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FOR THE CONTINUATION OF THIS WATER RIGHT FILE No. 61-12090

Principal Engineer
Hydrologist
Mediator

Christian R. Petrich, Ph.D., P.E., P.G.

Education

Ph.D., Geology
University of Idaho

M.S., Civil Engineering
Washington State University

B.S., Resource Conservation
University of Montana

Professional Certifications

Professional Engineer
Idaho No. 9011

Professional Geologist
Idaho No. 1088

Certified Professional Mediator
Idaho No. 251

Certified Water Rights Examiner
Idaho No. 7-132

Areas of Expertise

- Aquifer characterization
- Ground water monitoring
- Ground and surface water interaction
- Simulation of ground water flow
- Geothermal analysis and simulation
- Flow augmentation in the lower Snake River
- Solving water conflicts through mediation
- Teaching and instruction

Experience Summary

Dr. Petrich has over 20 years of progressive academic, professional, and managerial experience in hydrology and water resource engineering. He has particular expertise in characterizing and evaluating ground water flow systems, ground water monitoring, development and calibration of numerical ground water flow models, analysis of geothermal systems, and solving water problems through facilitation and mediation.

SPF Water Engineering, LLC – 2004 to present

Dr. Petrich is currently a Principal Engineer with (and co-founder of) SPF Water Engineering, LLC (SPF). SPF provides hydrologic characterization, water resource development, and water distribution engineering services. Dr. Petrich's recent project experience includes the following:

- Idaho Ground Water Appropriators – technical support for A&B Delivery Call
- Ada-Elmore Water Project – analysis of surface and ground water availability, development of Aquifer Storage and Recovery Strategy
- Numerous Clients – hydrologic and water supply studies in Ada, Blaine, Boise, Elmore, Gooding, Canyon, Valley, Teton, and Owyhee counties
- United Water Idaho – comprehensive water supply assessment for public water system with 87 high-capacity wells
- McCain Foods USA – water supply assessment for a 4 MGD potato processing facility
- Numerous Clients – various water right permitting, water right transfer, and expert witness services
- Numerous Clients – ground- and surface-water monitoring and data analysis
- Idaho Department of Water Resources - Technical support for the Interim Legislative Committee on Water Resources
- Idaho Office of the Attorney General – Technical support for Lower Snake River water issues

Idaho Water Resources Research Institute–1996 to 2004

- Treasure Valley Hydrologic Project (Idaho Department of Water Resources) – Dr. Petrich served as Principal Investigator for this 8-year regional ground water study, which included (1) extensive ground water level measurements, (2) monitoring well construction, (3) seepage measurements in the New York Canal, (5) collection, analysis, and interpretation of water chemistry data, and (6) construction and calibration of a numerical ground-water flow model to simulate increases in Treasure

EXHIBIT 1

Valley ground water withdrawals.

- Assessment and simulation of hydrologic conditions in the Boise Front geothermal aquifer (City of Boise and the National Renewable Energy Laboratory)
- Review and interpretation of lower Snake River subyearling fall chinook salmon migration data (Idaho Department of Water Resources)
- Coordinated various Institute outreach events, including the Treasure Valley Water Summit and a periodic water seminar

University of Idaho–1989 through 1996

- Doctoral research in the transport of conservative ion (e.g., bromide) and particle tracers (2-, 5-, and 15-μ polystyrene microspheres and agarose-encapsulated flavobacterium) in a shallow, unconsolidated aquifer
- Taught or co-taught the following graduate-level courses: Computer Geology (1989), Computer Applications in Hydrology (1989, 1991), and Contaminant Hydrogeology (1990, 1992, 1995)

Assorted Consulting Experience, 1986–1995

- Executive Secretary for the Pullman–Moscow Water Resources Committee (1994–1996)
- Independent Consultant (1989 and 1996) – projects included well design, well interference investigations, short course presentations, and numerical modeling
- Terragraphics Environmental Engineering, Moscow, Idaho (1993 and 1995, part-time)
- Engineering-Science, Inc. (Cleveland, Ohio, 1986–1987)

Selected Public Domain Publications, Presentations, and Short Courses

Petrich, C. and S. Urban. 2004. Characterization of Ground Water Flow in the Lower Boise River Basin. Idaho Water Resources Research Institute and the Idaho Department of Water Resources, Research Report IWRRI-2004-01.

Petrich, C.R. 2004. Simulation of Ground Water Flow in the Lower Boise River Basin. Idaho Water Resources Research Institute, Research Report IWRRI-2004-02.

Petrich, C.R. 2004. Simulation of Increased Ground Water Withdrawals in the Treasure Valley Associated with Unprocessed Well Applications. Idaho Water Resources Research Institute, Research Report IWRRI-2004-03.

Petrich, C.R., 2004. Treasure Valley Hydrologic Project–Executive Summary. Idaho Water Resources Research Institute, Research Report IWRRI-2004-04.

Petrich, C. 2003. Hydrogeologic Conditions in the Boise Front Geothermal Aquifer. Idaho Water Resources Research Institute, Research Report IWRRI-2003-05.

Zyvoloski, G., Keating, E. and Petrich, C., 2003. Simulation of potential increased withdrawal and re-injection from the Boise Front Geothermal Aquifer, Idaho Water Resources Research Institute, Research Report IWRRI-2003-04.

Petrich, C. 2003. Investigation of Hydrogeologic Conditions and Ground Water Flow in the Boise Front Geothermal Aquifer (Executive Summary). Idaho Water Resources Research Institute, Research Report IWRRI-2003-07.

Petrich, C. and J. Doherty. 2003. Simulation of increased ground water withdrawals associated with unprocessed well applications in the lower Boise River basin, Idaho. In Proceedings of MODFLOW 2003, Colorado School of Mines, Golden, CO.

Hutchings, J. and C. Petrich. 2002. Ground Water Recharge and Flow in the Regional Treasure Valley Aquifer System–Geochemistry and Isotope Study. Idaho Water Resources Research Institute, Research Report IWRRI-2002-08.

Hutchings, J. and C. Petrich. 2002. Influence of Canal Seepage on Aquifer Recharge near the New York Canal. Idaho Water Resources Research Institute, Research Report IWRRI-2002-09.

Dreher, K., C. Petrich, K. Neely, E. Bowles, and A. Byrne. 2000. Review of survival, flow, temperature, and migration data for hatchery-raised, subyearling fall Chinook Salmon above Lower Granite Dam, 1995–1998. Idaho Department of Water Resources.

Tuthill, D., C. Petrich, T. Morse, B. Kissinger, and J. Oakleaf. 2000. Migration from tabular to spatial data analysis techniques for water management in Idaho. Journal of Hydroinformatics. Vol. 2, No.3, pp. 183-195.

Petrich, C. 2002. Treasure Valley Hydrology–an Overview (*presentation*). Treasure Valley Water Summit, Boise, Idaho.

Petrich, C. 2001. An Introduction to Ground Water Flow Modeling (*presentation*). 18th Annual Water Law & Resources Issues Seminar, Idaho Water Users Association.

Petrich, C. 2001. Use of PEST for Model Calibration to Ground Water Levels and Residence Times (*presentation*). Connections 2001, Boise, Idaho.

Petrich, C., S. Urban, and J. Hutchings. 1999. Development and Calibration of a Regional-Scale Ground Water Flow Model in Southwestern Idaho, U.S.A (*presentation*). Geological Society of America Annual Meeting, Denver, Colorado.

Petrich, C., S. Urban, H. Anderson, and D. Tuthill, Jr. 1999. Development of a Hydrologic Data Platform for Conjunctive Management in Southwest Idaho (*presentation*). NGWA Pacific Northwest Focus Ground Water Conference, Portland, Oregon.

Petrich, C., K. Stormo, D. Ralston, and R. Crawford. 1998. Encapsulated cell bioremediation: evaluation on the basis of particle tracer tests. Ground Water, Vol. 36, No. 4., pg. 771.

Gregory, B. and C. Petrich. 1998. Water Rights Mediation Training (*short course*). Idaho Mediation Association.

Johnson, G., C. Petrich, and D. Cosgrove. 1998 (January and May). An Introduction to Ground Water Modeling (*short course*). Idaho Water Resources Research Institute short course, Boise, Idaho.

Petrich, C. and D. Ralston. 1998. Evaluation of Encapsulated Cell Movement in a Heterogeneous, Sedimentary Aquifer (*presentation*). International Conference on Future Ground Water Resources at Risk, Changchun, China.

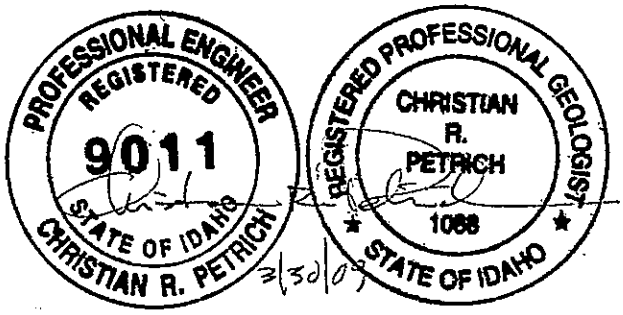
Carlson, R.A. and C. Petrich. 1998. New York Canal Geologic Cross-Section, Seepage Gain/Loss Data, and Ground Water Hydrographs: Compilation and Findings. Idaho Water Resources Research Institute and Idaho Department of Water Resources.

Urban, S.M. and C. Petrich. 1998. 1996 Water Budget for the Treasure Valley Aquifer System. Idaho Department of Water Resources Research Report.

Petrich, C., K. Stormo, D. Knaebel, D. Ralston, and R. Crawford. 1995. A preliminary assessment of field transport experiments using encapsulated cells. In Proceedings of the Third International In Situ and On-Site Bioreclamation Symposium, R. E. Hinchee et al., eds.

SPF WATER ENGINEERING

MEMORANDUM



DATE: March 30, 2009

TO: Norm Semanko, Rose Law Group

FROM: Christian Petrich, Ph.D., P.E., P.G.
Jennifer Sukow, P.E., P.G.

RE: *Response to IDWR memos regarding aquifer recharge along I-84 corridor from Boise to Mountain Home*

A. Executive Summary

We have reviewed two recent memorandums prepared by IDWR pertaining to Application 61-12090 (also referred to as the Nevid application). This application requests a diversion of 5 cfs of ground water for use in the proposed Elk Creek Village development.

The IDWR memorandums provide estimates of potentially available water in the Indian Creek and Elk Creek Village areas. The memos are based on several assumptions that we believe are overly conservative. Our understanding is that IDWR will review and may refine its estimates of potentially available water in this general area. Increased hydrogeologic understanding and further refinements to water supply estimates are anticipated as part of Idaho's Comprehensive Aquifer Management Planning (CAMP) process.

We have recalculated the water balance for the Nevid application using the IDWR methodology (modified where appropriate). Using the general IDWR approach, we estimate that the amount of water available for application 61-12090 ranges between 2,400 AF and 8,400 AF per year. The annual ground water withdrawal proposed under application 61-12090 is approximately 580 AF. The average consumptive use is estimated to be 419 AF/yr. The proposed withdrawals are less than the low estimate of ground water available for appropriation. A more detailed summary with supporting information is provided below.

B. Introduction

The Idaho Department of Water Resources (IDWR) has prepared two memorandums that will be considered in the matter of Application to Appropriate Water No. 61-12090:

1. Evaluation of aquifer recharge in areas of planned community applications along the I-84 corridor from Boise to Mountain Home, prepared by Craig Tesch and Sean Vincent for Gary Spackman, dated February 24, 2009.

EXHIBIT 2

300 East Mallard Drive, Suite 350, Boise, Idaho 83706 Tel: 208-383-4140 Fax: 208-383-4156

2. Evaluation of SPF Report entitled *Ground-Water Supply Evaluation for the Mayfield Townsite Property*, prepared by Dennis Owsley and Sean Vincent for Steve Lester, dated February 10, 2009. This memorandum was provided as an attachment to the Tesch and Vincent memorandum.

SPF Water Engineering, LLC (SPF) previously prepared a ground water supply evaluation for application 61-12090 (SPF, 2007b). To our knowledge, IDWR has not yet reviewed this evaluation. However, some of the comments in the above-listed memos pertain to the SPF ground water supply evaluation for application 61-12090. The purpose of this response is therefore to (1) address concerns raised by IDWR staff in the two above-listed memorandums with regard to application 61-12090 and (2) provide revisions to a water supply assessment prepared for application 61-12090.

The following section (Section C) summarizes our response to the IDWR memos. Comments specific to the Tesch and Vincent memo are provided in Section D (page 4). Specific comments regarding the Owsley and Vincent memo are provided in Section E (page 9). Section F (beginning on page 15) provides revisions to the SPF water supply evaluation for application 61-12090 to address general concerns raised in the IDWR memos.

C. Summary

We appreciate the effort taken by IDWR to better understand hydrogeologic conditions and recharge rates in aquifers in the east Ada County and west Elmore County areas. This memo addresses several of the concerns raised by IDWR that may apply to the Nevid application.

Our general conclusion remains that there is very likely sufficient ground water available for the proposed Nevid application. This conclusion is based on the following:

1. The amount of water available for appropriation under application 61-12090 ranges between about 2,400 and 8,400 AF per year.
2. The average annual ground water withdrawal under permit application 61-12090 is estimated to be approximately 580 AF, with an estimated average annual consumptive use of approximately 420 AF. These amounts are substantially less than the estimated recharge in this area.
3. The Tesch and Vincent memo suggests that annual recharge rates might range from -5 to 50.1 cfs. However, these recharge rates are based on water budget values (e.g., underflow) from a USGS regional ground water study and are of limited value for considering the proposed ground water diversions under application 61-12090 (or the 172 cfs of aggregate proposed diversions in eastern Ada County and western Elmore County).
4. Furthermore, the impacts of proposed ground water pumping can best be evaluated on the basis of annual withdrawal volumes, not aggregate maximum diversion rates. Average withdrawals for domestic and/or municipal purposes are almost always less than maximum diversion

amounts. For example, the average pumping rate required to divert 577 acre feet (AF) over a 1-year period is about 0.8 cfs (which is substantially less than the 5 cfs maximum diversion rate requested under application 61-12090. The average withdrawal rate represented by pending applications is much less than the maximum aggregate withdrawal rate of 172 cfs.

5. The 1-mile capture area for Mayfield Townsite pumping, estimated using the WhAEM model (which was used in the IDWR analysis), likely provides no greater certainty (or uncertainty) for recharge estimates than the 2-mile capture area used in SPF analyses for the Mayfield Townsite and Nevid applications.

6. We do not believe that the withdrawal of 577 AF per year by the Elk Creek Village will exacerbate ground water level declines in the Cinder Cone CGWA. Ground water flowing from the Elk Creek Village area is not currently captured by the cone of depression created by the Cinder Cone CGWA. Pumping of approximately 16,000 AF/year in the Cinder Cone CGWA area has not resulted in a cone of depression that extends into the Elk Creek Village area. It is therefore highly unlikely that a cone of depression created by withdrawals under application 61-12090 will extend into the Cinder Cone CGWA.

7. The WhAEM model likely leads to an over-prediction of water level impacts to the Cinder Cone CGWA from pumping in the Mayfield Townsite area (and, by extension, by proposed wells in the Elk Creek Village area). This results, in part, from the use of several underlying assumptions regarding the amount of tributary underflow (assumed to be zero), seepage from surface channels (assumed to be zero), and hydraulic continuity between the Elk Creek Village area and the Cinder Cone CGWA (no hydraulic boundaries assumed). Results from the WhAEM model should therefore not be used to evaluate extended impacts from pumping under application 61-12090.

8. We believe that a 5-percent precipitation infiltration rate is justified for the Elk Creek Village area because of porous soils and modest amounts of duripan. The 5-percent infiltration rate is also supported by the high seepage rates from the Indian Creek and Bowns Creek channels. The 5-percent infiltration assumption increases (albeit slightly) the amount of water available for appropriation in the Elk Creek Village area.

9. A water budget prepared for the Elk Creek Village area (SPF, 2007b) was revised based on IDWR comments on a similar water budget prepared for Mayfield Townsite. Results of the water budget indicate that there likely is sufficient water available for the diversions proposed under application 61-12090 without injuring existing water right holders.

D. Comments Pertaining to the Tesch and Vincent Memo

Craig Tesch and Sean Vincent (IDWR) conducted a preliminary evaluation (dated February 12, 2009) of water availability in the vicinity of proposed developments along the I-84 corridor between Boise and Mountain Home. Their review was based on information provided in the USGS Professional Paper 1408-G entitled "Geohydrology of the Regional Aquifer System, Western Snake River Plain, Southwestern Idaho" (Newton, 1991). Tesch and Vincent's conclusions included the following:

1. The net recharge in the general area containing the Mayfield Townsite ranges from -5.3 cfs to 50.1 cfs, depending on whether underflow from the Danskin Mountains is included.
2. The combined appropriation of 11 water right applications (172 cfs) exceeds this recharge range, and that this total appropriation greatly exceeds the "reasonably anticipated rate of future natural recharge."
3. Several developments within 5 miles of the Cinder Cone CGWA and Mountain Home GWMA could exacerbate conditions in these areas.

Specific comments in response to the Tesch and Vincent analysis include the following:

1. The water budget prepared by Tesch and Vincent uses underflow values estimated in a previous USGS study (Newton, 1991). However, the water budget used by the USGS was prepared for a regional-scale analysis that began in 1979 and, in our opinion, has limited applicability for determining sufficiency of supply for individual applications such as 61-12090.
    a. The USGS model was used to simulate ground water flow under the 144-mile-long, 50-mile-wide area of the Western Snake River Plain to a depth of 11,500 feet below ground surface. Successful model calibration was only achieved for the uppermost model layer (of 3 model layers). Insufficient hydrogeologic data for the middle and lower aquifer units prevented an acceptable calibration of the middle and lower model layers. The model was thus deemed useful for understanding general aspects of the western Snake River aquifer system but not for detailed management analyses.
    b. Although this study represented a respectable effort in the 1979-1991 period, applicability of the model and supporting water budget data for local-scale assessments (such as the Nevid application) is very limited.
2. Tesch and Vincent acknowledge that "some budget estimates [in the USGS study] have a range of uncertainty and are not well defined due to a lack of hydrologic data, particularly tributary underflow..." (pg. 4).
    a. Newton (1991) characterizes portions of the USGS water budget in this way:

        "The range of uncertainty associated with the estimated ground-water budget ... is large because the values used in

budget estimates are not well defined. For example, ... rates of ET in non-irrigated areas cannot be estimated accurately owing to lack of data..."

"Estimates of recharge from precipitation generally are poor because the many factors that affect infiltration from precipitation are not well determined."

"...the distribution of underflow is poorly known."

b. Tesch and Vincent note that the tributary underflow component of the water budget has a large range of uncertainty.

   i. As noted in the IDWR memo, the lack of regional underflow data was acknowledged in the USGS (Newton, 1991) and Treasure Valley Hydrologic Project (Petrich, 2004) studies. We agree with Tesch and Vincent that tributary underflow rates into the aquifers underlying the Nevid area are uncertain.

   ii. However, qualitative (and possibly quantitative) assessments can be made for individual tributary basins.

   iii. While tributary underflow from unfractured granitic rocks may be negligible (SPF, 2007a)[1], recent anecdotal observations in the Indian Creek and Bowns Creek drainages suggest tributary underflow in tributary basin sediments and other areas along the Danskin Mountain front may be an important component of local recharge. Efforts to begin describing tributary underflow in the Indian Creek drainage are underway.

c. Therefore, the uncertainty associated with IDWR's estimate of water availability with respect to the 172 cfs of proposed applications is very high.

3. Tesch and Vincent compare the combined appropriation of 11 water right applications (172 cfs) against an estimated recharge range developed using the Newton (1991) water budget.

   a. Recharge rates such as those estimated in the USGS water budget are average rates.

   b. The use of maximum diversion rates for comparisons with average recharge rates is not a valid comparison. This is because the proposed diversion rates listed on applications are for anticipated peak withdrawals. Average withdrawals are almost always substantially less than maximum diversion rates.

   c. For example, the maximum requested diversion rate under application 61-12090 is 5 cfs. The anticipated annual volumetric withdrawal is approximately 577 acre feet (AF) per year, which represents an

[1] Referred to in the Tesch and Vincent memo on pg. 5.

average withdrawal rate of 0.80 cfs (16 percent of the requested maximum diversion rate). The consumptive use (419 AF) – a measure of anticipated actual aquifer impact – represents an average withdrawal rate of 0.58 cfs (12 percent of the requested maximum diversion rate).

d. Similarly, the 10-cfs maximum diversion rate under permit 63-32225 (which is not included in the above-listed 172-cfs aggregate diversion rate represented by pending applications) for the nearby Mayfield Springs development is limited by IDWR to an annual volume of 1,815 AF. This volume is equivalent to a constant annual withdrawal rate of only 2.51 cfs.

4. Table 2 of the Tesch and Vincent memo compares the 8,000-acre reduction in irrigated acres in two subareas of the USGS model between 1980 and 2000 (pg. 5).

   a. Tesch and Vincent suggest that the changes may be explained by implementation of crop reduction programs, conversions to dry-land farming, and removal of land from agricultural production.

   b. Another explanation is that the land was not fully developed agricultural land in 1980 and never received the amount of water estimated in the USGS study. The implications of this would be that the USGS overestimated agricultural diversions and corresponding consumptive use. The net result of such an error would be higher-than-estimated recharge values.

5. Table 3 of the Tesch and Vincent memo presents a water budget for two subareas in the USGS model based on USGS data and METRIC-based evapotranspiration estimates. We have several concerns about conclusions drawn from this table, including the following:

   a. The largest component (underflow) represents inflows to the model subareas to a depth of 11,500 feet below ground surface in sedimentary, volcanic, and granitic strata that are poorly understood.

   b. We agree with Tesch and Vincent that the underflow value estimated by the USGS study and listed in Table 3 of the Tesch and Vincent memo (55.4 cfs) is very uncertain. Furthermore, estimated underflow to geologic strata excessively below target aquifers is of limited use in estimating water availability for the proposed applications.

   c. We believe that a more valid approach to estimating underflow potentially tapped by proposed wells is to quantify the difference between precipitation and evapotranspiration in contributing watersheds, which is the approach taken in the Mayfield Springs (SPF,

2007c), Mayfield Townsite (SPF, 2007a), and Elk Creek Village (SPF, 2007b) water supply assessments[2].

d. Conclusion No. 3 of the Tesch and Vincent memo (pg 8) states that "ignoring underflow, the net recharge for subareas four and eight is negative 5.3 cfs" and that "the negative 5.3 cfs [net recharge without underflow] estimate arguably is more meaningful for evaluating impacts to the resource if the rate of ground water outflow approaches the modeled rate of underflow."

   i. Net recharge, by definition, should include underflow.

   ii. An estimate of recharge that ignores underflow is not more meaningful for evaluating potential resource impacts. Because total aquifer discharge represents a combination of recharge *and* aquifer underflow, ignoring underflow will lead to estimates of negative aquifer inflows, which are not meaningful.

6. The Tesch and Vincent memo notes that several of the proposed developments in this area, including the Elk Creek Village, are within 5 miles of the Cinder Cone CGWA. The memo expresses concern that proposed ground water development will exacerbate ground water level declines in the Cinder Cone CGWA and Mountain Home GWMA. We do not believe that ground water withdrawals under the Nevid application will exacerbate ground water level declines in the Cinder Cone CGWA and Mountain Home GWMA, for the following reasons:

   a. Ground water in the vicinity of the Elk Creek Village flows in a southwesterly direction perpendicular to the water level contours shown in Figure 1. A cone of depression emanating from the Cinder Cone CGWA (coarsely illustrated with the 50-foot contours shown in Figure 1) does not intercept flow from the Elk Creek Village area. Furthermore, a water level change map in Figure 1 of the Tesch and Vincent memo does not show declines reaching the Elk Creek Village area.

   b. It is noteworthy that pumping in the Cinder Cone CGWA has not reached the Elk Creek Village area in 40 years of pumping. The extension of a cone of depression from the Cinder Cone area may be, in part, precluded from extending to the Elk Creek Canyon area by leaky hydraulic boundaries associated with faulting parallel to the Danskin Mountain Front (Figure 2). Seismic geophysics proposed for the summer of 2009 may help identify faulting in this area.

   c. Pumping from the proposed Elk Creek Village wells under application 61-12090 will reduce flows into areas southwest of the Elk Creek Village and west of the Cinder Cone CGWA. However, ground water

[2] Selected comments made by IDWR regarding the Mayfield Townsite water supply assessment (SPF, 2007a) are addressed in Section E.

withdrawals in the Elk Creek Village area will not impact ground water levels in the Cinder Cone CGWA unless the cone of depression from Cinder Cone pumping extends further to the west. This would entail substantial additional ground water level declines in the Cinder Cone CGWA, which likely would lead to less pumping and subsequently some ground water level stabilization.

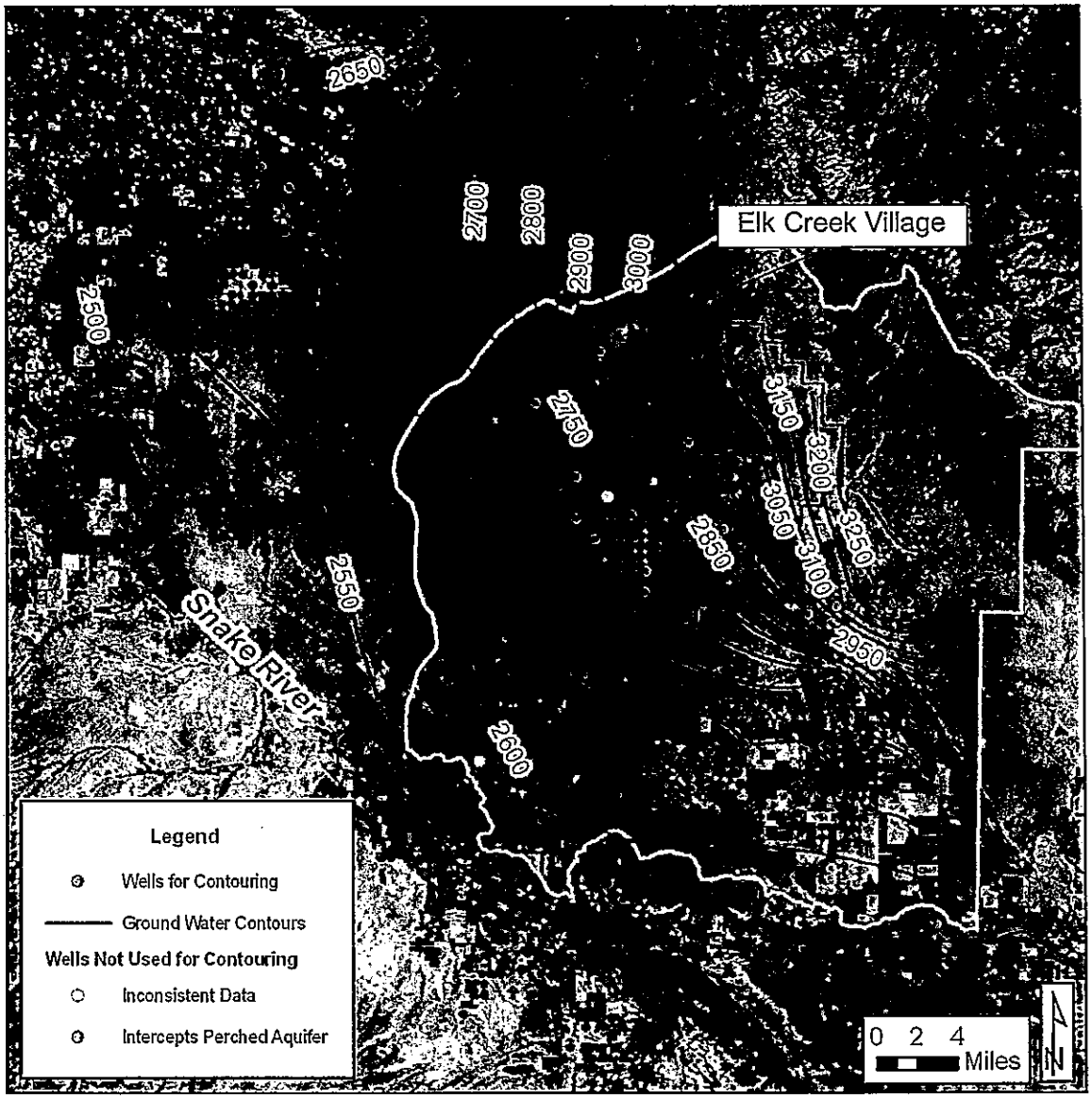


Figure 1. Ground water surface elevation contours (50-ft).

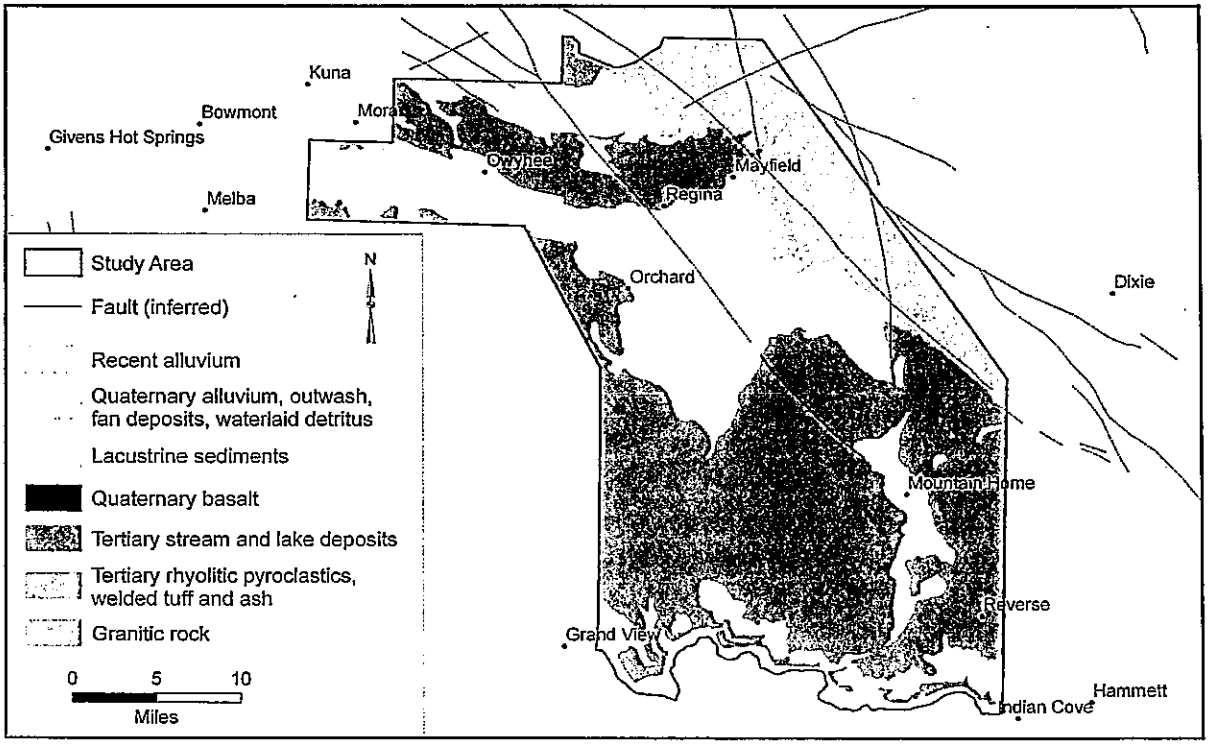


Figure 2. Surficial geology showing inferred faulting parallel to the Danskin Mountain front (Bond and Wood, 1978).

E. Comments Pertaining to the Owsley and Vincent Memo

In 2007 SPF prepared an assessment of likely water availability (SPF, 2007a) in conjunction with water right application 63-32499. This application requests 10 cfs for municipal purposes in the Mayfield Townsite area, which is located northwest of the Elk Creek Village site. Dennis Owsley and Sean Vincent of IDWR reviewed the Mayfield Townsite water supply assessment (memo dated February 10, 2009); their review was included as an attachment to the Tesch and Vincent memo (Section D).

To our knowledge, IDWR staff has not reviewed the water supply evaluation prepared for application 61-12090 (Elk Creek Village). However, some aspects of the Owsley and Vincent memo also apply to the Elk Creek Village assessment. This section therefore addresses concerns raised in IDWR's review of the Mayfield Townsite water supply assessment that likely apply to application 61-12090.

1. IDWR delineated an alternative capture area for wells in the Mayfield Townsite area using the WhAEM model (U.S. EPA, 2007) for purposes of comparison with the SPF assumed 2-mile capture area. The 1-mile capture area estimated using the WhAEM model provides, in our opinion, no greater certainty (or uncertainty) for recharge estimates than the 2-mile capture area.

a. The WhAEM code simulates flow in a 2-dimensional (i.e., horizontal) aquifer system; ground water flow in the Mayfield area clearly occurs in a 3-dimensional (horizontal and vertical) flow system.

b. The assumed uniform areal recharge of 3 percent used in the WhAEM model ignores substantial recharge that occurs from stream channel seepage and tributary underflow.

c. The 200-foot aquifer thickness assumed by Owsley and Vincent is almost certainly less than the actual aquifer thickness in the Mayfield Townsite area.

    i. The depth to water in the ARK properties well (Well No. 48 in Figure 4 of the Mayfield Townsite water supply assessment) used by Owsley and Vincent for the WhAEM analysis was extended to a depth of 690 feet. The initial depth to water was recorded as 229 feet, implying a saturated thickness of 461 feet above the bottom of the well.

    ii. The Kenny Owings Well (Well No. 49 in Figure 4 of the Mayfield Townsite water supply assessment) was drilled to a depth of approximately 1,300 feet. This well penetrated multiple zones of fine-, medium-, and coarse-grained sediments to depths of at least 960 feet based on a log of cuttings from this well that were described by a Boise State University student in 1980. Geophysical logging indicated that these sediments extend to the total depth.

    iii. Based on observations in the ARK Properties and Kenny Owings Well, the actual aquifer thickness in the Mayfield Townsite area is substantially greater than the 200 feet assumed in the Owsley and Vincent analysis.

d. Faulting or other features creating hydraulic heterogeneity are not included in the WHAEM model.

