076.1, Water Code.

Work started 8-6 1956 Completed 8-16 1956

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME DAVIDSON & MYERS 604
(Person, firm, or corporation) (Type or print)
Address BOX 804
BUANEY CALIF.
[Signed] C.C. Davidson
Well Driller
License No. 158996 Dated 8-16, 1956

95685 3-54 50M QUIN SPO DWR FORM NO. 246 (REV. 3-54)

ORIGINAL
File Original, Duplicate and Triplicate with the REGIONAL WATER POLLUTION CONTROL BOARD No. 5
(Insert appropriate number)

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

STATE OF CALIFORNIA

CONFIDENTIAL LOG Water Code Sec. 4853

LOCATION NOT CHECKED
Do Not Fill In
No 15670

State Well No.
Other Well No. 16N/ 5E-10

(2) LOCATION OF WELL:

County Shasta Owner's number, if any #3

R. F. D. or Street No.

~~5 miles north east of Burney~~
~~4 miles from Junction of 299~~
~~and Highway 89~~
~~1/4 mi. north of # 89~~

(3) TYPE OF WORK (check):

New well [X] Deepening [ ] Reconditioning [ ] Abandon [ ]

If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(5) EQUIPMENT:

Rotary [ ]
Cable [X]
Dug Well [ ]

(6) CASING INSTALLED:

SINGLE [ ] DOUBLE [ ]

From ft.	to ft.	Diam.	Gage or Wall
0	52'	10"	10

Type and size of shoe or well ring 4-5/8 -12"
Describe joint 4-5/8- 10 ~~Butt Weld~~

If gravel packed

Diameter of Bore	from ft.	to ft.

Size of gravel:

(7) PERFORATIONS:

Type of perforator used Torch
Size of perforations 1/4 in., length, by 3 in.
From 24 ft. to 52 ft. Perf. per row 5 Rows per ft. 5

(8) CONSTRUCTION:

Was a surface sanitary seal provided? [X] Yes [ ] No To what depth 10 ft. ft.

Were any strata sealed against pollution? [ ] Yes [X] No If yes, note depth of strata

From ft. to ft.

Method of Sealing ~~Drove 12" casing in solid rock~~

(9) WATER LEVELS:

Depth at which water was first found 32 ft.
Standing level before perforating 18' 6" ft.
Standing level after perforating 18' 6" ft.

(10) WELL TESTS:

Was a pump test made? [X] Yes [ ] No If yes, by whom? Davidson & Myers
Yield: 800 gal./min. with 12' 6" ft. draw down after 4 hrs.
Temperature of water Was a chemical analysis made? [ ] Yes [X] No
Was electric log made of well? [ ] Yes [X] No

(11) WELL LOG:

Total depth ft. Depth of completed well 52 ft.

Formation: *Describe by color, character, size of material, and structure.*

ft. to ft.	
0 - 20	porous lava
20 - 32	hard gray lava rock
32 - 41	black sand
41 - 52	Gray lava Rock

CONFIDENTIAL Section 7076.1, Water Code

Work started Oct. 16th 19 56 Completed oct 18th 19 56

WELL DRILLER'S STATEMENT:

604

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Davidson & Myers Drilling Co.
(Person, firm, or corporation) (Typed or printed)

Address Box 804 Burney Calif.

[SIGNED] C. C. Davidson
(Well Driller)

License No. 158996 Dated 10th 19th, 19 56

95689 3-54 50M QUIN © SPC

DWR FORM NO. 246 (REV. 3-54)

Appendix C: Alternative Groundwater Monitoring Evaluation and Report for SBX7-6 CASGEM Elevation Monitoring – 2014 UPDATE

ALTERNATIVE GROUNDWATER MONITORING EVALUATION AND REPORT FOR SBX7-6 CASGEM ELEVATION MONITORING – 2014 UPDATE

County of Shasta
California

01-SHC-003

Prepared For:

Shasta County Water Agency
1855 Placer Street
Redding, CA 96001

Prepared By:

SGI environmental THE SOURCE GROUP, INC.

3478 Buskirk Avenue, Suite 100
Pleasant Hill, CA 94523

Submitted: November 18, 2014

Prepared By:

Robert M. Gailey, P.G., C.HG.
Principal Hydrogeologist

PROFESSIONAL GEOLOGIST
exp 11/30/15
ROBERT M. GAILEY
No. 5338
STATE OF CALIFORNIA

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1.0 INTRODUCTION

Groundwater elevation monitoring is required throughout the state for areas that have been identified as groundwater basins by the California Department of Water Resources (CADWR). This requirement is implemented under the California Statewide Groundwater Elevation Monitoring (CASGEM) program. The program came about when Part 2.11 (Groundwater Monitoring) was added to Division 6 of the California Water Code (Sections 10920 through 10936) in response to passage of Senate Bill 6 in November 2009. Initial monitoring reports under the CASGEM program were due to the CADWR by the end of 2011. However, the CASGEM program requirements as initially formulated were not appropriate for all basins. Assembly Bill 1152, passed in September 2011, amended the above-referenced portion of the Water Code (Sections 10927, 10932 and 10933) to allow the use of "alternative monitoring techniques for certain groundwater basins and subbasins meeting prescribed conditions".

Alternative monitoring techniques may be used instead of directly monitoring groundwater elevations in wells if the basin or subbasin meets any one of the three following conditions quoted directly from Water Code Section 10932:

1. Groundwater elevations are unaffected by land use activities or planned land use activities, or naturally occurring total dissolved solids within the groundwater preclude the use of that water.
2. It is underlying land that is wholly owned or controlled, individually or collectively, by state, tribal, or federal authorities, and groundwater monitoring information is not available or was requested from, but not provided by, the state, tribal, or federal authorities.
3. It is underlying an area where geographic or geologic features make monitoring impracticable, including, but not limited to, a basin or subbasin that is inaccessible to well-drilling equipment.

A report must be submitted to the CADWR that is prepared by a California-licensed Professional Geologist and explains why one or more of the above-listed criteria apply.

The Shasta County Water Agency (Agency) identified six groundwater basins located within the county as possible candidates for alternative monitoring[1]. The six basins are designated by the CADWR as 5-38, Pondosa Town Area; 5-40, Hot Springs Valley; 5-45, Cayton Valley; 5-46, Lake Britton Area; 5-47, Goose Valley; and 5-49, Dry Burney Creek Valley (CADWR, 2003). Because these basins are remote and sparsely populated, the County engaged The Source Group, Inc (SGI) to 1) evaluate whether the use of alternative monitoring techniques are appropriate for the basins and 2) perform the initial alternative monitoring for the qualifying basins. The results of SGI's

[1] The identification was made after the Agency attempted to contact landowners in all of the basins. Solicitations of interest in allowing the Agency to monitor groundwater elevations were mailed to the landowners in 2011 (Appendix A). Only one owner in Goose Valley (Basin 5-47) responded in the affirmative, and only on the condition that he self-monitor. He has not responded to requests to provide elevation information since.

basin monitoring evaluation were summarized in a report titled *Alternative Groundwater Monitoring Evaluation and Report for SBX7-6, CASGEM Elevation Monitoring* (Initial Report) which was submitted to the Agency in December 2011 and revised in May 2012 based on CADWR comments. The Initial Report concluded that alternative monitoring was appropriate for each of the six listed basins.

CADWR subsequently evaluated and categorized all of California's groundwater basins as having very low, low, medium, or high priority. The categorization is based upon: overlying population; projected growth of overlying population; number of public supply wells; total number of supply wells; overlying irrigated acreage; reliance on groundwater as the primary source of water; impacts on the groundwater including overdraft, subsidence, saline intrusion, and other water quality degradation; and other information determined to be relevant. These six basins have been prioritized as very low, which is consistent with the findings of the Initial Report.

As required by Water Code Section 10932, the applicability of alternative monitoring for a basin must be reevaluated every three years. This 2014 update to the original alternative groundwater evaluation monitoring report presents both the evaluation as to whether alternative monitoring continues to be appropriate for each basin and the results of alternative monitoring where applicable.

2.0 DESCRIPTION OF GROUNDWATER BASINS

The six groundwater basins considered in this report as candidates for alternative monitoring are designated by the CADWR as 5-38, Pondosa Town Area; 5-40, Hot Springs Valley; 5-45, Cayton Valley; 5-46, Lake Britton Area; 5-47, Goose Valley; and 5-49, Dry Burney Creek Valley (CADWR, 2003). These basins are remote[2]. The basin locations are indicated on Figure 1.

All of the basins lay within the Cascade Range and Modoc Plateau geomorphic provinces. The division between these two provinces is not distinct as many geologic characteristics are shared (Bailey, 1966, and Norris and Webb, 1990). The geology of this area consists of assemblages of rocks, created by volcanism and faulting, that include localized pockets of unconsolidated alluvial and lake deposits[3]. In some instances, the unconsolidated materials are overlain by more recent volcanic rocks[4]. The presence of both high permeability surface rocks and low permeability rocks at depth results in significant groundwater recharge and relatively little surface drainage, as well as pronounced localized groundwater discharge as springs[5]. Brief descriptions for each basin based on published characteristics are presented below.

Basin 5-38, Pondosa Town Area

The Pondosa Town Area Groundwater Basin is located along State Route 89 and spans the border between Shasta and Siskiyou Counties (Figure 2). Only a small portion of the basin is located within Shasta County. Other than the geographic boundary and area of the basin, the CADWR (2003) presents no information regarding its characteristics. However, the 2,080-acre basin is mapped as alluvium by the California Geological Survey (Gutierrez et al, 2010).

Basin 5-40, Hot Springs Valley

The Hot Springs Valley Groundwater Basin is located near the town of Day with the southern edge of the basin approximately eight miles north of the center of Fall River Mills. It spans the border between Shasta and Modoc Counties (Figure 3). Only a small portion of the basin is located within Shasta County, and this portion of the basin is located within the footprint of Green Place Reservoir[6]. The basin is a northwest trending valley filled with alluvium (Gay and Aune, 1958). Only eight wells (seven designated as domestic use and one designated as municipal/irrigation

[2] The basin locations range from approximately 40 to 65 miles northeast of Redding, California. All are on the far (east) side of the Cascade Mountain Range from Redding.

[3] Bailey, 1966, page 94 and CADWR, 1960, page 21.

[4] Bailey, 1966, page 90, and Norris and Webb, 1990, page 171.

[5] Bailey, 1966, page 95; CADWR, 1960, page 21; and Norris and Webb, 1990, pages 172 and 174.

[6] Green Place Reservoir shown on United States Geological Survey topographic map Timbered Crater, CA Quadrangle, 1995.

use) were determined to exist in this 2,400-acre basin in approximately the year 2000, and deep percolation of applied water is estimated to far exceed groundwater extraction (CADWR, 2003).

Basin 5-45, Cayton Valley

The Cayton Valley Groundwater Basin is located along State Route 89 with the southern edge of the basin approximately one mile north of Lake Britton (Figure 4). The basin is filled with lake sediments and receives surface water drainage from Cayton Creek (CADWR, 1964). Only one well (designated as municipal/irrigation use) was determined to exist in this 1,300-acre basin in approximately the year 2000, and deep percolation of applied water is estimated to far exceed groundwater extraction (CADWR, 2003).

Basin 5-46, Lake Britton Area

The Lake Britton Area Groundwater Basin is located west of the town of Fall River Mills with the southwestern edge of the basin approximately two miles northeast of the intersection between State Route 89 and State Route 299 (Figure 5). The basin is filled with interlayered volcanic rocks and unconsolidated deposits (lake sediments and alluvium)[7]. Only a small number of wells (17 designated as domestic use) were determined to exist in this 14,060-acre basin in approximately the year 2000, and deep percolation of applied water is estimated to slightly exceed groundwater extraction (CADWR, 2003).

Basin 5-47, Goose Valley

The Goose Valley Groundwater Basin is located northwest of the town of Burney with the southern edge of the basin approximately three miles north of State Route 299 (Figure 6). The basin is filled with lake sediments (Lydon et al, 1960) and groundwater has been so shallow that areas of marsh existed (CADWR, 1964). Only five wells (three designated as domestic use and two designated as municipal/irrigation use) were determined to exist in this 4,210-acre basin in approximately the year 2000, and deep percolation of applied water is estimated to far exceed groundwater extraction (CADWR, 2003).