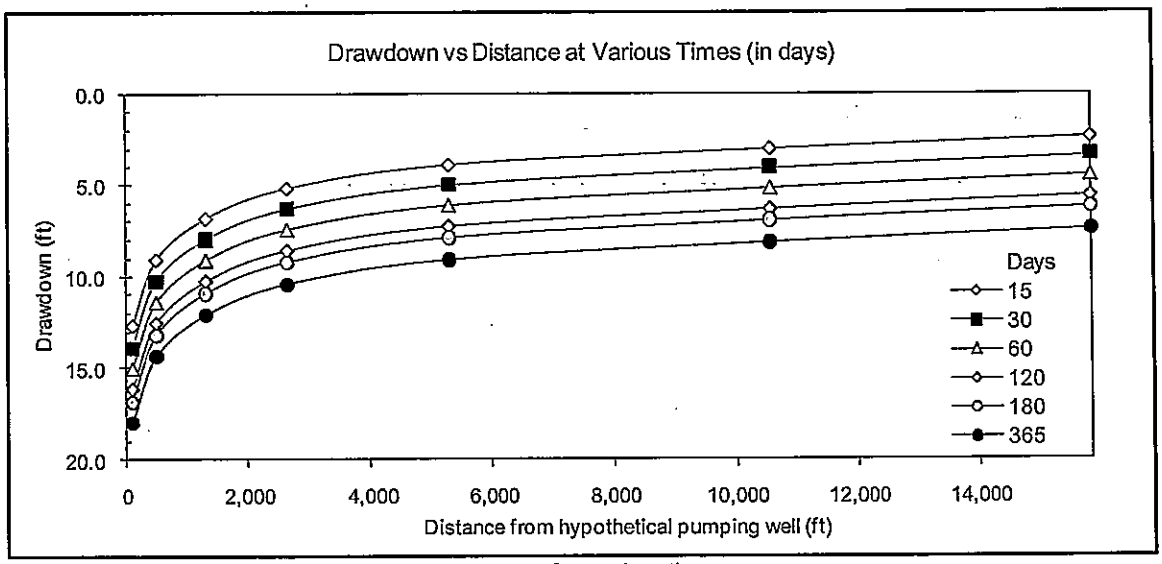
e. Different assumptions about aquifer thickness, hydraulic parameters, and recharge amounts will either increase or decrease the size of an aquifer capture area.

    i. A specified recharge rate biases the estimation of capture area. For example, an assumed high value of recharge would lead to a small estimated capture area when using the WhAEM model. A low value leads to a broader simulated capture area. Thus, the use of recharge rates as a model input contributes to a pre-determination of capture zone.

    ii. For comparison purposes, a Theis analysis (Theis, 1935) was performed to determine the potential capture zone for pumping under application 61-12090. Using the same transmissivity used in the WhAEM model by IDWR (25,000 gpd/ft), an assumed

storativity of 0.005, and an average withdrawal rate of 0.8 cfs (which provides for an annual withdrawal of 577 AF under the Elk Creek Village application), a water level decline of up to about 8 feet is possible at a distance of 2 miles after 1 year[3]. (Figure 3). This shows the possible extent of a capture zone. Note, however, that any recharge to the aquifer during the year of withdrawal would reduce (or eliminate) this long-term drawdown predicted using the Theis solution. The Theis solution, like the WhAEM model, is a 2-dimensional solution that does not account for boundary effects, vertical ground water flow, or hydraulic discontinuities.

iii. The WhAEM model, while appropriate for some wellhead protection analyses, is not ideal for defining recharge capture areas in complex hydrogeologic areas because of the dependence on pre-defined recharge rates and other simplifying assumptions.



See text for explanation

Figure 3. Theoretical drawdown after a period of one year.

[3] Assumptions inherent to the use of the non-equilibrium well equation (Theis, 1935) are that the aquifer is homogeneous and isotropic, uniform in thickness and areal extent, the aquifer receives no recharge, the pumping well penetrates the full aquifer thickness, water removed by discharge is removed instantaneously, the pumping well is 100 percent efficient, laminar flow exists throughout the aquifer, and that the water table or potentiometric surface has no slope. These assumptions are rarely completely satisfied under field conditions, but this method will often provide an indication of possible well drawdown in the absence of aquifer recharge.

f. The effect of a 1-mile capture zone is that it would intercept less recharge than an assumed 2-mile capture zone, and therefore represents a more conservative assessment of potential water availability. Despite our comments regarding the use of the WhAEM model (and its underlying assumptions), we have re-estimated potential recharge available to the Elk Creek Village wells using the 1-mile capture zone (see Section F).

2. The WhAEM model predicted additional steady-state water level declines of 130 feet at the Cinder Cone CGWA boundary resulting from Mayfield Townsite pumping. Similar (but lesser magnitude) declines could be predicted from Elk Creek Village pumping with a similar WhAEM analysis. However, too little about aquifer conditions (transmissivity, potential hydraulic boundaries, and recharge rates) is known for use of the WhAEM code in such an application.

   a. It is notable that ground water withdrawals in the Cinder Cone CGWA have had no discernable effect in the Elk Creek Village area. Withdrawals in the Cinder Cone CGWA of about 16,000 acre feet per year (AF/yr)4 have resulted in an average decline of about 37 feet between 1976 and 2000. Ground water withdrawals in the Cinder Cone area have not yet reached equilibrium; water levels are declining at a rate of approximately 2 feet per year. However, ground water levels in the Elk Creek Village area are stable or rising slightly (see Figure 4 in SPF, 2007b).

   b. Owsley and Vincent acknowledge that the effects of possible faulting between the Mayfield (and Elk Creek Village) and Cinder Cone CGWA could limit the propagation of pumping effects between these two areas.

   c. We believe that it is highly unlikely that withdrawals of up to 577 AF per year from the Village area will impact water levels in the Cinder Cone CGWA because

      i. Water level declines in the Cinder Cone CGWA have not extended to the Elk Creek Village area in approximately 40 years of pumping (which may be attributable, in part, to hydraulic discontinuities associated with faulting); and

      ii. The current cone of depression created by the Cinder Cone CGWA does not intercept ground water flowing from the Elk Creek Village area.

3. The Owsley and Vincent memo notes that SPF assumed an areal infiltration rate of 5 percent in the Mayfield Townsite water supply evaluation, compared to a 3 percent infiltration rate assumed in the USGS

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[4] Based on METRIC-derived evapotranspiration in the Cinder Cone CGWA.

study (Newton, 1991). The same 3 percent infiltration rate was assumed in the Treasure Valley Hydrologic Project (Urban, 2004; Urban and Petrich, 1998). However, we believe that the 5 percent infiltration rate is justified for the Mayfield Townsite and Elk Creek Village areas.

a. Much of the Treasure Valley rangeland areas have a prominent duripan[5] that limits deep-infiltration rates.

b. One would expect that alluvial sediments and overlying soils near the granitic Danskin mountain front would have substantially greater porosity than basinward sediments.

c. Soils in the assumed Elk Creek Village infiltration area overlying alluvial sediments have greater permeability than typical Treasure Valley soils.

   i. Soils with duripan layers cover about 22 percent of the estimated sedimentary infiltration area for the Elk Creek Village.

   ii. Soil unit 27 (Figure 4), which has low-permeability (i.e., duripan) characteristics, covers about 12.4 percent of the sedimentary portion of the Elk Creek Village infiltration area.

   iii. Thirty percent of Unit 94, which covers 33.5 percent of the sedimentary infiltration area, has duripan low-permeability characteristics.

d. Most of the soil (78 percent) in the sedimentary portion of the Elk Creek Village capture area consists of soils without duripan. We believe that higher permeability soil near the basin margin in this area justifies the 5 percent infiltration rate assumed in the Mayfield Townsite and Elk Creek Village studies.

4. SPF used rangeland evapotranspiration developed with SEBAL (Surface Energy Balance Algorithm for Land) based on 2000 data.

   a. The Owsley and Vincent memo correctly points out that

      i. The variability for rangeland ET estimates is high; and

      ii. SEBAL data do not include wintertime ET estimates.

   b. Owsley and Vincent used evapotranspiration estimates using ET Idaho[6] data based on the Boise 7N weather station data. The resulting ET estimates for the Mayfield Townsite area are larger than those estimated by SPF.

   c. SPF used IDWR's comments regarding evapotranspiration in the Mayfield Townsite report to re-estimate evapotranspiration for the Elk

[5] http://soils.ag.uidaho.edu/soilorders/aridisols_08.htm

[6] *ET Idaho --- Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho*, University of Idaho at Kimberlly, http://www.kimberly.uidaho.edu/ETIdaho/.

Creek Village capture zone area. The results from this refined estimate are presented in Section F.

Soil Unit	% of Area	Description	Infiltration Capacity (in/hr)	Duripan
94	33.5%	Lanktree_Chilcott loams, 0-12% slopes	0.00-0.20	30% of soil type
78	20.2%	Haw-Lankbush complex, 4-20% slopes	0.20-0.60	no
129	13.3%	Rainey-Van Dusen_Schoolhouse association, 30-60 % slopes	0.20-20.0	no
27	12.4%	Chilcott-Elijah silt loams, 0-12 % slopes	0.00-0.06	yes
59	9.7%	Farrot-Haw complex, 4-20% slopes	0.20-0.60	no
91	4.2%	Lankbush-Lanktree complex, 4-30% slopes	0.06-0.60	no
92	4.2%	Lankbush_Jenness association, 0-4% slopes	0.20-2.0	no
108	2.3%	Monroe-Jenness complex, 0-2% slopes	0.57-2.00	no
127	0.0%	Rainey-Schoolhouse-Oland association, 30-70% slopes	2.0-6.0	no

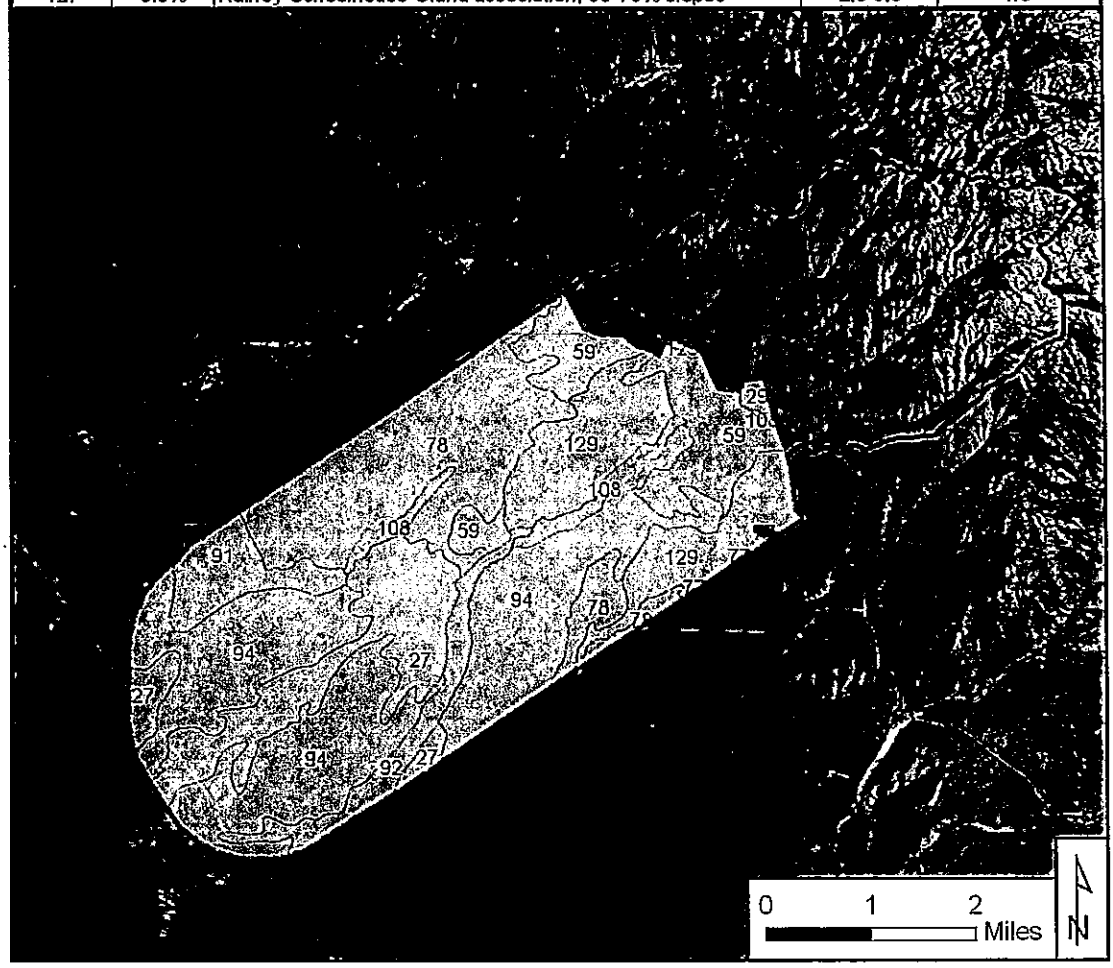

Figure 4. Soils in the Elk Creek Village area.

5. Owsley and Vincent estimated evapotranspiration in the vicinity of the Mayfield Townsite area using a 1999 vegetation coverage. Our understanding is that this coverage was prepared by or for the Idaho Department of Fish and Game. We believe that the vegetation coverage is not correct.

a. The coverage included substantially more agricultural acreage planted in alfalfa and more "low intensity urban" acreage than currently exists. The alfalfa acreage exceeds the irrigated area authorized under existing water rights. Some of the assumed diversion rates exceed allowable application rates.

b. The amount of evapotranspiration estimated for these lands was overestimated by IDWR.

c. A more appropriate evapotranspiration rate using ET Idaho might be an average rate represented by four vegetation categories: sagebrush, range grasses (bromegrass), range grasses (long season), and range grasses (early short season).

F. Revised Water Budget Information for Nevid Application

A partial water budget was prepared as part of the ground water supply evaluation for the Elk Creek Village (SPF, 2007b). This water budget was revised based on comments made by Owsley and Vincent in their review of the Mayfield Townsite water supply evaluation (see Section E). Specific refinements to the Elk Creek Village water supply evaluation included the following:

1. The recharge capture zone was decreased from a 2-mile radius around the Elk Creek Village property to a 1-mile radius.
2. Wintertime evapotranspiration was added to the annual evapotranspiration.
3. Evapotranspiration estimates were made using data from ET Idaho.

Results from these changes are summarized beginning on page 21. The data and methods used to develop the revised water budget are described in the following paragraphs. The following paragraphs correspond with Sections 4.1.1 through 4.2 in the original Elk Creek Village water supply evaluation (SPF, 2007b).

Contributing Basins

Four watershed areas define surface water flow in and upgradient of the property, shown in Figure 5. However, these surface water drainages do not necessarily define subsurface flow divides. Aquifers in the area extend beyond, and can be influenced by, recharge and discharge from areas outside of these watershed areas. For this analysis it was assumed that the capture area for aquifers in the project area and the area of well withdrawals near the Elk Creek Village property is the area upgradient and within approximately 1 mile of the Elk Creek Village property but limited by contacts with granitic rocks (Figure 5). The assumed capture area for areal infiltration is approximately 12,000 acres.

Precipitation in granitic areas in the upper Sand Hollow Creek and Bowns Creek watersheds is expected to contribute to aquifer recharge in the project area via (1) seepage from surface channels into underlying sediments and (2) shallow underflow. Seepage of channel flows continues as the channels cross from primarily granitic to

primarily sedimentary areas. These upper watershed areas include approximately 5,400 additional acres (Figure 5).

Precipitation

Average annual precipitation estimates, based on data obtained from IDWR, range from approximately 12 to 14 inches per year in lower elevations of the water budget area to 24 to 28 inches of precipitation at the highest elevations (Figure 6). The average annual precipitation volume over the entire water budget area is approximately 24,300 acre feet. The average annual precipitation over the assumed area of areal infiltration is approximately 14,800 acre feet.

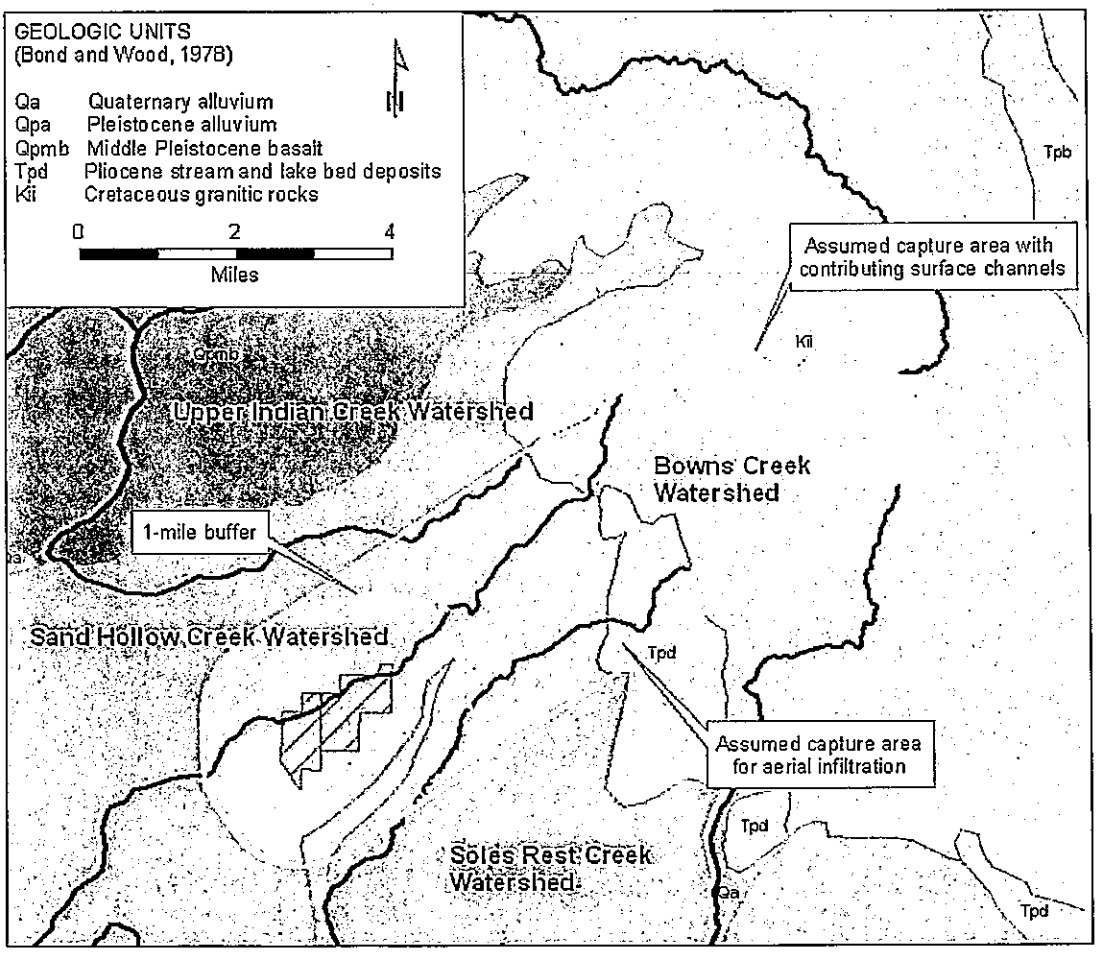

Figure 5. Assumed capture area for areal infiltration and contributing watershed areas for surface channel seepage. Surficial geology from Bond and Wood, 1978.

Evapotranspiration

Evapotranspiration was estimated using two different methods. The first estimate of evapotranspiration was obtained using METRIC evapotranspiration data[7] from the year 2000 and winter evapotranspiration estimates from ET Idaho. The second estimate was made using annual ET Idaho data.

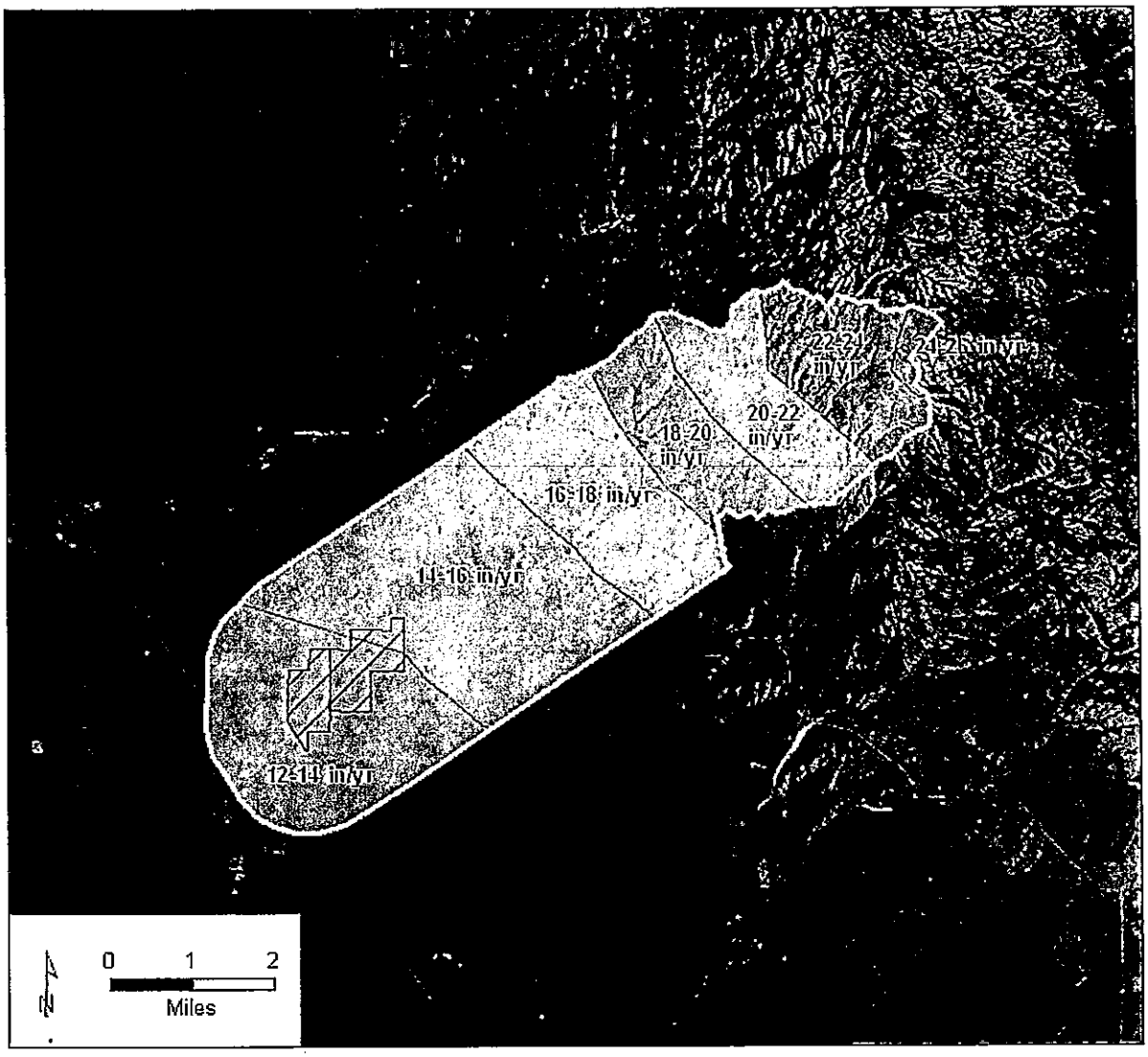

Figure 6. Annual precipitation rates in the project area.

Net evapotranspiration in the contributing area between March 1, 2000 and October 31, 2000 was estimated to be approximately 13,100 acre feet using the METRIC data. The average evapotranspiration rate in the contributing area during this period was

[7] Obtained from IDWR.

approximately 9.0 inches (or approximately 0.75 AF/acre). From ET Idaho, the average evapotranspiration during the wintertime months (November through February) for sage brush and rangeland at five area weather stations (Figure 7) is similar (ranging from 1.85 to 2.00 inches). An assumed average value of 1.93 inches during the wintertime months yielded an additional 2,780 AF of evapotranspiration for the Elk Creek Village area, resulting in a total estimated evapotranspiration of approximately 15,900 acre feet.

METRIC evapotranspiration data are not well calibrated for range land values[8]. The error associated with these data is uncertain, but could be 20 to 30 percent high or low.

The second estimate of evapotranspiration was calculated using annual ET Idaho data for sage brush and range grasses. There are no weather stations in the immediate vicinity of the Elk Creek Village property; the closest weather stations are shown in Figure 7. The Anderson Dam (3,240 feet) and Arrowrock Dam (elevation 3,880 feet) weather stations are located at elevations similar to that of the Elk Creek Village property (which lies at approximately 3,400 feet elevation). Average evapotranspiration rates for sage brush, bromegrass, long-season range grass, and early-season range grass are 1.23 feet and 1.26 feet per year at the Arrowrock Dam and Anderson Dam stations, respectively (Table 1). At an average evapotranspiration rate of 1.26 feet per year for the 4 vegetation types listed above, the total evapotranspiration for the contributing area surrounding the Elk Creek Village is approximately 21,900 acre feet.

The use of Anderson Dam weather station data may be conservative in the sense that it could yield a higher estimate of evapotranspiration than actually exists. This is because METRIC evapotranspiration data (Figure 7) show lower evapotranspiration rates in the Elk Creek Village area than near the Arrowrock Dam and Anderson Dam locations. While METRIC data may have inherent error in non-agricultural areas (resulting from lack of calibration), the relative spatial differences are likely to be relatively accurate[9].

The actual annual average evapotranspiration in the Elk Creek Village contributing area is likely to be between 15,900 and 21,900 acre feet.

Aquifer Inflows

Only a small portion of precipitation infiltrates through the soil; the remainder is lost to evaporation, transpiration by plants, or drains as surface runoff. Estimates of areal infiltration rates might range from about 2 to 8 percent. An average infiltration rate of 5 percent of precipitation was assumed for this analysis (see Section E). Factors supporting this assumption include (1) abundant sandy areas, (2) the presence of decomposed granitic soils, granitic fractures, and alluvial sediments in upland areas, and (3) higher rates of precipitation during months of lowest evapotranspiration (i.e. winter). However, infiltration of water into the granitic rocks in the northeastern highlands of the

[8] Bill Kramber (IDWR) and Dr. Rick Allen (University of Idaho – Kimberly), personal communication, 2009.
[9] Dr. Rick Allen (University of Idaho – Kimberly), personal communication, 2009.

water budget area is likely small. The estimated average areal infiltration, based on the assumption that 5 percent of precipitation that falls on non-granitic materials and contributes to deep infiltration, is about 740 acre feet.

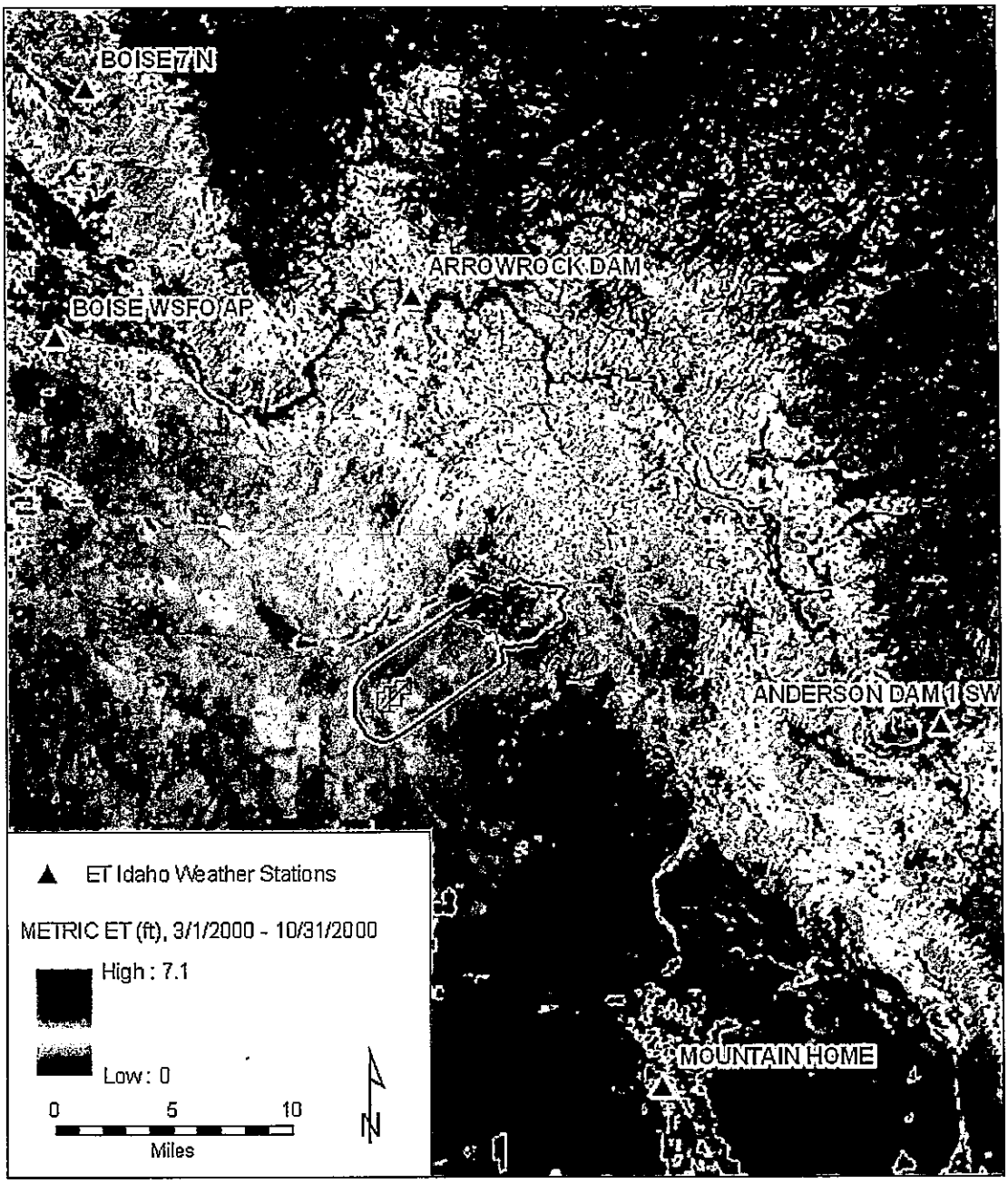

Figure 7. ET Idaho weather stations.

Water that does not infiltrate or is not lost to evapotranspiration becomes surface runoff. Most of the surface runoff in the Elk Creek Village area becomes aquifer recharge through channel seepage or shallow subsurface underflow.

Basin evapotranspiration (approximately 15,900 to 21,900 AF) and areal infiltration (approximately 740 AF) are less than the estimated average basin precipitation (24,300 AF). Much of the difference (1,700 to 7,700 to AF) becomes surface runoff. Because of the lack of significant surface flow leaving the study area via Sand Hollow Creek and Bowns Creek, and minimal surface water diversions, a substantial portion of this water is expected to seep into the subsurface from the Sand Hollow Creek, Bowns Creek, and other tributary channels. Shallow subsurface underflow from upland areas also likely contributes to this component.

Crop	Station (Site Elevation, in feet)				
	Mountain Home 1W (3,150)	Boise WSFO (2,860)	Arrowrock Dam (3,240)	Anderson Dam (3,880)	Boise 7N (3,890)
Sage Brush	0.83	0.94	1.48	1.55	1.51
Range Grasses - bromegrass	0.82	0.94	1.15	1.17	1.27
Range Grasses - long season	0.85	0.95	1.35	1.39	1.47
Range Grasses - early short season	0.73	0.84	0.93	0.93	1.01
Average of 4 crops	0.81	0.92	1.23	1.26	1.31

Source: ET Idaho: http://www.kimberly.uidaho.edu/ETIdaho/

Table 1: Estimated actual evapotranspiration for 4 types of range vegetation (in feet per year).

A text-based search of the IDWR water rights database for water rights in T1N and T1S, R4E and R5E revealed two surface-water irrigation rights diverted from Sand Hollow Creek or Bowns Creek basins. Water right 61-2002 authorizes diversions of 0.5 cfs from Roost Creek for the irrigation of 25 acres, and water right 61-2051 authorizes diversions of 1 cfs from Bowns Creek for the irrigation of 50 acres. Diversions under these surface water rights, assuming an annual diversion volume of 4.0 AF/ac (which is likely high because these creeks do not flow during the entire irrigation season), are estimated to be approximately 300 acre feet. However, neither of these rights were claimed in the Snake River Basin Adjudication (SRBA), and it is highly unlikely that these rights will be used in the future. Nonetheless, this potential diversion volume reduces the surface runoff potentially available for channel seepage to approximately 1,400 to 7,400 AF.

The range of estimated recharge from channel seepage is substantial (1,400 to 7,400 AF), which reflects the uncertainty in evapotranspiration estimates for the study area. However, it demonstrates that a substantial volume of aquifer recharge is derived from stream channel seepage.

Aquifer Outflows

Most of the discharge from aquifers in this area consists of (1) withdrawals by wells and (2) underflow toward the Snake River. There are 21 wells listed in the IDWR well construction database with locations in the assumed capture boundary. Of these 21 wells, 18 are for domestic uses, two are for commercial purposes, and one is for stockwater. IDWR records do not indicate the presence of irrigation wells within the capture boundary. Assuming domestic use for 21 homes (at 0.3 AF/yr per household), commercial use from four wells (at 1.0 AF/yr per well), and stockwater use for 100 cattle (1.4 AF/yr), the annual average withdrawal of ground water is estimated to be approximately 10 AF/yr. Inclusion of the annual withdrawal rate in the water budget is conservative, because non-consumptive components of these withdrawals would result in returns (recharge) to the shallow subsurface.

The developers of the nearby Mayfield Townsite and Mayfield Springs properties have an existing permit and/or an application for ground water use that are senior to application 61-12090. The extent to which either the application will be granted by IDWR or permits developed by the applicants is not clear at this time. Because this revised water budget includes a reduced capture zone area, overlap with potential capture areas for the Mayfield Townsite and Mayfield Springs projects is significantly less than that shown in the earlier water supply evaluation (SPF, 2007b). Because those projects are located in the Indian Creek watershed, which does not significantly overlap the revised contributing area for this project, water use associated with those projects is not included in the revised water budget. Similarly, additional aquifer recharge occurring in the Indian Creek watershed is not included in the revised water budget for application 61-12090.

Water Budget Summary

A summary of estimated basin and aquifer inflows and outflows is provided in Table 2. Average annual recharge to aquifers in the vicinity of the Elk Creek Village site is estimated to be between 2,400 and 8,400 AF. Existing ground water withdrawals in the contributing area are estimated to be minimal (approximately 10 AF per year). Thus, the amount of water available for appropriation is estimated to be between 2,400 and 8,400 AF per year. The average annual ground water withdrawal under permit application 61-12090 is estimated to be approximately 580 AF, with an estimated average annual consumptive use of approximately 420 AF.

Potential Impacts to Existing Wells

We anticipate minimal impacts to existing wells as a result of proposed withdrawals under application 61-12090. Based on a review of drillers' reports listed in the IDWR well construction database, there are 1, 5, and 15 wells within ¼, ½, and 1 mile of the Elk Creek Village property, respectively. The single well within ¼ mile of the property is controlled by the Elk Creek Village property owners. Potential water level declines will be significantly less than the 10 feet shown in Figure 3 because of recharge in the Elk Creek Village area.

Summary: Ground Water Availability for Appropriation

Additional ground water appears to be available for appropriation in the Elk Creek Village area. This opinion is based on estimated recharge in excess of current uses (Table 3) and on steady (or slightly rising) water levels in the area (see Figure 5 in SPF, 2007b). Stable water levels suggest that water is available for appropriation. The amount of water available for appropriation is estimated to be between 2,400 and 8,400 AF per year. The average annual ground water withdrawals for uses proposed under application 61-12090 are approximately 580 AF, with an estimated annual consumptive use of 420 AF. The average annual use anticipated under application 61-12090 is less than the low estimate of ground water available for appropriation.