Basin 5-49, Dry Burney Creek Valley

The Dry Burney Creek Valley Groundwater Basin is located southwest of the town of Burney with the northern edge of the basin approximately nine miles south of State Route 299 (Figure 7). The 3,070-acre basin is filled with alluvial sediments (Lydon et al, 1960). Other than the geographic boundary and area of the basin, the CADWR presents no information regarding its characteristics (CADWR, 2003).

[7] Bailey, 1966, pages 73, 91 and 92; Gay and Aune, 1958; and CADWR, 1984, page 37.

3.0 INFORMATION COLLECTION

Additional information was collected so that each basin could be evaluated relative to the three criteria identified in the Water Code as described in Section 1.0:

- The Principal-In-Charge for this project performed reconnaissance on each of the six basins considered in this report. This work included reviewing available satellite imagery and then visiting the basins on September 26, 2014. The basin visits consisted of viewing portions of the basins from publicly accessible roads.
- A well log search was conducted through the CADWR office in Red Bluff on behalf of Shasta County. The purpose of the review was to evaluate the level of groundwater pumping that occurs in each basin[8].
- Annual[9] rainfall data for each basin was obtained from the PRISM Climate Group (PRISM), Oregon State University (http://prism.oregonstate.edu)[10]. The purpose was to obtain basin specific rainfall data and to evaluate trends in precipitation that occurred within the last three years. Historic PRISM data for each basin spanning the water years 1980 through 2014 is included as Figure 8.
- The following information was obtained from the County to 1) confirm and build upon observations made during September 26 field reconnaissance and 2) establish current and near-term future land use plans.
    - Information on current and planned land use for each basin from the Shasta County Resources Management Department Planning Division,
    - Information on building permit applications within the past two years for each basin from the Shasta County Resources Management Department Building Division,
    - Information on well construction permit applications within the past two years for each basin from the Shasta County Resources Management Department Environmental Health Division, and
    - Information on public and private land ownership for each basin from the Shasta County Assessor's Office.

The information collected for each basin is summarized below.

Basin 5-38, Pondosa Town Area

As noted in Section 2, the vast majority of the basin area is located in Siskiyou County. To date, limited information has been received from Siskiyou County to support this reporting effort. The

[8] The well logs are not presented in this report in accordance with California Water Code Section 13752.

[9] Based on Water Year (October through September).

[10] PRISM spatially interpolates rainfall data between existing meteorological station locations to create local rainfall estimates.

information collected from Shasta County, along with the information obtained from Siskiyou County, is discussed below and summarized on Table 1.

Reconnaissance observations indicate that very little development exists in this basin other than a small number of residences (Figure 2). Aerial photography shows a significant amount of logging has occurred since 2011 on lands immediately surrounding the basin. The basin is sparsely populated. The well log search revealed no records of water supply wells in the basin; however, it is expected that a few residential water supply wells exist. Within Shasta County, 100 percent of the land is privately owned and there are no apparent plans for development. Table 2 presents water budget calculations performed based upon the available information. Basin recharge is expected to far exceed the small amount of groundwater pumped for domestic purposes. Annual basin rainfall totals have been less than average since 2011 (Figure 8).

Basin 5-40, Hot Springs Valley

As noted in Section 2, the vast majority of the basin area is located in Modoc County. To date, limited information has been received from Modoc County in support of this reporting effort. The information collected from Shasta County, along with the information obtained from Modoc County, is discussed below and summarized on Table 3.

Reconnaissance observations indicate that development in this basin consists of relatively light agricultural activity. Portions of the basin are irrigated for hay production (Figure 3) and it appears that some cattle grazing also occurs in the basin. Irrigation appears to be accomplished, at least partly, by routing discharges located along the edge of the basin to the hay fields. Springs and creeks within the basin, where observable, were observed to be flowing. The basin and its general vicinity are sparsely populated with a small number of residences located just outside of the basin. The well log search revealed no records of water supply wells in the basin; however, there are records of residential water supply wells just outside the basin[11]. Within Shasta County, 60 percent of the land is privately owned and there are no apparent plans for development. Information from Modoc County indicates that approximately 68 percent of the land is privately owned within that county.

Table 4 presents water budget calculations performed based upon the available information. There appears to be no direct groundwater demand imposed on the basin as a result of human activity; however, some water that might otherwise enter the basin as recharge may be intercepted as a result of domestic pumping just outside the basin and increased evapotranspiration related to hay production. The calculations indicate that precipitation falling on the basin significantly

[11] It is noted that the CADWR (2003) reports the existence of eight wells in the basin; however, the well log search performed by the CADWR for this report indicates otherwise. It appears possible that the CADWR considered some of the domestic wells to be located within the basin.

exceeds the amount of water intercepted for domestic and irrigation uses. Annual basin rainfall totals have been less than average since 2011 (Figure 8).

Basin 5-45, Cayton Valley

The collected information is discussed below and summarized on Table 5. Reconnaissance observations indicate that development in this basin largely consists of agricultural activity. The majority of the basin is irrigated for hay production (Figure 4). Irrigation appears to be accomplished by routing discharges located along the edge of the basin to the hay fields and, as noted by the CADWR (2003), from Cayton Creek. Springs and creeks within the basin, where observable, were observed to be flowing. The basin is sparsely populated. A small number of residences are located along the edge of the basin. The well log search revealed no records of water supply wells in the basin; however, it is expected that a few residential water supply wells exist[12]. Approximately 99 percent of the land is privately owned. Other than two building and two well permit applications, there are no apparent plans for development.

Table 6 presents water budget calculations performed based upon the available information. Other than a few domestic wells that are assumed to exist, there appears to be no direct groundwater demand imposed on the basin as a result of human activity; however, some water that might otherwise enter the basin as recharge is likely intercepted as a result of increased evapotranspiration related to hay production. The calculations indicate that precipitation falling on the basin may not exceed the amount of water intercepted for domestic and irrigation uses; however, the calculations do not account for contributions to the basin water budget from the surrounding lands (runoff and seepage). Annual basin rainfall totals have been less than average since 2011 (Figure 8).

Basin 5-46, Lake Britton Area

The collected information is discussed below and summarized on Table 7. Reconnaissance observations indicate that very little development exists in this relatively large basin other than a small number of residences (Figure 5). Surface water is retained for use in hydroelectric power generation; a diatomaceous earth mining operation appears to be located along the edge of the lake; and there are a small number of residences. The basin is sparsely populated. The well log search revealed records of 22 domestic and one public water supply[13] wells in the basin. The production ranges for the wells are reported to range from 5 to 100 gallons per minute (gpm). Approximately 69 percent of the land is privately owned. Other than four building and one well permit applications, there are no apparent plans for development.

[12] It is noted that the CADWR (2003) reports the existence of one well in the basin; however, the well log search performed by the CADWR for this report indicates otherwise. It appears possible that the CADWR considered the one well indentified in the search (Table 3) to be located within the basin; however, review of the geologic log suggests that the well is not located within the basin.

[13] The public supply well is for a lodge and not expected to produce a large volume of water on an annual basis.

Table 8 presents water budget calculations performed based upon the available information. Other than 22 domestic wells and one public well that supplies a lodge, there appears to be no direct groundwater demand imposed on the basin as a result of human activity. Basin recharge is expected to significantly exceed the amount of water supply pumping. While the diatomaceous earth mining operation located along the edge of the lake may include some dewatering efforts, no significant impact on the groundwater system is anticipated because the lake is immediately adjacent to the operation and is expected to act as a source of much of the pumped water. Annual basin rainfall totals have been less than average since 2011 (Figure 8).

Basin 5-47, Goose Valley

The collected information is discussed below and summarized on Table 9. Reconnaissance observations indicate that development in this basin consists of agricultural activity. The majority of the basin is irrigated for hay and rice[14] production (Figure 6). Irrigation appears to be accomplished, at least partly, by routing discharges located along the edge of the basin to the hay and rice fields. Springs and creeks within the basin, where observable, were observed to be flowing. The basin is sparsely populated with a small number of residences located along the edge of the basin. The well log search revealed records of two domestic and four irrigation water supply wells in the basin. The production ranges for the wells are reported to range from 60 to 3,000 gpm. Approximately 100 percent of the land is privately owned. Other than four building permit applications, there are no apparent plans for development.

Table 10 presents water budget calculations performed based upon the available information. Other than three domestic and three irrigation wells, there appears to be no direct groundwater demand imposed on the basin as a result of human activity; however, some water that might otherwise enter the basin as 1) natural recharge or 2) deep percolation of applied water pumped from the irrigation wells may be intercepted as a result of increased evapotranspiration related to hay production. The calculations indicate that precipitation falling on the basin may exceed the amount of water pumped and intercepted for domestic and irrigation uses. Annual basin rainfall totals have been less than average since 2011 (Figure 8).

Basin 5-49, Dry Burney Creek Valley

The collected information is discussed below and summarized on Table 11. Reconnaissance observations indicate that this basin is very remote, unpopulated, and used only for cattle grazing (Figure 7). Aerial photography shows some logging has occurred since 2011 on lands immediately surrounding the basin. The well log search revealed no records of water supply wells in the basin. 100 percent of the land is privately owned and there are no apparent plans for development. Water budget calculations were not prepared for this basin because no pumping or significant water diversions appear to occur. Annual basin rainfall totals have been less than average since 2011 (Figure 8).

[14] www.goosevalley.com

4.0 EVALUATION OF BASINS RELATIVE TO ALTERNATIVE MONITORING CRITERIA

The applicability of alternative monitoring was evaluated for each basin based upon the criteria presented in Section 1 and the information presented in sections 2 and 3. The overall finding was that criteria #1 (groundwater elevations are unaffected by land use activities or planned land use activities) and/or #3 (geographic or geologic features make monitoring impracticable) applied to all six basins and, therefore, the use of alternative groundwater monitoring methods was appropriate for all of the candidate basins. These conclusions were based upon the fact that at least one of the following two conditions applies to each of the basins:

- Groundwater withdrawals from the basin caused by human activities either are quite low relative to the expected amount of recharge or do not exist; and
- The basin is remote and traditional groundwater monitoring approaches would be geographically impractical.

Each basin is discussed below.

Basin 5-38, Pondosa Town Area

This basin is remote and contains little development. Other than a few domestic wells that are assumed to exist in the Siskiyou County portion of the basin, there appears to be no groundwater demand imposed on the basin as a result of human activity. Therefore, Criterion #1 presented in Section 1 of this report applies. Criterion #3 also applies given that the basin is remote and traditional groundwater monitoring approaches would be geographically impractical. It is appropriate to apply alternative monitoring techniques to this basin.

Basin 5-40, Hot Springs Valley

This basin is remote and contains relatively little development. Criterion #3 presented in Section 1 of this report applies given that 1) the basin is remote and traditional groundwater monitoring approaches would be geographically impractical and 2) the portion of the basin in Shasta County is located within the footprint of a reservoir and is periodically covered by surface water[15]. It is appropriate to apply alternative monitoring techniques to this basin.

Basin 5-45, Cayton Valley

This basin is remote and contains relatively little development. Criterion #3 presented in Section 1 of this report applies given that the basin is remote and traditional groundwater monitoring approaches would be geographically impractical. It is appropriate to apply alternative monitoring techniques to this basin.

[15] The presence of the reservoir makes groundwater level monitoring logistically challenging. Furthermore, placement of a monitoring well within an area that floods with surface water may pose a threat to groundwater quality.

Basin 5-46, Lake Britton Area

This basin is remote and contains relatively little development. Criterion #3 presented in Section 1 of this report also applies given that the basin is remote and traditional groundwater monitoring approaches would be geographically impractical. It is appropriate to apply alternative monitoring techniques to this basin.

Basin 5-47, Goose Valley

This basin is remote and contains relatively little development. Criterion #3 presented in Section 1 of this report also applies given that the basin is remote and traditional groundwater monitoring approaches would be geographically impractical. It is appropriate to apply alternative monitoring techniques to this basin.

Basin 5-49, Dry Burney Creek Valley

This basin is remote and contains no apparent development. There appears to be no current or planned development in this basin and no groundwater demand appears to be imposed as a result of human activity. Therefore, Criterion #1 presented in Section 1 of this report applies. Criterion #3 also applies given that the basin is remote and traditional groundwater monitoring approaches would be geographically impractical. It is appropriate to apply alternative monitoring techniques to this basin.

5.0 ALTERNATIVE MONITORING RESULTS FOR QUALIFYING BASINS

CADWR (2010) states that "The primary objective of the CASGEM Monitoring program is to define the seasonal and long-term trends in groundwater elevations in California's groundwater basins." A secondary objective of the program is identified as providing "sufficient data to draw representative contour maps of the elevations" such that it would be possible to "estimate changes in groundwater storage and to evaluate potential areas of overdraft and subsidence." These objectives were clearly envisioned for a traditional groundwater monitoring program that involves monitoring wells and are not directly applicable to an alternative monitoring approach. However, the essential basin monitoring goal of detecting long-term changes in the groundwater system at the basin scale can still be accomplished through alternative monitoring.

As required by Water Code Section 10932, the applicability of alternative monitoring for a basin must be reevaluated every three years[16]. It was proposed in the Initial Report that evaluation of potential long-term changes be performed along with the reevaluation of applicability of alternative monitoring. The following sections present the results of these evaluations as well as plans for evaluations in subsequent reports.

5.1 Evaluation of Potential Long-Term Changes

The identification of potential long term changes for each basin was accomplished by comparing available baseline information with information (for water 2011 and before where available) collected in 2014 (for water years 2012, 2013 and 2014). The differences were then evaluated to determine the nature and scale of the changes. The goal was to detect long-term trends (i.e., changes in components of the water budget, such as recharge and discharge, for each basin). The information evaluated included changes in land use, ownership, building permits, well permits, number of wells, water budget calculations and rainfall. The nature of potential changes included consideration as to whether any changes were 1) actual or artifacts of the information collection, analysis and reporting processes and 2) significant or minor. The results of each basin comparison are presented below. This 2014 evaluation of the basins by alternative monitoring methods showed no significant changes in groundwater conditions in the six basins considered.

Basin 5-38, Pondosa Town Area

There were no changes in available data collected for the Pondosa Town Area Basin (Table 1). One change was made to the basin water budget calculation (Table 2) based upon use of the historical average precipitation in place of the CADWR estimate used previously. Annual precipitation had previously been estimated by CADWR to be between 35 to 41 inches per year. A

[16] It is acknowledged that Water Code Section 10932 also requires the Agency to notify CADWR within 60 days of finding that a basin is no longer eligible for alternative monitoring. However, the geographic impracticality of applying traditional groundwater monitoring approaches in these remote basins (Criterion #3 which applies to all six basins) is not expected to change over a three-year period. The three-year review cycle is expected to be sufficient but the Agency will track conditions that might change applicability of Criterion #3.

more basin-specific estimate of 32.8 inches per year was obtained from PRISM (see section 3.0). The net result was insignificant as the amount of recharge to the basin is still estimated to be more than 1000 times greater than the basin discharge estimate. Overall, there were no significant changes within the Pondosa Town Area Basin.

Basin 5-40, Hot Springs Valley

Land use within the Shasta County portion of Hot Springs Valley Basin changed from 100% 'Unclassified' in 2011 to 40% 'Unclassified' and 60% 'Natural Habitat' in 2014 (Table 3). This change is an artifact of how Shasta County currently defines land use as opposed to an actual change in land use. This change had no effect on the basin water budget calculation.

There was only one change to the basin water budget calculation (Table 4). Annual precipitation had previously been estimated by CADWR to be between 19 and 27 inches per year. A more basin-specific estimate of 19.2 inches per year was obtained from PRISM (see section 3.0). The net result was insignificant as the amount of recharge to the basin is still estimated to be more than 2 times greater than the basin discharge estimate. Overall, there were no significant changes within the Hot Springs Valley Basin.

Basin 5-45, Cayton Valley

Land use within Cayton Valley Basin changed from 96.9% 'Agricultural' and 3.1% 'Unclassified' in 2011 to 98.6% 'Agricultural', 0.3% 'Timberland' and 1.1% 'Unclassified' in 2014 (Table 5). These changes are an artifact of how Shasta County currently defines land use as opposed to an actual change in land use. This change had no effect on the basin water budget calculation.

Two building permits and two well permits were approved within the 2012 to 2014 time period (Table 5). Based on a records search by CADWR, no new wells were identified within the basin. While these permits may indicate the potential for future development, they currently have no effect on the basin water budget calculation.

There was only one change to the basin water budget calculation (Table 6). Annual precipitation had previously been estimated by CADWR to be between 35 to 41 inches per year. A more basin specific estimate of 27.4 inches per year was obtained from PRISM (see section 3.0). The net result was minor as the amount of recharge to the basin is still estimated to be approximately at parity with the basin discharge estimate. Overall, there were no significant changes within the Cayton Valley Basin.

Basin 5-46, Lake Britton Area

In 2014, 23 wells were identified within the Lake Britton Area Basin as opposed to the 20 wells identified within the basin in 2011 (Table 7). While the apparent increase in wells was used to update the basin water budget calculation, the changed number of identified wells is an artifact of the well identification process. Wells within the basin were identified through review of Well

Completion Reports provided by CADWR. The Well Completion Reports can have limited or missing information which sometimes make the decision to include a well within the basin area a judgment call. In this case, the wells identified by CADWR as being in the vicinity of the Lake Britton Area Basin were reevaluated using better well location information[17] which resulted in the location status of several wells changing for 2014. The inclusion of three additional wells within the basin had a minor effect on the basin water budget calculation.

Land use within the Lake Britton Area Basin changed from 8.0% 'Residential', 4.6% 'Woodland', 0.2% 'Recreation', 2.4% 'Agricultural', 1.7% 'Open Space', and 83.1% 'Unclassified' in 2011 to 5.5% 'Residential', 62.7% 'Timberland', 0.4% 'Agricultural', and 31.4% 'Unclassified' in 2014 (Table 7). These changes are an artifact of how Shasta County currently defines land use as opposed to an actual change in land use. This change had no effect on the basin water budget calculation.

Land ownership within the Lake Britton Area Basin changed from 75.7% private and 24.3% public in 2011 to 68.8% private and 31.4% public (Table 7). This change is an artifact of how Shasta County currently calculates land ownership as opposed to an actual change in land ownership. This change had no effect on the basin water budget calculation.

Four building permits and one well permit were approved within the 2012 to 2014 time period (Table 7). Based on a records search by CADWR, no additional wells were identified within the basin. While these permits may indicate the potential for future development, they currently have no effect on the basin water budget calculation.

There were two changes to the basin water budget calculation (Table 8). The first, mentioned above, is the increase in the estimated number of residences from 20 to 23 based on the number of wells identified within the basin. Secondly, the annual precipitation had previously been estimated by CADWR to be between 21 to 43 inches per year. A more basin specific estimate of 19.1 inches per year was obtained from PRISM (see section 3.0). The net result was insignificant as the amount of recharge to the basin is still estimated to be more than 1000 times greater than the basin discharge estimate. Overall, there were no significant changes within the Lake Britton Area Basin.

Basin 5-47, Goose Valley

In both 2011 and 2014, six wells were identified with Goose Valley Basin. In 2011, three of the wells were identified as agricultural wells and three were identified as domestic wells. Well use information provided by CADWR in 2014 indicated that one of the domestic wells identified in 2011 is now classified as an agricultural well (i.e. instead of three domestic wells and three agricultural wells in the basin, there are two domestic wells and four agricultural wells) (Table 9). The effect of reclassifying one of the domestic wells identified in 2011 to an agricultural well had a minor effect on the basin water budget calculation.

[17] Shasta County Assessor Parcel Mapping tool (http://gis.co.shasta.ca.us/Parcels/)

Land use within the Lake Britton Area Basin changed from 100% 'Agricultural' in 2011 to 99.2% 'Agricultural', 0.6% 'Timberland', and 0.2% 'Unclassified' in 2014. This change is an artifact of how Shasta County currently defines land use as opposed to as actual change in land use. This change had no effect on the basin water budget calculation.

Four building permits were approved within the 2012 to 2014 time period (Table 9). While these permits may indicate the potential for future development, they currently have no effect on the basin water budget calculation.

There were two changes to the basin water budget calculation (Table 10). The first, mentioned above, was the decrease in the estimated number of residences from three to two based on the number of domestic wells identified within the basin. Secondly, the annual precipitation had previously been estimated by CADWR to be between 29 to 33 inches per year. A more basin specific estimate of 34.5 inches per year was obtained from PRISM (see section 3.0). The net result was insignificant as the amount of recharge to the basin is still estimated to be approximately at parity with the basin discharge estimate. Overall, there were no significant changes within the Goose Valley Basin.

Basin 5-49, Dry Burney Creek Valley

There were no changes within the Dry Burney Creek Valley Basin (Table 11).

5.2 Evaluation of Alternative Monitoring Applicability

Table 18 summarizes the results of the evaluation tasks discussed in the previous sections. The results of data collection and analysis indicate that use of an alternative groundwater monitoring approach is appropriate for each of the six candidate basins since at least one of the qualifying criteria stated in Water Code Section 10932 applies to each basin.

5.3 Plans for Subsequent Reports

The baseline information (i.e. the data initially collected in 2011 and again in 2014) that will be used in the future evaluations is presented in figures 2 through 8 and tables 1 through 11 in this report as well as the Initial Report. The data that will be collected in for the subsequent update of this report in 2017 is indicated on Tables 12 through 17. The 2017 data collection for each basin will include the following:

- Performing drive-by field reconnaissance observations;
- Reviewing available satellite imagery;
- Conducting a well log search;
- Obtaining PRISM rainfall data for water years 2015, 2016 and 2017[18].

[18] http://prism.oregonstate.edu

- Evaluating indicators of development:
    - Current and planned land use;
    - Recent building permit applications;
    - Recent well construction permit applications;
    - Evaluating changes in public and private land ownership.

As appropriate, water budget calculations similar to those presented in this report will be made. In addition, trends in precipitation will be presented starting with September 2011 when the first field reconnaissance of the basins was performed. Comparing the collected information and related calculations to the baseline data will provide 1) an assessment of long-term trends in components of the water budget, such as recharge and discharge, for each basin and 2) an evaluation as to whether continued use of alternative monitoring is appropriate for each basin.

6.0 CONCLUSIONS

This 2014 evaluation of the basins by alternative monitoring methods showed no significant changes in groundwater conditions in the six basins considered. Consistent with this result, there were no significant changes in the water budget calculations for any of the six basins. Additionally, at least one of the qualifying criteria stated in Water Code Section 10932 applies to each basin. Therefore, the continued use of alternative monitoring is appropriate for all six basins. The data collected and analyzed to date provide a baseline for future comparative evaluations to be performed every three years for the purpose of detecting long-term trends in components of the water budget, such as recharge and discharge, for each basin. The next data collection event is anticipated on or about September 2017.