Component	Estimated Average Annual Volume (AF)
Precipitation in assumed capture area and upper Sand Hollow and Bowns Creek basins	24,300
Precipitation in assumed capture area	14,800
Estimated infiltration (5% of precipitation in assumed capture area)	700
Low estimate of evapotranspiration in assumed capture area and upper Sand Hollow and Bowns Creek basins	15,900
High estimate of evapotranspiration in assumed capture area and upper Sand Hollow and Bowns Creek basins	21,900
Estimated surface water diversions from Sand Hollow and Bowns Creek (water rights 61-2002 and 61-2051, which could require a volume of 300 AF/yr, were not claimed in the SRBA and will likely never be used.	0
Low estimate of surface channel seepage into shallow aquifers[1]	1,700
High estimate of surface channel seepage into shallow aquifers[2]	7,700
Estimated aquifer recharge (low estimate)[3]	2,400
Estimated aquifer recharge (high estimate)[4]	8,400
Estimated discharge to wells[5]	10
Available for appropriation (high estimate)	2,400
Available for appropriation (low estimate)	8,400

[1] Precipitation less areal infiltration, high evapotranspiration, and surface water diversions (24,300-700-21,900=1,700)
[2] Precipitation less areal infiltration, low evapotranspiration, and surface water diversions (24,300-700-15,900=7,700)
[3] Areal infiltration plus high infiltration estimate (700+7,700=8,400)
[4] Areal infiltration plus low infiltration estimate (700+1,700=2,400)
[5] See Section 3.1.6
[6] High recharge estimate less estimated discharge to wells (8,400-10=2,400 (rounded value))
[7] Low recharge estimate less estimated discharge to wells (2,400-10=2,400 (rounded value))

Table 2. Revised water budget summary

Document Info:
SPF Job Number: 591.0010

G. References

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SPF, 2007b. Groundwater Supply Evaluation for Elk Creek Village, Application for Permit No. 61-12090, Consulting report prepared by SPF Water Engineering, LLC for Elk Creek Canyon, LLC.

SPF, 2007c. Water Supply Assessment for the Mayfield Springs Planned Community, Consulting report prepared prepared by SPF Water Engineering, LLC for Intermountain Sewer and Water Corporation.

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Urban, S.M. and Petrich, C.R., 1998. 1996 Water Budget for the Treasure Valley Aquifer System, Idaho Department of Water Resources Research Report.

SPF Water Engineering, LLC
water resource consultants

December 31, 2007

Steve Lester
Western Region
Idaho Dept. of Water Resources
2735 Airport Way
Boise, ID 83706

Re: Application for Permit 61-12090

Dear Steve,

In response to your correspondence dated May 17, 2007, this letter provides additional information for a permit application originally submitted by Boise-Highland Development Co. An assignment has been submitted to IDWR establishing Nevid LLC as the new owner of the application.

Nevid's authority to do business in the State of Idaho is evidenced by the enclosed copies of the *Certificate of Existence* filed in the State of Nevada, and the *Application for Registration of Foreign Limited Liability Company* filed October 26, 2007 with the Secretary of State for the State of Idaho.

Nevid LLC is the current owner of the property that is the subject of application 61-12090, as evidenced by the attached Warranty Deed conveying the property from Betsy Binnendijk-Zijderlaan, Willem Zijderlaan, and Nicholaas Willem Zijderlaan (Instrument No. 391646).

The previous owner of *Application for Permit* 61-12090 also filed an *Application for Transfer* regarding water right 61-7208. Nevid LLC did not acquire an interest in the transfer application and will not be pursuing a transfer of water right 61-7208.

We are also providing information on behalf of Nevid LLC, as required under Idaho Water Appropriation Rule 40, Rule Subsection 040.05 concerning:

1. the effect on existing water rights
2. sufficiency of supply
3. the good faith purposes of the applicant
4. the financial resources of the applicant
5. local public interest

600 East River Park Lane, Suite 105, Boise, Idaho 83706 Tel: 208-383-4140 Fax: 208-383-4158

EXHIBIT 3

The following paragraphs supply the information requested under Idaho Water Appropriation Rule 40.

Subsection 040.05c - Information relative to effects on existing water rights, and
Subsection 040.05d - Information relative to the sufficiency of water supply

SPF has completed a report entitled "Groundwater Supply Evaluation for Elk Creek Village, Application for Permit No. 61-12090" to supply the information required by Subsections 040.05c/d. A copy of the report is included with this correspondence. (Elk Creek Village is the initial phase of the planned community being developed at this site.)

As noted in the report, application 61-12090 requests appropriation of 5.0 cfs for municipal uses. Elk Creek Canyon, LLC (a related business entity) has applied for additional appropriation of groundwater under applications 61-12095 and 61-12096 (submitted April 3, 2007) for the remainder of Elk Creek Village and the Elk Creek Canyon planned community.

Subsection 040.05e – Information relative to good faith

The application is made in good faith and is not for speculative purposes. Nevid LLC is the current owner of the property which is the subject of application 61-12090, as evidenced by a copy of a Warranty Deed noted above.

Nevid LLC is developing the property in conjunction with a property (known as the "Ranch Property) directly to the north also owned by Nevid LLC. A copy of the Warranty Deed for the Ranch Property is also attached. Nevid was asked by Elmore County to delay filing an application for this planned community development until after the County had an opportunity to update the existing comprehensive plan. Preliminary concept design and significant work on the planned community application has been completed.

Subsection 040.05f – Information relative to financial resources

Nevid has made a substantial financial commitment to this project. It has purchased its property without debt financing. As shown on the enclosed settlement statements, Nevid has paid $2,100.000 for the property in question and an additional $6,500,000 for the Ranch Property.

Subsection 040.05g - Information relative to local public interest

As noted above, Nevid LLC is in the process of completing an application for the planned community to be known as Elk Creek Canyon. This will initiate the development process with Elmore County.

Nevid LLC is an appropriate entity to develop and operate a municipal water supply system which will be regulated by IDEQ as a public water supply. Nevid will comply with all of the requirements of the IDPUC and IDEQ.

We look forward to supplying additional information concerning applications 61-12095 and 61-12096 in the near future. Please contact me if you have questions or need additional information.

Sincerely,

Roxanne

Roxanne Brown

Cc: John Erickson

Enclosures
Groundwater Supply Report

SPF Job No.: 591.0010

GROUNDWATER SUPPLY EVALUATION FOR ELK CREEK VILLAGE, APPLICATION FOR PERMIT NO. 61-12090

RECEIVED
DEC 3 1 2007
WATER RESOURCES
WESTERN REGION

Prepared for

Elk Creek Canyon, LLC
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Prepared by

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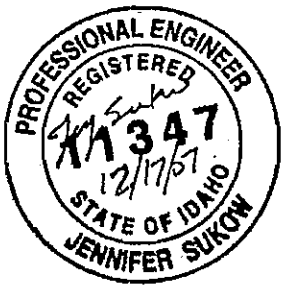

December 17, 2007

SPF Water Engineering, LLC
water resource consultants

EXHIBIT 3A

Executive Summary

Elk Creek Canyon, LLC is proposing to develop a planned community about 25 miles southeast of Boise in western Elmore County. Elk Creek Village is the first phase of this project. A portion of the Elk Creek Village property and water right permit application 61-12090 were acquired from Boise Highland Development Company. Application 61-12090 will provide a portion of the water needed for the proposed Elk Creek Village development. The purpose of this water supply assessment is to provide additional information in support of application 61-12090, as requested by the Idaho Department of Water Resources (IDWR) on May 17, 2007. The assessment evaluates potential water availability in aquifers underlying the project site.

Elk Creek Canyon, LLC is proposing to supply domestic and irrigation water to the Elk Creek Village development via a new public water system supplied by groundwater. The proposed Elk Creek Village development includes approximately 1,200 equivalent domestic units (EDUs). Application 61-12090 requests appropriation of 5.0 cfs for municipal uses, including domestic and commercial use for 178 EDUs, 138 acres of irrigation, and fire flow. Two or more wells would be constructed within the Elk Creek Village property to divert water. Elk Creek Canyon, LLC applied for additional appropriation of groundwater under applications 61-12095 and 61-12096 (submitted April 3, 2007) for the remainder of Elk Creek Village and the Elk Creek Canyon planned community. This assessment is limited to water use under application 61-12090.

The anticipated average annual groundwater diversion associated with permit application 61-12090 was estimated to be approximately 577 AF. The anticipated average annual consumptive use was estimated to be approximately 419 AF. Additional groundwater appears to be available for appropriation in the Elk Creek Village area, as evidenced by stable or rising water level hydrographs from areas wells. The amount of water available for appropriation in this area is estimated to be between 1,200 and 12,100 AF per year.

Significant impacts on existing water rights are not anticipated as a result of proposed new diversions for the project. The estimated water budget suggests there is an adequate water supply for existing water rights and permits, and the new uses proposed under water right application 61-12090. Based on IDWR's groundwater level change map and groundwater elevation contours, the Elk Creek Village site is not up-gradient of areas with declining water levels in the Cinder Cone Butte CGWA or Mountain Home GWMA. Diversions in the Elk Creek Village area are not expected to have significant impacts on water levels in the Cinder Cone Butte CGWA.

Because the ultimate capacity of aquifers in this area is uncertain, groundwater level monitoring should be conducted in the area prior to and following construction of new public water system wells. Monitoring should occur on a periodic basis (i.e. quarterly or semi-annually) for an extended period of time during and following development of municipal uses.

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

1.1. Project Location

Elk Creek Canyon, LLC is proposing to develop a planned community about 25 miles southeast of Boise in western Elmore County. Elk Creek Village is the first phase of this project. A portion of the Elk Creek Village property and water right permit application 61-12090 were acquired from Boise Highland Development Company. Application 61-12090 will provide a portion of the water needed for the proposed Elk Creek Village development. The location of Elk Creek Village is shown in Figure 1. The project site is approximately 703 acres and lies in a high desert environment at an elevation of approximately 3,400 feet.

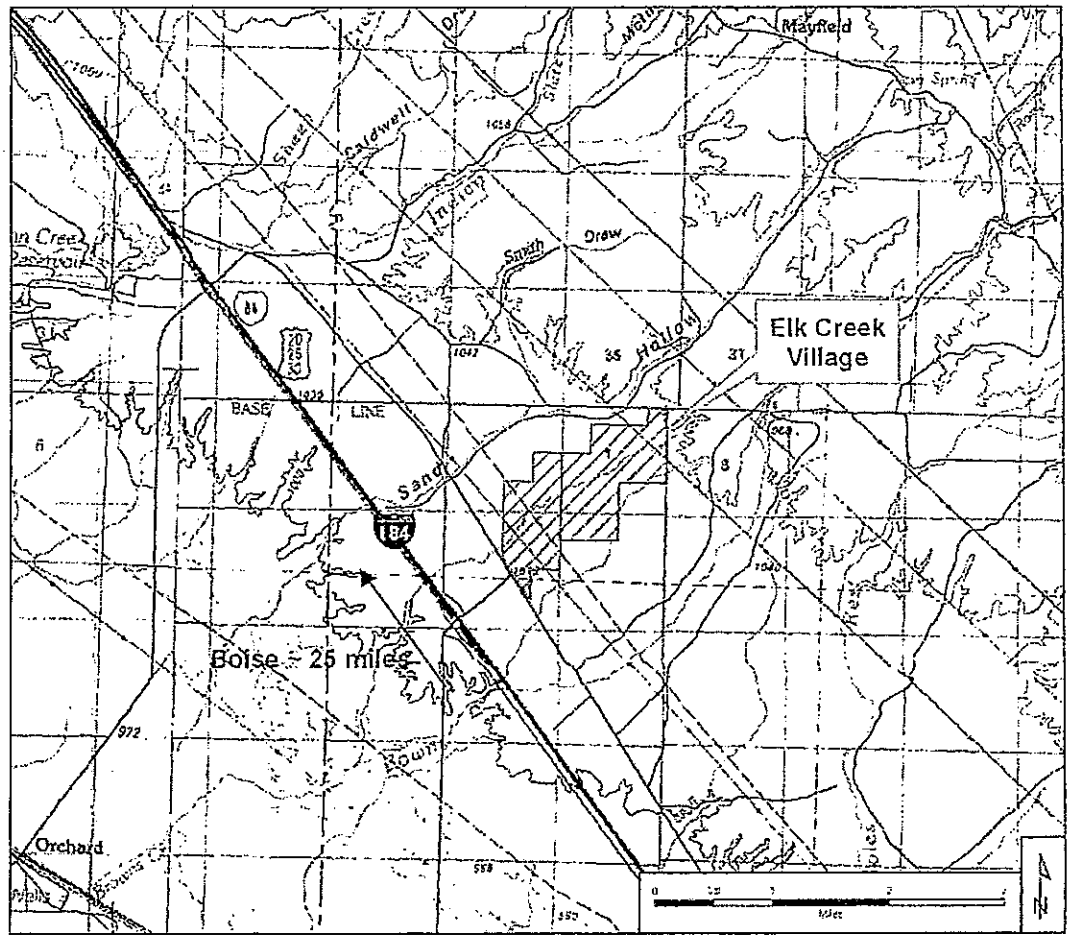

Figure 1. Elk Creek Village location map.

1.2. Purpose and Objectives

The purpose of this water supply assessment is to provide additional information in support of application 61-12090, as requested by the Idaho Department of Water Resources (IDWR) on May 17, 2007. The assessment evaluates potential water availability in aquifers underlying the project site. Specific objectives of the assessment included the following:

1. Assess water availability based on general aquifer characteristics and estimated aquifer recharge and discharge.
2. Evaluate potential impacts on existing water rights
3. Evaluate potential impacts to water levels in the Mountain Home Ground Water Management Area (GWMA) and Cinder Cone Butte Critical Ground Water Area (CGWA).

1.3. Proposed Water Supply

Elk Creek Canyon, LLC is proposing to supply domestic and irrigation water to the Elk Creek Village development via a new public water system supplied by groundwater. The proposed Elk Creek Village development includes approximately 1,200 equivalent domestic units (EDUs). Application 61-12090 (submitted September 28, 2006) requests appropriation of 5.0 cfs for municipal uses, including domestic and commercial use for 178 EDUs, 138 acres of irrigation, and fire flow. Two or more wells would be constructed within the Elk Creek Village property to divert water. Elk Creek Canyon, LLC applied for additional appropriation of groundwater under applications 61-12095 and 61-12096 (submitted April 3, 2007) for the remainder of Elk Creek Village and the Elk Creek Canyon planned community. This assessment is limited to water use under application 61-12090.

2. WATER DEMAND

This section provides peak hour, maximum day and average annual water demand for the portion of the project to be supplied under water right application 61-12090. Water demands are based on the following assumptions.

1. Proposed municipal water uses include domestic use for 178 EDUs (176 homes and two commercial EDUs are described in application 61-12090), irrigation of 138 acres, and fire flow.

2. Annual domestic use averages 250 gallons per day (gpd) per EDU. For comparison, average annual domestic use in the Boise area ranges from about 175 to 225 gpd per unit.

3. Peak hour and maximum day demands for domestic use were estimated using Idaho Department of Environmental Quality (DEQ) guidelines (Marchus, 2006).

4. Municipal wastewater will be treated and re-used for irrigation. Approximately 50 percent of the water diverted for domestic use is assumed to be available for re-use. Approximately 40 percent of the water diverted for domestic use is assumed to return to the subsurface via infiltration. The remaining 10 percent of the domestic use is assumed to be consumptive use.

5. The annual diversion rate for irrigation is 4.0 acre-feet (AF) of water per irrigated acre. The annual consumptive use rate for irrigation is 3.0 AF per acre.

6. The peak hour irrigation rate is approximately 15 gallons per minute per acre (gpm/ac). The maximum day irrigation rate is approximately 9 gpm/ac.

7. The groundwater diversion rate will be equal to or greater than the maximum day demand. Storage reservoir(s) (water tanks) may be used to provide a portion of the peak hour and/or fire flows.

Anticipated water demands are shown in Table 1. Annual use estimates are shown in Table 2. The anticipated average annual groundwater diversion associated with permit application 61-12090 was estimated to be approximately 577 AF (Table 2). This estimate includes average annual demands of approximately 50 AF for residential and commercial domestic use and 552 AF for irrigation use. Approximately 25 AF of the irrigation demand will be met with reclaimed wastewater. The anticipated average annual consumptive use was estimated to be approximately 419 AF.

Residential & commercial domestic use (178 EDUs)	210	0.5	100	0.2
Irrigation (138 acres)	2,070	4.6	1,240	2.8
Total domestic and irrigation demand	2,280	5.1	1,340	3.0
Fire flow	1,000	2.2	--	--

Table 1. Estimated peak hour and maximum day water demands for Elk Creek Village water right permit application 61-12090.

Residential & commercial domestic (178 EDUs)	50	5
Irrigation (138 acres)	552	414
Wastewater reuse	-25	–
Fire protection	<1	<1
Total	**577**	**419**

Table 2. Estimated average annual water use for Elk Creek Village water right permit application 61-12090.

3. GROUNDWATER RESOURCE EVALUATION

3.1. Geologic and Hydrogeolgic Setting

The Elk Creek Village site is located in an area of unconsolidated alluvial sediments mapped as Pleistocene waterlaid detritus by Bond and Wood (1978) and as cobbly to pebbly fan gravel of the Bruneau Formation by Rember and Bennett (1979). These sediments are likely underlain by basalt flow deposits and/or Tertiary-age sediments.

The base of the Danskin Mountain front, located approximately 4 miles northeast of the project site, is a faulted contact between granitic rocks of the Idaho batholith and the younger sediments and basalt flows. Productive aquifers may be present in the sediments if sufficient thickness of permeable sediments exist below the water table. Moderately productive aquifers may be present in the basalt if hydraulically connected fractures are present below the water table. Additional northwest-trending faults are likely present between I-84 and the mountain front.

3.2. Review of Nearby Well Data

Well driller's logs available from the Idaho Department of Water Resources were reviewed for wells located within approximately three miles of the Elk Creek Village site. IDWR records include 28 well driller's logs with locations in this area. A map showing approximate locations of the wells, a summary table, and copies of selected well logs are included in Attachment A. Well locations are based on the well driller's reports and have not been field-verified.

The wells located within three miles of the proposed well sites include 24 domestic wells, 2 commercial wells, and 2 wells drilled to provide cathodic protection. The wells range in depth from 75 to 665 feet and had static water levels ranging from 15 to 528 feet below ground level when drilled. Production rates reported on the drillers' logs ranged from 5 to 70 gallons per minute (gpm). These production rates are typically based on short-term tests conducted by air-lifting. The production rate in some of the deeper wells may have been limited by the pumping method.

Well logs for wells located within approximately 1 mile of the project site reported static water levels ranging 300 to 440 feet. Well depths ranged from 390 to 633 feet and yields ranged from 10 to 70 gpm.

Driller's logs from nearby wells suggest that wells drilled at the proposed locations are likely to encounter unconsolidated sediments (including clay, silt, sand and gravel) interbedded with varying thicknesses of volcanic deposits (basalt and other volcanic rocks). Cemented or consolidated sedimentary units may also be encountered. New wells drilled to serve Elk Creek Village would likely be between 400 and 800 feet deep.

3.3. Regional Groundwater Levels

The project site is located within the Mountain Home Groundwater Management Area (GWMA), but is outside of the Cinder Cone Butte Critical Groundwater Area (CGWA). The Cinder Cone Butte CGA was established by IDWR in 1981 because of observed water level declines. The Mountain Home GMA was established in 1982, because of concerns about regional water levels and groundwater recharge. New groundwater appropriations are not allowed within the Cinder Cone Butte CGWA. The order designating the Mountain Home GWMA stated that the area is approaching critical conditions, "although there appear to be subareas where new appropriations could be authorized without injuring existing water rights" (Harrington and Bendixsen, 1999). An except from an IDWR open-file report that describes these areas is provided in Appendix B. This report noted that water levels in some parts of the CGWA and GWMA had water level declines of 50 to 60 feet between the 1960s and 1998. However, the north and northwest parts of the area, where the Elk Creek Village site is located, were observed to have water levels that were apparently stable and had increases of as much as 3 to 4 feet between the 1960s and 1998 (Harrington and Bendixsen, 1999).

Appendix C shows groundwater hydrographs from wells in the IDWR water level monitoring program, which show data collected through 2005. Hydrographs from wells located near the project site suggest that water levels in wells within approximately six miles of the project site are stable or increasing slightly. A copy of the *Final Report and Recommendations* of the Expanded Natural Resources Interim Committee Mountain Home Working Group (2004) is included in Appendix D. The Working Group acknowledges that "there are areas of the Mountain Home Basin where underlying groundwater levels in the regional aquifer have not declined significantly," and that "the areas of groundwater decline are sufficiently separated by horizontal distance and the parallel direction of groundwater flow that withdrawals of

groundwater from one area do not significantly impact water levels in the other area." The Working Group recommended that "the Idaho Department of Water Resources reconsider the boundaries of the Mountain Home Ground Water Management Area and the Cinder Cone Butte Critical Ground Water Area, and redefine the boundaries of areas for ground water management to match physical evidence of declining ground water levels and areas of water supply."

An evaluation of regional groundwater levels by Lindholm, et al. (1988) suggests that the static water level beneath the project site in the spring of 1980 ranged from approximately 3,000 to 3,100 feet above mean sea level, with the regional hydraulic gradient sloping toward the southwest. Water level elevations measured by IDWR in 2005 (Appendix C) are generally consistent with the groundwater contour map and suggest that the groundwater elevation beneath the project site is likely to be between 2,950 and 3,100 feet.

3.4. Water Quality Data

Groundwater quality data were available from the Idaho Statewide Ground Water Quality Monitoring Program for eleven wells located within 6 miles of the Elk Creek Village site. The data were collected during various years between 1991 and 2004. Available data suggest that groundwater quality is generally good in this area. Water temperature and arsenic concentration appear to increase with depth, approaching 80°F and 8 µg/L, respectively, in a 960-foot deep well located approximately 5 miles southwest of the project site. The arsenic concentration is this well is still below the primary drinking water standard of 10 µg/L. Groundwater with a temperature exceeding 85°F (and less than 212°F) is classified by the state of Idaho as a low temperature geothermal resource. Water temperatures exceeding 80°F are also less desirable for a public water supply well. Additional regulations and bonding requirements apply to the development of wells in a low temperature geothermal aquifer.

4. WATER SUPPLY ASSESSMENT

4.1. Water Budget

A general water budget was prepared to estimate recharge rates to aquifers underlying the property area. Water budget components included precipitation, seepage of areal infiltration into the subsurface, surface water runoff, evapotranspiration, and seepage from surface channels. Aquifer recharge components included areal infiltration and seepage from surface channels. Aquifer discharge in this area includes limited well withdrawals; most groundwater leaves aquifers in this area as underflow. These water budget components are described in the following sections and summarized in Section 3.1.7.

4.1.1. Contributing Basins

Four watershed areas define surface water flow in and upgradient of the property, shown in Figure 2. However, these surface water drainages do not necessarily define subsurface flow divides. Aquifers in the area extend beyond, and can be influenced by, recharge and discharge from areas beyond these watershed areas. For this analysis it was assumed that the capture area for aquifers in the project area and the area of well withdrawals near the Elk Creek Village property, is the area within approximately 2 miles of the Elk Creek Village property but limited by contacts with granitic rocks (Figure 2). The assumed capture area for areal infiltration is approximately 21,400 acres.

Precipitation in granitic areas in the upper Sand Hollow Creek and Bowns Creek watersheds is expected to contribute to aquifer recharge in the project area via seepage from surface channels into underlying sediments. These upper watershed areas include approximately 5,400 additional acres (Figure 2).

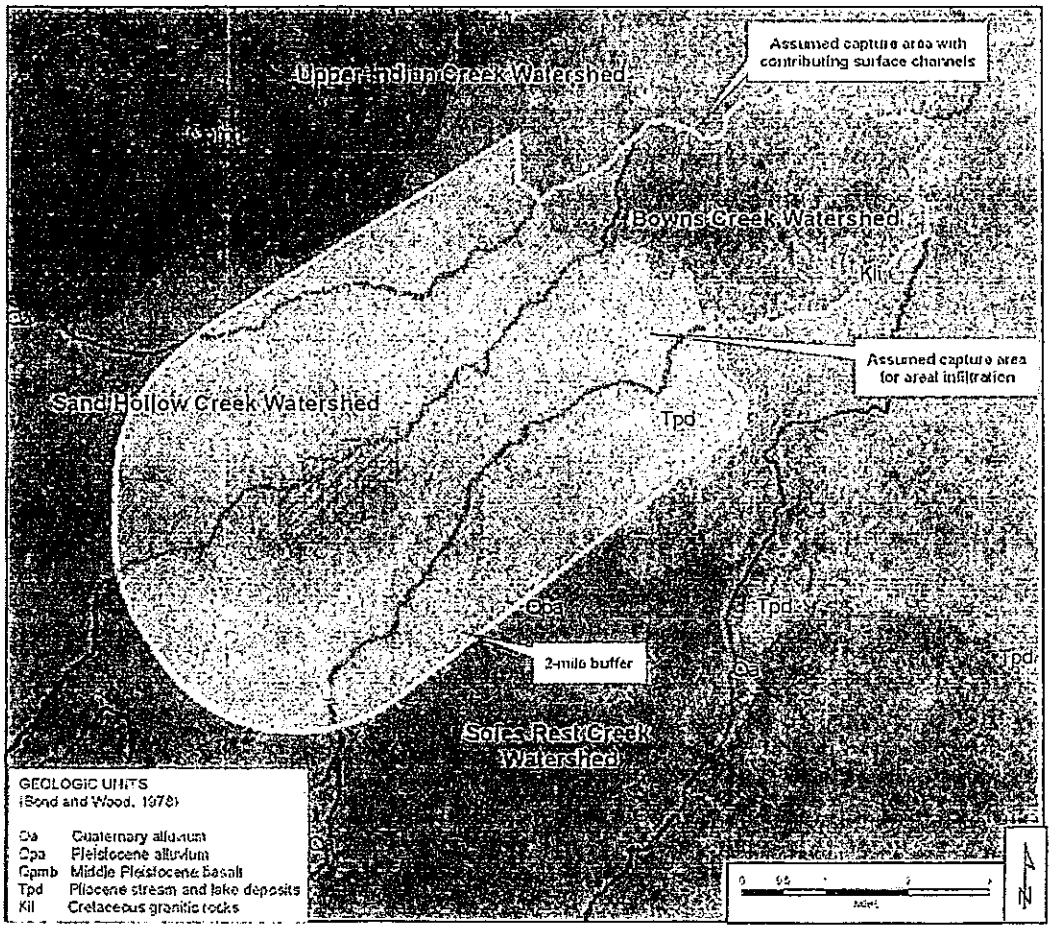

Figure 2. Assumed capture area for areal infiltration and contributing watershed areas for surface channel seepage. Surficial geology from Bond and Wood, 1978.

4.1.2. Precipitation

Average annual precipitation estimates, based on data obtained from the IDWR, range from approximately 12 to 14 inches per year in lower elevations of the water budget area to 24 to 28 inches of precipitation in highest elevations (Figure 3). The average precipitation volume over the entire water budget area is approximately 35,500 acre feet. This estimate is based on an average of 13 inches per year over 8,895 acres, 15 inches per year over 8,585 acres, 17 inches per year over 3,963 acres, 19 inches per year over 1,671 acres, 21 inches per year over 1,767 acres, 23 inches per year over 1,740 acres, and 25 inches per year over 199 acres.

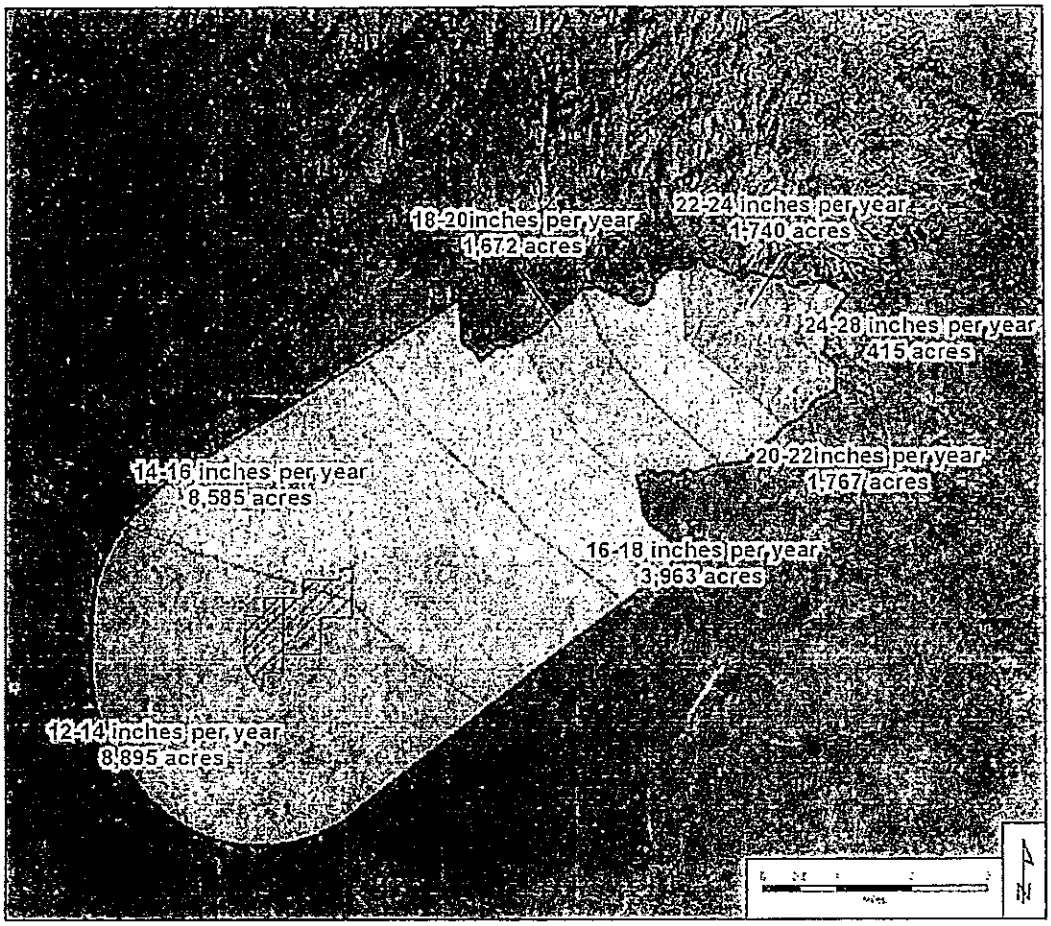

Figure 3. Annual precipitation rates in the project area.

4.1.3. Evapotranspiration

A preliminary 2002 SEBAL[1] estimate for seasonal rangeland evapotranspiration in the lower Boise River basin was 9.5 inches (Morse et al., 2003). Assuming that this rough approximation applies to the capture area shown in Figure 3, the annual volume of evapotranspiration would be approximately 21,200 acre feet.

4.1.4. Aquifer Inflows

4.1.4.1. Areal Infiltration

Only a small portion of precipitation infiltrates through the soil; the remainder is lost to evaporation, transpiration by plants, or drains as surface runoff. Estimates of areal infiltration rates might range from about 2 to 8 percent. An average infiltration rate of 5 percent of precipitation was assumed for this analysis. Factors supporting this assumption include (1) abundant sandy areas and/or fractured basalt in low-lying areas, (2) the presence of decomposed granitic soils, granitic fractures, and alluvial sediments in upland areas, and (3) higher rates of precipitation during months of lowest evapotranspiration (i.e. winter). However, infiltration of water into the plutonic rocks in the northeastern highlands of the water budget area is likely negligible, and assumed to be zero. The estimated average areal infiltration, based on the assumption that 5 percent of precipitation that falls on non-plutonic rock and soil becomes deep infiltration, is about 1,300 acre feet (Figure 4).

4.1.4.2. Stream Seepage

Water that does not infiltrate or is not lost to evapotranspiration becomes surface runoff. Basin evapotranspiration (approximately 21,200 AF) and areal infiltration (approximately 1,300 AF) are substantially less than the estimated average basin precipitation (35,500 AF). Much of the difference (13,000 AF) becomes surface runoff. A substantial portion of this water may seep into the subsurface from the Sand Hollow Creek and Bowns Creek channels.

Channel seepage in the adjacent Indian Creek basin was described in a *Ground-Water Supply Evaluation for the Mayfield Townsite Property* (SPF, 2007). A range of average annual channel seepage from Indian Creek and it tributaries was estimated from limited streamflow observations and annual precipitation, infiltration, and evapotranspiration estimates. The low estimate of channel seepage was approximately 14% of the difference between the precipitation and infiltration/evapotranspiration for the Mayfield Townsite study area. Because streamflow data are not available for Sand Hollow Creek and Bowns Creek, this ratio was used to estimate the low range of recharge from channel seepage for this

[1] "Surface Energy Balance Algorithm for Land"

study area. The low estimate of recharge from channel seepage is approximately 1,800 AF (14% of 13,000 AF).

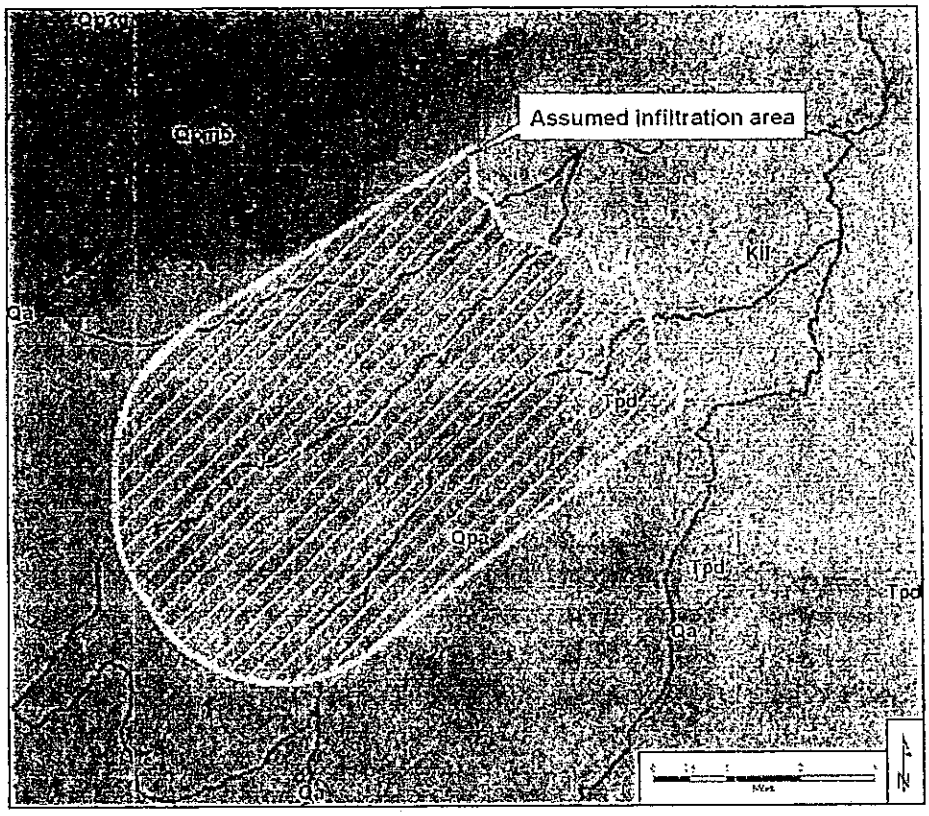

Figure 4. Precipitation infiltration area in the vicinity of the property.