7.0 REFERENCES

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Shasta County Department of Public Works

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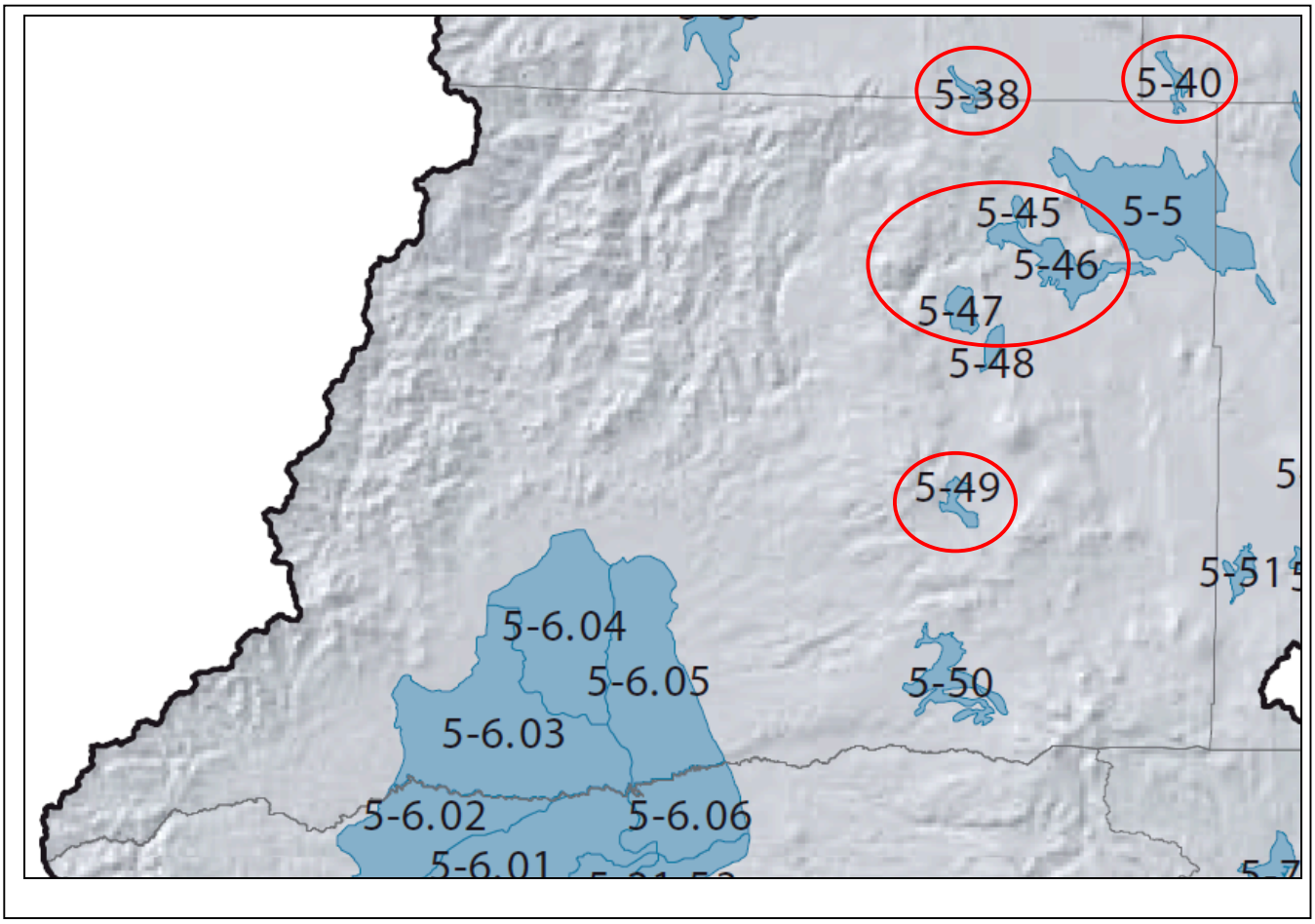
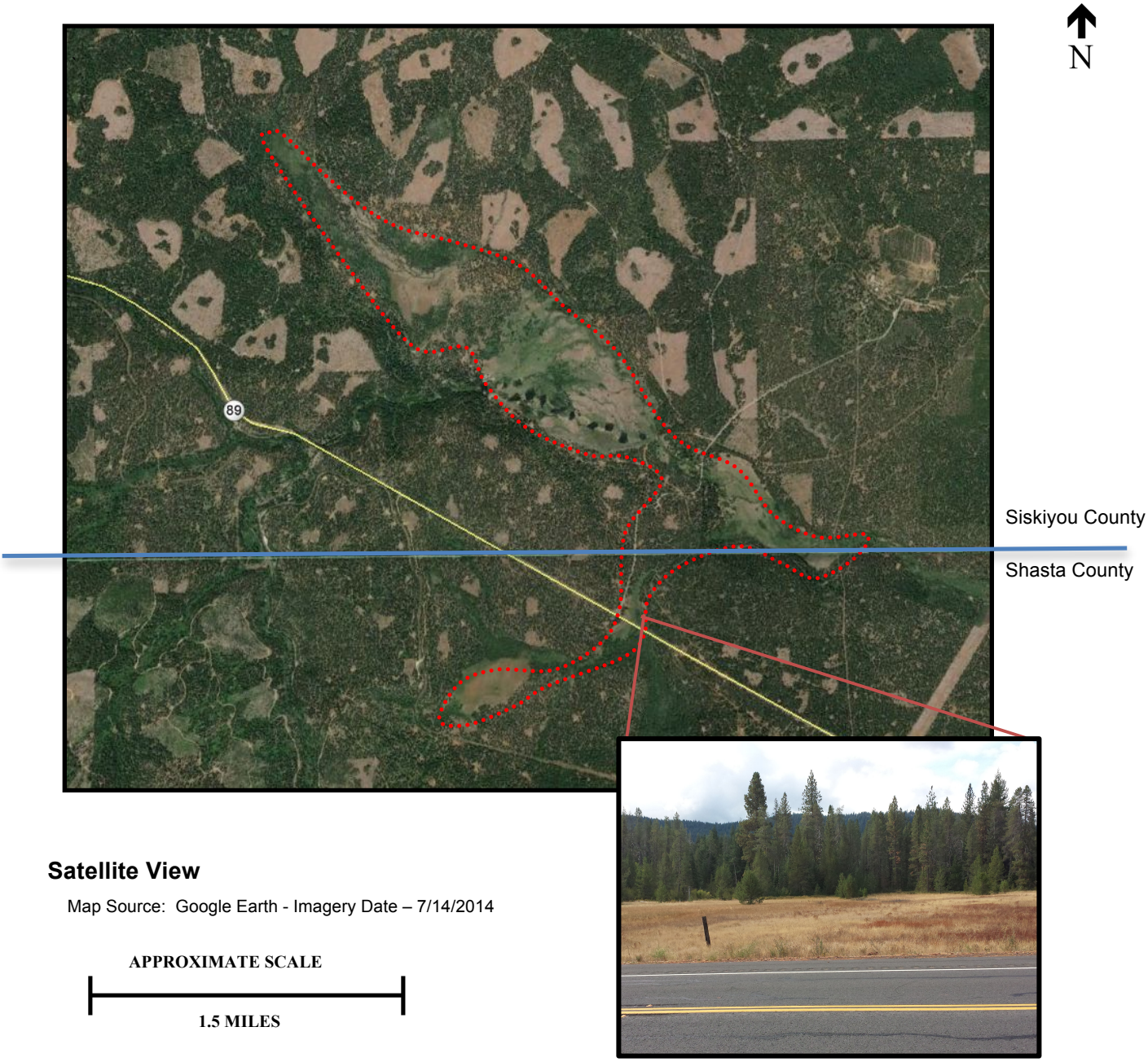
FIGURES

FIGURE 1
BASIN LOCATIONS



Adapted from California's Groundwater, Bulletin 118 – Update 2003, California Department of Water Resources, 2003, figure entitled Sacramento River Hydrologic Region, available at http://www.water.ca.gov/groundwater/bulletin118/maps/SR.pdf

FIGURE 2
BASIN 5-38, PONDOSA TOWN AREA



Satellite View

Map Source: Google Earth - Imagery Date – 7/14/2014

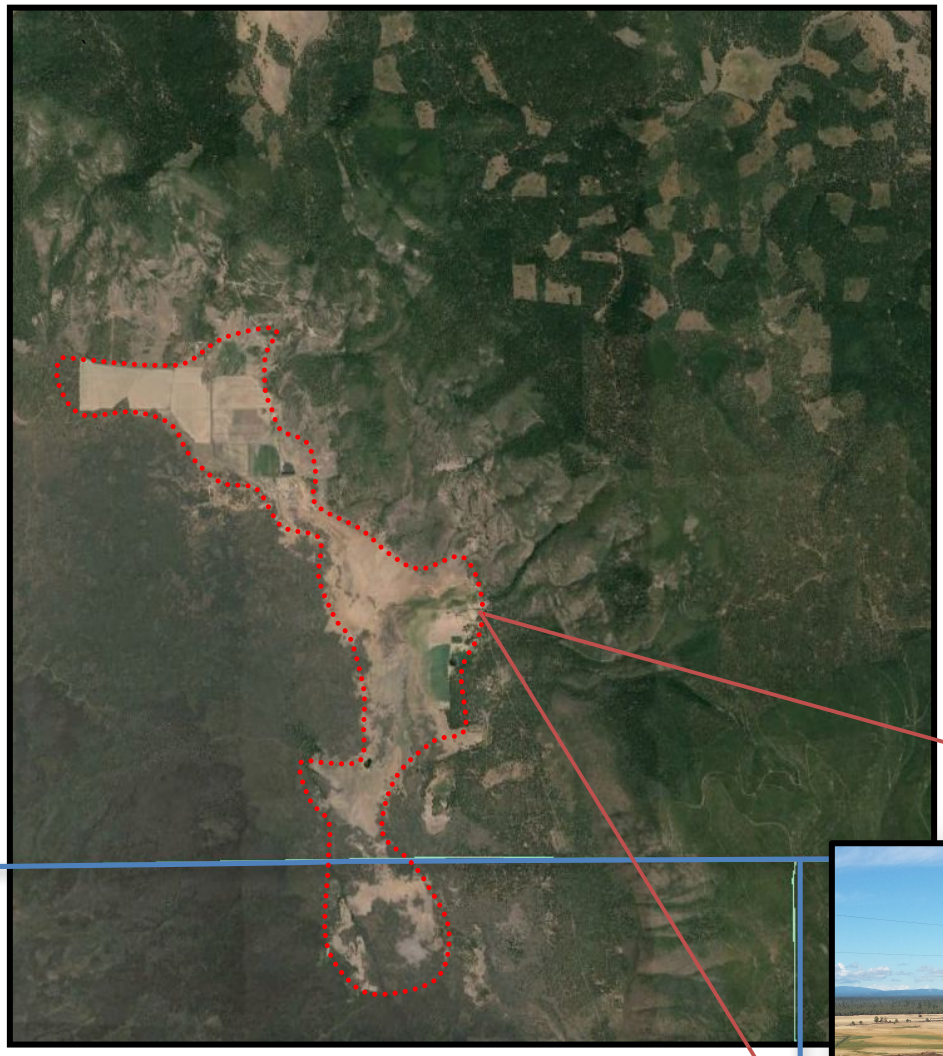
APPROXIMATE SCALE

1.5 MILES

Looking Southwest

SGI water THE SOURCE GROUP, INC.

FIGURE 3
BASIN 5-40, HOT SPRINGS VALLEY



N

Modoc County

Shasta County

Satellite View

Map Source: Google Earth - Imagery Date – 7/4/2014

APPROXIMATE SCALE

2.5 MILES

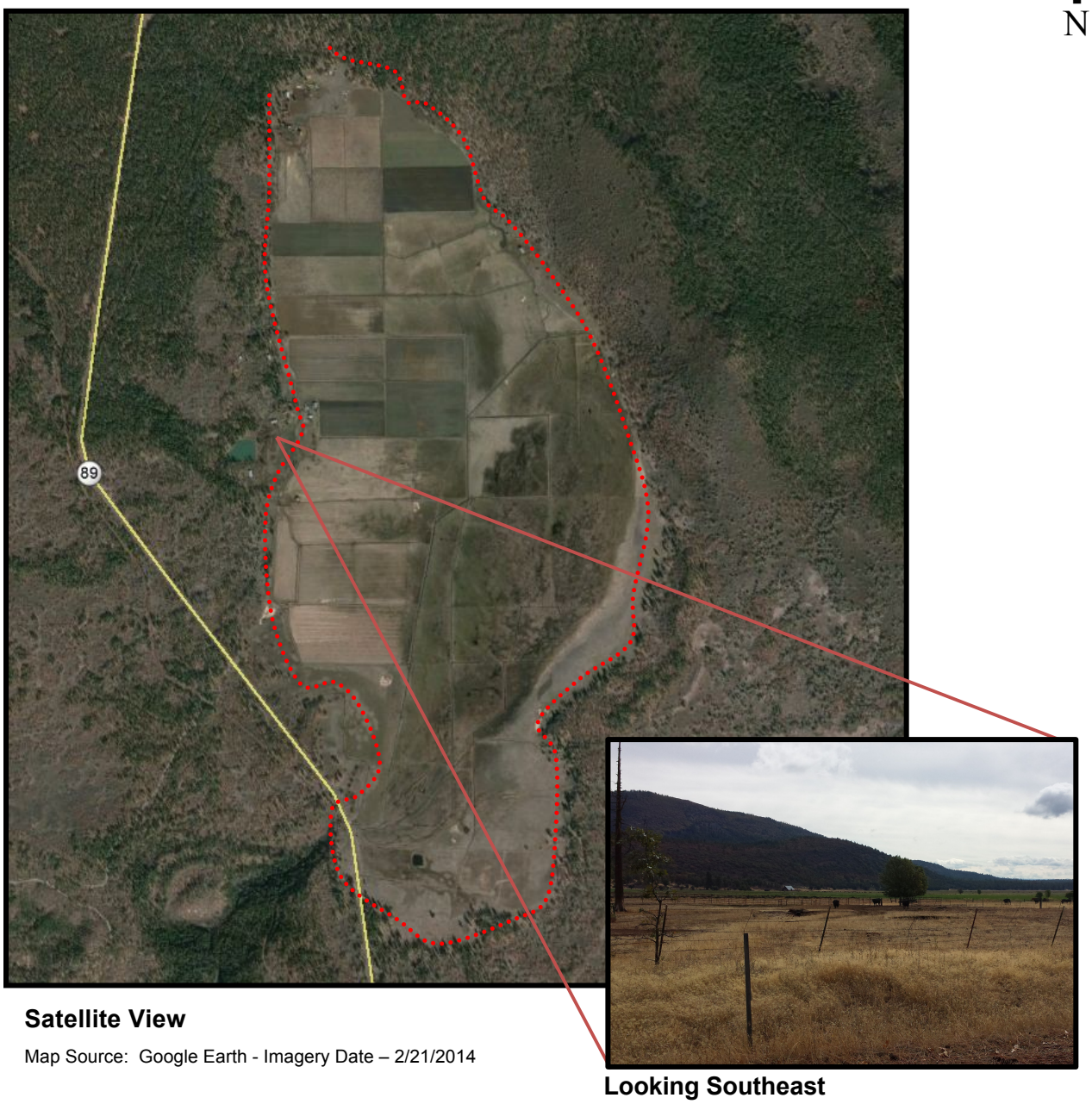
Looking Northwest

Shasta County

Lassen County

SGI water THE SOURCE GROUP, INC.

FIGURE 4
BASIN 5-45, CAYTON VALLEY



Satellite View

Map Source: Google Earth - Imagery Date – 2/21/2014

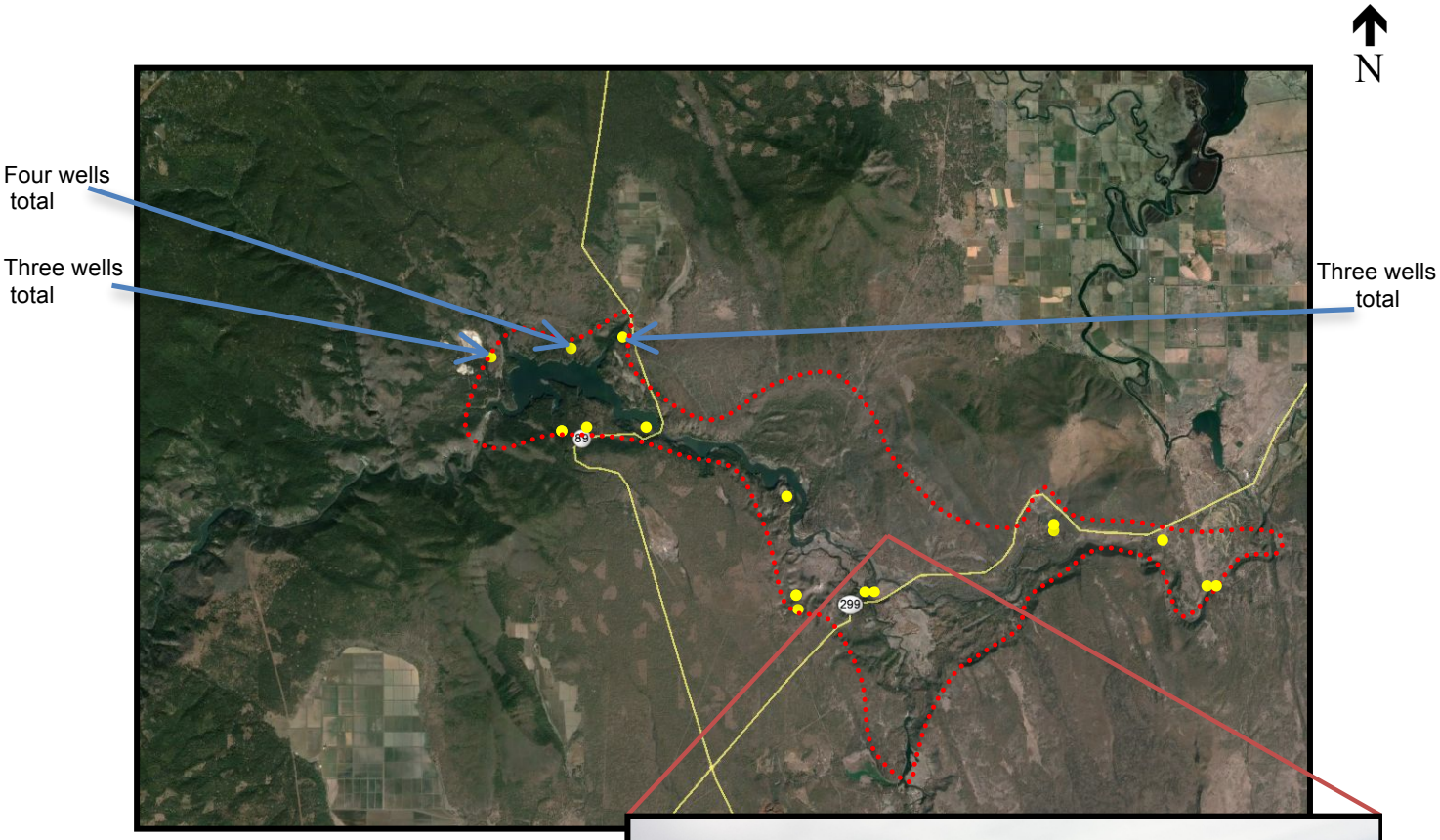
Looking Southeast

APPROXIMATE SCALE

1 MILE

SGI water THE SOURCE GROUP, INC.

FIGURE 5
BASIN 5-46, LAKE BRITTON AREA



Satellite View

Map Source: Google Earth - Imagery Date – 2/21/2014

Approximate Well Location within Basin

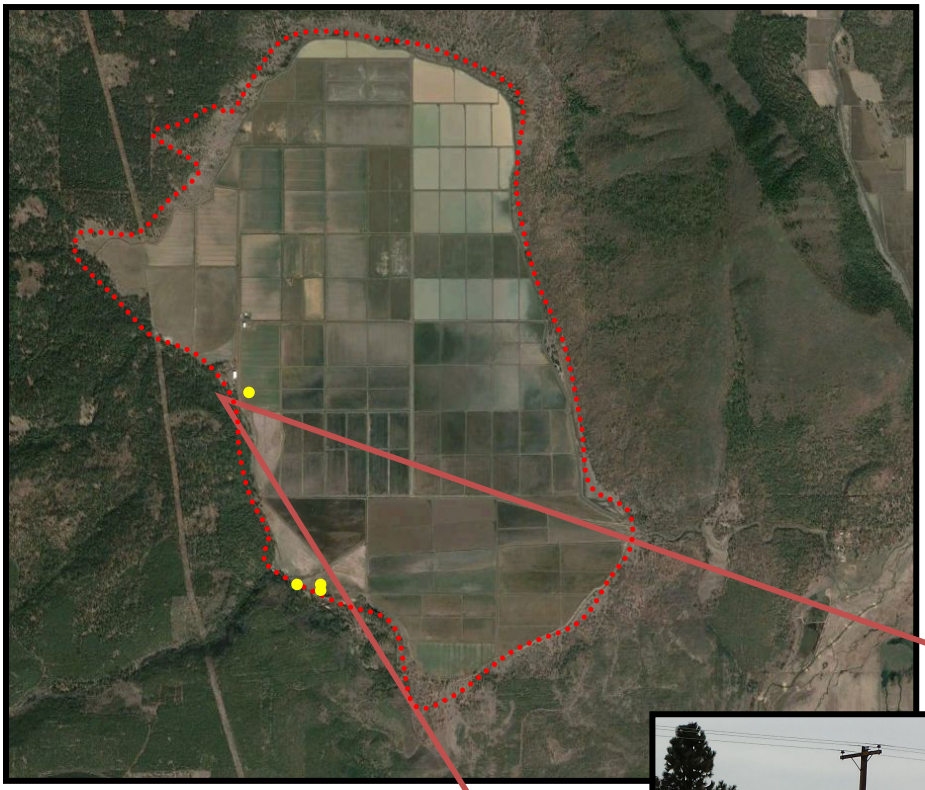
APPROXIMATE SCALE

6 MILES

Looking Southwest

SGI water THE SOURCE GROUP, INC.

FIGURE 6
BASIN 5-47, GOOSE VALLEY



N

Satellite View

Map Source: Google Earth - Imagery Date – 2/21/2014

Approximate Well location within the Basin

Two additional well locations not shown due to limited information listed on the well record.

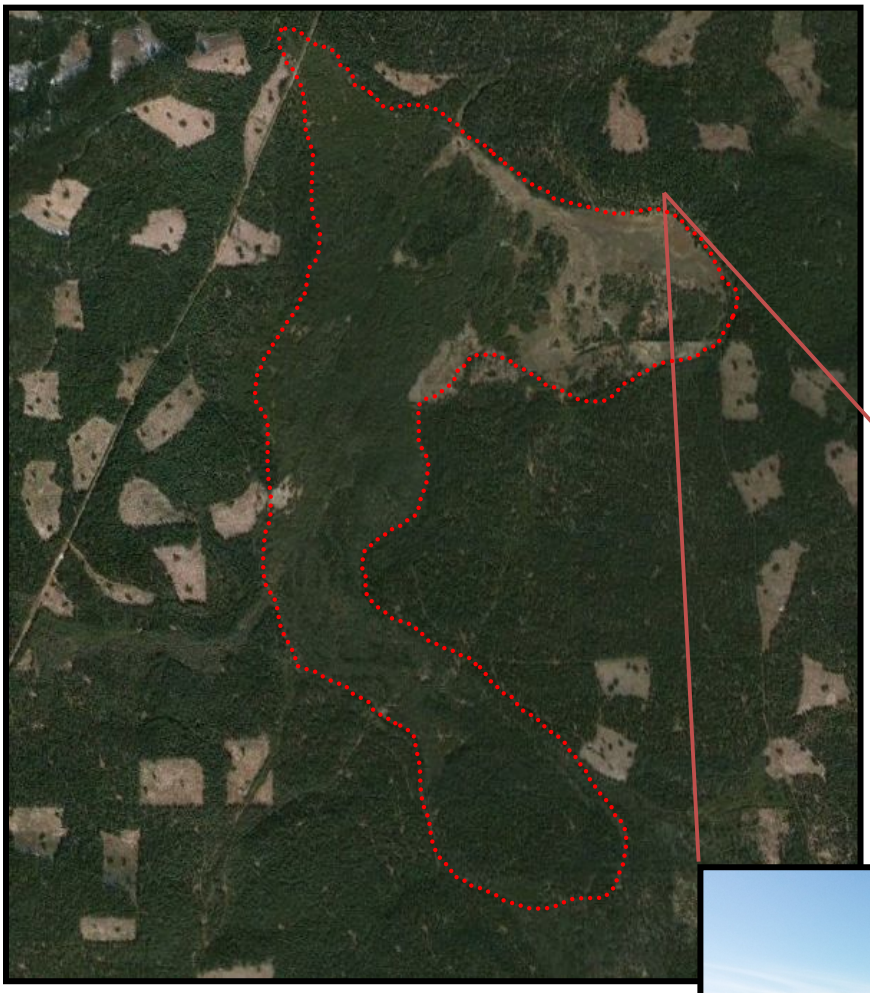
Looking Southeast

APPROXIMATE SCALE

2 MILES

SGI water THE SOURCE GROUP, INC.