A text-based search of the IDWR water rights database for water rights in Twp. 1N and 1S, Rge. 4E and 5E revealed two surface-water irrigation rights diverted from Sand Hollow Creek or Bowns Creek basins. Water right 61-2002 authorizes diversions of 0.5 cfs from Roost Creek for the irrigation of 25 acres, and water right 61-2051 authorizes diversions of 1 cfs from Bowns Creek for the irrigation of 50 acres. Diversions under these surface water rights, assuming an annual diversion volume of 4.0 AF/ac, are estimated to be approximately 300 acre feet. This diversion volume reduces the surface runoff potentially available for channel seepage to approximately 12,700 AF.

The range of estimated recharge from channel seepage is substantial (1,800 to 12,700 AF). Uncertainties in estimates of precipitation, evapotranspiration, areal infiltration rates, stream seepage rates, and/or surface irrigation contribute to the uncertainty in this component of the water budget. Recharge from channel seepage is likely greater than 1,800 AF, but less than 12,700 AF.

4.1.5. Overlap with Water Supply Evaluation for Mayfield Townsite and Mayfield Springs properties

Estimating groundwater available for appropriation in the vicinity of the Elk Creek Village site is complicated by a partial overlap between the Elk Creek Village assumed capture area, the Mayfield Townsite assumed capture area (SPF, 2007a), and the Mayfield Springs assumed capture area (SPF, 2007b). The assumed capture area for Elk Creek Village overlaps with approximately 8,700 acres (26%) of the Mayfield Springs water budget area and approximately 11,300 acres (18%) of the Mayfield Townsite capture area.

4.1.6. Aquifer Outflows

Most of the subsurface flow from aquifers in this area is (1) withdrawals by wells and (2) underflow toward the Snake River. There are 35 wells listed in the IDWR well construction database with locations in the assumed capture boundary. Of these 35 wells, 28 are for domestic uses, two are for cathodic protection, four are for commercial purposes, and one is for stockwater. Based on water rights listed in the IDWR database, the amount of land irrigated by groundwater in this area appears to be small, likely less than 130 acres. Assuming 130 acres of irrigation (at an average diversion volume of 4.0 acre feet per year), domestic use for 28 homes (at 0.3 acre feet per year per household), commercial use from four wells (at 1.0 acre feet per year per well), and stockwater use for 100 cattle (1.4 acre feet per year), the annual average withdrawal of groundwater is estimated to be approximately 530 acre feet per year. Inclusion of the annual withdrawal rate in the water budget is conservative, because non-consumptive components of these withdrawals would result in returns (recharge) to the shallow subsurface.

In addition, the developer of the nearby Mayfield Townsite property plans to divert approximately 3,950 AF per year under water right permit 63-12447 and application 63-32499, which are senior to application 61-12090. Because of the partial overlap between the Mayfield Townsite and Elk Creek Canyon capture areas, a portion of water use for the Mayfield Townsite property is considered in the Elk Creek Village water budget. The Elk Creek Village assumed capture area overlaps with approximately 26% of the Mayfield Townsite water budget area. The water use applicable to the Elk Creek Village water budget is estimated to be approximately 1,040 AF (26% of 3,950 AF).

Similarly, the developer of the nearby Mayfield Springs property plans to divert approximately 1,815 AF per year under existing water rights and permits. The Elk Creek Village assumed capture area overlaps with approximately 18% of the Mayfield Springs water budget area. The water use applicable to the Elk Creek Village water budget is estimated to be approximately 320 AF (18% of 1,815 AF). Therefore, total discharge to existing and proposed wells within the Elk Creek Village water budget area is estimated to be approximately 1,890 AF.

4.1.7. Water Budget Summary

A summary of estimated basin and aquifer inflows and outflows is provided in Table 3. Average annual recharge to aquifers in the vicinity of the Elk Creek Canyon site is estimated

to be between 3,100 and 14,000 AF. Existing and permitted groundwater withdrawals in the study area are estimated to be approximately 2,150 AF per year. The amount of water available for appropriation is estimated to be between 1,200 and 12,100 AF per year. Average annual groundwater withdrawal under permit application 61-12090 is estimated to be approximately 580 AF, with an estimated average annual consumptive use of approximately 420 AF.

Component	Estimated Average Annual Volume (AF)
Precipitation in assumed capture area and upper Sand Hollow and Bowns Creek basins	35,500
Precipitation in assumed capture area	26,000
Estimated infiltration (5% of precipitation in assumed capture area)	1,300
Evapotranspiration in assumed capture area and upper Sand Hollow and Bowns Creek basins	21,200
Evapotranspiration in assumed capture area	17,000
Estimated surface water diversions from Sand Hollow and Bowns Creek	300
High estimate of surface channel seepage into shallow aquifers[1]	12,700
Low estimate of surface channel seepage into shallow aquifers[2]	1,800
Estimated aquifer recharge (high estimate)[3]	14,000
Estimated aquifer recharge (low estimate)[4]	3,100
Estimated discharge to wells[5]	1,900
Available for appropriation (high estimate)	12,100
Available for appropriation (low estimate)	1,200

[1] Precipitation less areal infiltration, evapotranspiration, and surface water diversions
[2] See Section 3.1.4.2
[3] Areal infiltration plus high infiltration estimate
[4] Areal infiltration plus low infiltration estimate
[5] See Section 3.1.6
[6] High recharge estimate less estimated discharge to wells
[7] Low recharge estimate less estimated discharge to wells

Table 3. Water budget summary

4.2. Groundwater Availability for Appropriation

Additional groundwater appears to be available for appropriation in the Elk Creek Canyon area. This opinion is based on estimated recharge in excess of current uses (Table 3) and on steady (or slightly rising) water levels in the area (Figure 5). Stable water levels suggest that water is available for appropriation. The amount of water available for appropriation is estimated to be between 1,200 and 12,100 AF per year. The average annual groundwater withdrawals for uses proposed under application 61-12090 is approximately 580 AF, with an estimated annual consumptive use of 420 AF. The average annual use anticipated under application 61-12090 is less than the low estimate of groundwater available for appropriation.

4.3. Potential Impact on Existing Water Rights

Significant impacts on existing water rights are not anticipated as a result of proposed new diversions for the project. The estimated water budget suggests there is an adequate water supply for existing water rights and permits, and the new uses proposed under water right application 61-12090.

Because of uncertainties inherent to estimating a water budget, groundwater level monitoring prior to and during development of additional water right permits in this area is recommended. The ultimate groundwater supply in this general area is limited. Use of water-efficient fixtures and appliances, drougt-tolerant landscaping, and other water conservation measures are strongly encouraged to maximize water resources in this area.

4.4. Potential Impact on Mountain Home GWMA

Elk Creek Village is located within the Mountain Home Ground Water Management Area (GWMA). The property is located near the northwestern boundary of the GWMA and is located approximately 3 miles northwest of the Cone Butte Critical Ground Water Area (CGWA). Figure 5 shows groundwater elevation contours developed for the Mountain Home Ground Water Management Area (GWMA) by IDWR and hydrographs of groundwater level monitoring wells in the vicinity of the Elk Creek Village site. Figure 6 (Harrington, 2004) shows groundwater level changes measured by IDWR in the Mountain Home GWMA between 1976 and 2002.

As shown in Figure 5, hydrographs in the vicinity of the Elk Creek Village site indicate that groundwater levels are stable or rising slightly in this area. Figure 6 (Harrington, 2004) indicates that three areas of significant groundwater level declines are located in the southwestern portion of the Cinder Cone Butte CGWA and the southern portion of the Mountain Home GWMA. Therefore, use of groundwater in the project area is not expected to reduce recharge entering the Cinder Cone Butte CGWA. Groundwater level contours shown in Figure 5 (Harrington, 2004) indicate that groundwater flow is to the southwest in the vicinity of the Elk Creek Village site. These figures indicate that Elk Creek Village and tributary basin areas considered in this water budget are not up-gradient of the Cinder Cone

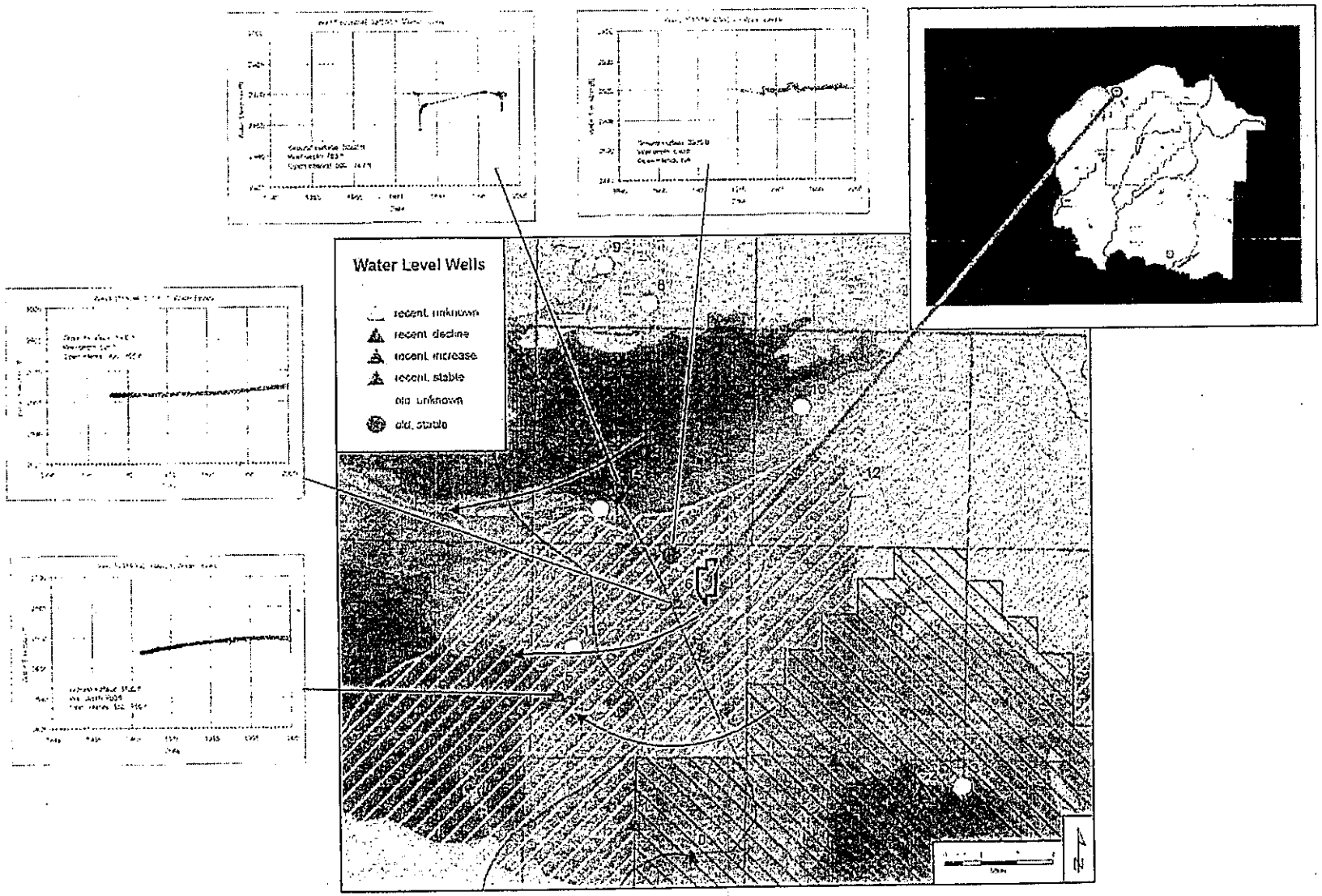

Figure 5. Mountain Home GWMA and Cinder Cone Butte CGWA boundaries with IDWR water level monitoring sites and hydrographs (Bendixsen, 1994). Arrows show general groundwater flow directions. Groundwater elevation contours in inset from Harrington, 2004.

Butte CGWA or areas of decline in the southern Mountain Home GWMA. Therefore, water use at the Elk Creek Village site is not expected to reduce underflow into areas of declining water levels.

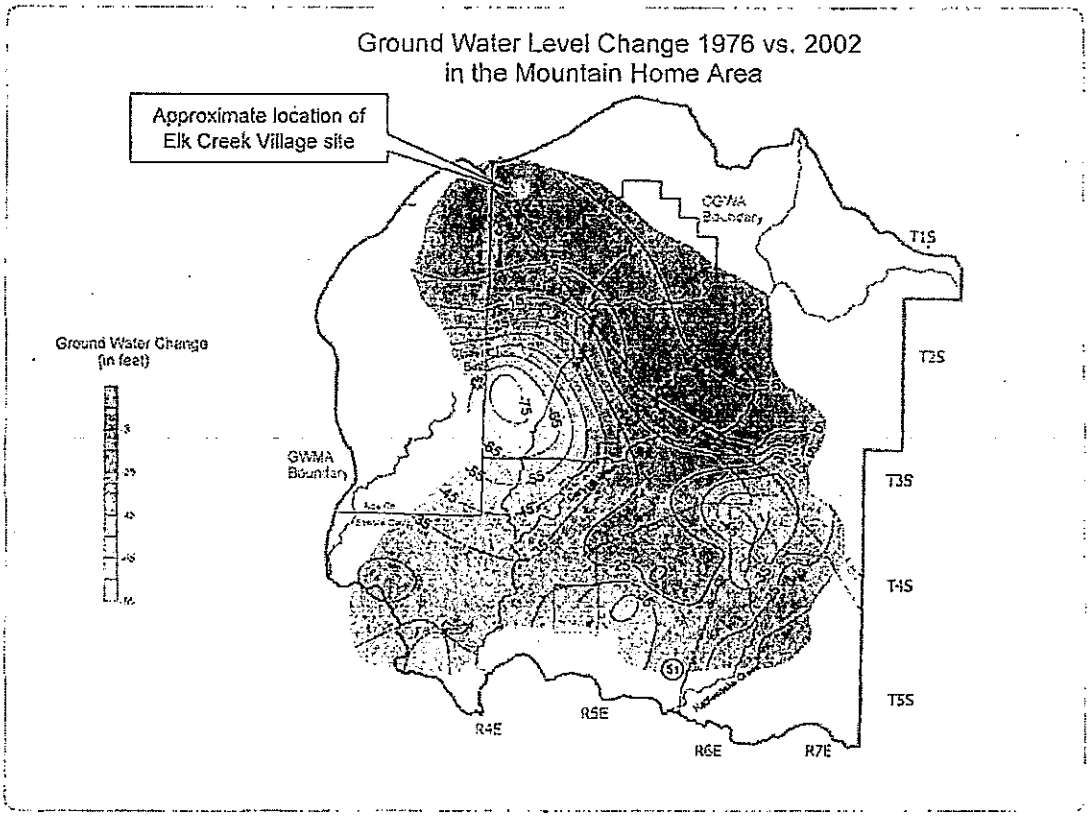

Figure 6. Water level changes measured by IDWR, 1976 to 2002 (from Harrington, 2004).

5. CONCLUSIONS

1. The amount of water available for appropriation is estimated to be between 1,200 and 12,100 AF per year.

2. The average annual groundwater withdrawals for uses proposed under application 61-12090 is approximately 580 AF, with an estimated annual consumptive use of 420 AF.

3. Additional groundwater appears to be available for appropriation in the Elk Creek Canyon area, as evidenced by stable or rising hydrographs.

4. Significant impacts on existing water rights are not anticipated as a result of proposed new diversions for the project. The estimated water budget suggests there is an adequate water supply for existing water rights and permits, and the new uses proposed under water right application 61-12090.

5. Hydrographs in the vicinity of the Elk Creek Village site indicate that groundwater levels are stable or rising slightly in this area.

6. Based on IDWR's groundwater level change map and groundwater elevation contours, the Elk Creek Village site is not up-gradient of areas with declining water levels. Therefore, diversions under application 61-12090 are unlikely to significantly impact areas of decline within the Cinder Cone Butte CGWA or Mountain Home GWMA.

7. Because the ultimate capacity of aquifers in this area is uncertain, groundwater level monitoring should be conducted in the area prior to and following construction of new public water system wells. Monitoring should occur on a periodic basis (i.e. quarterly or semi-annually) for an extended period of time during and following development of municipal uses.

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SPF Water Engineering, 2007b. *Ground-Water Supply Evaluation for the Mayfield Springs Planned Community*, August 22, 2007.

Appendix A

Area Well Logs


APPROXIMATE BOUNDARY OF PROJECT SITE
APPROXIMATE LOCATION OF PROPOSED WELL LOT
ATTACHMENT A. AREA WELL LOCATION MAP
ELK CREEK VILLAGE SUBDIVISION
ELMORE COUNTY, IDAHO
N
0 2,000 4,000
Feet
SPF

STERLING SAGE SUBDIVSION
WELL LOGS AVAILABLE FOR WELL LOCATED WITHIN APPROXIMATELY 3 MILES OF PROJECT SITE
Records compiled from IDWR database on January 10, 2007. Locations are based on driller's reports and have not been field-verified.

WELL NO	OWNER	COUNTYNAME	TOWNSHIP	RANGE	SEC	QQQ	QQ	Q	WELL ADDRESS	WELLUSE	PRODUCTION (GPM)	STATIC WATER LEVEL (FT)	CASING DIA. (IN)	SCREEN DIA. (IN)	CASING DEPTH (FT)	TOTAL DEPTH (FT)	CONSTRUCTION DATE
1	RONALD D AMBROSE	ELMORE	01N	04E	23		SW	SE		Domestic-Single Residence	40	205	8		255		Mar 13 1992
2	DARLA UNDERWOOD	ELMORE	01N	04E	27	NW	NE	NE	HC 34 MAYFIELD STAGE	Domestic-Single Residence	9	343	5		515		May 7 1991
2	JAMES UNDERWOOD	ELMORE	01N	04E	27	NW	NE	NE	HC 34 MAYFIELD STAGE	Domestic-Single Residence	9	343	5		515		May 7 1991
3	NEIL HELMICK	ELMORE	01N	04E	27		NW	SW	INDIAN CREEK OR MAYFIELD ROAD	Domestic-Single Residence	20	340	6		404		Aug 7 1992
4	DANSKIN PROPERTIES LTD	ELMORE	01N	04E	27		SW	NE	INDIAN CK RD HC34 MAYFIELD STA	Domestic-Single Residence			12		460		Oct 20 1993
5	JAMES UNDERWOOD	ELMORE	01N	04E	27		SW	NE	INDIAN CREEK RD, HC 34, MAYFIELD STAGE STOP	Domestic-Single Residence	55	15	8		68	75	Oct 13 1993
6	GUY VAN BEEK	ADA	01N	04E	28		SW	SE		Domestic?		160				375	May 17 1978
7	JIM PHAGAN	ADA	01N	04E	33		NE	NW	NORTH OF 23735 DESERT WIND	Domestic-Single Residence	17	481	6	6	560	572	Nov 17 2001
8	TIM ANDERSON	ADA	01N	04E	33		SE	NE	24601 S OLD HWY 30	Domestic-Single Residence	20	528	6	5	660	665	Nov 9 2000
8	TIM ANDERSON	ADA	01N	04E	33		SE	NE	24601 S OLD HWY 30	Domestic-Single Residence	20	528	6	6	660	665	Nov 9 2000
9	RONALD L MILLER	ELMORE	01N	04E	34		SW	SE	MAYFIELD RD	Domestic-Single Residence		450	5		595		Sep 23 1999
9	PAMELA K MILLER	ELMORE	01N	04E	34		SW	SE	MAYFIELD RD	Domestic-Single Residence		450	5		595		Sep 23 1999
10	BOB WICKHAM	ADA	01S	04E	1		SW	NW	730 S PRAIRIE GRASS DRIVE	Domestic-Single Residence	20	337	6	6	444	460	Jan 11 2002
11	CHRIS RENINGER	ELMORE	01S	04E	1		SW	NW	Baseline Rd jsut past old Hwy 30 cutoff	Domestic-Single Residence	70	342	6	6	502	516	Apr 10 2001
12	MARY BOTTS	ELMORE	01S	04E	2		NE	NE	5625 BASELINE RD	Domestic-Single Residence	20	310	8		537		Jun 2 1999
13	DALE MEEKS	ELMORE	01S	04E	2		NE	NE	PRAIRIE GRASS OFF BESELINE PRAD 3 MILES PAST STAGE STOP	Domestic-Single Residence	30	331	6	6	428	435	Nov 1 2002
14	RICH CORNELL	ELMORE	01S	04E	2		NW	NE	1/2 MILE OFF BASELINE ROAD	Domestic	20	300	6	6	383	390	Nov 26 2002
15	JACK BUCHANAN	ADA	01S	04E	2		SE	NE	731 S PRAIRIE GROSS RD (MAYFIELD)	Domestic-Single Residence	50	331	6	7	469	476	May 5 2003
16	BIG VIEW BUILDERS	ELMORE	01S	04E	2		SE	SW	1020 DESERT WIND RD	Domestic-Single Residence	15	365	6	5	491	504	Feb 15 2004
16	BIG VIEW BUILDERS	ELMORE	01S	04E	2		SE	SW	1020 DESERT WIND RD	Domestic-Single Residence	15	365	6	6	276	504	Feb 15 2004
17	GLEN JORGENSEN	ELMORE	01S	04E	2		SW	SW	Baseline Rd.	Domestic-Single Residence	20	388	6	6	608	633	Nov 17 2000
17	JANET JORGENSEN	ELMORE	01S	04E	2		SW	SW	Baseline Rd.	Domestic-Single Residence	20	388	6	6	608	633	Nov 17 2000
17	JANET JORGENSEN	ELMORE	01S	04E	2		SW	SW	Baseline Rd.	Domestic-Single Residence	20	388	6	5	633	633	Nov 17 2000
17	GLEN JORGENSEN	ELMORE	01S	04E	2		SW	SW	Baseline Rd.	Domestic-Single Residence	20	388	6	5	608	633	Nov 17 2000
17	JANET JORGENSEN	ELMORE	01S	04E	2		SW	SW	Baseline Rd.	Domestic-Single Residence	20	388	6	5	608	633	Nov 17 2000
17	GLEN JORGENSEN	ELMORE	01S	04E	2		SW	SW	Baseline Rd.	Domestic-Single Residence	20	388	6	5	633	633	Nov 17 2000
18	JERRY MORTON	ELMORE	01S	04E	3		NE	NE		Domestic-Single Residence	25	460	6		584		Nov 11 1989
19	RONALD B CASTLE	ELMORE	01S	04E	3		SE	NE	HC 34 MAYFIELD STAGE BOX 100	Commercial	30	338	8		490		Jul 28 1993
19	ROSANNA K CASTLE	ELMORE	01S	04E	3		SE	NE	HC 34 MAYFIELD STAGE BOX 100	Commercial	30	338	8		490		Jul 28 1993
20	RONALD B CASTLE	ELMORE	01S	04E	3		SE	NE	HC 34, MAYFIELD STAGE, BOX 100	Commercial	40	435	6		550		Apr 25 1996
20	ROSANNA K CASTLE	ELMORE	01S	04E	3		SE	NE	HC 34, MAYFIELD STAGE, BOX 100	Commercial	40	435	6		550		Apr 25 1996
21	JIM HISEL	ADA	01S	04E	10		SE	SE	MAYFIELD STAGE HC -34	Domestic-Single Residence	10	350	6		541		Sep 23 1998
22	ED DIENES	ELMORE	01S	04E	11		NW	NE		Domestic	27	440					Jun 27 1979
23	LEONARD EISEMAN	ELMORE	01S	04E	15		NE	NE	SIMCO RD/I-84	Domestic-Single Residence	35	335	8		448		Jun 26 1994
24	EL PASO NATURAL GAS CO	ADA	01S	04E	17		NE	NE		Other-Cathodic Protection		450				571	Apr 30 1973
25	MIKE EISMAN	ADA	01S	04E	22		NE	SE	1639 S SIMCO ROAD	Domestic-Single Residence	40	464	6	8	175	640	Jun 20 2002
25	MIKE EISMAN	ADA	01S	04E	22		NE	SE	1639 S SIMCO ROAD	Domestic-Single Residence	40	464	6	6	625	640	Jun 20 2002
26	WILLIAM PIPELINE WEST	ELMORE	01S	04E	23		SW	NW	3 MILES SOUTH ON SIMCO ROAD	Cathodic Protection			10	8	55	500	Oct 30 2001
26	WILLIAM PIPELINE WEST	ELMORE	01S	04E	23		SW	NW	3 MILES SOUTH ON SIMCO ROAD	Cathodic Protection			10	8	500	500	Oct 30 2001
27	RICK MILLINGTON	ELMORE	01S	05E	6		NE	SW	BASELINE RD	Domestic-Single Residence	30	387	6		575		Jul 18 1997
28	FRED T SMITH	ELMORE	01S	05E	18		SW	SW		Domestic-Single Residence	5	334	6		431		Mar 26 1990
28	FRANCES E SMITH	ELMORE	01S	05E	18		SW	SW		Domestic-Single Residence	5	334	6		431		Mar 26 1990
										Max	70	528	12	8	660	665	
										Min	5	15	5	5	55	75	

Form 238-7
8/90

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

R-2

1. WELL OWNER

Name Ron Ambrose

Address 2295 E. 3100 South, Wendell, ID 83355

Drilling Permit No. 63-92-W-119

Water Right Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.250 inches	6 5/8 inches	+ 2 feet	255 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

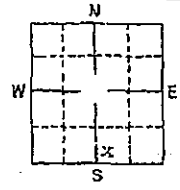
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 98 Material used in seal: ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing
☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld
☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Elmore
SW ¼ SE ¼ Sec. 23, T. 1 N ☒ S ☐ R. 4 E ☒ W ☐

7. WATER LEVEL

Static water level 205 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature ____ °F. Quality _____
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
40		3

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
10	0	20	Decomposed granite		
"	20	24	Decomp granite and red clay		
"	24	60	Tan clay and sand		
10	60	98	Gravel and sand		
8	98	110	Tan clay		
"	110	160	Tan clay sand		
"	160	180	Sand and ¼ gravel		
"	180	225	Sand		
"	225	250	Tan clay and sand		
"	250	253	Sand	X	
8	253	256	Sand and gravel		

RECEIVED
MAR 31 1992
Department of Water Resources

RECEIVED
MAR 24 1992
Department of Water Resources
Southern Regional Office

RECEIVED
APR 09 1992

10.

Work started 3/10/92 finished 3/13/92

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc Firm No. 35
Address Rt. 3, Box 610-D Mtn Home, ID 83647 Date 3/16/92
Signed by (Firm Official) _____
and
(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
6/89

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name James & Darla Underwood
RC11, Mayfield Stage
Address Boise, ID 83706
Drilling Permit No. 63-819-127-100
Owner's Permit No. _____

2. NATURE OF WORK

☐ New well ☒ Deepened ☐ Replacement
☐ Well diameter increase
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log).

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION * = Depth Referenced to Top of 6 Inch Casing.

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
_____ inches	_____ inches	+ 3 feet	359 feet
(See original	inches	well feet	log) feet
0.258 inches	5 9/16 inches	443.4* feet	507.3 feet
0.237 inches	4 1/2 inches	475.3* feet	513.2 feet

Was casing drive shoe used? ☐ Yes ☒ No - liners pulled
Was a packer or seal used? ☐ Yes ☒ No top & bottom
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation _____ inches by _____ inches

Number		From	To
_____	perforations	_____ feet	_____ feet
_____	perforatinns	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ____ Slot size ____ Set from _____ feet to _____ feet
Diameter ____ Slot size ____ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth _____ Material used in seal: ☐ Cement grout ☐ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing liners ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port Remove pitless cap for 5" plug access.

6. LOCATION OF WELL

Sketch map location must agree with written location.

N / W / E / S

Subdivision Name _____
Lot No. _____ Block No. _____
County Elmore NW¼NE¼NE¼ Sec. 27 T. 1S N ☐ S ☐ R. 8E E ☐ W ☐

7. WATER LEVEL ** Depth Reference @ top of casing.

Static water level 243 ft.* feet below ~~land surface~~
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 71 °F. Quality Excellent
Describe artesian or temperature zones below.

8. WELL TEST DATA

☒ Pump ☐ Bailer ☐ Air ☐ Other installed. Caution, keep sounding device out of well/pump

Discharge G.P.M.	Pumping Level	Hours Pumped
5.7	less than 270 ft	65

9. LITHOLOGIC LOG * = Depth referenced to top of 6 inch casing.

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
		475!	See original log by Bill Dotz: Drlg		
5"	475	506*	Dusty, poorly sorted fine sand	x	
			fines on down to silt size		
	506	507	Streak of clay brown to grey		x
	507	513	Sand, fine, poorly sorted, lighter colored, w/ Grey cast	x	
	513	520	Sand & Gravel, Bank Run, Tight	x	
	520	530	Silty Sand	x	
	530	545	Tight Sand & Gravel	x	
	545	549	Rock, Basalt?Sandstone? Cemented Gravel? Boulder?	?	
	549	551	Silt-Clay, Light Grey		x
[redacted]	551	551	Sand	x	
	551	565	Sandstone, Clay binder		x
	565	569*	Sand	x	
			Bridged hard at 551'*,		
			Jarred back to 529'* and		
			eventually on back to [redacted]		
			liner at 514'.		

MAY 8 1991
Department of Water Resources
Western Regional Office

10. Work started March 25, 1991 Finished May 7, 1991

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Artesian Co. Firm No. 318
7335 W. 36th S.
Address Mountain Home, ID Date May 7,1991
83647-3613
Signed by (Firm Official) Hugh Harden
and Hugh Harden
(Operator) Hugh Harden

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

AUG 28 1991

Form 238-7
6/98

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ball Point Pen

RECEIVED
NOV 03 1993
Department of Water Resources

1. DRILLING PERMIT NO. 93 - 869 -0
Other IDWR No. 93-11382

2. OWNER:
Name DANSKIN PROPERTIES LTD
Address INDIAN CR. RD. HC 34 MAYFIELD STAGE
City BOISE State ID Zip 83706

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

T. 01 N North ☐ or South ☐
R. 04 E East ☐ or West ☐
Sec. 27 1/4 (10 acres) 1/4 (40 acres) 1/4 (160 acres)
Gov't Lot ____ County ELMORE

Address of Well Site INDIAN CK RD HC34 MAYFIELD STAGE
(Give at least Direction + Distance to Road or Landmark)

Lot No. 19 Block No. 1 Subdivision DANSKIN PROPERTIES

4. PROPOSED USE: DOMESTIC
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK NEW WELL
☐ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD REVERSE CIRCULATION
☐ Mud Rotary ☐ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
BENTONITE	0	126	22,500#	POURED
BENTONITE	368	388	2500#	POURED

Was drive shoe seal tested? YES NO How?

8. CASING/LINER:

Diameter	From	To	Gauge	Casing	Liner	Steel	Plastic	Welded	Threaded
12"	+3	420	.250			☒	☐	☒	☐
18"	468	488	.258			☒	☐	☒	☐
						☐	☐	☐	☐
						☐	☐	☐	☐

Final location of shoes
Top Packer or Headpipe Bottom Tailpipe

9. PERFORATIONS/SCREENS
☐ Perforations Method
☒ Screens Type HOUSTON Material STAINLESS STEEL

From	To	Slot Size	Number	Diameter	Tele/Pipe Size	Casing	Liner
420	468	.20		18"		☐	☐
						☐	☐
						☐	☐
						☐	☐

10. WELL TESTS: N/A
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Depth	Time
NA	NA	NA	NA

Temperature of water 65 Was a water analysis done? Yes ☐ No ☒
By whom?
Water Quality (odor, etc.) GOOD
Bottom Hole Temperature 65

11. STATIC WATER LEVEL:
NA ft. below surface Depth artesian flow found
Artesian pressure lb. Describe access port WELL CAP
Describe Controlling Devices:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	GPM	SWL
26"	0	10	TOPSOIL		N
	10	35	COURSE SAND		Y
	35	55	CLAY & CRSE SAND MIX		Y
	55	65	CRS & FINE SAND SOME CLAY MIX		Y
	65	75	CRS SAND W/BRN CLAY MIX		N
	75	185	CRS SAND W/BRN CLAY & GRAVEL MIX		Y
	185	115	BRN CLAY W/CRS SAND&SMALL ROCK MIX		N
	115	120	BRN CLAY		N
	120	125	FINE TO COURSE SAND, WITH CLAY AND SMALL GRAVEL & LARGE ROCKS MIXED		N
	125	140	CRS SAND, CLAY, SMALL & LARGE GRAVEL MIXED		N
					N
	140	160	FINE TO CRS SAND		N
	160	165	BROWN CLAY		N
	165	195	FINE TO CRS SAND W/CLAY & GRAVEL MIX		N
	195	218	FINE TO CRS SAND & GRAVEL		N
	218	223	FINE TO CRS SAND & CLAY MIX		N
	223	235	FINE TO CRS SAND & GRAVEL		N
	235	245	FINE TO CRS SAND & SMALL GRAVEL		N
	245	255	FINE TO CRS SAND W/ CLAY MIX		N
	255	260	FINE TO CRS SAND		N
	260	265	FINE SAND & CLAY MIX		N
	265	271	FINE TO CRS SAND W/CLAY&GRAVEL MIX		N
	271	275	FINE SAND		Y
	275	285	FINE SAND WITH CLAY MIX		N
	285	295	FINE TO CRS SAND		N
	295	305	CLAY & FINE SAND MIX		N

Date: Started 10-15-93 Completed 10-20-93

FEB 28 1994

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name PETE COPE DRILLING Firm No. 213
Firm Official [signature] Date 10/29/93
and
Supervisor or Operator Date 10/29/93
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/93

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ball Point Pen

2 of 3

108846

1. DRILLING PERMIT NO. 63 93 C - 869 - 0
Other IDWR No.

2. OWNER:
Name DANSKIN PROPERTIES LTD
Address
City State Zip

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

T. 1 North ☒ or South ☐
R. 4 East ☒ or West ☐
Sec. 27, 10 acres 1/4 SW 40 acres 1/4 NE 160 acres 1/4
Govt Lot ___ County Elmore

Address of Well Site INDIAN CREEK RD
(Give at least Direction & Distance to Road or Landmark)

Lot No. ___ Block No. ___ Subd. Name

4. PROPOSED USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK
☐ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☐ Mud Rotary ☐ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD

Was drive shoe seal tested? YES ☐ NO ☐ How?