FIGURE 7
BASIN 5-49, DRY BURNEY CREEK



N

Satellite View

Map Source: Google Earth - Imagery Date – 2/21/2014

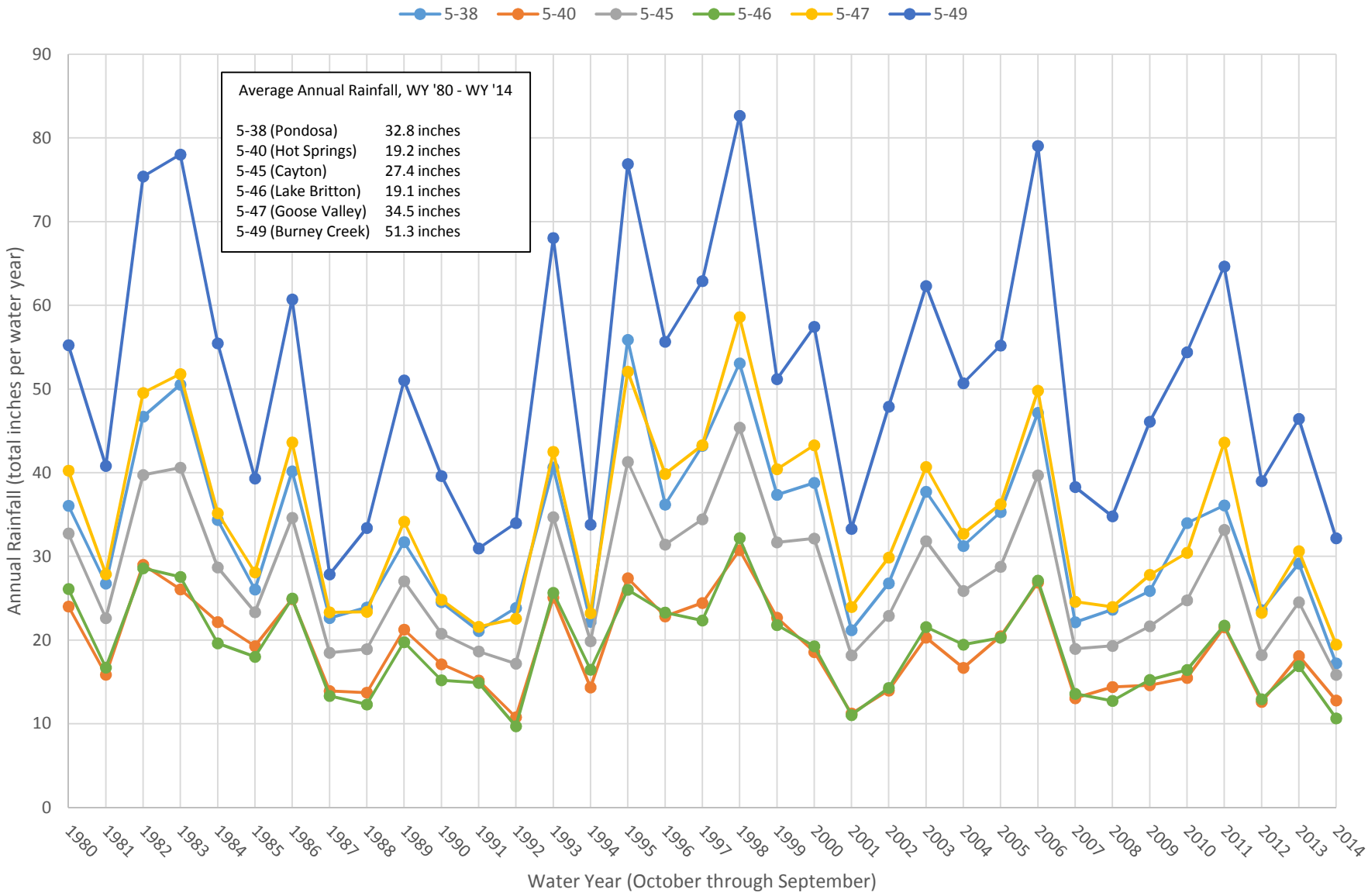
APPROXIMATE SCALE

1.5 MILES

Looking Southwest

SGI water THE SOURCE GROUP, INC.

Figure 8
Annual Rainfall (by Water Year) for Each Basin



Data: http://prism.oregonstate.edu

The Source Group, Inc.

TABLES

Table 1
Summary of DWR and County Information
Basin 5-38, Pondosa Town Area
Shasta County, California

Reconnaissance Observations (9/26/14)

1) The area is largely woodland with some meadow.
2) A few residences were evident.

Well Search

Search details	
Township/Range/Sections searched	T39N, Range 2E, Sections 16, 21, 22, 23, 24, 25, 26, 27, 34, 35, 36
Total wells identified	0
Wells excluded and reasons	NA
Total wells applicable to basin	0
Residential	NA
Agricultural	NA
Depth range (feet)	NA
Production range (gallons per minute)	NA

Zoned Land Use (acres)

Total basin area	2,080
Current use[1]	
Residential	0% (Shasta)
Agricultural	0% (Shasta), est. >50% (Siskiyou)
Industrial	0% (Shasta)
Timberland	100% (Shasta), est. <50% (Siskiyou)
Planned use	
Residential	0% (Shasta)
Agricultural	0% (Shasta)
Industrial	0% (Shasta)
Timberland	100% (Shasta)

Building Permit Applications (2012 through 2014)

Residential	0 (Shasta)
Agricultural	0 (Shasta)
Industrial	0 (Shasta)

Well Construction Permit Applications (2012 through 2014)

Residential	0 (Shasta)
Agricultural	0 (Shasta)
Industrial	0 (Shasta)

Land Ownership (acres)[1]

Total basin area	2,080
Private	100% (Shasta), est. >90% (Siskiyou)
Public	0% (Shasta)

Notes:
[1] Siskiyou county information estimated from supplied zoning and ownership maps

Table 2
Water Budget Calculations
Basin 5-38, Pondosa Town Area
Shasta County, California

Estimated Recharge		
Total basin area (acres)	2,080	
Annual precipitation (inches) - Average rainfall	32.8	PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, created 28 Oct 2014 Averaged across water years 1980 through 2014.
Basin recharge (acre-feet/year) estimated from precipitation falling on the basin	5,685	Average precipitation falling on basin. Does not account for runoff concentration from greater watershed or evaporation.
Estimated Groundwater Pumping		
Estimated number of residences	4 to 8	Reconnaissance observations
Approximate annual residential water use (acre-feet/residence)	0.5 to 1	Range presented in recent CADWR Water Plan Updates[1]
Pumping from basin (acre-feet/year)	2 to 8	
Estimated residential pumping (acre-feet/year)	5	Average
Recharge to Pumping Factor	1,137	

Notes:

[1] 1.0 acre-feet per year: Bulleting 160-98, Table 4-10, figures for statewide averages 1995 and 2020 reworked for a family of four.

0.5 acre-feet per year: Bulletin 160-05, Volume 4, article titled "Addressing California's Uncertain Water Future by Coordinating Long-Term Land Use and Water Planning: Is a Water Element in the General Plan the Next Step?"

Table 3
Summary of DWR and County Information
Basin 5-40, Hot Springs Valley
Shasta County, California

Reconnaissance Observations (9/26/14)

1) The area is largely meadow and pasture used for hay production and grazing.
2) A few residences were evident along the edge and just outside of the basin.
3) Irrigation appears to be accomplished, at least partly, by routing spring discharges located along the edge of the basin into the hay fields.
4) Springs and creeks within the basin were still flowing.

Well Search

Search details	
Township/Range/Sections searched	T39N, R5E, Sections 7, 8, 9, 15,16, 17, 21, 22, 23, 27, 28, 33, 34
Total wells identified	21
Wells excluded and reasons[1]	
Outside basin	21
Total wells applicable to basin	0
Residential	NA
Agricultural	NA
Depth range (feet)	NA
Production range (gallons per minute)	NA

Zoned Land Use (acres)

Total basin area	2,400
Current use	
Residential	0% (Shasta)
Natural Habitat	60% (Shasta)
Unclassified	40% (Shasta)
Planned use	
Residential	0% (Shasta)
Natural Habitat	60% (Shasta)
Unclassified	40% (Shasta)

Building Permit Applications (2012 through 2014)

Residential	0 (Shasta)
Agricultural	0 (Shasta)
Industrial	0 (Shasta)

Well Construction Permit Applications (2012 through 2014)

Residential	0 (Shasta)
Agricultural	0 (Shasta)
Industrial	0 (Shasta)

Land Ownership (acres)[2]

Total basin area	2,400
Private	60% (Shasta), 68% (Modoc)
Public	40% (Shasta), 32% (Modoc)

Notes:

[1]Wells were determined to be outslide the basin by evaluating their locations or, if the location of a well was unclear, by comparing the geology of the well log to the known geology in the basin.

[2]The percentages of public and private land were estimated based data provided by Shasta County and the area of government ownership (675 acres out of 2,085 total within Modoc County) provided by Modoc County (Modoc County data from 2014).

Table 4
Water Budget Calculations
Basin 5-40, Hot Springs Valley
Shasta County, California

Estimated Recharge		
Total basin area (acres)	2,400	
Annual precipitation (inches) - Average rainfall	19.2	PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, created 28 Oct 2014 Averaged across water years 1980 through 2014.
Basin recharge (acre-feet/year) estimated from precipitation falling on the basin	3,840	Average precipitation falling on basin. Does not account for runoff concentration from greater watershed or evaporation.
Estimated Intercepted Recharge		
Estimated number of residences near basin	21	CADRW well log search results
Approximate annual residential water use (acre-feet/residence)	0.5 to 1	Range presented in recent CADWR Water Plan Updates[1]
Pumping from near basin (acre-feet/year)	10.5 to 21	
Estimated residential pumping (acre-feet/year)	15.8	Average
Estimated area under cultivation (acres)	750	Derived from Google Earth (Figure 2)
Crop water demand (inches/year)	25.9	Estimated incremantal water consumption for alfalfa grown from April through October in CADWR ETo Zone 7 using a conservatively high crop coefficient of 1.2 and a landscape coefficient of 0.5 that reflects moderate to average conditions[2].
Agricultural water use (acre-feet/year)	1,619	
Estimated intercepted recharge (acre-feet/year)	1,635	Sum of pumping and crop demand
Recharge to Intercepted Factor	2.35	

Notes:

[1] 1.0 acre-feet per year: Bulleting 160-98, Table 4-10, figures for statewide averages 1995 and 2020 reworked for a family of four.
0.5 acre-feet per year: Bulletin 160-05, Volume 4, article titled "Addressing California's Uncertain Water Future by Coordinating Long-Term Land Use and Water Planning: Is a Water Element in the General Plan the Next Step?"

[2] The incremental amount of water consumed by growing a crop in the basin was estimated by comparing the consumption for alfalfa to an estimate for a natural landscape. Alfalfa was chosen because it 1) is known to be grown as a hay crop in the area and 2) consumes a relatively large amount of water and would, therefore, provide a conservatively high estimate of water use from agricultural activity. The crop coefficient approach was used: Incermental Consumption = ETo (Kc - Kl). Monthly ETo was determined from information provided by the CADWR California Irrigation Management Information System (http://wwwcimis.water.ca.gov/cimis/images/etomap.jpg). The crop coefficient (Kc) for alfalfa was determined from Using Reference Evapotranspiration (ETo) and Crop Coefficients to Estimate Crop Evapotranspiration (ETc) for Agronomic Crops Grasses, and Vegetable Crops, University of California Cooperative Extension Leaflet 21427, Table 1 - Northern Mountain Valleys section. The landscape coefficient (Kl) value was taken from A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California, University of California Cooperative Extension and CADWR, 2000.

Table 5
Summary of DWR and County Information
Basin 5-45, Cayton Valley
Shasta County, California

Reconnaissance Observations (9/26/14)

1) The area is largely meadow and pasture used for hay production and grazing.
2) A few residences were evident.
3) Irrigation appears to be accomplished, at least partly, by routing spring discharges located along the edge of the basin into the hay fields.
4) Springs and creeks within the basin were still flowing

Well Search

Search details	
Township/Range/Sections searched	T37N, R3E, Sections 3, 4, 9, 10, 15, 16
Total wells identified	1
Wells excluded and reasons[1]	
Outside basin	1
Total wells applicable to basin	0
Residential	NA
Agricultural	NA
Depth range (feet)	NA
Production range (gallons per minute)	NA

Zoned Land Use (acres)

Total basin area	1,300
Current use	
Residential	0%
Agricultural	98.6%
Timberland	0.3%
Unclassified	1.1%
Planned use	
Residential	0%
Agricultural	98.6%
Timberland	0.3%
Unclassified	1.1%

Building Permit Applications (2012 through 2014)

Residential	0
Agricultural	2
Industrial	0

Well Construction Permit Applications (2012 through 2014)

Residential	0
Agricultural	2
Industrial	0

Land Ownership (acres)

Total basin area	1,300
Private	98.9%
Federal	1.1%

Notes:

[1]Wells were determined to be outslide the basin by evaluating their locations or, if the location of a well was unclear, by comparing the geology of the well log to the known geology in the basin.

Table 6
Water Budget Calculations
Basin 5-45, Cayton Valley
Shasta County, California

Estimated Recharge		
Total basin area (acres)	1,300	
Annual precipitation (inches) - Average rainfall	27.4	PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, created 28 Oct 2014 Averaged across water years 1980 through 2014.
Basin recharge (acre-feet/year) estimated from precipitation falling on the basin	2,968	Average precipitation falling on basin. Does not account for runoff concentration from greater watershed or evaporation.
Estimated Intercepted Recharge		
Estimated number of residences near basin	2 to 4	CADRW well log search results
Approximate annual residential water use (acre-feet/residence)	0.5 to 1	Range presented in recent CADWR Water Plan Updates[1]
Pumping from near basin (acre-feet/year)	1 to 4	
Estimated residential pumping (acre-feet/year)	2.5	Average
Estimated area under cultivation (acres)	1,300	Estimated from Figure 4
Crop water demand (inches/year)	28.7	Estimated incremantal water consumption for alfalfa grown from April through October in CADWR ETo Zone 7 using a conservatively high crop coefficient of 1.2 and a landscape coefficient of 0.5 that reflects moderate to average conditions[2].
Agricultural water use (acre-feet/year)	3,108	
Estimated intercepted recharge (acre-feet/year)	3,111	Sum of pumping and crop demand
Recharge to Intercepted Factor	0.95	

Notes:

[1] 1.0 acre-feet per year: Bulleting 160-98, Table 4-10, figures for statewide averages 1995 and 2020 reworked for a family of four.

0.5 acre-feet per year: Bulletin 160-05, Volume 4, article titled "Addressing California's Uncertain Water Future by Coordinating Long-Term Land Use and Water Planning: Is a Water Element in the General Plan the Next Step?"

[2] The incremental amount of water consumed by growing a crop in the basin was estimated by comparing the consumption for alfalfa to an estimate for a natural landscape. Alfalfa was chosen because it 1) is known to be grown as a hay crop in the area and 2) consumes a relatively large amount of water and would, therefore, provide a conservatively high estimate of water use from agricultural activity. The crop coefficient approach was used: Incermental Consumption = ETo (Kc - Kl). Monthly ETo was determined from information provided by the CADWR California Irrigation Management Information System (http://wwwcimis.water.ca.gov/cimis/images/etomap.jpg). The crop coefficient (Kc) for alfalfa was determined from Using Reference Evapotranspiration (ETo) and Crop Coefficients to Estimate Crop Evapotranspiration (ETc) for Agronomic Crops Grasses, and Vegetable Crops, University of California Cooperative Extension Leaflet 21427, Table 1 - Northern Mountain Valleys section. The landscape coefficient (Kl) value was taken from A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California, University of California Cooperative Extension and CADWR, 2000.

Table 7
Summary of DWR and County Iinformation
Basin 5-46, Lake Britton Area
Shasta County, California

Reconnaissance Observations (9/26/14)

1) The area is largely meadow and woodland.

2) Surface water (Pit River/Lake Britton and Hat Creek) occupies a significant portion of the area.

3) There appears to be a diatomaceous earth mining operation on the southwestern edge of the lake in the center of the basin.

Well Search

Search details	
Township/Range/Sections searched	T36N, R3E, Sections 1, 2, 3, 4, 11, 12, 13, 14, 24 T36N, R4E, Sections 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 29, 30, 31, 32 T36N, R5E Sections 6, 7 T37N, R3E, Sections 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 36 T37N, R4E, Sections 30, 31, 32, 33, 34, 35, 36
Total wells identified	124
Wells excluded and reasons[1]	
Outside basin	101
Total wells applicable to basin[2]	23
Residential	22
Public	1 (supplies a lodge)
Agricultural	0
Depth range (feet)	48 to 415
Production range (gallons per minute)	5 to 100

Land Use (acres)

Total basin area	14,060
Current use	
Residential	5.5%
Timberland	62.7%
Agricultural	0.4%
Unclassified	31.4%
Planned use	
Residential	4.7%
Timberland	63.5%
Agricultural	0.4%
Unclassified	31.4%

Building Permit Applications (2012 through 2014)

Residential	3
Timber	1
Agricultural	0
Industrial	0

Well Construction Permit Applications (2012 through 2014)

Residential	0
Timber	1
Agricultural	0
Industrial	0

Land Ownership (acres)

Total basin area	14,060
Private	68.8%
Public (Federal, state, county)	31.4%

Notes:

[1]Wells were determined to be outslide the basin by evaluating their locations or, if the location of a well was unclear, by comparing the geology of the well log to the known geology in the basin.

[2]Wells in Basin State Well Identifcation Numbers: 5980, 8944, 37691, 37692, 63187, 63194, 116183, 116184, 124130, 124133, 139959, 184680, 263637, 393972, 431557, 513309, 705538, 750490, 750496, 963471, 1093494, E0118123, E0144075

Table 8
Water Budget Calculations
Basin 5-46, Lake Britton Area
Shasta County, California

Estimated Recharge		
Total basin area (acres)	14,060	
Annual precipitation (inches) - Average rainfall	19.1	PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, created 28 Oct 2014 Averaged across water years 1980 through 2014.
Basin recharge (acre-feet/year) estimated from precipitation falling on the basin	22,379	Average precipitation falling on basin. Does not account for runoff concentration from greater watershed or evaporation.
Estimated Groundwater Pumping		
Estimated number of residences	23	Supply well for lodge counted as a domestic well
Approximate annual residential water use (acre-feet/residence)	0.5 to 1	Range presented in recent CADWR Water Plan Updates[1]
Pumping from basin (acre-feet/year)	11.5 to 23	
Estimated residential pumping (acre-feet/year)	17	Average
Recharge to Pumping Factor	1,316	

Notes:

[1] 1.0 acre-feet per year: Bulleting 160-98, Table 4-10, figures for statewide averages 1995 and 2020 reworked for a family of four.

0.5 acre-feet per year: Bulletin 160-05, Volume 4, article titled "Addressing California's Uncertain Water Future by Coordinating Long-Term Land Use and Water Planning: Is a Water Element in the General Plan the Next Step?"

Table 9
Summary of DWR and County Information
Basin 5-47, Goose Valley
Shasta County, California

Reconnaissance Observations (9/26/14)

1) The area is largely meadow and pasture used for hay production and grazing. The southwest portion of the basin appeared to be marshland.
2) A few residences were evident.
3) Irrigation appears to be accomplished partly by routing spring discharges located along the edge of the basin into the hay fields.
4) One production well was visible on the western edge of the basin.
5) Springs and creeks within the basin were still flowing

Well Search

Search details	
Township/Range/Sections searched	T35N, R2E, Sections 1,2 T35N, R3E, Section 6 T36N, R2E, Sections 22, 23, 24, 25, 26, 27, 34, 35, 36; T36N, R3E, Section 31
Total wells identified	8
Wells excluded and reasons[1]	
Outside basin	2
Total wells applicable to basin[2]	6 (1 record since 1995 - bulletin 118 study)
Residential	2
Agricultural	4
Depth range (feet)	185 to 680
Production range (gallons per minute)	60 to 3,000

Zoned Land Use (acres)

Total basin area	4,210
Current use	
Residential	0%
Agricultural	99.2%
Timberland	0.6%
Unclassified	0.2%
Planned use	
Residential	0%
Agricultural	99.2%
Timberland	0.6%
Unclassified	0.2%

Building Permit Applications (2012 through 2014)

Residential	0
Agricultural	4
Industrial	0

Well Construction Permit Applications (2012 through 2014)

Residential	0
Agricultural	0
Industrial	0

Land Ownership (acres)

Total basin area	4,210
Private	99.8%
Public (Federal)	0.2%

Notes:

[1]Wells were determined to be outslide the basin by evaluating their locations or, if the location of a well was unclear, by comparing the geology of the well log to the known geology in the basin.

[2]State Well Identifcation Numbers for wells in basin: 15660, 72767, 378052, 513300, 513301, 962844.

Table 10
Water Budget Calculations
Basin 5-47, Goose Valley
Shasta County, California

Estimated Recharge		
Total basin area (acres)	4,210	
Annual precipitation (inches) - Average rainfall	34.5	PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, created 28 Oct 2014 Averaged across water years 1980 through 2014.
Basin recharge (acre-feet/year) estimated from precipitation falling on the basin	12,104	Average precipitation falling on basin. Does not account for runoff concentration from greater watershed or evaporation.
Estimated Pumped and Intercepted Recharge		
Estimated number of residences near basin	2	CADRW well log search results
Approximate annual residential water use (acre-feet/residence)	0.5 to 1	Range presented in recent CADWR Water Plan Updates[1]
Pumping from near basin (acre-feet/year)	1 to 2	
Estimated residential pumping (acre-feet/year)	1.5	Average
Estimated area under cultivation (acres)	4,210	Estimated from Figure 6
Crop water demand (inches/year)	28.7	Estimated incremantal water consumption for alfalfa/rice grown from April through October in CADWR ETo Zone 7 using a conservatively high crop coefficient of 1.2 and a landscape coefficient of 0.5 that reflects moderate to average conditions[2].
Agricultural water use (acre-feet/year)	10,064	
Estimated intercepted recharge (acre-feet/year)	10,066	Sum of pumping and crop demand
Recharge to Intercepted Factor	1.2	

Notes:

[1] 1.0 acre-feet per year: Bulleting 160-98, Table 4-10, figures for statewide averages 1995 and 2020 reworked for a family of four.

0.5 acre-feet per year: Bulletin 160-05, Volume 4, article titled "Addressing California's Uncertain Water Future by Coordinating Long-Term Land Use and Water Planning: Is a Water Element in the General Plan the Next Step?"

[2] The incremental amount of water consumed by growing a crop in the basin was estimated by comparing the consumption for alfalfa to an estimate for a natural landscape. Alfalfa was chosen because it 1) is known to be grown as a hay crop in the area and 2) consumes a relatively large amount of water and would, therefore, provide a conservatively high estimate of water use from agricultural activity. The crop coefficient approach was used: Incermental Consumption = ETo (Kc - Kl). Monthly ETo was determined from information provided by the CADWR California Irrigation Management Information System (http://wwwcimis.water.ca.gov/cimis/images/etomap.jpg). The crop coefficient (Kc) for alfalfa was determined from Using Reference Evapotranspiration (ETo) and Crop Coefficients to Estimate Crop Evapotranspiration (ETc) for Agronomic Crops Grasses, and Vegetable Crops, University of California Cooperative Extension Leaflet 21427, Table 1 - Northern Mountain Valleys section. The landscape coefficient (Kl) value was taken from A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California, University of California Cooperative Extension and CADWR, 2000.