8. CASING/LINER:

Diameter	From	To	Gauge	Casing	Liner	Steel	Plastic	Welded	Threaded
						☐	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐

Final location of shoes
Top Packer or Headpipe Bottom Tailpipe

9. PERFORATIONS/SCREENS
☐ Perforations Method
☐ Screens Type Material

From	To	Slot Size	Number	Diameter	Tele/Pipe Plug Size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

FEB 28 1994

10. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Depth	Time

Temperature of water ___ Was a water analysis done? Yes ☐ No ☐
By whom?
Water Quality (odor, etc.)
Bottom Hole Temperature

11. STATIC WATER LEVEL:
___ ft. below surface Depth artesian flow found
Artesian pressure ___ lb. Describe access port
Describe Controlling Devices

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	GPM	SWL
	305	315	FINE SAND AND CLAY MIX		N
	315	325	CLAY & FINE SAND MIX		N
	325	335	LIGHT BRN CLAY		N
	335	339	LIGHT BRN CLAY		N
	339	341	FINE TO CRS SAND		N
	341	351	SANDY LIGHT BRN CLAY		N
	351	355	FINE TO CRS SAND & GRAVEL		N
	355	365	FINE SAND W/SMALL AMOUNT CLAY MIX		N
	365	370	FINE SAND		N
	370	372	FINE TO CRS SAND & BOULDERS		N
	372	374	FINE TO CRS SAND W/BOULDERS & BROKEN ROCK		N
	374	376	SAND & CLAY MIXED		N
	376	382	SANDY CLAY LIGHT BROWN COLOR		N
	382	387	SANDY CLAY & GYVLE MIXED		N
	387	408	CRS SAND & CLAY MIXED		N
	408	407	FINE TO MED SAND		N
	407	413	SAND & CLAY MIXED		Y
	413	423	FINE TO MED SAND & CLAY MIXED		Y
			SOME PEA GRAVEL MIXED		Y
	423	429	FINE TO MED SAND & PEA GRAVEL		Y
	429	433	FINE SAND, & SMALL AMOUNT CLAY MIXED		Y
	433	448	FINE MED SAND		Y
	448	443	FINE TO CRS SAND W/GRAVEL/CLAY MIXED		Y
	443	449	FINE TO COURSE SAND		N
	449	458	BRN CLAY		Y
	458	453	SAND, GRAVEL & CLAY MIXED		

Date: Started Completed

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Firm No.
Firm Official Date
and
Supervisor or Operator Date
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

4

Form 238-7
6/93

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ball Point Pen

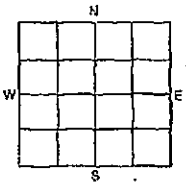
3 of 3

108847

1. DRILLING PERMIT NO. 63 93 C . 869 . 8
Other IDWR No. _____

2. OWNER:
Name DAESKIN PROPERTIES LTD
Address _____
City _____ State ____ Zip ____

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.



T. 1 North ☒ or South ☐
R. 4 East ☒ or West ☐
Sec. 27 ____ 1/4 SW 1/4 NE 1/4
(10 acres) (40 acres) (160 acres)
Gov't Lot ____ County Elmore

Address of Well Site _____
(Give at least Direction + Distance to Road or Landmark)
Lot No. _____ Block No. _____ Subd. Name _____

4. PROPOSED USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK
☐ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☐ Mud Rotary ☐ Air Rotary ☐ Cable ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	

Was drive shoe seal tested? YES NO How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Casing	Liner	Steel	Plastic	Welded	Threaded
						☐	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐

Final location of shoes _____
Top Packer or Headpipe _____ Bottom Tailpipe _____

9. PERFORATIONS/SCREENS
☐ Perforations Method _____
☐ Screens Type _____ Material _____

From	To	Slot Size	Number	Diameter	Tele/Pipe Size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

FEB 28 1994

10. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Depth	Time

Temperature of water ____ Was a water analysis done? Yes ☐ No ☐
By whom? _____
Water Quality (odor, etc.). _____
Bottom Hole Temperature _____

11. STATIC WATER LEVEL:
____ ft. below surface Depth artesian flow found _____
Artesian pressure _____ lb. Describe access port _____
Describe Controlling Devices: _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	GPM	SWL
	453	456	CLAY, SAND, SOME GRAVEL		Y
	456	468	FINE TO COURSE SAND (GREEN COLOR)		Y
	468	463	FINE SAND BLUISH-GREEN CLAY MIXED		Y
	463	473	LIGHT BLUE CLAY		N
	173	480	VERY FINE BLUE SAND & LIGHT BLUE CLAY		N

Date: Started _____ Completed _____

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name _____ Firm No. _____
Firm Official _____ Date _____
and
Supervisor or Operator _____ Date _____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

5

38-7

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ball Point Pen

108844

1. DRILLING PERMIT NO. 63 93 W 1045 .000
Other IDWR No.

2. OWNER:
Name JIM UNDERWOOD
Address HC 34 MAYFIELD STAGE
City BOISE State ID Zip 83706

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

T. 4N North ☐ or South ☐ 15 L.F. ft. below surface
R. 4E East ☐ or West ☐
Sec. 27 SW 1/4 NE 1/4 1/4
Gov't Lot County ELMORE

Address of Well Site HC 34 INDIAN CREEK RD HC 34 Mayfield Stage Stop
(Give at least Direction + Distance to Road or Landmark)

Lot No. Block No. Subd. Name

4. PROPOSED USE: DOMESTIC
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK NEW WELL
☐ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD AIR ROTARY
☐ Mud Rotary ☐ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
BENTONITE	0	28	750#	POURED

Was drive shoe seal tested? YES NO How?

8. CASING/LINER:

Diameter	From	To	Guage	Casting	Liner	Steel	Plastic	Welded	Threaded
8"	+1	68	.250			☒	☐	☒	☐
						☐	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐

Final location of shoes 63
Top Packer or Headpipe Bottom Tailpipe

9. PERFORATIONS/SCREENS
☒ Perforations Method FACTORY
☐ Screens Type Material

From	To	Slot Size	Number	Diameter	Tele/Pipe Size	Casting	Liner
28	68	1/8"		8"	PIPE	☒	☐
						☐	☐
						☐	☐
						☐	☐

10. WELL TESTS: PUMP
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Depth	Time
55	48	63	60

Temperature of water 65 Was a water analysis done? Yes ☐ No ☒
By whom?
Water Quality (odor, etc.) GOOD
Bottom Hole Temperature 65

11. STATIC WATER LEVEL:
Artesian pressure lb. Describe access port WELL CAP
Describe Controlling Devices:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	GPM	SWI
	0	9	TOPSOIL		N
10	9	28	SAND		Y
8	28	23	GRAVEL		Y
	23	27	SAND		Y
	27	29	CLAY		N
	29	46	SAND		Y
	46	49	BROWN CLAY		N
	49	58	SAND		Y
	58	75	BROWN CLAY		N
	75		SAND		Y

RECEIVED
OCT 20 1993
WATER RESOURCES
WESTERN REGION

FEB 28 1994

Date: Started 10/12/93 Completed 10/13/93

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name PETE COPE DRILLING Firm No. 213
Firm Official Date 10/19/93
and
Supervisor or Operator Date 10/19/93
(Sign both if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Resources

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

X3 6

1. WELL OWNER

Name [illegible]

Address Middleton [illegible]

Owner's Permit No. 63-8720

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)

☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 8 inches Total depth 375 feet

Casing schedule: ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
.250 inches	8 inches	+1 feet	375 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? ☒ Yes ☐ No

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☒ Yes ☐ No

How perforated? ☐ Factory ☒ Knife ☐ Torch

Size of perforation ⅛ inches by 2 inches

Number		From	To
200	perforations	103 feet	200 feet
80	perforations	228 feet	250 feet
	perforations	feet	feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name

Type Model No.

Diameter Slot size Set from feet to feet

Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ☐ No Size of gravel

Placed from feet to feet

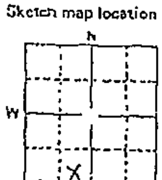
Surface seal depth 20' Material used in seal ☐ Cement grout ☒ Puddling clay ☐ Well cuttings

Sealing procedure used ☐ Slurry pit ☐ Temporary surface casing ☐ Overbore to seal depth

6. LOCATION OF WELL

63

Sketch map location must agree with written location.



Subdivision Name

Lot No. Block No.

County ~~[illegible]~~ Ada

SW ¼ SE ¼ Sec. 28 T. 1 N. R. 4 E.

7. WATER LEVEL

Static water level 260 feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow

Temperature °F. Quality

Artesian closed-in pressure p.s.i.

Controlled by ☐ Valve ☒ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☒ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

106023

9. LITHOLOGIC LOG

Hole Diam.	From	To	Material	Water Yes	Water No
8"	0	3	Top soil		
	3	56	Sand & Clay		
	56	69	Coarse Sand		
	69	103	[illegible]		
	103	200	Coarse Sand	✓	
	200	228	Sand & Clay [illegible]		
	228	245	Coarse Sand	✓	
	245	265	Fine Sand		
	265	305	Sand & Clay		
	305	340	Coarse Sand	✓	
	340	375	Coarse Sand & Clay		

[stamp] Department of Water Resources Western Regional Office

10. Work started 2/14/78 finished 5/17/78

11. DRILLERS CERTIFICATION

Firm Name Middleton [illegible] Firm No. 260

Address Middleton, Id. Date 12/1/78

Signed by (Firm Official) [signature]

and

(Operator) [signature]

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

8693E 77053

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by
Twp Rge Sec
1/4 1/4 1/4
Lat: : : Long: : :

7

1. DRILLING PERMIT NO. - - - - -
Other IDWR No. D0019379

2. OWNER:
Name JIM PHAGAN
Address 4200 PASADENA DR. #30
City BOISE State ID Zip 83705

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W E
S

Twp. 1 North ☒ or South ☐
Rge. 4 East ☒ or West ☐
Sec. 33 1/4 (10 acres) NE 1/4 (40 acres) NW 1/4 (160 acres)
Gov't lot County ADA
Lat: : : Long: : :
Address of Well Site 23735 DESERT WIND
City BOISE
(Give at least name of road + Distance to Road or Landmark)
Lt. Blk. Sub. Name REGINA HEIGHTS

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
BENTONITE	0	18	9 SACKS	OVERBORE

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+2	560	250	ST	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 10'8" Length of Tailpipe

9. PERFORATIONS/SCREENS
☐ Perforations Method
☒ Screens Screen Type telescoping

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
559	569	20		5"	ST ST	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
481 ft. below ground Artesian Pressure lb
Depth flow encountered ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
17		560	2 HRS

Water Temp. Bottom hole temp.
Water Quality test or comments:
Depth first Water Encountered 487

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10	0	3	BROWN TOPSOIL		☒
10	3	14	BROWN SANDY CLAY		☒
10	14	18	TAN SANDY CLAY		☒
8	18	29	TAN SANDY CLAY		☒
8	29	57	BROWN CLAY, SAND & SMALL		
			GRAVEL		☒
8	57	81	BLACK LAVA		☒
8	81	212	TAN CLAY W/SAND		☒
8	212	244	STICKY TAN CLAY		☒
8	244	309	STICKY TAN CLAY W/STRIPS BROWN		
			SAND		☒
8	309	376	BROWN SAND W/SMALL STRIPS		
			TAN CLAY		☒
8	376	421	CEMENTED BROWN SAND		☒
8	421	480	STRIPS BROWN SAND & TAN CLAY		☒
6	480	487	STRIPS BROWN SAND & TAN CLAY		☒
6	487	511	FINE BROWN & CLEAR QUARTZ SAND	☒	
6	511	539	STICKY TAN CLAY		☒
6	539	541	VERY FINE BROWN & MICA SAND	☒	
6	541	545	DIRTY BROWN SAND & SOFT TAN		
			CLAY		☒
6	545	562	MEDIUM STICKY TAN CLAY		☒
6	562	572	COARSE CLEAR QUARTZ SAND &		
			PEA GRAVEL	☒	

RECEIVED
JAN 03 2002
WATER RESOURCES
WESTERN REGION

Completed Depth: 569 (Measurable)
Date: Started 11/12/01 Completed 11/17/01

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name SOS Welldrilling & Pump Co Firm No. 212
Firm Official Frank Skinner Date 12-5-01
Supervisor or Operator Date 12-28-01
(Sign once if Firm Official & Operator)

Date: 12/5/01 Time: 12:12 PM

Form 238-7
3/95-C96

767255

Office Use Only
Inspected by _____
Twp _____ Rge _____ Sec _____
_____ 1/4 _____ 1/4 _____ 1/4
Lat: : : Long: : :

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. DRILLING PERMIT NO. _____
Other IDWR No. D0015796
2. OWNER:
Name Tim Anderson
Address 4450 S. Timridge Way
City Boise State ID Zip 83716
3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W [X] E
S

Twp. 1 North X or South ☐
Rge. 4 East X or West ☐
Sec. 33 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)
Gov't lot _____ County Ada
Lat. : : Long. : :
Address of Well Site 24601 S. Old Hwy 30
City Boise
(Give at least name of road + Distance to Road or Landmark)
Lt. _____ Blk. _____ Sub. Name _____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____
5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other _____
6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____
7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	18	800lbs	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y X N How? _____
8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6.625	+2	660	250	Steel	X	☐	X	☐
5.563	654	650	188	Steel	☐	X	X	☐
					☐	☐	☐	☐

Length of Headpipe 6' Length of Tailpipe N/A
9. PERFORATIONS/SCREENS
☐ Perforations Method _____
X Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
660	665	020		5.563	SS	☐	X
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
528ft. below ground Artesian Pressure _____ lb
Depth flow encountered _____ Describe access port or control devices: _____

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Pumping Level	Time
20		-650	1hr

Water Temp. _____ Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encountered 583'
12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10	0	2	Top soil		X
10	2	10	Tan sand		X
10-6	10	120	Sand & Clay seam		X
6	120	260	Sand & small gravels		X
6	260	583	Cemented sand & gravel		X
6	583	620	Fine sand	X	
6	620	630	Tan clay		X
6	630	665	Med. Sand	X	

RECEIVED
DEC 27 2000
Department of Water Res.
RECEIVED
DEC 12 2000
WATER RESOURCES
WESTERN REGION

Completed Depth: 665' (Measurable)
Date: Started 10/27/00 Completed 11/09/00

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc Firm No. 35
Firm Official _____ Date 12-7-00
Supervisor or Operator _____ Date 12-7-00
(Sign once if Firm Official & Operator)

195-C96

Inspected by _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: ° ' " Long: ° ' "

3N 9

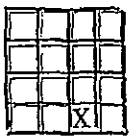
IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. DRILLING PERMIT NO. 61-99-W-0059-000
Other IDWR No. D0012097

2. OWNER:
Name Ronald & Pamela Miller
Address HC 34 Mayfield Stage
City Boise State ID Zip 83716

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N



Twp. 1 North X or South ☐
Rge. 4 East X or West ☐
Sec. 34 1/4 SW 1/4 SE 1/4
(10 acres) (40 acres) (160 acres)

orm 2387

E

S

Gov't lot ____ County Elmore
Lat: ° ' " Long: ° ' "
Address of Well Site Mayfield Road
City Mayfield
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other ____

6. DRILL METHOD
☐ Air Rotary ☐ Cable X Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	18	900 lbs	Overbore

Was drive shoe used? ☐ Y X N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y X N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Materia	Casing	Liner	Welded	Threaded
5.438	+2	596	288	Steel	X	☐	X	☐
5.563	606	616	288	Steel	X	☐	X	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☐ Perforations Method ____
☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
596	606	020		5.563	SS	X	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
450 ft. below ground Artesian Pressure ____ lb
Depth flow encountered ____ Describe access port or control devices: ____

11. WELL TESTS: 59137
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments. ____
Depth first Water Encountered ____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
12	0	3	Top Soil		X
12	3	15	Hard Pan		X
12	15	18	Sand & Clay Seams		X
8	18	22	Tan Clay		X
8	22	257	Tan Sand & Clay Seams		X
8	257	260	Tan Clay		X
8	260	320	Brown Silt & Sand		X
8	320	400	Tan Clay & Some Sand		X
8	457	469	White Clay & Large Stone		X
8	469	471	Sand – 015		X
8	471	500	Tan Clay & Some Sand		X
8	500	520	White Clay & Some Sand		X
8	520	594	Tan Clay & Some Sand		X
8	594	610	White Clay & Some Sand		X
8	610	615	Medium Sand & White Clay		X
8	615	620	White Clay & Some Stone		X

MICROFILMED NOV 3 1 1999

RECEIVED OCT 13 1999 WATER RESOURCES WESTERN REGION

Completed Depth: 616 (Measurable)
Date Started 9-18-99 Completed 9-23-99

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official Mark R. Hiddleston Date 10/11/99
Supervisor or Operator John Hiddleston Date ____
(Sign once if Firm Official & Operator)

870655-775948

#10

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by
Twp Rge Sec
1/4 1/4 1/4
Lat: Long:

1. DRILLING PERMIT NO. - - - -
Other IDWR No. D0019537

2. OWNER:
Name Bob Wickham
Address 730 S. Prairie Grass Dr.
City Boise State ID Zip 83716

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W X E
S

Twp. 1 North ☐ or South X
Rge. 4 East X or West ☐
Sec. 1 1/4 SW 1/4 NW 1/4
10 acres 40 acres 160 acres

Gov't lot County Elmore
Lat: : : Long: : :
Address of Well Site 730 S. Prairie Dr.
City Mtn Home
(Give at least name of road + Distance to Road or Landmark)
Lt. Blk. Sub. Name

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonie	0	20	700 lbs.	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? ☐ Y X N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6.625	+1	444	.250	Steel	X	☐	X	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 6' Length of Tailpipe 3'

9. PERFORATIONS/SCREENS
☐ Perforations Method
X Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
445	450	.030		5"	SS	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
337 ft. below ground Artesian Pressure lb
Depth flow encountered ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
20			1 hr

Water Temp. 68 Bottom hole temp.
Water Quality test or comments:
Depth first Water Encountered 415'

12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia.	From	To	Remarks:Lithology, Water Quality & Temp.	Water Y	Water N
10"	0	2	Top Soil		X
10"	2	7	Cleache		X
10"	7	18	Sand & Gravel		X
6"	18	30	Sand & Gravel		X
6"	30	34	Brown Clay		X
6"	34	225	Sand & Gravel w/ Clay Seams		X
6"	225	236	Brown Clay		X
6"	236	250	Tan Sand Stone		X
6"	260	415	Sand & Gravel w/ Clay Seams		X
6"	415	428	Coarse Sand	X	
6"	428	441	Brown Clay		X
6"	441	455	Coarse Sand	X	
6"	455	460	Brown Clay		X

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WATER RESOURCES
WESTERN REGION

Completed Depth: 455' (Measurable)
Date: Started 1-04-02 Completed 1-11-02

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Biddleston & Son, Inc. Firm No. 35
Firm Official Date 04-22-02
Supervisor or Operator Date 4-17-02
(Sign once if Firm Official & Operator)

768411

Form 238-7
3/95-0.96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. - - - - -
Other IDWR No. D0018029
2. OWNER:
Name Chris Reninger
Address P.O. Box 190782
City Boise State ID Zip 83719
3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W E
S

Twp. 1 North ☐ or South ☒
Rge. 4 East ☒ or West ☐
Sec. 1 1/4 (10 acres) SW 1/4 (40 acres) NW 1/4 (160 acres)
Gov't lot ____ County Elmore
Lat: : : Long: : :
Address of Well Site Baseline Rd just past
Old Hwy. 30 cut-off City Boise
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____
5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other ____
6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____
7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
bentonite	0'	18+'	25 sacks	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y ☒ N How? ____
8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2'	502'	.250	steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 12' Length of Tailpipe ____
9. PERFORATIONS/SCREENS
☐ Perforations Method pull back
☒ Screens Screen Type telescoping

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
504'	514'	.020		5 5"	StSt	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
342 ft. below ground Artesian Pressure ____ lb
Depth flow encountered ____ ft. Describe access port or control devices: ____
11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
70 GPM		500'	2 hrs.

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered 355'
12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia	From	To	Remarks:Lithology, Water Quality & Temp.	Water Y	Water N
10"	0'	2'	brown top soil		☒
10"	2'	4'	brown hard pan		☒
10"	4'	6'	hard brown clay		☒
10"	6'	8'	coarse brown sand		☒
10"	8'	18'	brown clay		☒
8"	18'	21'	brown clay		☒
8"	21'	65'	brown clay & coarse sand strips		☒
8"	65'	72'	brown & white decomposed granite		☒
8"	72'	85'	bron clay		☒
8"	85'	150'	soft brown & white granite		☒
8"	150'	166'	soft white granite		☒
8"	166'	203'	black & brown granite		☒
8"	203'	240'	soft white granite		☒
8"	240'	290'	brown clay & coarse sand strips		☒
8"	290'	305'	white & brown granite		☒
8"	305'	312'	hard brown clay		☒
8"	312'	355'	brown clay & coarse white sand strip		☒
8"	355'	358'	white & brown sand	☒	
8"	358'	361'	brown clay		☒
6"	361'	381'	brown clay		☒
6"	381'	384'	brown sand	☒	
6"	384'	397'	brown clay		☒
6"	397'	415'	coarse brown sand w/sandy clay strip	☒	
6"	415'	448'	coarse white & brown sand	☒	
6"	448'	457'	brown clay		☒
6"	457'	461'	crse/fine brn & wht sand w/gravel	☒	
6"	461'	470'	sandy clay & sm sand & gravel strips		☒
6"	470'	502'	coarse/fine brown sand packed		☒
6"	502'	504'	brown clay		☒
6"	504'	515'	white sand & small gravel	☒	

Completed Depth: 516 (Measurable)
Date: Started 4-3-01 Completed 4-10-01

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MAY 17 2001
WATER RESOURCES
WESTERN REGION

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name ____ Firm No. ____
Firm Official [signature] Date 5-17-00
Supervisor or Operator [signature] Date 5-17-01
(Sign once if Firm Official & Operator)

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Date: 5/16/01 Time:9:18 AM
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Department of Water Resources

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#4 12

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT 053590

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 61-99-W-0028-000
Other IDWR No. D0009421
2. OWNER:
Name Mary Botts
Address 5625 Baseline Rd.
City Boise State ID Zip 83617
3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W [X] E
S

Twp. 1 North ☐ or South X
Rge. 4 East X or West ☐
Sec. 2 1/4 NE 1/4 NE 1/4
(10 acres) (40 acres) (160 acres)
Gov't lot ____ County Elmore
Lat: : : Long: : :
Address of Well Site 5625 Baseline Rd. - Tippanuk
City Boise
(Give at least name of road + distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____
5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other ____
6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____
7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	158	4000 lbs	Overbore

Was drive shoe used? ☐ Y X N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y X N How? ____
8. CASING/LINER:

Diameter	From	To	Gauge	Materia	Casing	Liner	Welded	Threaded
8.625	+6"	158'	.250	SS	X	☐	X	☐
8.625	+2	523	.250	SS	X	☐	X	☐
6.625	523	537	.250	STEEL	☒	☐	☒	☐

Length of Headpipe 523' Length of Tailpipe 3'
9. PERFORATIONS/SCREENS
☐ Perforations Method ____
☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Materia	Casing	Liner
523	533	.020		5.563	SS	X	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
310 ft below ground Artesian Pressure ____ lb
Depth flow encountered Describe access port or control devices: ____

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
20+			

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered ____
12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks:Lithology, Water Quality & Temp.	Y	N
12"	0	2	Top Soil	☐	X
12"	2	10	Sandy Clay	☐	X
12"	10	138	Tan Sand & Clay Seam	☐	X
12-8	138	175	Brown Sand & Clay Seam	☐	X
8"	175	195	Sand Stone	☐	X
8"	195	210	Brown Clay	☐	X
8"	210	215	Sand & Clay Seam	☐	X
8"	215	290	Tan Clay & Sand Seam	☐	X
8"	290	312	Sand-10/20	☐	X
8"	312	330	Sand & Clay Seam	☐	X
8"	330	350	Coarse Sand	☐	X
8"	350	367	Clay & Sand Seam	☐	X
8"	367	400	Brown Clay & Sand Seam	☐	X
8"	400	462	Tan Clay & Sand Seam	☐	X
8"	462	465	Tan Clay & Some Pea Gravel	☐	X
8"	465	514	Light Tan Clay & Some Stone	☐	X
8"	514	522	Sand Stone	☐	X
8"	522	534	Coarse Sand	X	
8"	534	540	Ash Color Clay	☐	X
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐
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JUL - 1 1999
RECEIVED
JUN 22 1999
Department of Water Resources
WATER RESOURCES
WESTERN REGION

Completed Depth: 537' (Measurable)
Date: Started 5-13-99 Completed 6-2-99

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official [signature] Date 6/17/99
Supervisor or Operator [signature] Date 6/17/99

188349

Office Use Only
Inspected by _____
Twp _____ Rge _____ Sec _____
_____ 1/4 _____ 1/4 _____ 1/4
Lat: : . Long: . :

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. DRILLING PERMIT NO. _____
Other IDWR No. D0025893

2. OWNER:
Name Dale Meeks
Address 977 N. Ethridge Pl
City Boise State ID Zip 83704

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W E S

Twp. 1 North ☐ or South X
Rge. 4 East X or West ☐
Sec. 2 1/4 (10 acres) NE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't lot _____ County Elmore
Lat: : : Long: : :
Address of Well Site Prairie Grass Rd. off baseline rd.
City Mtn Home
(Give at least name of road – Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD:
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	19	500 lbs	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y X N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6.625	+2	428	.250	Steel	X	☐	X	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe N/A Length of Tailpipe _____

9. PERFORATIONS/SCREENS
☐ Perforations Method _____
X Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
429	434	.025		5"	SS	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
331 ft below ground Artesian Pressure ___ lb
Depth flow encountered ___ ft. Describe access port or control devices: _____

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
30			1

Water Temp. 60 Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encountered 409'

12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10	0	2	Top Soil		X
10	2	5	Cleache		X
10	5	15	Sand & Gravel		X
10	15	18	Tan Clay		X
6	18	22	Tan Clay		X
6	22	78	Tan Coarse Sand		X
6	78	83	Tan Clay		X
6	83	213	Coarse Sand		X
6	213	225	Brown Sandstone		X
6	225	290	Coarse Sand		X
6	290	409	Tan Sandy Clay		X
6	409	414	Coarse Sand	X	
6	414	421	Tan Sand w/ Clay Seams		X
6	421	434	Tan Sand	X	
6	434	435	Tan Clay		X

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WATER RESOURCES
WESTERN REGION

Completed Depth: 434' (Measurable)
Date: Started 10-28-02 Completed 11-01-02

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official _____ Date 11-11-02
Supervisor or Operator Matt Hiddleston Date 11-11-02
(Sign once if Firm Official & Operator)

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Form 238-7
5/95-D/S

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp _____ Rge _____ Sec _____
1/4 _____ 1/4 _____ 1/4
Lat: . . Long: . .

1. DRILLING PERMIT NO. _____
Other IDWR No. D0025928
2. OWNER:
Name Rich Cornell
Address HC 87 Box 700
City Mtn Home State ID Zip 83647
3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N

W [X] E

Twp. 1 North ☐ or South X
Rge. 4 East X or West ☐
Sec. 2 1/4 (10 acres) NW 1/4 (40 acres) NE 1/4 (80 acres)

S

Gov't lot County Elmore
Lat: . . Long: . .
Address of Well Site ½ mile off baseline rd.
City Mtn Home
(Give street name of road or Distance to Road or Landmark)
Lt. _____ Blk. _____ Sub. Name _____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____
5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other _____
6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____
7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	19	600 lbs	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y X N How? _____
8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6.625	+2	383	.350	Steel	X	☐	X	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 5' Length of Tailpipe N/A
9. PERFORATIONS/SCREENS
☐ Perforations Method _____
X Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
385	390	.030		5"	SS	☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
300 ft. below ground Artesian Pressure ___ lb
Depth flow encountered ___ ft. Describe access port or control devices: _____

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
20			

Water Temp. 62 Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encountered 185
12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10	0	2	Top Soil		X
10	2	10	Silty Sand		X
10	10	12	Big Sand & Gravel		X
10	12	19	Coarse Sand & Gravel		X
6	19	21	Tan Clay		X
6	21	88	Coarse Sand & Gravel		X
6	88	92	Brown Clay		X
6	92	165	Sand		X
6	165	185	Sandstone		X
6	185	250	Sand	X	
6	250	255	Tan Clay		X
6	255	380	Sand		X
6	380	382	Tan Clay		X
6	382	390	Coarse Sand	X	

Completed Depth: 390' (Measurable)
Date: Started 11-22-02 Completed 11-28-02

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official [signature] Date 12-20-02
Supervisor or Operator Matt Hiddleston Date _____
(Sign once if Firm Official & Operator)

799883

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. - - - -
Other IDWR No. D0029374
2. OWNER:
Name Jack Buchanan
Address 731 S. Prairie Grass Rd.
City Boise State ID Zip 83716
3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W [ ] E
S

Twp. 15 North ☐ or South X
Rge. 4 East X or West ☐
Sec. 2 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't lot ____ County Ada
Lat: : : Long: : :
Address of Well Site 731 S. Prairie Grass Rd.
City Boise
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____
5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other ____
6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____
7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	18	700 lbs	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y X N How? ____
8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6.625	+2	469	.250	Steel	X	☐	X	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 20' Length of Tailpipe N/A
9. PERFORATIONS/SCREENS
☐ Perforations Method ____
X Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
471	476	.020		5"	SS	☐	☐
451	471	N/A		5"	Steel		X
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
331 ft. below ground Artesian Pressure ___ lb
Depth flow encountered ___ ft. Describe access port or control devices: ____

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
50			1 hr

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered ____
12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10"	0	2	Top Soil		X
10"	2	7	Cleache		X
10"	7	16	Tan Sand W/ Gravel		X
10"	16	18	Tan Clay		X
6"	18	22	Tan Clay		X
6"	22	80	Tan Coarse Sand		X
6"	80	83	Tan Clay		X
6"	83	217	Coarse Sand		X
6"	217	227	Brown SandStone		X
6"	227	460	Tan Sand w/ Clay Seams		X
6"	460	476	Coarse Tan Sand & Gravel	X	

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WATER RESOURCES
WESTERN REGION

Completed Depth: 476' (Measurable)
Date: Started 4-28-03 Completed 5-5-03

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official [signature] Date 5-27-03
Supervisor or Operator Matt Hiddleston Date ____
(Sign once if Firm Official & Operator)

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Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
__ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. __-__-__-____-____
Other IDWR No. D0030779

2. OWNER:
Name Big View Builders
Address 5006 Man O War
City Nampa State ID Zip 83686

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W E
S

Twp. 1 North ☐ or South ☒
Rge. 4 East ☒ or West ☐
Sec. ___ 1/4 (10 acres) SE 1/4 (40 acres) SW 1/4 (80 acres)
Gov't lot ____ County Elmore
Lat: : : Long: : :
Address of Well Site 1020 Desert Wind Rd
City Mountain Home,
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other ____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	20	12	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 278
Was drive shoe seal tested? ☐ Y ☒ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	-2	278	250	steel	☒	☐	☒	☐
5"	6~~5~~7	491	188	steel	☐	☒	☒	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☐ Perforations Method ____
☒ Screens Screen Type sand blocker

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
492	504	n/a	n/a	4"	stst	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
365 ft. below ground Artesian Pressure ____ lb
Depth flow encountered 485 ft. Describe access port or control devices: ____

11. WELL TESTS:
☒ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
15	50	415	3 hrs

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered 408

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10"	0	18	Sandy brown clay		☒
8	18	36	Sandy brown clay		☒
8	36	42	Cemented gravel		☒
8	42	185	Brown clay		☒
8	185	243	Brown clay w/ sand strips		☒
8	243	278	Black cinders		☒
8	278	408	Black lava		☒
8	408	485	Brown clay w/ sand strips	☒	
8	485	504	Coarse white sand & some gravel	☒	

RECEIVED
MAR 08 2004
WATER RESOURCES
WESTERN REGION

Completed Depth: 504 (Measurable)
Date: Started 01/12/04 Completed 02/15/04

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Skinner&Son Well Drilling Firm No. 635
Firm Official ____ Date 3-2-04
Supervisor or Operator ____ Date 3-2-04
(Sign once if Firm Official & Operator)

Date: 3/2/04 Time: 3:50 PM

767572 58 17

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat : : Long: : :

1. DRILLING PERMIT NO. ____
Other IDWR No. D0091563

2. OWNER:
Name Glen & Janet Jorgensen
Address 1386 N. Little Creek
City Meridian State ID Zip 83642

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N / W / E / S — X

Twp. 1 North ☐ or South X
Rge. 4 East X or West ☐
Sec. 2 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't lot ____ County Elmore
Lat: : : Long: : :
Address of Well Site Base Line Rd.
City Mtn Home
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement: etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other ____

6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	18	800 lbs	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y X N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6.625	+2	608	250	Steel	X	☐	X	☐
5.563	602	608	.188	Steel	☐	X	X	☐
5.563	618	633	188	Steel	☐	X	X	☐

Length of Headpipe 6' Length of Tailpipe 15'

9. PERFORATIONS/SCREENS
☐ Perforations Method ____
X Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
608	618	.010		5.563	SS	☐	X
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
388 ft. below ground Artesian Pressure ____ lb
Depth flow encountered ft. Describe access port or control

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
20			

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered 500

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10	0	2	Top Soil		X
10	2	18	Sandy Clay		X
6	18	120	Tan Sand & Clay Seams		X
6	120	175	Brown Sand & Clay		X
6	175	200	Sand Stone		X
6	200	290	Tan Clay & Sand Seam		X
6	290	400	Tan Sand & Clay Seams		X
6	400	465	Tan Clay & Sand Seams		X
6	465	500	Tan Sand & Clay Seam		X
6	500	510	Coarse Sand – Rusty	X	
6	510	540	Tan Clay & Sand Seam		X
6	540	551	Brown Clay		X
6	551	620	Gray Sand	X	
6	620	633	Gray Sand & Hard Clay Seam		X

RECEIVED
DEC 27 2000
Department of Water Resources

RECEIVED
DEC 12 2000
WATER RESOURCES
WESTERN REGION

Completed Depth: 633 (Measurable)
Date: Started 11-09-00 Completed 11-17-00

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official ____ Date 12/6/00
Supervisor or Operator ____ Date 12-7-00
(Sign once if Firm Official & Operator)

Form 238-7
6/88

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

58
18

1. WELL OWNER

Name Jerry Marton

Address Box 48 Mayfield Stage Boise

Owner's Permit No. 61-89-7-026 53707

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.250 inches	6 5/8 inches	+ 2 feet	584 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

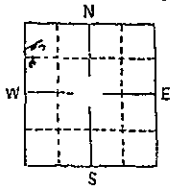
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 50 Material used in seal: ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing
☒ Overbore to seal depth
Method of joining casing: ☒ Threaded ☐ Welded ☐ Solvent Weld
☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Elmore
SW ¼ NW ¼ Sec. 34 T. 1 ☒ N ☐ S R. 4 ☐ E ☐ W

7. WATER LEVEL

Static water level 460 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature _____ °F Quality _____
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
25		2

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
8"	0	10	Sand		
8"	10	28	Clay w/some sand		
8"-6"	28	260	Clay w/ sand		
6"	260	510	Cemented sand & gravel w/clay		
6"	510	583	fine sand (gray) w/clay, little gravel	X	
6"	583	586	sand & gravel	X	

NOV 15 1989
Department of Water Resources

DEC 13 1989
Department of Water Resources
Western Regional Office

JUN 05 1990

10. Work started 10-24-89 finished 11-11-89

11. DRILLERS CERTIFICATION DL

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Middleton & Son, Inc Firm No. 35
Address Mt. Home, Id Date 11-12-89
Signed by (Firm Official) Mark S Middleton
and
(Operator) Mark S Middleton

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
4/92

POOR QUALITY

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

RECEIVED
AUG 0 3 1993
Department of Water Resources

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER
Name RONALD & RUSEANNA CASTLE
Address HC 85, BX 237 GRANDVIEW, ID 83624
Drilling Permit No. 53-93-C-0031-000
Water Right Permit No. 61-07683 (UPON APPROVAL)

2. NATURE OF WORK NEW WELL
☐ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE NON-DOMESTIC
☐ Domestic ☐ Irrigation ☐ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED AIR&MUD ROTARY
☐ Rotary ☐ Air ☐ Auger ☐ Reverse rotary
☐ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION
Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.25 inches	8 inches +	1 feet	490 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? _____ inches by _____ inches

Number		From	To
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet

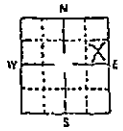
Well screen installed? ☐ Yes ☒ No
Manufacturer _____ Type _____
Top Packer or Headpipe _____
Bottom of Tailpipe _____

Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet

Surface seal depth 270 Material used in seal: ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit
☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded
☐ Solvent Weld ☐ Cemented between strata

Describe access port WELL CAP

6. LOCATION OF WELL
Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County ELMORE
Address of Well Site HC 74 MAYFIELD STAGE RD (give at least name of road)
T. 01S N ☐ or S ☐
SE ¼ NE ¼ Sec. 3 , R. 08E E ☐ or W ☐

7. WATER LEVEL
Static water level 338 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 65 °F. Quality Good
Describe artesian or temperature zones below.