Table 11
Summary of DWR and County Information
Basin 5-49, Dry Burney Creek Valley
Shasta County, California

Reconnaissance Observations (9/26/14)

1) The basin is remote - located approximately 11 along a logging road off of State Route 299.

2) The area is largely woodland and meadow used for grazing.

3) No residences evident.

Well Search

Search details	
Township/Range/Sections searched	T33, R2E, Sections 1, 2, 11, 12, 13, 14, 24 T33, R3E, Sections 6, 7
Total wells identified	0
Wells excluded and reasons	
Wells excluded and reasons[1]	NA
Total wells applicable to basin	0
Residential	NA
Agricultural	NA
Depth range (feet)	NA
Production range (gallons per minute)	NA

Zoned Land Use (acres)

Total basin area	3,070
Current use	
Residential	0%
Agricultural	0%
Timberland	100%
Planned use	0%
Residential	0%
Agricultural	0%
Timberland	100%

Building Permit Applications (2012 through 2014)

Residential	0
Agricultural	0
Industrial	0

Well Construction Permit Applications (2012 through 2014)

Residential	0
Agricultural	0
Industrial	0

Land Ownership (acres)

Total basin area	3,070
Private	100%
Public	0%

Notes:

[1]Wells were determined to be outslide the basin by evaluating their locations or, if the location of a well was unclear, by comparing the geology of the well log to the known geology in the basin.

Table 12
Alternative Monitoring Plan
Basin 5-38, Pondosa Town Area
Shasta County, California

Reconnaissance Observations (September 2017)

1) Land use and vegataion

2) Number of residences

3) Changes evident from available satellite imagery

Well Search

Search details	
Township/Range/Sections searched	T3N, Range 2E, Sections 16, 21, 22, 23, 25, 26, 27, 34, 35
Total wells identified	#
Wells excluded and reasons	#
Total wells applicable to basin	#
Residential	#
Agricultural	#
Depth range (feet)	#
Production range (gallons per minute)	#

Zoned Land Use (acres)

Total basin area	2,080
Current use	
Residential	#% (Shasta), #% (Siskiyou)
Agricultural	#% (Shasta), #% (Siskiyou)
Industrial	#% (Shasta), #% (Siskiyou)
Woodland	#% (Shasta), #% (Siskiyou)
Planned use	
Residential	#% (Shasta), #% (Siskiyou)
Agricultural	#% (Shasta), #% (Siskiyou)
Industrial	#% (Shasta), #% (Siskiyou)
Woodland	#% (Shasta), #% (Siskiyou)

Building Permit Applications (2015 through 2017)

Residential	# (Shasta), # (Siskiyou)
Agricultural	# (Shasta), # (Siskiyou)
Industrial	# (Shasta), # (Siskiyou)

Well Construction Permit Applications (2015 through 2017)

Residential	# (Shasta), # (Siskiyou)
Agricultural	# (Shasta), # (Siskiyou)
Industrial	# (Shasta), # (Siskiyou)

Land Ownership (acres)

Total basin area	2,080
Private	#% (Shasta), #% (Siskiyou)
Public	#% (Shasta), #% (Siskiyou)

Table 13
Alternative Monitoring Plan
Basin 5-40, Hot Springs Valley
Shasta County, California

Reconnaissance Observations (September 2017)

1) Land use and vegataion

2) Number of residences

3) Changes evident from available satellite imagery

Well Search

Search details	
Township/Range/Sections searched	T39N, R5E, Sections 7, 8, 9, 15,16, 17, 21, 22, 27, 28, 33, 34
Total wells identified	#
Wells excluded and reasons	#
Total wells applicable to basin	#
Residential	#
Agricultural	#
Depth range (feet)	#
Production range (gallons per minute)	#

Zoned Land Use (acres)

Total basin area	2,400
Current use	
Residential	#% (Shasta), #% (Modoc)
Agricultural	#% (Shasta), #% (Modoc)
Industrial	#% (Shasta), #% (Modoc)
Woodland	#% (Shasta), #% (Modoc)
Planned use	
Residential	#% (Shasta), #% (Modoc)
Agricultural	#% (Shasta), #% (Modoc)
Industrial	#% (Shasta), #% (Modoc)
Woodland	#% (Shasta), #% (Modoc)

Building Permit Applications (2015 through 2017)

Residential	# (Shasta), # (Modoc)
Agricultural	# (Shasta), # (Modoc)
Industrial	# (Shasta), # (Modoc)

Well Construction Permit Applications (2015 through 2017)

Residential	# (Shasta), # (Modoc)
Agricultural	# (Shasta), # (Modoc)
Industrial	# (Shasta), # (Modoc)

Land Ownership (acres)

Total basin area	2,400
Private	#% (Shasta), #% (Modoc)
Public	#% (Shasta), #% (Modoc)

Table 14
Alternative Monitoring Plan
Basin 5-45, Cayton Valley
Shasta County, California

Reconnaissance Observations (September 2017)

1) Land use and vegataion

2) Number of residences

3) Changes evident from available satellite imagery

Well Search

Search details	
Township/Range/Sections searched	T37N, R3E, Sections 3, 4, 9, 10, 15, 16
Total wells identified	#
Wells excluded and reasons	#
Total wells applicable to basin	#
Residential	#
Agricultural	#
Depth range (feet)	#
Production range (gallons per minute)	#

Zoned Land Use (acres)

Total basin area	1,300
Current use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%
Planned use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%

Building Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Well Construction Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Land Ownership (acres)

Total basin area	1,300
Private	#%
Public	#%

Table 15
Alternative Monitoring Plan
Basin 5-46, Lake Britton Area
Shasta County, California

Reconnaissance Observations (September 2017)

1) Land use and vegataion

2) Number of residences

3) Changes evident from available satellite imagery

Well Search

Search details

Township/Range/Sections searched	T36N, R3E, Sections 1, 2, 3, 4, 11, 12, 13, 14, 24 T36N, R4E, Sections 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 29, 30, 31, 32 T36N, R5E Sections 6, 7 T37N, R 3E, Sections 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 36 T37N, R4E, Sections 30, 31, 32, 33, 34, 35, 36
Total wells identified	#
Wells excluded and reasons	#
Total wells applicable to basin	#
Residential	#
Agricultural	#
Depth range (feet)	#
Production range (gallons per minute)	#

Zoned Land Use (acres)

Total basin area	14,060
Current use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%
Planned use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%

Building Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Well Construction Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Land Ownership (acres)

Total basin area	14,060
Private	#%
Public	#%

Table 16
Alternative Monitoring Plan
Basin 5-47, Goose Valley
Shasta County, California

Reconnaissance Observations (September 2017)

1) Land use and vegataion

2) Number of residences

3) Changes evident from available satellite imagery

Well Search

Search details

Township/Range/Sections searched	T35N, R2E, Sections 1,2 T35N, R3E, Section 6 T36N, R2E, Sections 22, 23, 24, 25, 26, 27, 34, 35, 36; T36N, R3E, Section 31
Total wells identified	#
Wells excluded and reasons	#
Total wells applicable to basin	#
Residential	#
Agricultural	#
Depth range (feet)	#
Production range (gallons per minute)	#

Zoned Land Use (acres)

Total basin area	4,210
Current use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%
Planned use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%

Building Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Well Construction Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Land Ownership (acres)

Total basin area	4,210
Private	#%
Public	#%

Table 17
Alternative Monitoring Plan
Basin 5-49, Dry Burney Creek Valley
Shasta County, California

Reconnaissance Observations (September 2017)

1) Land use and vegataion

2) Number of residences

3) Changes evident from available satellite imagery

Well Search

Search details

Township/Range/Sections searched	T33, R2E, Sections 1, 2, 11, 12, 13, 14, 24
	T33, R3E, Sections 6, 7
Total wells identified	#
Wells excluded and reasons	#
Total wells applicable to basin	#
Residential	#
Agricultural	#
Depth range (feet)	#
Production range (gallons per minute)	#

Zoned Land Use (acres)

Total basin area	3,070
Current use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%
Planned use	
Residential	#%
Agricultural	#%
Industrial	#%
Woodland	#%

Building Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Well Construction Permit Applications (2015 through 2017)

Residential	#
Agricultural	#
Industrial	#

Land Ownership (acres)

Total basin area	3,070
Private	#%
Public	#%

Table 18
Summary of Findings
Shasta County, California

Basin	Alternative Monitoring Applicable?		Baseline Alternative Monitoring Conditions						
	Determination	AB 1152 Criteria[1]	Residences	Agricultural Activity	Water Supply Wells	Land Use	Building Permit Applications	Well Construction Permit Applications	Land Ownership
5-38, Pondosa Town Area	yes	#1 and #3	Possibly 4 to 8	No	Possibly 4 to 8 residential	Timberland 100% (Shasta portion)	None (Shasta portion)	None (Shasta portion)	100% Private (Shasta portion) >90% Private (Siskiyou portion)
5-40, Hot Springs Valley	yes	#3	None	Hay (approx. 750 acres)	None	Natural Habitat 60% Unclassified 40% (Shasta portion)	None (Shasta portion)	None (Shasta portion)	60% Private (Shasta portion) 68% Private (Modoc portion)[2]
5-45, Cayton Valley	yes	#3	Possibly 2 to 4	Hay (approx. 1,300 acres)	Possibly 2 to 4 residential	Agricultural 98.6% Timberland 0.3% Unclassified 3.1%	2	2	98.9% Private
5-46, Lake Britton Area	yes	#3	23	Minor	23 Residential	Residential 5.5% Timberland 62.7% Agricultural 0.4% Unclassified 31.4%	4	1	68.8% Private
5-47, Goose Valley	yes	#3	3	Hay and rice (approx. 4,210 acres)	2 Residential 4 Agricultural	Agricultural 99.2% Timberland 0.6% Unclassified 0.2%	4	None	99.8% Private
5-49, Dry Burney Creek Valley	yes	#1 and #3	None	Cattle grazing	None	Timberland 100%	None	None	100% Private

Notes:

[1] AB 1152 Criteria:

#1: Groundwater elevations are unaffected by land use activities or planned land use activities.

#3: Geographic or geologic features make monitoring impracticable.

[2] Modoc County data from 2014

APPENDIX A

SHASTA COUNTY

WATER AGENCY

COUNTY OFFICE BUILDING
1855 PLACER STREET
REDDING, CA 96001
(530) 225-5661
FAX (530) 225-5667

PATRICK J. MINTURN
CHIEF ENGINEER

March 23, 2011 FPA 040805

«Owner_1»
«M_Street_Address»
«Mail_City» «State» «Zip»«Zip4»

Subject: SBx7-6 CASGEM Well Monitoring

Dear Landowner:

On November 6, 2009, Governor Schwarzenegger signed Senate Bill 7-6. This new law requires Counties to monitor groundwater basins and report the results to the Department of Water Resources ("DWR"). This monitoring is at the basin level. Individual well owners are not required to participate. However, the County is seeking volunteers. DWR manages the California Statewide Groundwater Elevation Monitoring Program ("CAGSIM"). They will collect the data from counties and other monitoring agencies and publish it. A DWR brochure is attached. More info is available on their website:

http://www.water.ca.gov/groundwater/casgem/

There are ten recognized groundwater basins in Shasta County. Our records indicate that you are the owner of record of a parcel overlying one of these basins. We assume that there is a well on your property. The County wishes to negotiate a Permit to Enter to monitor groundwater elevations in your well. Measurements will be taken approximately three a year. A sample right of entry is attached. We look forward to your response.

If you have any questions, please contact Eric Wedemeyer at (530) 225-5661.

Very truly yours,

Patrick J. Minturn, Chief Engineer

By E. B. Wedemeyer
Eric B. Wedemeyer, Supervising Engineer

EBW/ldr

Enclosures: Sample Permit to Enter
DWR Brochure