8. WELL TEST DATA AIR
☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
30	338	1

081538

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
10"	0	5	BLEACHEY		X
	5	50	CLAY & DECOMPOSED GRANIT AND SAND MIX		X
	50	65	SAND		X
	65	90	CLAY AND SAND MIXED		X
	90	170	BOULDERS & SAND		X
	170	225	CLAY, & SAND MIXED		X
	225	240	HARD GRANIT		X
	240	270	DECOMPOSED GRANIT		X
	270	275	BROWN CLAY		X
	275	330	DECOMPOSED GRANIT		X
	330	485	SAND		X
	485	497	CLAY		X
	497	510	LAVA ROCK	X	
			SWITCHED TO AIR ROTARY		
8"	510	535	BROKEN LAVA ROCK, & SOME ROUND LAVA	X	

RECEIVED
AUG 0 2 1993
Department of Water Resources
Western Regional Office

FEB 09 1994

10. Work started 7/8/93 finished 7/28/93

11. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name ETE CORP DRILL Firm No. 1111
Address Chris W. CHINDEN Date 7/28/93
Signed by Drilling Supervisor [signature]
and
(Operator) _____
(If different than the Drilling Supervisor)

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
3/95

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT 053341

Use Typewriter or Ballpoint Pen

Office Use Only
Inspected by _____
Twp____ Rge____ Sec____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

54
20

1. DRILLING PERMIT NO. 61 - 96 - W - 10 - 100
Other IDWR No. 61-07683
Previous permit 61-93-C-0031-000

2. OWNER:
Name RONALD B & ROSANNA K CASTLE
Address HC 34 BOX 34-106
City BOISE State ID Zip 83706

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 1 S North ☐ or South ☐
Rge. 4 E East ☐ or West ☐
Sec. 3 ____ 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)
Gov't Lot ____ County ELMORE
Lat: : : Long: : :
Address of Well Site HC 34 MAYFIELD STAGE
BOX 100 City MAYFIELD
(Give at least name of road + Distance to Road or Landmark)

Lt ____ Blk. ____ Sub. Name ____

4. USE: NON-DOMESTIC MULTIPLY HOME DOMESTIC
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply DEEPEN (Replacement etc.)
☐ New Well ☐ Modify ☐ Abandonment ☒ Other Deepen

6. DRILL METHOD AIR ROTARY
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
REFER TO FIRST WELL LOG				

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y ☐ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
REFER TO FIRST WELL LOG				0 TO 535	☐	☐	☐	☐
6"	+2	550	.250	STEEL	☒	☐	☒	☐
4.5"	498	678	40	PVC	☐	☒	☐	☒

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☒ Perforations Method SKIL SAW
☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
378	678	178"	3 per ft	4.5"	PVC	☐	☒
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
435 ft. below ground Artesian pressure — lb.
Depth flow encountered — ft. Describe access port or control devices: WELL CAP

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
40 GPM	N/A	616 FT	2 HRS

Water Temp. COLD Bottom hole temp. COLD
Water Quality test or comments: GOOD, CLEAR, NO SMELL
Depth first Water Encountered 629

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
		0	TO 535 REFER TO FIRST WELL LOG		X
6"	535	550	CAVING LAVA ROCK		X
	550	565	LAVA & GRANITE		X
	565	570	BROWN CINDERS		X
	570	584	LAVA		X
	584	588	BROWN CINDERS		X
	588	597	LAVA ROCK		X
	597	609	GREEN GRANITE		X
	609	618	WHITE & GREEN GRANITE W/ LAVA		X
	618	619	GRAY GRANITE		X
	619	629	WHITE GRANITE W/ LAVA	X	
	629	638	BROWN CINDERS	X	
	638	670	BRN. CINDERS FINE & CRS SND	X	
	670	678	LAVA ROCK & SAND		

RECEIVED
MAY 30 1996
Department of Water Resources
RECEIVED
MAY 22 1996
WATER RESOURCES
WESTERN REGION
AUG 21 1996

Completed Depth 678 FEET (Measurable)
Date Started [redacted] 4/10/96 Completed [redacted] 4-25-96

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name PETE COPE DRILLING CO., INC. Firm No. 213
Firm Official [signature] Date 5/6/96
and
Supervisor or Operator ____ Date ____
(Signatures of Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

CORRECTED 94796

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

61-98-W-0059-000

Office Use Only
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. ____

Other IDWR No. D0007514

2. OWNER:

Name Jim Hisel

Address Mayfield Stage, HC-34

City Boise State ID Zip 83706

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location

N

W E S

Twp. 1 North ☐ or South ☒

Rge. 4 East ☒ or West ☐

Sec. 10 1/4 (10 acres) SE 1/4 (40 acres) SE 1/4 (160 acres)

Gov't lot ____ County Elmore

Lat: : : . - Long: : :

Address of Well Site Mayfield Stage, HC-34

City Boise

(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ____

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement etc.)

☒ New Well ☐ Modify ☐ Abandonment ☐ Other ____

6. DRILL METHOD

☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	2'	40+'	16	Overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) ____

Was drive shoe seal tested? ☐ Y ☒ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1'	541	250	Steel	☒	☐	☒	☐
4.5"	532'	542'	Sc40	PVC	☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS

☒ Perforations Method saw

☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
539'	542'		80	4.5"	PVC	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

150ft. below ground Artesian Pressure ____ lb

Depth flow encountered ____ ft. Describe access port or control devices: ____

11. WELL TESTS:

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Pumping Level	Time
10		400'	1hr
40		520'	1hr
50		540'	1hr

Water Temp. ____ Bottom hole temp. ____

Water Quality test or comments: ____

Depth first Water Encountered 358'

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks/Lithology, Water Quality & Temp.	Water Y	Water N
10"	0'	1'	brown top soil		☒
10"	1'	2'	lt brown hardpan		☒
10"	2'	8'	coarse brown sand		☒
10"	8'	18'	brown sandy clay		☒
10"	18'	20'	coarse brown sand		☒
8"	20'	205'	brown clay/coarse sand strips		☒
8"	205'	225'	brown brown & black granite		☒
8"	225'	307'	brown & white granite		☒
8"	307'	328'	cemented quartz sand		☒
8"	328'	358'	white & clear granite		☒
8"	358'	396'	brown clay w/sand strips	☒	
6"	396'	410'	coarse white & brown sand		☒
6"	410'	422'	brown clay		☒
6"	422'	432'	coarse white sand	☒	
6"	432'	453'	lt brown clay w/small cracks		☒
6"	453'	464'	hard brown clay		☒
6"	464'	467'	coarse brown sand	☒	
6"	467'	484'	lt brown sand w/sm. cracks		☒
6"	484'	501'	dirty brown sand w/clay strips		☒
6"	501'	532'	brown clay w/small cracks		☒
6"	532'	538'	grey clay w/grey sand		☒
6"	538'	542'	grey clay		☒
6"	542'	545'	blue/grey & white sand	☒	

RECEIVED
MAR 26 1999
WATER RESOURCES
WESTERN REGION

RECEIVED
MAR 30 1999
Department of Water Resources

Completed Depth: 542 (Measurable)

Date: Started 09-16-98 Completed 09-23-98

13. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name SOS Welldrilling & Pump Co Firm No. 212

Firm Official ____ Date 3-24-99

Supervisor or Operator ____ Date 3/24/99

(Sign once if Firm Official & Operator)

Date: 03/24/99 Time: 12:30 PM

MICROFILMED
JUN 08 1999

Form 22(f-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

5A
22

1. WELL OWNER

Name ED DIENES

Address MT. HOME

Owner's Permit No. —

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.250 inches	8" inches	+ 1 feet	340 feet
.250 inches	6" inches	1 feet	360 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

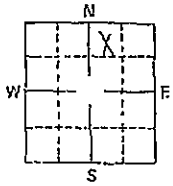
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 40 Material used in seal: ☐ Cement grout ☒ Puddling clay ☒ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL 61

Sketch map location must agree with written location.



Subdivision Name —
Lot No. — Block No. —
County ELMORE
NW ¼ NE ¼ Sec. 11, T. 1 N Ⓢ R. 4 Ⓔ W.

7. WATER LEVEL

Static water level 440 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☒ Cap ☐ Plug
Temperature ___ °F. Quality _____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
27	—	3

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8	0	340	SAND & CLAY		✓
6	340	362	SAND & CLAY		✓
	362	543	LAVA	✓	

JAN 3
Department of Water Resources
Western Regional Office

10. Work started 6-6-79 finished 6-27-79

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name H2O Well Drilling Firm No. 303
Address 11917 HIGHLAND TR Date 9-1-79
Signed by (Firm Official) Bruce H Connolly
and
(Operator) Bruce H Connolly

MICROFILMED

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
1/94

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ball Point Pen

56757

1. DRILLING PERMIT NO. 61 -94 - W - 0027 - 000
Other IDWR No.

2. OWNER:
Name LEONARD EISEMAN
Address 802 East Pennsylvania Ave.
City Boise State ID Zip 83706

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 1 North ☐ or South ☒
Rge. 4 East ☒ or West ☐
Sec. 15, ____ 10 acres 1/4 NE 40 acres 1/4 NE 160 acres 1/4
Gov't Lot ____ County Elmore

Address of Well Site Simco Rd.
City Mountain Home
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ____

4. PROPOSED USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK
☒ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☐ Mud Rotary ☒ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	250'	20	overbore

Was drive shoe used? Y☒ N☐
Was drive shoe seal tested? Y☒ N☐ How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8.625	0	250'	.250	steel	☒	☐	☐	☐
6.625	2'	425'	.250	steel	☒	☐	☐	☐
5.57	436'	448'	.188	steel	☐	☒	☐	☐

Length of Headpipe 7' Length of Tailpipe 5'

9. PERFORATIONS/SCREENS
☐ Perforations Method
☒ Screens Screen Type V-wire

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
453'	448'	.040		5.57	S.S.	☐	☒
436'	431'	.030		5.57	S.S.	☐	☒
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
335 ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
35			5hr.

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0	2'	Topsoil		
"	2'	11'	Brown Clay		
"	11'	18'	Sand & Gravel		
"	18'	21'	Brown Clay		
"	21'	43'	Sand & Gravel		
"	43'	65'	Clay w/Sand		
"	65'	80'	Coarse Sand		
"	80'	84'	Sandy clay		
"	84'	108'	Sand w/gravel		
"	108'	140'	Sandy clay		
"	140'	150'	Coarse sand		
"	150'	155'	Sand w/gravel		
"	155'	161'	Sandy clay		
"	161'	190'	Coarse sand w/clay		
"	190'	203'	Cemented sand & gravel		
"	203'	228'	Clay w/sand & gravel		
"	228'	240'	Coarse Sand		
"	240'	330'	Sandstone		
"	330'	340'	Coarse sand		
"	340'	356'	Brown clay		
"	356'	365'	Coarse sand		
"	365'	375'	Brown clay		
"	375'	386'	Coarse sand		
"	386'	409'	Clay w/sand seams		
"	409'	415'	Brown clay		
"	415'	428'	Coarse sand	X	
"	428'	430'	Brown clay		
6"	430'	439'	Coarse sand	X	
"	439'	441'	Brown clay		
"	441'	458'	Sand & Gravel	X	
"	458'	467'	Brown clay		

RECEIVED JUL 20 1994 WATER RESOURCES WESTERN REGION
RECEIVED OCT 17 1994 Department of Water Resources
MAY 08 1995

Completed Depth 458' (Measurable)
Date: Started June 11, 1994 Completed June 26, '94

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official [signature] Date 7/19/94
and
Supervisor or Operator ____ Date ____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

USE TYPEWRITER OR BALL POINT

Department of Water Administration

WELL DRILLER'S REPORT 1150

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

24

1. WELL OWNER

Name El Paso Natural Gas

Address

Owner's Permit No.

2. NATURE OF WORK Anode Bed

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

Not a Water Well

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test Not a Water Well

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 12 inches Total depth 576 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
¼ inches	10¾ inches	+1 feet	505 feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name

Type ____ Model No. ____

Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel

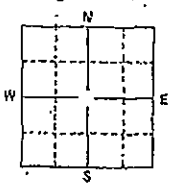
Placed from ____ feet to ____ feet

Surface seal? ☒ Yes ☐ No To what depth 118 feet

Material used in seal ☐ Cement grout ☒ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



16

61

DP

County Otero

NE ¼ NE ¼ Sec. 17 T. 1 ☐S. R. 4 ☐E ☐W

7. WATER LEVEL

Static water level 450 feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow

Temperature ____° F. Quality

Artesian closed-in pressure ____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
None		
Was Not Tested		

9. LITHOLOGIC LOG 028863

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
12	0	8	Surface		
12	8	114	Clay Fine gravel & sand		✓
12	114	118	gravel		✓
12	118	177	Blue Basalt		✓
12	177	187	Red Basalt		✓
12	187		Gravel		✓
12	187	197	Red Basalt		✓
12	197	223	Blue Basalt		✓
12	223	237	Red BASALT		✓
12	237	277	Fine gravel & sand		✓
			Clay Brown & Gray		✓
12	277	284	Gravel & sand.		✓
			Casing		✓
			Blue Basalt		✓
10	284	288	gravel & sand		✓
10	288	360	Upper Clay & water bearing sand		✓
	360	450	Sand & Clay		✓
		450	Water Bearing	✓	
	450	550	Clay with layers		
			Sand Could be		
			Water at 550	?	
			Casing 0 50-538		
	550	576	Clay		
			Clay was Stuck		
			Sand with Gravel		
			Blue Fuzzy Formation		
			Was		
			a Water		
			Well		
			Could not Drive Pipe Further		

10. Work started 14 Feb 73 finished 30 April 1973

11. DRILLER'S CERTIFICATION

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

USGS

Eugene W Walker 15

Driller's or Firm's Name Number

624 Prewitt Tucumcari

Address

Eugene W Walker 14 June 1973

Signed By Date

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

778010

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. _ _ - _ _ - _ _ _ - _ _ _ _
Other IDWR No. D0025092

2. OWNER:
Name Mike Eisman
Address 2988 S. Owyhee
City Boise State ID Zip 83705

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N / W / E / S

Twp. 1 North ☐ or South X
Rge. 4 East X or West ☐
Sec. 22 1/4 (10 acres) NE 1/4 (40 acres) SE 1/4 (160 acres)

Gov't lot _____ County Elmore
Lat: : : Long: : :
Address of Well Site 1639 S. Simco Rd.
City Boise
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	18	500 lbs	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y X N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6.625	+1	625	.250	Steel	X	☐	X	
8"	+1	175	.322	Steel	X	☐	X	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
☐ Perforations Method _____
X Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
625	635	.025		5"	SS	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
464 ft. below ground Artesian Pressure ___ lb
Depth flow encountered ___ ft. Describe access port or control devices. _____

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
40			2 hrs.

Water Temp. 63 degrees Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encountered _____

12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
12"	0	2	Top Soil		X
12"	2'	7'	Cleache		X
12"	7'	18'	Sand & Brown Clay		X
8"	18'	70'	Tan Sand		X
8"	70'	80'	Brown Clay		X
8"	80'	130'	Coarse Sand		X
8"	130'	134'	Brown Clay		X
8"	134'	150'	Gray Lava		X
8"	150'	155'	Brown Coarse Sand		X
8"	155'	174'	Brown Clay		X
8"	174'	230'	Gray Lava		X
6"	230'	240'	Redish Brown Cinders		X
6"	240'	350'	Coarse Tan Sand		X
6"	350	351	Tan Clay		X
6"	351	396	Decomposed Granite		X
6"	396	760	Brown Sandstone		X
6"	460'	570'	Brown Clay		X
6"	570'	600'	Brown Clay w/ Sand Seams	X	
6"	600'	640'	Coarse Tan Sand	X	

RECEIVED
JUL 24 2002
WATER RESOURCES
WESTERN REGION

Completed Depth: 640' (Measurable)
Date: Started 6-19-02 Completed 6-20-02

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official _____ Date 7-16-02
Supervisor or Operator _____ Date 7/16/02
(Signature if Firm Official & Operator)

8L1262 - 771970

Inspect
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat : ' Long.

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. DRILLING PERMIT NO. - - - ____ ____ ____
Other IDWR No D0019345 CFS#1655
2. OWNER:
Name Williams Pipeline West
Address 5821 Industrial Way
City American Falls State ID Zip 83202
3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N
W X E
S

Twp. 1 North or South X
Rge 4 East X or West ☐
Sec. 23 1/4 SW/4 NW 1/4
(40 acres) (40 acres)

Gov't lot ____ County Elmore
Lat ____ : ____ Long: ____ : ____
Address of Well Site 3 miles South on Simco Rd.
City Mtn Home
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection X Other Cathodic
5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other ____
6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____
7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	18	1200 lbs	Overbore

Was drive shoe used? X Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y X N How? ____
8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8.625	+2	55	250	PVC	X	☐	X	☐
8.625	-50	500	362	Steel	X	☐	X	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____
9. PERFORATIONS/SCREENS
☐ Perforations Method ____
☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
Dry ft. below ground Artesian Pressure ____ lb
Depth flow encountered ____ ft Describe access port or control

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield Gal/min	Drawdown	Pumping Level	Time
N/A			

Water Temp. ____ Bottom hole temp ____
Water Quality test or comments: ____
Depth first Water Encountered ____
12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
12	0	2	Top Soil		X
12-10	2	152	Sand & Gravel		X
10	152	175	Gray Lava		X
10	175	195	Sand & Red Cinder		X
10	195	228	Gray Lava		X
10	228	300	Tan Sand		X
10	300	321	Tan Clay		X
10	321	340	Tan Sand		X
10	340	345	Tan Clay		X
10	345	400	Tan Sand & Gravel		X
10	400	422	Tan Clay		X
10	422	492	Tan Sand		X
10	492	506	Tan Sand		X

RECEIVED
NOV 26 2001
WATER RESOURCES
WESTERN REGION

Completed Depth: 500' (Measurable)
Date Started 10-26-01 Completed 10-30-01

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston & Son, Inc. Firm No. 35
Firm Official ____ Date 11-19-01
Supervisor or Operator ____ Date 11/21/01
(Signature if Firm Official & Operator)

63
26

Form 238-7
3-95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT 065952

Office Use Only
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: :

1. DRILLING PERMIT NO. 61 -97 -W -0033 -000
Other IDWR No.

2. OWNER:
Name Rick Millington
Address 8011 Ustick Rd.
City Boise State ID Zip 83704

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location

N / W / E / S

Twp. 1 North ☐ or South ☒
Rge. 5 East ☒ or West ☐
Sec. 6 1/4 (10 acres) NE 1/4 (40 acres) SW 1/4 (160 acres)

Gov't lot ____ County Elmore
Lat: : : Long: : :
Address of Well Site Baseline Rd
City Mayfield
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
bentonite	2	18	6	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	575	250	steel	☒	☐	☒	☐
8"	0	80	250	steel	☒	☐	☒	☐
					☐	☐	☐	☐

Leagth of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☐ Perforations Method
☐ Screens Screen Type

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
387 ft. below ground Artesian Pressure ____ lb
Depth flow encountered ____ ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min.	Drawdown	Pumping Level	Time
30		560	2 hrs.

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:
Depth first Water Encountered 455

12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temp.	Water Y	Water N
10"	0	1	brown top soil		☒
10"	1	3	brown clay		☒
10"	3	5	brown hardpan clay		☒
10"	5	20	brown sand		☒
8"	20	24	brown clay		☒
8"	24	60	brown clay & strips brown sand		☒
8"	60	114	white & brown soft granite		☒
8"	114	117	black granite		☒
8"	117	160	white & brown granite		☒
8"	160	175	brown granite chips		☒
8"	175	225	white & brown granite		☒
8"	225	338	brown clay		☒
8"	338	365	clear & white grnt. w/strips brn clay		☒
8"	365	402	brown fine sand		☒
8"	402	440	brn snad w/strips of clay		☒
6"	440	455	brown sandy clay		☒
6"	455	473	brown sand w/small gravel	☒	
6"	473	495	brown clay		☒
6"	495	528	brown sand & small gravel	☒	
6"	528	533	brown sandy clay		☒
6"	533	561	brown & white sand		☒
6"	561	566	light brown clay		☒
6"	566		gray sand	☒	

RECEIVED
SEP 11 1997
Department of Water Resources

RECEIVED
SEP - 4 1997
WATER RESOURCES
WESTERN REGION

Completed Depth: 387 (Measurable)
Date: Started 07-11-97 Completed 07-18-97

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name SOS Welldrilling & Pump Co Firm No. 212
Firm Official Brad Simmons Date 9-2-97
Supervisor or Operator Tony Kilgore Date 9-2-97
(Sign once if Firm Official & Operator)

Date: 08/22/97 Time: 4:11 PM

MICROFILMED
JAN 09 1998

Form 238-7
6/89

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name FRED T. & FRANCES E. SMITH
Address HC 34 SIMCO RD BOISE, ID 83706
Owner's Permit No. 61-90-W-002

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.125 inches	6 inches	+ 2 feet	431 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

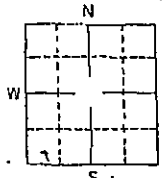
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 10' Material used in seal: ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☒ Temp. surface casing
☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld
☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Elmore
SW ¼ SW ¼ Sec. 18 T. 1 ☐ N ☒ S R. 5 ☐ W

7. WATER LEVEL

Static water level 334' feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow 5
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 58 °F. Quality Good
Describe artesian or temperature zones below

8. WELL TEST DATA

☐ Pump ☒ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
	0	2	SURFACE SOIL		
	2	8	DECOMPOSED GRANITE		
	8	190	D. 6. / CLAY		
	190	193	BOULDERS & SAND STONE		
	193	300	D. 6. / clay		
	300	307	D. 6.		
	307	334	D. 6. / CLAY		
	334	340	SAND / & WATER	✓	
	340	376	SAND / CLAY		
	376	380	SAND	✓	
	380	396	SAND / clay		
	398	400	SAND / water	✓	
	400	427	SAND / clay		
	427	431	SAND / WATER	✓	
	396	398	CLAY		

RECEIVED
APR 25 1990
Department of Water Resources

RECEIVED
APR 19 1990
Department of Water Resources

RECEIVED
APR 23 1990
Department of Water Resources
Western Regional Office

10.

Work started 6 FEB 90 finished 26 MAR 90

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name C&C Drilling Wtr. Well Firm No. 476
Address 12410 AIR BASE RD MTN HOME, ID Date 14 APR 90
Signed by (Firm Official) George A. Hawley
and
(Operator) _____

MICROFILMED
MAY 05 1992

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Appendix B

Excerpt from Harrington and Bendixsen (1999)

OPEN-FILE REPORT

GROUND WATER MANAGEMENT AREAS IN IDAHO:
OVERVIEW AS OF 1998

By
Helen Harrington
Shane Bendixsen

Idaho Department of Water Resources
Boise, Idaho

December 1999

INTRODUCTION

Introduction

The purpose of this report is to provide a summary of the current areas designated as Ground Water Management Areas (GWMA) and Critical Ground Water Management areas (CGWA). At present, there are 17 areas: eight CGWA and nine GWMA (Table 1 and Figure 2). This report is intended to provide a compilation of the current status of administrative actions and ground water level trends. Additionally, each section summarizes the general hydrogeology, current ground water level monitoring frequency, and a list of the primary reports and documents related to the area whether or not they are cited in the text.

This report is the first phase of a project to review, update and analyze data and develop recommendations for administration options for each management area. As you will note in the summaries, each area has unique characteristics, history, and impacts. Because of this uniqueness, data collection and management of each area must consider the localized aspects and develop individualized plans tailored to address the problems and issues of the area. These summaries will provide a foundation from which to build these plans.

The next phase will evaluate the technical aspects and activities within each area to determine the needs for additional data and follow up with updating or acquiring data. Water rights, land use changes, and other impacts will be analyzed. Water budgets and conceptual models will be developed for the most critical areas. The final phase of the project will develop recommendations for administrative and technical actions to alleviate ground water declines.

Statutory Authority

The authority for designating areas for regulating ground water withdrawals from aquifers subject to insufficient supplies was first granted in 1953 through amendments to Idaho's Ground Water Act. However, it was not until 1962 that the first CGWAs were designated in the Oakley Fan area. Amendments to the Act in 1982 granted authority for designating ground water management areas. The Grandview-Bruneau area, designated in 1982, was the first GWMA.

The Director of Idaho Department of Water Resources (IDWR) is granted the authority to designate "critical ground water areas" and "ground water management areas" under Idaho Code Title 42, Chapter 233a and 233b, respectively. These sections codify the definitions and bases for designating these special management areas.

A CGMA is all or part of a ground water basin that does not have sufficient ground water to provide a reasonably safe supply for irrigation or other uses at the current or projected rates of withdrawal. The Director of IDWR can deny an application for a proposed use if the point of diversion lies within the designated area and may require water users to report diversions or other information.

A GWMA is all or part of a ground water basin that may be approaching the conditions of a CGMA. Applications for new water appropriations may be approved only after it is

determined that sufficient supply is available and other prior water rights will not be injured. The director may require reporting of water use by water users within the area.

The Order designating the Southeast Boise GWMA in 1994 was the first time an advisory committee was required as a part of the initial formation of a GWMA. Since that time, orders requiring the formation of advisory committees have been issued subsequent to the initial formation of the management areas. These committees are to assist in the management of ground water resources through development of management plans, establishing processes for dispute resolution and acting as a forum for discussion and communication.

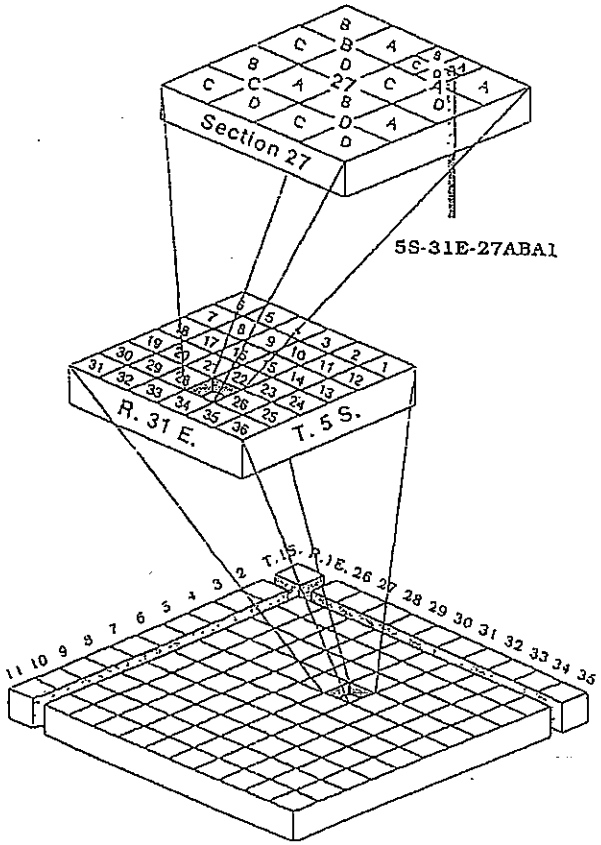
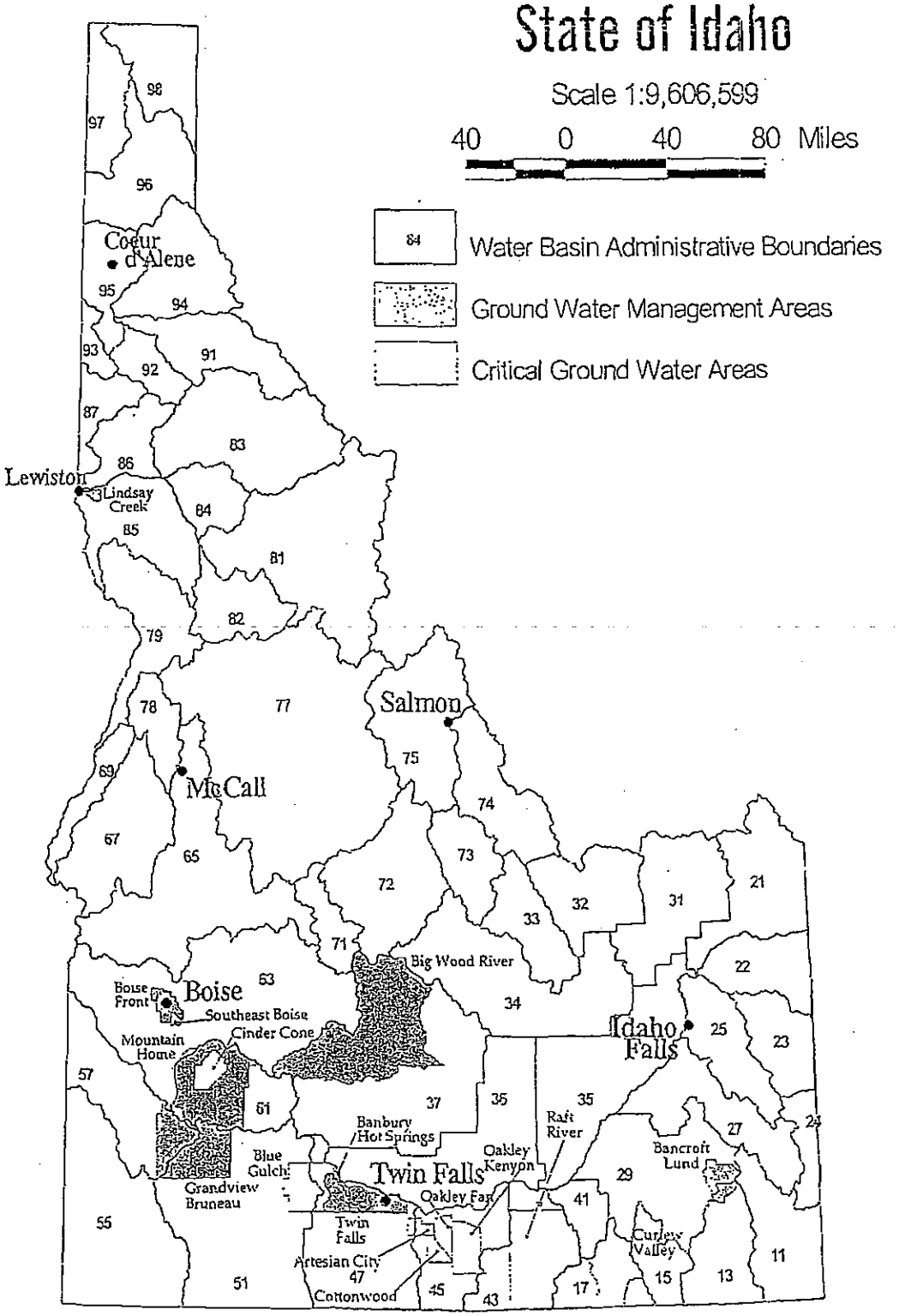


Figure 1: Well Numbering System

IDWR uses this well numbering system to indicate the location of wells within the Public Land Survey, as shown in the example above. The first two segments designate the township and range, the third section indicates the section. Quarter sections are designated by letters A,B,C, and D in counterclockwise order from the northeast quarter. Forty-acre and 10-acre tracts within each quarter section are lettered in the same manner. Well 5S-31E-27ABA1, for example, is in the NE1/4NW1/4NE1/4, section 27, Township 5 South, Range 31 East.

Management Area	Date Designated
CRITICAL GROUND WATER AREAS (CGWA)	
Blue Gulch	12/9/1970
Cinder Cone Butte	5/7/1981
Curlew Valley	3/15/1976
Oakley Fan	
Artesian City	1/16/1962
Cottonwood	1/16/1962
Oakley-Kenyon	1/16/1962
West Oakley Fan	1/19/1982
Raft River	7/23/1963
GROUND WATER MANAGEMENT AREAS (GWMA)	
Banbury Hot Springs	4/12/1983
Bancroft Lund	10/21/1991
Big Wood River	6/28/1991
Boise Front	6/15/1987
Grandview-Bruneau	10/29/1982
Lindsay Creek	3/5/1992
Mountain Home	11/9/1982
Southeast Boise	10/14/1994
Twin Falls	7/24/1987

Table 1: List of Critical and Ground Water Management Areas



slateg.wn.epr - SBT - 10/99

Figure 2

Mountain Home Ground Water Management Area and Cinder Cone Butte Critical Ground Water Area

Overview of Current Management Status

The Cinder Cone Butte area, located in Elmore County, was declared a CGWA on May 7, 1981 (Figure 20). Following the declaration, a study was conducted to evaluate the entire Mountain Home area. As a result of that study by Norton and others (1982), the Mountain Home GWMA, which surrounds the Cinder Cone Butte area, was designated on November 9, 1982. The Mountain Home GWMA is located in Elmore and western Ada counties. The areas were designated due to declining ground water levels.

New ground water appropriations are not allowed in the Cinder Cone Butte CGWA. The order declaring the Mountain Home area a GWMA states that the area is approaching critical, "although there appear to be subareas where new appropriations could be authorized without injuring existing water rights."

A management policy was not included in the designation of either area. On June 6, 1996, the Director issued an order establishing an advisory committee. The Committee has the following objectives:

a. Collect and review data;
b. Mediate water related issues involving water users;
c. Develop draft ground water management plan;
d. Develop and propose implementation of a ground water recharge program;
e. Serve as a forum for communication of water related issues.

The composition of the Committee is specified in the order. The Committee does not have any formal enforcement authority.

Hydrogeology

The Mountain Home area contains a regional aquifer system that flows west-southwest. Depth to water in the regional system is usually in excess of 300 feet. Two perched aquifer systems are found in the area: one system in the area in and around the City of Mountain Home, and another system northwest of Mountain Home in Township 2 South, Range 5 East (Young, 1977). Water in the perched areas range from a few feet to several hundred. Ground water flow direction is south to southwest.

Major geologic units in the area are, from youngest to oldest: 1) alluvium and terrace gravels; 2) Snake River Group; 3) Idaho Group; 4) Idavada Volcanics, and 5) Idaho Batholith. The regional aquifer is found primarily in the Bruneau Formation, a unit in the Idaho Group that consists of fluvial-lake deposits, layers of ash, and basaltic lava flows (Ralston and Chapman, 1968). Two northwest trending faults pass through the northeast part of the area (Bond, 1978). The perched aquifers occur primarily in the alluvium and terraces.

Recharge to the perched system in the Mountain Home area is from Rattlesnake and Canyon creeks, local irrigation, and leakage from Mountain Home Reservoir. Recharge to the perched system northwest of Mountain Home is from percolation from intermittent streams Recharge to the regional system occurs mainly from downward flow from the perched system, precipitation from the uplands and underflow from the north. It has been suggested that the regional system is quite old based on isotope composition (Young, 1977).

Current Conditions

Ground water levels in the regional system in the southern and eastern portions of the area near the Mountain Home Air Force Base show declines of more than 50 feet since 1968 (Figures 21 and 22). Steep declines occurred during the late 1960s and early1970s. Water levels appeared to stabilize in several wells during the mid 1970s and early 1980s. However, declines began again in the mid to late 1980s and have continued to present. In the northcentral part of the Cinder Cone Butte CGWA, water levels have declined as much as 50 feet since 1976. In the north and northwest parts of the area, ground water levels appear to be stable and have increased by as much as 3 to 4 feet since 1966.

The perched system in and surrounding Mountain Home fluctuates in response to seasonal and climatic cycles. Fluctuations can be as much as 50 feet. Overall water levels appear to be relatively stable based on data collected since 1975.

The IDWR monitors 15 wells on a monthly basis Prior to June 1998, these wells were monitored on a semi-annual basis. USGS monitors 9 wells, two semi-annually and seven bi-monthly. In November 1997, IDWR contracted for seven additional wells to be monitored on a monthly basis by a private consultant.

REFERENCES

Bendixsen, Shane, 1994, Summary of Hydrologic Conditions in the Mountain Home and Cinder Cone Butte Areas, IDWR Open File Report, 30 pages.

Castelin, Paul M., 1988, Review of Factors Affecting Ground-Water Levels in the Mountain Home Plateau Area Elmore and Ada Counties, Idaho, IDWR Open File Report, 5 pages.

Norton, Marc A., Ondrechen, William and Baggs, James L., 1982, Groundwater Water Investigation of the Mountain Home Plateau, Idaho, IDWR Open File Report, 62 pages.

Ralston, Dale R., and Chapman, Sherl L., 1968, Ground-Water Resource of the Mountain Home Area, Elmore County, Idaho, IDWR Water Information Bulletin No. 4, 63 pages.

Ralston, Dale R., and Chapman, Sherl L.,1970, Ground-Water Resource of Southern Ada and Western Elmore Counties, Idaho, IDWR Water Information Bulletin No. 15, 52 pages.

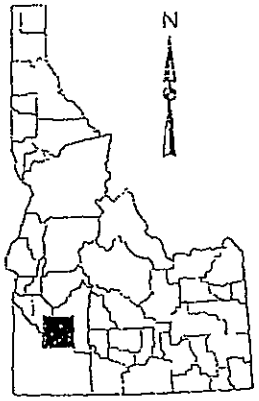
Young, H. W., 1977, Reconnaissance of Ground-Water Resources in the Mountain Home Plateau Area, Southwest Idaho, USGS Water-Resources Investigations 77-108, 40 pages.

Mountain Home

Ground Water Management Area

and Cinder Cone Butte

Critical Ground Water Area



Scale 1:493,190

4 0 4 Miles

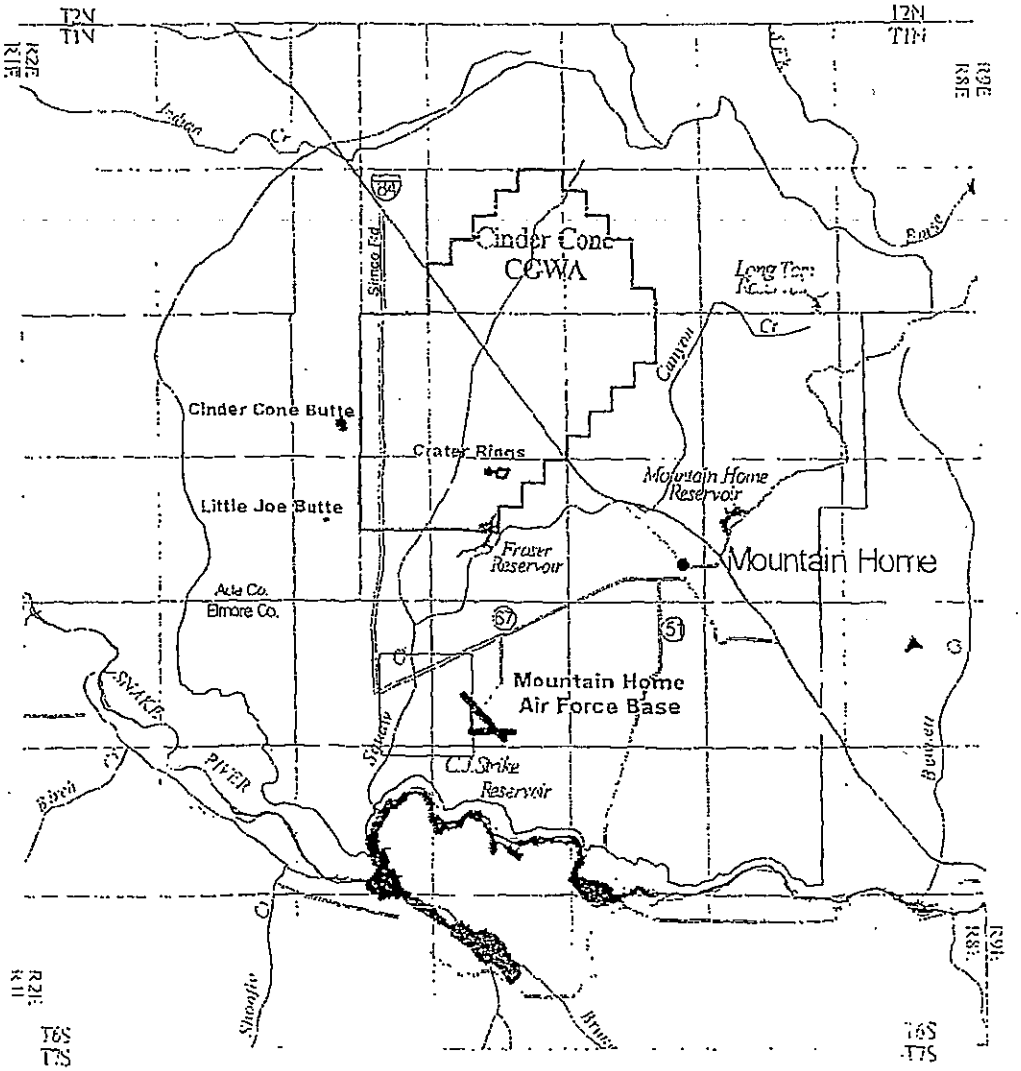
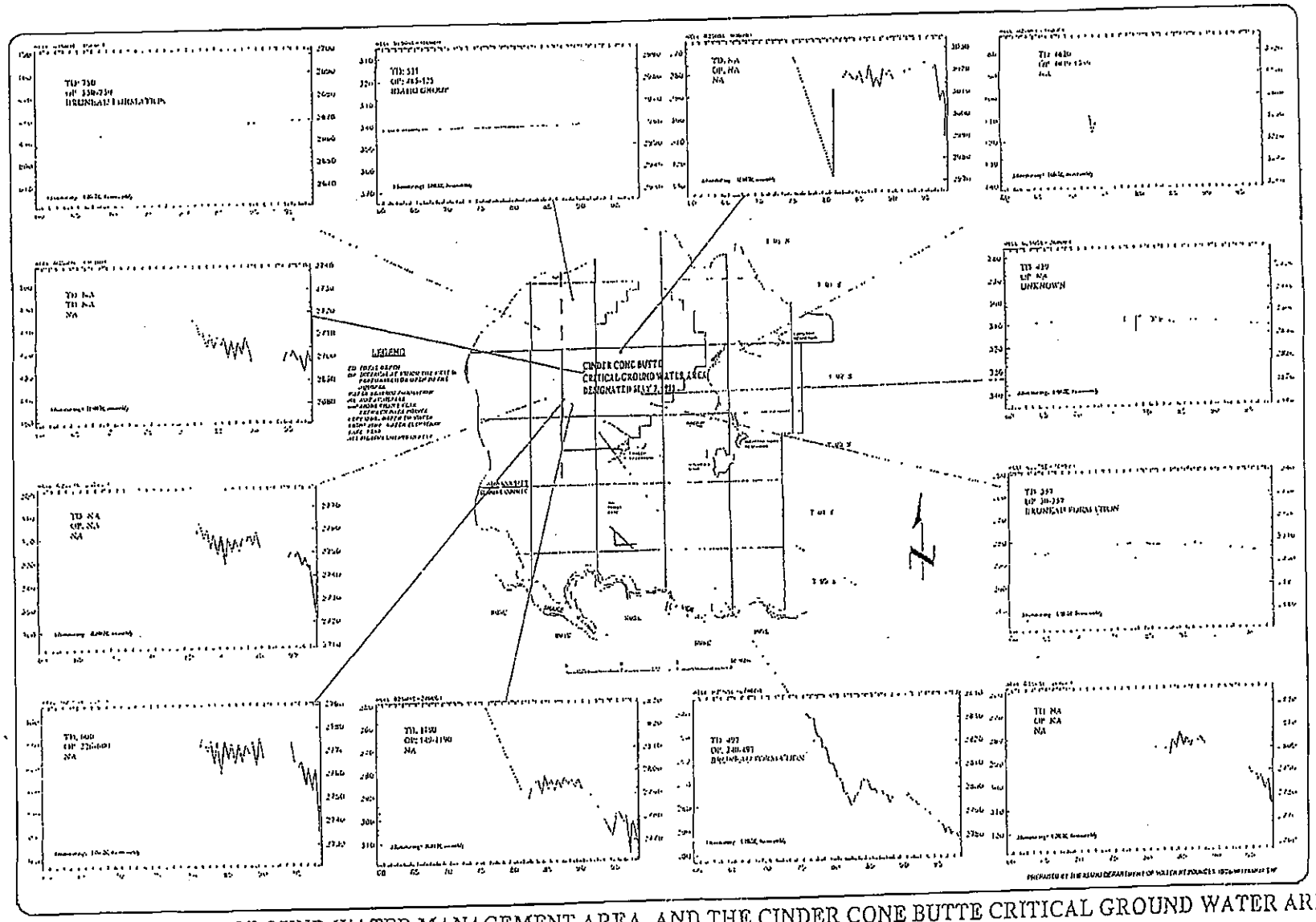


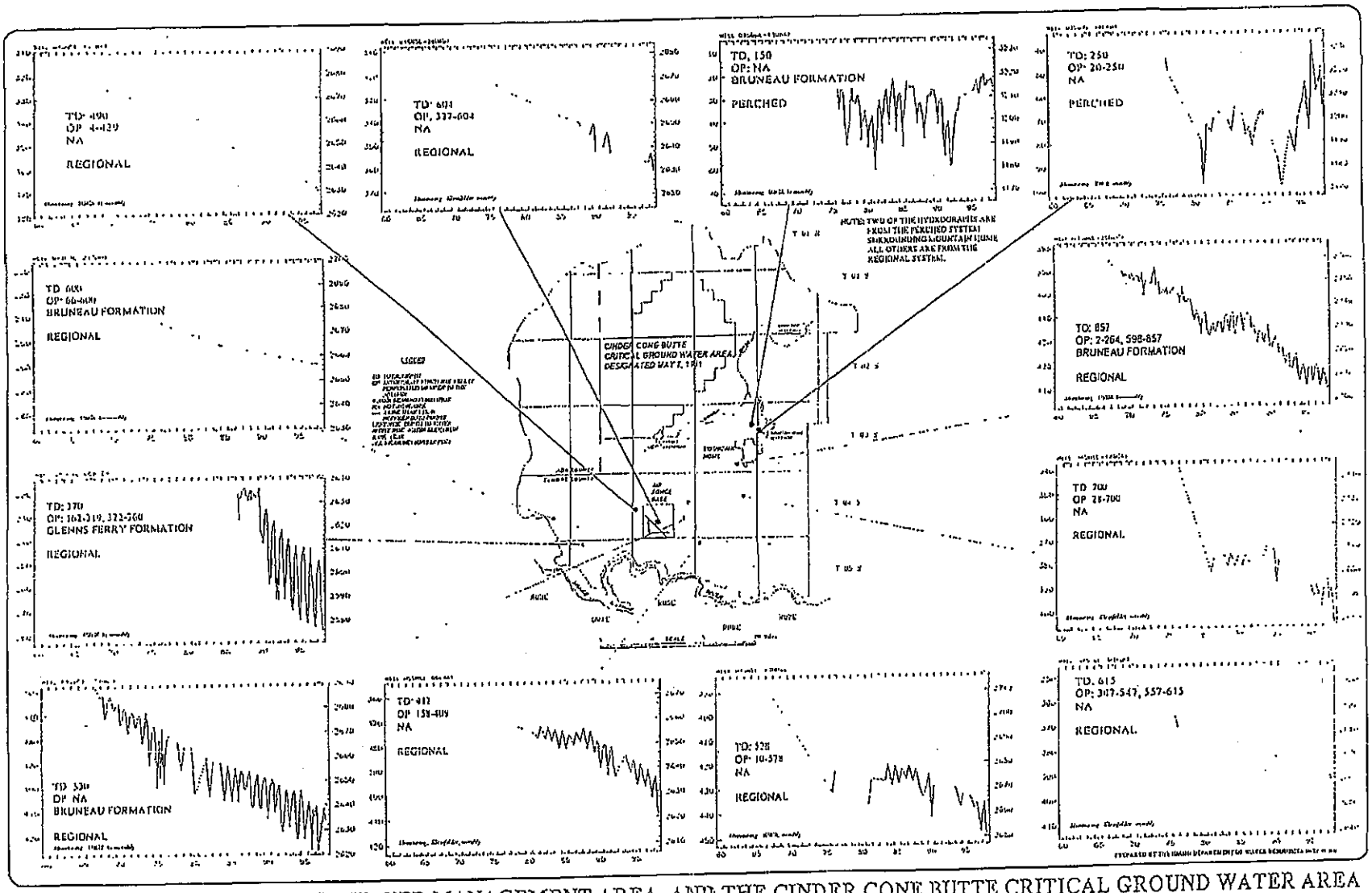
Figure 20



MOUNTAIN HOME GROUND WATER MANAGEMENT AREA AND THE CINDER CONE BUTTE CRITICAL GROUND WATER AREA

Ground Water Hydrographs - North Area

FIGURE 21



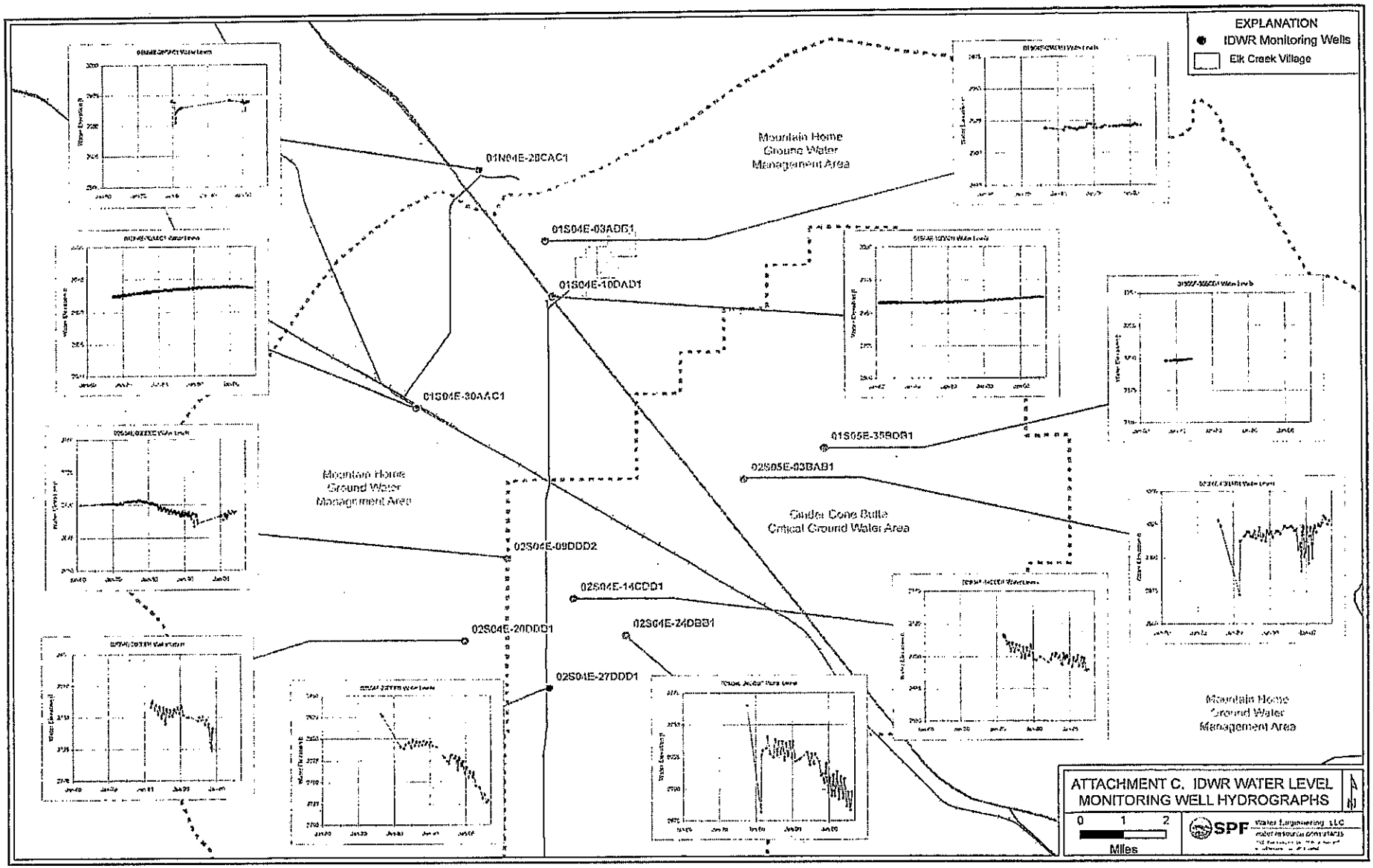
MOUNTAIN HOME GROUND WATER MANAGEMENT AREA AND THE CINDER CONE BUTTE CRITICAL GROUND WATER AREA

Ground Water Hydrographs - South Area

FIGURE 22

Appendix C

Well hydrographs


EXPLANATION
IDWR Monitoring Wells
Elk Creek Village
01N04E-28CAC1
01S04E-03ADD1
01S04E-10DAD1
01S04E-30AAC1
01S05E-35BDB1
02S05E-03BAB1
02S04E-09DDD2
02S04E-14CDD1
02S04E-20DDD1
02S04E-24DBB1
02S04E-27DDD1
Mountain Home
Ground Water
Management Area
Mountain Home
Ground Water
Management Area
Snake Cone Butte
Critical Ground Water Area
Mountain Home
Ground Water
Management Area
ATTACHMENT C. IDWR WATER LEVEL
MONITORING WELL HYDROGRAPHS
0 1 2
Miles
SPF Water Engineering, LLC

Appendix D

Final Report and Recommendations of Mountain Home Working Group

Expanded Natural Resources Interim Committee
Mountain Home Working Group

Final Report and Recommendations
Adopted December 6, 2004

INTRODUCTION

The Mountain Home Working Group has met on a regular basis since April to hear local concerns, discuss ground water conditions, and analyze strategies to address the issues and concerns specific to the Mountain Home area. After conducting the meetings, the Mountain Home Working Group Finds and Recommends as follows:

FINDINGS

1. The Mountain Home ground water budget is not in balance. Annual withdrawals of ground water are exceeding the average annual rate of natural recharge to the groundwater. IDWR studies show an annual deficit of approximately 30,000 acre-feet per year.

2. The regional aquifer is generally described as east of Indian Creek, west of Bennett Creek. The north boundary is below the foothills and the southern boundary is the rim of the Snake River Canyon. Two areas of significant ground water level declines can be geographically defined.

a. Ground water levels in the regional aquifer have declined as much as 70 feet during the last 35 years in an area roughly encompassing the City of Mountain Home, the Mountain Home Air Force Base, and surrounding agricultural lands.

b. Ground water levels in the regional aquifer have declined as much as 70 feet during the last 35 years in an area approximately 15 miles northwest of the City of Mountain Home, near Cinder Cone Butte.

c. There are areas of the Mountain Home Basin where underlying ground water levels in the regional aquifer have not declined significantly.

3. The areas of ground water decline are sufficiently separated by horizontal distance and the parallel direction of ground water flow that withdrawals of ground water from one area do *not* significantly impact water levels in the other area.

4. Opportunities for recharge or water savings in the Mountain Home Basin are limited.

a. All surface water in the basin is fully appropriated except for occasional short duration flood water flowing in some of the low elevation, south-facing streams. The volume of water that could be recharged to the regional aquifer by these occasional

flood flows is insignificant when compared to the deficient volume of water in the water budget.

b. Water for recharge or conversion of lands from irrigation with ground water to surface water could be delivered from the South Fork of the Boise River and its tributaries, Bennett Creek, or the Snake River. Very little unappropriated water remains in these streams, however, and any water delivered to the Mountain Home Plateau from these sources for recharge would probably have to be obtained by the acquisition of existing water rights.

c. Some surface water delivery losses could be saved through conservation efforts.

5. Irrigation (agricultural/domestic use) is responsible for an estimated 95% of ground water pumping. The number of acres irrigated on the Mountain Home Plateau must be reduced to balance the water budget.

6. Some proposed water uses are presently given preference over other proposed water uses. For instance, the Department of Water Resources will not approve new ground water right permits for irrigation but will approve new water rights for domestic or municipal users. Those seeking to use water for domestic use as defined by Idaho Code § 42-111 may obtain a drilling permit and may appropriate ground water by beneficially using the water without express approval by the Idaho Department of Water Resources.

ISSUES

The working group is particularly concerned about economic impacts of balancing the water budget. The working group expects growth in the Mountain Home area, and all recommendations must attempt to minimize negative impacts to the local economy.

Mountain Home Air Force Base contributes significantly to the area economy. With the U.S. Department of Defense in the process of restructuring and closing military bases around the country, it is essential to demonstrate sufficient water availability to satisfy the base's water needs.

Agriculture also contributes significantly to the economy and is a large component of the local tax base. Forced curtailment could impact an estimated 15,000 acres or one-half of the ground water irrigated acres. Drought, declining aquifer levels and rising electrical costs of high lift pumping may mean irrigators can no longer afford to pump. Agricultural users of ground water may be the first user group that cannot afford the cost of pumping water from deeper, declining water levels. Some of these ground water irrigators hold water rights bearing early priority dates. The prior appropriation doctrine cannot be compromised or weakened in any way. Water rights should not be made valueless by allowing water level declines to lower below reasonable economic pumping levels.

Holders of water rights for all uses of water must be subject to limitations on further water appropriation and must all participate in and reductions in use, curtailments, or mitigation to prevent such curtailment under the doctrine of prior appropriation.

The following options were discussed during working group meetings:

Agricultural set-aside programs (CREP, EQIP)
Local water projects
Low impact landscaping (and demonstration project)
Bennett Creek water importation
Storage increases in Little Camas and Long Tom Reservoirs
Determine and decrease reach losses in ditches and canals
Increase tunnel capacity
Seal or line canals

RECOMMENDATIONS

These recommendations are formulated from presentations and discussions.

1. Mountain Home Ground Water Advisory Committee. The committee has been meeting for over eight years and a recommended management plan has not been completed. The Working Group recommends that the committee complete and submit to IDWR a recommended management plan within 180 days starting January 1. 2005. The Working group has reviewed an existing draft plan prepared by the committee in 1998, and recommends the committee pursue revision and completion of this plan that is consistent with the following recommendations.

2. The Working Group recommends a net reduction of approximately 30,900 acre-feet per year in ground water withdrawals from the regional aquifer system to balance the water budget. Reductions in ground water withdrawal must be sufficient to arrest, or at least significantly slow the declines in water levels in the regional aquifer

3. The Working Group recommends that the Idaho Department of Water Resources reconsider the boundaries of the Mountain Home Ground Water Management Area and the Cinder Cone Butte Critical Ground Water Area, and redefine the boundaries of a areas for ground water management to match physical evidence of declining ground water levels and areas of water supply.

4. The Working Group recommends legislation that would authorize the creation of an umbrella aquifer management authority with broad authority for inclusion of ground water users, for implementing actions to address water shortages, and for equitably assessing all water users to finance the actions.

5. The Working Group recommends the legislature analyze the existing definition of domestic use in Idaho Code § 42-111 and the associated exclusion from the requirement

to apply for a water right contained in Idaho Code § 42-227 to determine need for revision.

6. The Working Group recommends the Director of the Idaho Department of Water Resources form a water district that includes the ground water rights in the Mountain Home area. While regulation should not be immediately contemplated by the creation, ground water users must measure and report their diversions of water to insure adherence to limitation of the water rights.

7. The Working Group recommends establishment of a Conservation Reserve Enhanced Program (CREP) for the state of Idaho. Some lands irrigated with ground water could be taken out of production through CREP, reducing the financial loss of nonagricultural production.

8. The Working Group recommends adoption of water conservation measures by local governments, including incentives for low water use landscaping.

9. The Working Group recommends the county and city evaluate the benefits of revisions to land use codes. Land use codes may be used to ensure water rights are transferred when lands are annexed. Revisions to land use codes could also restrict development of large lot acreage that may ultimately be irrigated illegally with ground water.

10. The Working Group recommends a one-time budget request in the amount of $100,000 to IDWR for installation of dedicated monitoring wells. Dedicated monitoring wells provide valuable and accurate data for evaluating the aquifer conditions and changes. Current monitoring network depends on existing wells that were drilled for various uses. Dedicated monitoring wells at key locations would add important data to the network. To obtain such wells, they would need to be installed at selected locations. Estimated cost for installing monitoring wells is $25-30 per foot; estimated cost for pressure transducer monitoring equipment is $1500. Estimated cost for a 600-foot monitoring well, with monitoring equipment would be $15,000-18,000. It is recommended that 5 wells be installed, with a total estimated cost of $75,000-$90,000.

11. The Working Group evaluated several projects during the course of meeting. A description and evaluation of these projects is attached at Appendix I. The Working Group recommends the following projects:

a. Conservation Reserve Enhancement Program (CREP)
b. Little Camas Canal PAM Study

Additional details about the projects, cost estimates, and cost comparisons can be found in Appendix I.

MEMO

State of Idaho
Department of Water Resources
322 E Front Street, P.O. Box 83720, Boise, Idaho 83720-0098
Phone: (208) 287-4800 Fax: (208) 287-6700

Date: February 24, 2009

To: Gary Spackman

From: Craig Tesch CT and Sean Vincent SV

cc: Steve Lester
Rick Raymondi
John Westra

Subject: Evaluation of aquifer recharge in areas of planned community applications along the I-84 corridor from Boise to Mountain Home

Per your request, we have conducted a preliminary evaluation of water availability in the vicinity of proposed housing developments along the I-84 corridor between Boise and Mountain Home. The basis of our evaluation is a review of the aquifer water budget presented in the USGS Professional Paper 1408-G entitled "*Geohydrology of the Regional Aquifer System, Western Snake River Plain, Southwestern Idaho*" (Newton, 1991).

As of October 9, 2008, there are a total of 11 pending water right applications for planned communities along the I-84 corridor with a total combined appropriation of 172 cfs. Many of the proposed developments overlap the Mountain Home Ground Water Management Area (GWMA). Additionally, several of the developments are within five miles of the northern boundary of the Cinder Cone Critical Ground Water Area (CGWA), which has experienced significant water level declines since 1976 (Figure 1).

As discussed in our review of the water supply evaluation report accompanying the Mayfield Townsite water right application (Attachment 1), there is considerable uncertainty in the amount of water available for appropriation in the area of proposed development. Although there is uncertainty, it can be concluded based on available data that aquifer recharge is limited in the surrounding area, as evidenced by two nearby GWMAs and one CGWA; aquifer mining is a possibility if proposed development proceeds. Our previous review confirmed the finding that "*The ultimate ground-water supply in the Mayfield area is limited*" (SPF, 2007, p. 28).

EXHIBIT 4

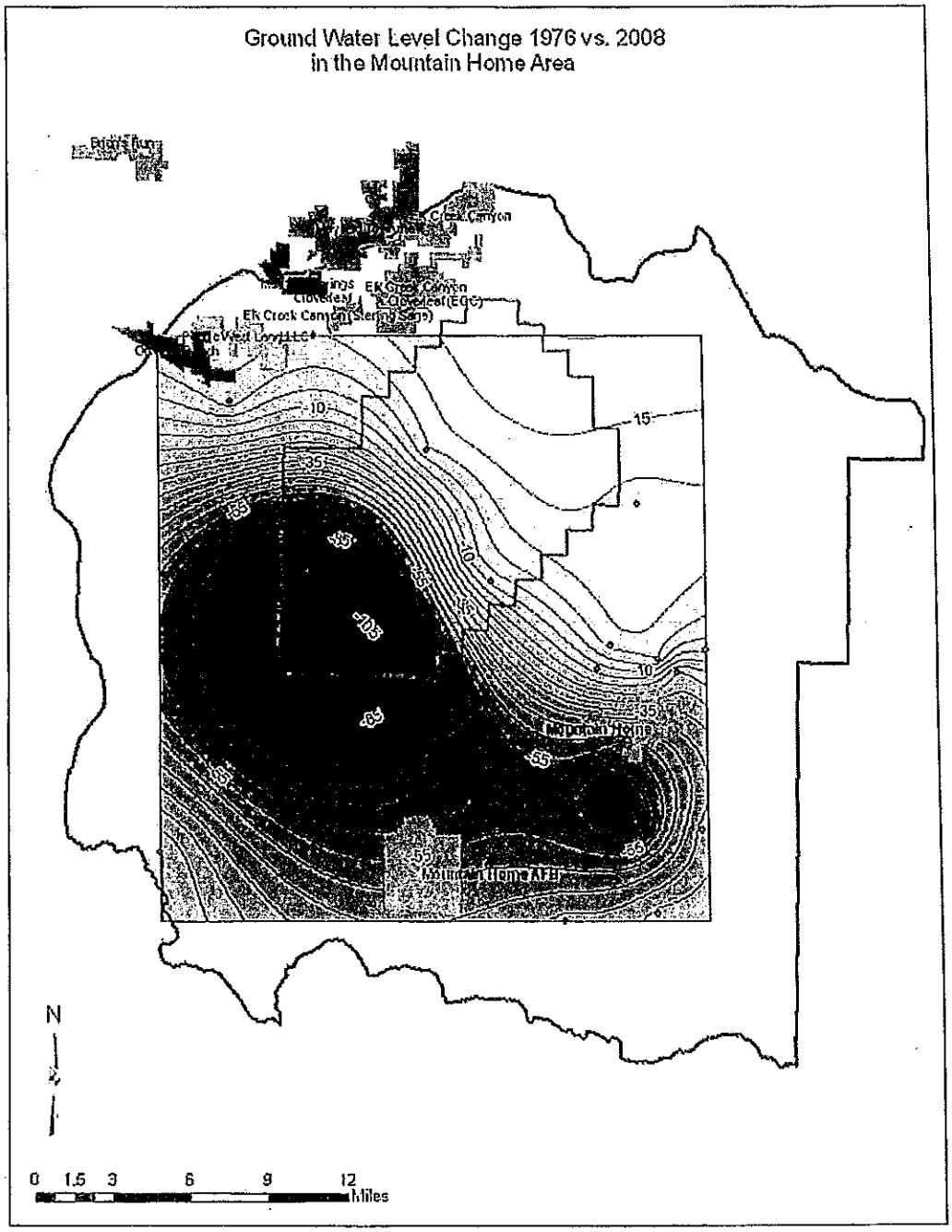


Figure 1. Ground water level change in the area of proposed development along the I-84 corridor. The Cinder Cone CGWA is outlined in red and the Mountain Home GWMA is outlined in black. Water levels are kriged with a contour interval of five feet.

To provide an evaluation of aquifer recharge on a larger scale, this memo presents components of a ground water budget that was developed by the USGS for a three-dimensional ground water flow model of the western Snake River Plain (Newton, 1991). The modeling domain was divided into a network of cells, each two miles on a side, with the entire model grid broken up into 11 subareas based on geologic and hydrologic characteristics (Figure 2). Subareas four and eight are the focus of this evaluation, contain the bulk of the proposed developments along the I-84 corridor, and cover an area of approximately 400,000 acres.

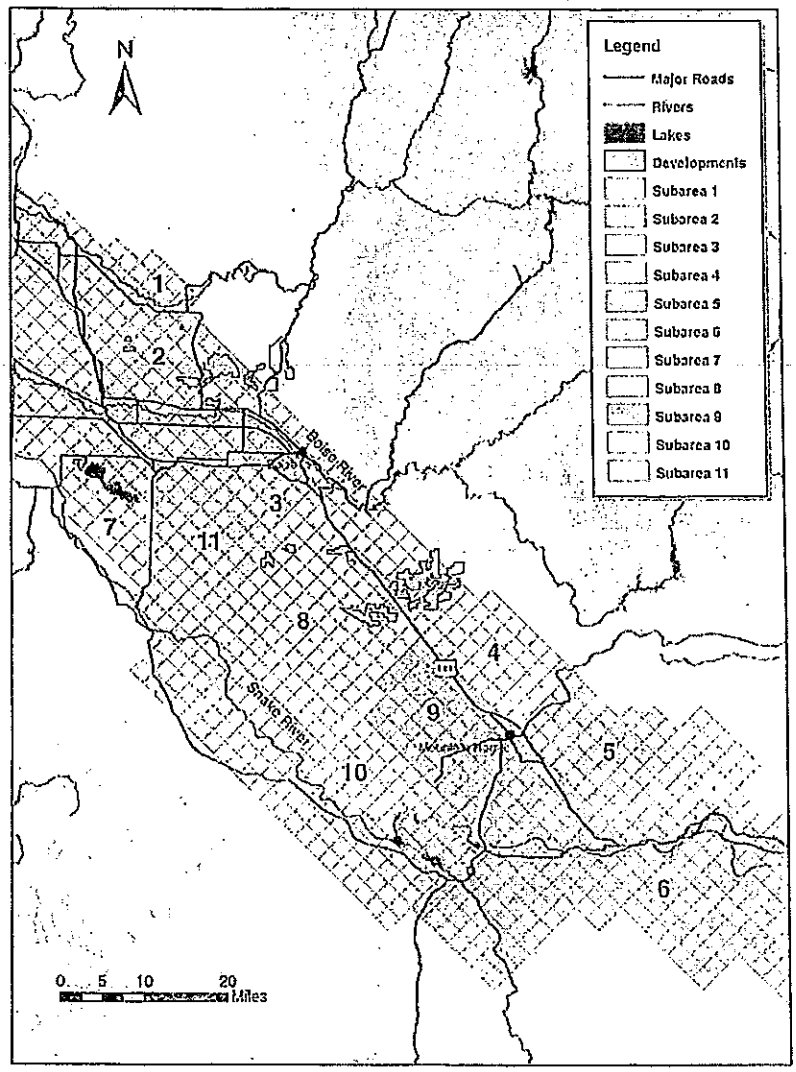


Figure 2. USGS western Snake River Plain model subareas and proposed community developments.

Evaluation of 1980 Water Budget

The USGS prepared a water budget using 1980 data for a three-layer model of the western Snake River Plain aquifer system (Newton, 1991). Identified recharge sources include infiltration from surface water irrigation, tributary underflow from surrounding aquifers, and recharge from precipitation. Primary discharge components are discharge to rivers and drains, and consumptive use from ground water pumping. Some budget estimates have a range of uncertainty and are not well defined due to a lack of hydrologic data, particularly tributary underflow, which was simulated in the model using constant flux boundaries. It is unknown what effect this and other water budget uncertainties will have on determining the amount of water available for appropriation.

Recharge

The three major recharge components of the USGS water budget for the western Snake Plain Aquifer are:

- Recharge from precipitation
- Infiltration from surface water irrigation
- Tributary underflow

Tables of estimated ground water recharge from precipitation and surface water irrigation were provided in the USGS report and are presented for subareas four and eight in Table 1 below.

Average recharge from precipitation on the plain was estimated by the USGS to be two percent of the annual precipitation. The total estimated recharge from precipitation for model subareas four and eight during 1980 was 7,200 acre-feet (10.0 cfs).

The USGS estimated 13.8 ft^3/sec (cfs) of surface water irrigation recharge for subareas four and eight combined. Some of the major sources of surface water irrigation include Indian Creek, Slater Creek, Dry Creek, Ditto Creek, and Rattlesnake Creek.

Table 1. Western Snake River Plain Aquifer recharge and discharge estimates for 1980 in USGS model subareas four and eight.

Model Subarea	Total Area (acres)	(1) Recharge from Precipitation (cfs)	(2) Recharge from Surface Water Irrigation (cfs)	(3) Net Pumpage (Consumptive Use) (cfs)	Net Recharge without Tributary Underflow [(1)+(2)-(3)]
4	207,360	7.5	13.8	9.8	11.5
8	184,320	2.5	0	3.9	-1.4
Total	391,680	10.0	13.8	13.7	10.1

The USGS model utilized 1980 Landsat imagery from a previous study (Lindholm and Goodall, 1986) to estimate irrigated acres within each subarea. Estimated recharge to the aquifer from irrigation was then calculated using U.S. Bureau of Reclamation recharge rates.

Analysis of satellite imagery suggests that in 2000 there were approximately 8,000 fewer surface water irrigated acres in the model subareas than there were in 1980 (Table 2). Assuming a proportional reduction in the recharge from surface water irrigation, the surface water irrigation recharge estimate is reduced from 13.8 cfs for 1980 to 1.4 cfs for 2000 (Table 3).

Potential explanations for the apparent reduction in irrigated acres from 1980 to 2000 include: (1) implementation of Crop Reduction Programs (CRP) in 1985, (2) conversion of acres from irrigated agriculture to dry-land farming, and (3) removal of irrigated land from production.

Table 2. Irrigated acres in subareas four and eight for 1980 and 2000.

Model Subarea	1980 Irrigated Acres			2000 Irrigated Acres		
	Ground Water	Surface Water	Total	Ground Water	Surface Water	Total
4	2,800	8,700	11,500	248	770	1,018
8	2,900	100	3,000	3,574	123	3,697
Total	5,700	8,800	14,500	3,822	893	4,715

The tributary underflow component of the water budget has a large range of uncertainty and is not well defined due to a lack of hydrologic data. In fact, the USGS report states that underflow was estimated from the water budget because "*almost no data are available to estimate underflow*" (p. G-15).

Based on our literature review, data for quantifying underflow into the western Snake River Plain Aquifer with confidence are still lacking. A report documenting a model of groundwater flow in the Treasure Valley (Petrich, 2004), for example, concludes "*The rate and spatial and vertical distribution of underflow into the valley and into the model domain is highly uncertain*" (p. 107). Although relevant, the water budget from the more recent modeling effort was not used for this analysis because the model domain includes only a portion of the area of interest.

In qualitative terms, it is considered unlikely that granitic rocks of the Idaho batholith, which typically are relatively impermeable, provide significant underflow to the aquifer system represented by model subareas four and eight. This conclusion is supported by the fact that the water supply evaluation report accompanying the Mayfield Townsite water

right application considers underflow from the Idaho batholith negligible and does not include it as a component of their water budget (SPF, 2007, p. 27).

Volcanic rocks are mapped adjacent to the granite pluton along the valley margin south and east of Mayfield, however. These formations generally are more permeable than granite and, as such, are considered more likely to be a significant source of underflow to the area of interest.

The occurrence of both granitic and volcanic rocks adjacent to model subarea four is not unique; the same geologic units are mapped adjacent to subareas seven and ten, which are located on the opposite side of the western Snake Plain (see Plate 1 and Figures 16 and 17 in Newton, 1991). Constant flux boundaries were also used to represent underflow into these two subareas.

In the absence of better information, Petrich (2004) assumed that underflow was uniformly distributed along the valley margin. Adopting the same approach, an underflow estimate for the area of interest was derived from the USGS model budget by multiplying the total underflow across model boundaries during 1980 (310,000 acre-feet) by the ratio of the number of constant flux cells in subarea four divided by the total number of constant flux cells in the model. The resulting rate (55.4 cfs) is approximately 13% of the total and conceptually includes underflow from granitic and volcanic rocks along the valley margin as well as surface water recharge from the Danskin Mountains.

Note that this recharge estimate (55.4 cfs) includes underflow not only to the shallow aquifer system (layer 1 in the USGS model) but also underflow to sedimentary and volcanic rocks simulated with model layers 2 and 3, which extend to a total depth of more than 10,000 feet. Limited vertical hydraulic communication between the shallow and deep aquifer systems would tend to make the underflow estimate based on the USGS water budget high in the context of evaluating hydrologic impacts resulting from withdrawals in the shallow aquifer system.

As identified in Table 3 below, total recharge from precipitation and surface water irrigation [(1) + (2)] into subareas four and eight is 11.4 cfs. Total recharge including underflow [(1) + (2) + (5)] is 66.8 cfs.

Discharge

The two major discharge components of the regional USGS water budget for the western Snake Plain aquifer are:

- Discharge to rivers and drains
- Consumptive use from ground water pumping

Ground water discharge to rivers and drains was a major component of analysis within the entire Western Snake Plain model domain; however, there are no return flows in the project area of this memo.

Using power consumption records for individual wells, the USGS estimated 13.7 cfs of net ground water pumpage (consumptive use) for subareas four and eight for 1980 (Table 1). An updated estimate of consumptive use (16.7 cfs) was developed by IDWR GIS staff by analysis of METRIC (Mapping Evapotranspiration at high Resolution and with Internalized Calibration) data that was collected in 2000 (Table 3).

At a more localized scale, the rate of groundwater flow exiting the two subareas is unknown and cannot be accurately quantified without running the model.

Table 3. Western Snake River Plain recharge and discharge estimates for 2000 in subareas four and eight using METRIC analysis.

Model Subarea	Total Area (acres)	(1) Recharge from Precipitation (cfs)	(2) Recharge from Surface Water Irrigation (cfs)	(3) METRIC ET estimate (cfs)	(4) Net Recharge without Underflow [(1)+(2)-(3)]	(5) Underflow (cfs)	(6) Net Recharge with Underflow [(4)+(5)]
4	207,360	7.5	1.2	2.9	5.8	55.4	61.2
8	184,320	2.5	0.2	13.8	-11.1	-	-11.1
Total	391,680	10.0	1.4	16.7	-5.3	55.4	50.1

Net Recharge

Ignoring tributary underflow, a net recharge of negative 5.3 cfs is calculated for 2000 by subtracting aquifer withdrawals (16.7 cfs) from total recharge from precipitation and surface water irrigation (11.4 cfs). If underflow (55.4 cfs) is considered, the net recharge into the model subareas is 50.1 cfs. Either way, groundwater outflow from the subareas is ignored and the total appropriation amount for the 11 pending water right applications (172 cfs) greatly exceeds the estimated net recharge for 2000. Assuming similar conditions in future years, the total appropriation amount also greatly exceeds the "*reasonably anticipated rate of future natural recharge*" (Idaho Code §42-237a.g.), which according to IDAPA 37.03.11 includes precipitation, underflow from tributary sources, stream losses, and incidental recharge of water used for irrigation and other purposes.

Conclusions

The following conclusions are based upon our review of the 1980 water budget for a model of the western Snake River Plain Aquifer presented in the USGS Professional Paper 1408-G and an updated 2000 METRIC analysis:

1. The USGS water budget was published in 1991 using data collected in 1980. There is uncertainty in individual water budget components and how changes in land and water use practices have changed the water budget since 1980. The collection of new data in an upcoming hydrogeologic characterization program will help refine the water budget for the area of proposed development.

2. USGS estimates of recharge from surface water irrigation and consumptive use were updated herein through an analysis of satellite imagery and METRIC evapotranspiration data for 2000. The other water budget components (i.e., recharge from precipitation and inflow from the Danskin Mountains) are as originally estimated using 1980 data.

   Based on National Weather Service precipitation data from the Boise Airport weather station, 1980 was an above average water year (15.2 inches total precipitation versus the average of 12.2 inches) and 2000 was an average water year (12.0 inches precipitation). NRCS Snow Course data for Mores Creek Summit shows an above average snow pack on April 1, 1980 (39.6 inches versus the average of 34.6 inches) and a below average snow pack on April 1, 2000 (30.7 inches). The impact of using an above average year (1980) for determining recharge from precipitation and inflow from the Danskin Mountains is to overestimate recharge relative to what might be expected in an average year.

3. Ignoring underflow, the net recharge for subareas four and eight is negative 5.3 cfs. If underflow is considered, net recharge increases to 50.1 cfs for the subareas. Both estimates ignore groundwater outflow from the subareas as this rate is unknown and it is not a component of the "*reasonably anticipated rate of future natural recharge*" (Idaho Code §42-237a.g.). The negative 5.3 cfs estimate arguably is more meaningful for evaluating impacts to the resource if the rate of ground water outflow approaches the modeled rate of underflow (55.4 cfs).

4. The total combined appropriation for the 11 pending water right applications for planned communities along the I-84 corridor (172 cfs) greatly exceeds the range of estimates for net recharge in 2000 (-5.3 to 50.1 cfs). Assuming similar conditions in future years, the total appropriation amount also greatly exceeds the "*reasonably anticipated rate of future natural recharge*".

5. Several of the proposed developments are within five miles of the Cinder Cone CGWA, which has experienced significant water level declines since 1976. The analysis in the attached IDWR memo suggests that the proposed ground water development could exacerbate conditions in the Cinder Cone CGWA and Mountain Home GWMA and cause significant declines locally.

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Lindholm, G.F., and Goodell, S.A., 1986. Irrigated acreage and other land uses on the Snake River Plain, Idaho and eastern Oregon: U.S. Geological Survey Hydrologic Investigations Atlas HA-691, scale 1:500,000.

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Petrich, C.R., 2004. Simulation of Ground Water Flow in the Lower Boise River Basin. Idaho Water Resources Research Institute Research Report IWRRI-2004-02. 130 pp.

SPF Water Engineering, 2007. Ground-Water Supply Evaluation for the Mayfield Townsite Property. November 1. 30 pp.

Attachment

February 10, 2009 IDWR Memo from
D. Owsley and S. Vincent to S. Lester

MEMO

State of Idaho
Department of Water Resources
322 E Front Street, P.O. Box 83720, Boise, Idaho 83720-0098
Phone: (208) 287-4800 Fax: (208) 287-6700

Date: February 10, 2009

To: Steve Lester, Western Regional Office

From: Dennis Owsley and Sean Vincent, Hydrology Section, State Office

cc: Rick Raymondi and John Westra

Subject: Evaluation of SPF Report entitled *Ground-Water Supply Evaluation for the Mayfield Townsite Property*

Introduction

Per your request, we have reviewed the subject report in order to evaluate potential impacts to the aquifer from Water Right Application 63-32499 for the appropriation of 10 cfs of ground water from up to eight wells in the Mayfield, Idaho Area. The proposed Mayfield Townsite development comprises approximately 8,000 homes within a 6,363 acre area (SPF, 2007). The property overlaps the northern edge of the Mountain Home Ground Water Management Area (GWMA) and is approximately 3.5 miles northwest of the Cinder Cone Critical Ground Water Area (CGWA).

Total projected water use is 4,860 acre-feet, 2,240 acre-feet for domestic purposes and 2,620 acre feet for irrigation (SPF, 2007, p. ii). Assuming 1,120 acre-feet of domestic effluent will be treated and re-used for irrigation, the net annual consumptive use is approximately 3,960 acre-feet, which is equivalent to an average annual rate of 5.5 cfs. The maximum demand for the 8,000-home development is estimated to be 21.1 cfs. This demand would be met by combining the maximum rate of diversion for water right 63-32499 (10 cfs) with 4 cfs ground water under water right 63-123447, 5 cfs of reclaimed domestic wastewater, and, when available, up to 2.57 cfs of surface water under water right 63-2046.

According to the SPF report, the proposed wells would extend to depths ranging from 600 to over 800 feet, with static water levels ranging from approximately 300 to 600 feet below ground surface (p. v). SPF describes the aquifers that underlay the Mayfield Townsite as "*layers of unconsolidated sediments and volcanic materials*" (p. iii). The hydrogeology of the area is poorly characterized at present but it is targeted for study as part of the recently authorized Aquifer Planning and Management program.

In accordance with your request, we attempt to address the following questions at the conclusion of our review:

1) Does the study describe possible impacts this water right will have on the aquifer? If so, are those impacts significant?

2) Does the study describe possible impacts this water right and water right 63-32225 will have on the aquifer? If so, are those impacts significant?

3) What is the probability of the 10 cfs diversion rate from this right causing the borders of the Mountain Home Ground Water Management Area to migrate and/or change?

4) What is the probability of the 10 cfs diversion rate from this right and the 10 cfs diversion rate from 63-32225 causing the borders of the Mountain Home Ground Water Management Area to migrate and/or change?

5) Does this study show that mining of the aquifer will not occur and that there is sufficient proof of the long-term sustainability of the water supply for this project?

IDWR Review of SPF Report

The SPF report includes a water budget for the "*contributing basins*" and an evaluation of historic water level data. Selected aspects of the SPF report are described in the following sections in order to provide a framework for our assessment of potential impacts to the aquifer.

Contributing Basins

SPF uses the term "*contributing basins*" to refer to the portion of the Indian Creek watershed that may provide recharge to "*aquifers in the project area*" (p. 19). The area that defines the contributing basin for ground water (also referred to by SPF as the "*ground water capture area*") was arbitrarly selected. The need for SPF to identify a potential recharge area stems from the fact that a recharge area must be defined in order to calculate the annual volume of recharge entering the aquifer. In other words, an aquifer water budget cannot be prepared without first defining the extent of the aquifer.

There are multiple aquifers/aquifer layers in the project area and they are of unknown thickness and lateral extent. This hydrogeologic uncertainty makes it difficult for SPF (and IDWR) to quantify the "*reasonably anticipated average rate of future natural recharge*" (Idaho Code, Section 42237a.g.).

In the absence of a well-developed hydrogeologic conceptual model, the contributing basin was arbitrarily assumed by SPF as a two-mile buffer from each of the proposed wells. The area is truncated by the geologic contact between the granitic uplands and the basin geologic units (Figure 1). SPF's resulting capture area encompasses approximately

27,500 acres (SPF, 2007, p. 19). Even though arbitrary, the 2-mile capture area presented by SPF is one estimate of the recharge area for the aquifer of interest.

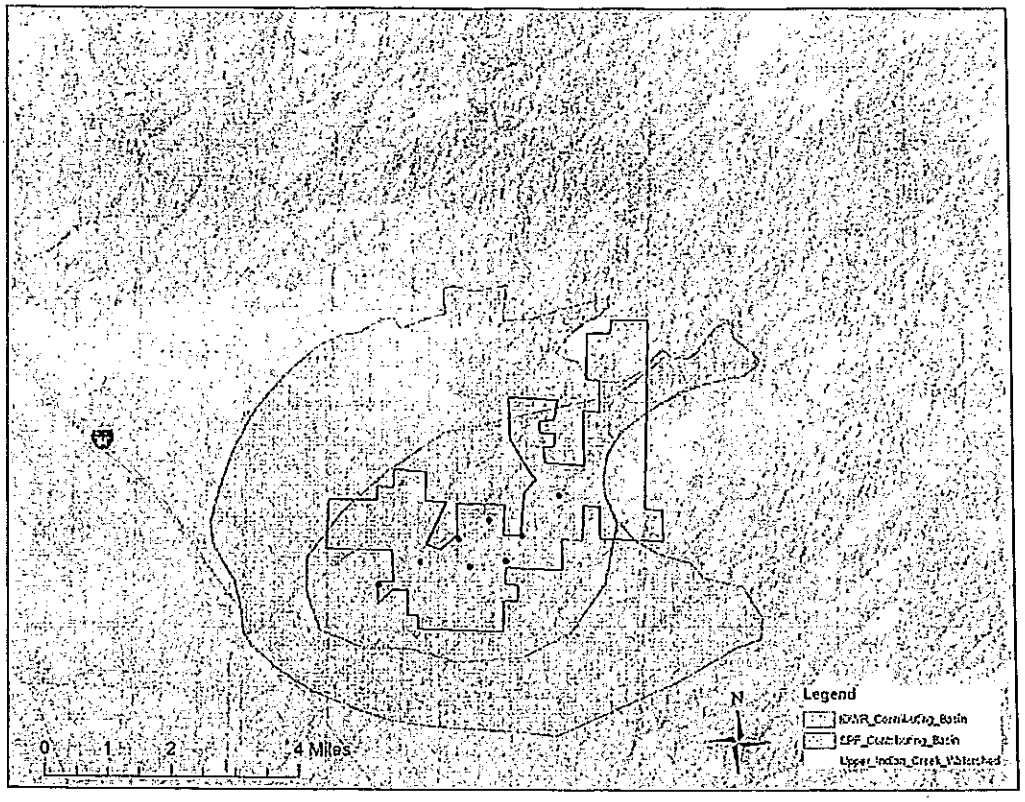


Figure 1. SPF and IDWR areas of interest. The proposed Mayfield Townsite development is outlined in black.

For purposes of comparison, we delineated the geometry of the hydraulic capture zone for the proposed well field using the analytic element model WhAEM (EPA, 2007). We assumed a hydraulic conductivity of 17 ft/day (5.9×10^{-3} cm/sec) and an aquifer thickness of 200 feet based on a transmissivity estimate of 25,000 gpd/ft, which is presented in the SPF report based on a well test performed on the ARK irrigation well (p. 13). The ARK well is located centrally within the Mayfield Townsite and is completed in the aquifer that is proposed for development in this water right application. The ARK well is 622 feet deep and has open intervals from 432 to 462, 468 to 478, and 542 to 552 feet below ground surface. Other required model input includes the rate of areal recharge, and the steady-state production rate for the production wells. Based on the USGS modeling effort for the western Snake River Plain (Newton, 1991), a uniform areal recharge rate of 0.5 in/yr was used, which is equivalent to 3% of the approximate average annual precipitation over the project area (16.5 in/yr) as determined by PRISM data (IDWR, 2008). Lastly, a steady-state production rate of 308 gpm was used at each of the eight diversion locations that are identified on the SPF figure that accompanies the permit application. This production rate is equivalent to SPF's estimate of the average

consumptive use for the development (5.5 cfs, p. ii), equally distributed among each of the eight proposed wells.

As shown in Figure 1, the resulting 10-year hydraulic capture zone is considerably smaller (18,000 acres) than the "*contributing basin for aquifers in the project area*" (p. 19) that was assumed in the SPF analysis (27,500 acres). The area delineated by IDWR is similar to the area assumed by SPF in the fact that the 10-year travel time was selected arbitrarily. Although actual pumping rates and aquifer properties were used in defining the area, hydraulic gradients and aquifer boundary conditions were not included in the modeling process. Therefore, the resultant area represents the theoretical area in which the production wells would withdrawal water from a flat, infinite aquifer in a 10-year timeframe.

However, the drawdown values that were predicted through the IDWR delineation of the recharge area are not arbitrary. The drawdown values were calculated using the presented transmissivity and estimated pumping values and the ground water gradient and storage coefficient do not influence the predicted drawdown under steady state conditions. The maximum model-predicted drawdown is 130 feet and the drawdown at the northwest boundary of the Cinder Cone CGWA is 81 feet.

It's worth mentioning that hydraulic communication between the Mayfield Townsite sedimentary aquifer system and the basalt aquifer in the Cinder Cone CGWA possibly is limited by a fault system that runs along I-84 (Figure 2). The fault system may act as a barrier to flow based upon our preliminary evaluation of available water level data. Assuming that the fault system serves as a partial or complete barrier to flow, the WhAEM-based drawdown estimates are too low for the portions of the management areas that are north of the highway and too high for areas that are south of the highway.

Upper Indian Creek Watershed
Although not part of the "*contributing basin*" for ground water, precipitation on the upper Indian Creek Basin is an aquifer inflow term for the water budget that SPF developed in order to evaluate the amount of water available for appropriation. The underlying assumption is that, if not evapotranspired, all precipitation on the granitic uplands ends up recharging the aquifer that is proposed for development. The contributing area of the Upper Indian Creek watershed is approximately 15,630 acres.

Average Rate of Future Natural Recharge
SPF's report presents estimates of the average future natural recharge and compares these volumes to existing and proposed aquifer withdrawal amounts in order to evaluate whether total withdrawals, including the proposed new water right, would exceed the "*reasonably anticipated rate of future natural recharge*" (Section 42-237a.g., Idaho Code). SPF acknowledges that "*the ultimate carrying capacity of aquifers in the Mayfield Townsite area is unknown*" (p. 28) and presents a range of recharge estimates to account for this uncertainty. SPF's recharge estimates are described below.

High Estimate
The "*high estimate*" of average future aquifer recharge was calculated by subtracting the annual average evapotranspiration (ET) from the average annual precipitation for the combined area that includes the ground water capture area and the granitic uplands within the upper Indian Creek watershed. All of the precipitation that is not evapotranspired is assumed to recharge the aquifer, either as infiltration or surface water seepage. In this case, the distinction between infiltration and surface water seepage is of no consequence as both water budget components contribute to the amount of water that is available for appropriation.

Evapotranspiration (ET)
SPF assumed that a preliminary SEBAL (Surface Energy Balance Algorithm for Land) estimate of the ET during the 2000 growing season (March 15, 2000 to October 15, 2000) for rangeland in the Boise River Valley (9.5 inches; Morse et al., 2003) applies to the Indian Creek watershed. SPFs estimate of ET for the combined area that includes the ground water capture area and the upper Indian Creek watershed is 34,140 acre-feet.

SEBAL is geared toward estimating ET on irrigated lands. (Morse et al., 2003, p. 2). Not surprisingly, the coefficient of variation (i.e., the standard deviation divided by the mean) for this satellite-based ET estimation technique is much higher for rangeland than for agricultural lands. In other words, there is more uncertainty associated with a SEBAL-derived estimate for rangeland as compared to a SEBAL-derived estimate for irrigated cropland. In addition, the SPF estimate only includes ET rates for the growing season (April through October). ET that occurs during the non-growing season would tend to make the SPF estimate too low.

Based on consideration of the above and a discussion with one of the authors of the SEBAL ET study (Kramber, 2008), our estimate of ET for the Indian Creek watershed is based on ET Idaho data. Using ET Idaho data for the years 1904 to 2004, the annual ET for the IDWR area of interest is 34,656 acre-feet. On a per area basis, the ET Idaho-based estimate is higher than the SEBAL-derived value. The discrepancy between these ET rates suggests that there is considerable uncertainty in the ET estimates.

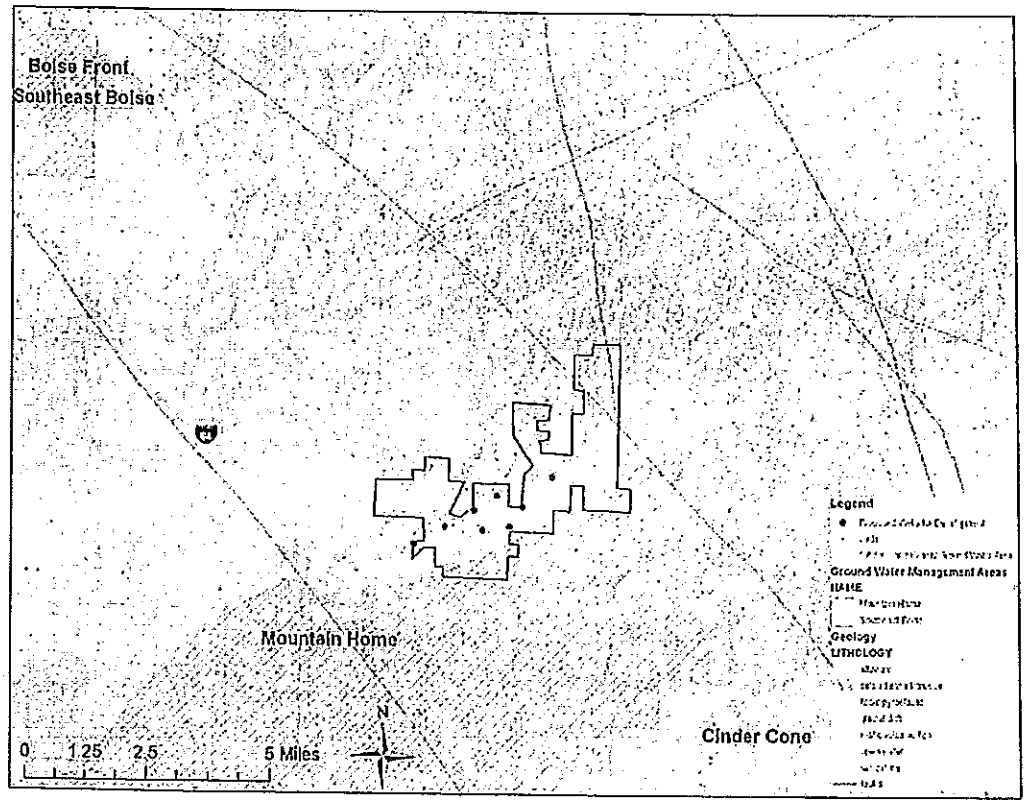


Figure 2. Map showing the location of the proposed project site (black outlined area) in relation to ground water management areas.

SPF's high estimate of annual recharge is 31,590 acre-feet. The corresponding IDWR estimate is 12,761 acre-feet (Table 1). As discussed previously, the ET rates on a per area basis also are different but the difference in the high recharge estimates is primarily attributable to the difference in size of the contributing areas.

In developing the high estimate, SPF assumed that all precipitation in the combined area that does not infiltrate or is not lost to ET becomes surface runoff and all surface runoff ends up recharging the aquifer system that is proposed for development. Although we make the same assumption for comparison purposes, we are concerned that this simplifying assumption would tend to overestimate recharge to the relatively deep aquifer layers that are targeted for production. Recharge would be overestimated, for example, if not all of the surface runoff seeped into the ground within the capture area or if some of the infiltration was to overlying water bearing zones with limited hydraulic communication to the target layers.

Table 1. Comparison of High Aquifer Recharge Estimates

Water Budget Component	Annual Volume (acre-feet) SPF	Annual Volume (acre-feet) IDWR	Comments
Precipitation in combined area (upper Indian Creek watershed + ground water contributing basin)	65,730	47,417	Differences due primarily to differences in size of the combined areas (Figure 1). For the SPF estimate, Sheep Creek and Caldwell Creek watershed precipitation is included.
Evapotranspiration in combined area	34,140	34,656	SPF used SEBAL estimates of ET. IDWR estimate is based on ET Idaho data. The values are similar, but the area calculated for the IDWR estimate is significantly smaller than the area SPF estimated.
High aquifer recharge estimate	31,590	12,761	Precipitation minus ET in combined area.

Low Estimate
The so-called "low estimate" of average aquifer recharge is a more conservative and, in our opinion, more defensible number as it relies upon field observations and measurements of flow in order to quantify surface channel seepage into the aquifer instead of just assuming that it's the difference between precipitation and the estimate of ET. The method for estimating each recharge component is described below.

Infiltration
Five percent of the precipitation that falls within the ground water contributing basin was assumed by SPF to recharge the aquifer as infiltration. This arbitrary percentage is higher, however, than the only known published estimate for recharge in this area, 3%, which was used by the USGS as input for their model of western Snake Plain Aquifer (Newton, 1991).

Surface Channel Seepage
Seepage from Indian Creek is, in fact, a significant and known source of recharge to the aquifer as all flow infiltrates between the Mayfield area and Interstate 84 under non-flood conditions. The volume of water that is contributed to the aquifer from the Indian Creek watershed was assumed by SPF to be the total annual flow in Indian Creek.

There are very few historical flow data available for Indian Creek. The USGS measured flows of 1.66 and 0.6 cfs in February and June of 1954, respectively. A site visit in March of 2005 by SPF provided an opportunity to observe flows in Indian Creek. Based on field observations during the March of 2005 site visit, a flow of 8 to 10 cfs was estimated. SPF suggests that the observed flow was less than typical for this time of year, owing to cool basin temperatures (p. 24). An average flow of 20 cfs was presented by SPF as an estimate of the runoff rate in Indian Creek.

The SPF report calculated the volume of water that recharges the aquifer from Indian Creek as follows: 20 cfs was assumed as the average runoff rate for a three-month spring runoff period (3,689 acre-feet). In addition, a temporary 3-day flow of 100 cfs (595 acre-feet) was included in the water budget to account for rain-on-snow events in the Indian

Creek watershed. The flow in Indian Creek was considered negligible for the remainder of the year. The total seepage from Indian Creek was estimated by SPF at 4,200 acre-feet. Note that the 20 cfs average runoff and the 100 cfs peak flow were not based on field measurements.

Due to the lack of data, IDWR measured the flow in Indian Creek with a FlowTracker® Handheld ADV® (Acoustic Doppler Velocimeter) eight times over the course of a 16-week period (3/08-6/08) at the Mayfield bridge. The flow measurements are presented in Table 2.

Table 2. Indian Creek ADCP Measurements.

Date	Flow (cfs)
3/12/2008	7.4
3/27/2008	11.8
4/03/2008	6.6
4/18/2008	9.0
4/23/2008	7.7
5/05/2008	3.9
5/27/2008	1.9
6/13/2008	0.4

With average to above average snow pack conditions in the Indian Creek watershed this year (2008), we consider the measured flow rates in Indian Creek to be representative of a typical runoff season. However, based on the hydrograph for Cottonwood Creek (USGS Station 13204640), a creek north of Boise that drains a basin of similar physical characteristics (elevation, vegetation, slope, aspect, weather conditions), the runoff season is considerably longer than 3 months A continuous record of flow in Cottonwood Creek was available for the same period (March-June) as our field measurements. The flow rates are remarkably similar for the period of overlapping measurements (Figure 3). As such, and because the Cottonwood Creek drainage experiences similar weather and has similar physical characteristics, the early season Cottonwood Creek flow data were used to extrapolate the flow data for Indian Creek. The resulting estimated runoff volume for Indian Creek is 2,065 acre-feet for a runoff season that lasts 7 months (Table 3). This is a considerably longer runoff season than the 3-month season that was assumed by SPF.

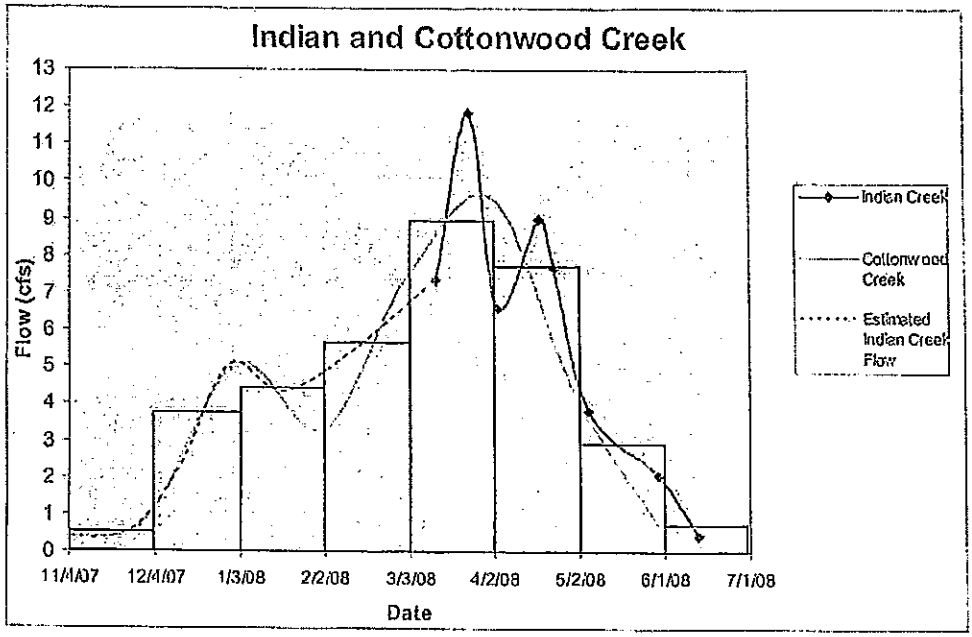


Figure 3. Hydrographs of Indian Creek and Cottonwood Creek. The runoff volume in Indian Creek was estimated by summing the areas of the shaded rectangles. Cottonwood Creek hydrograph was downloaded from http://waterdata.usgs.gov/nwis/sw.

Based on field observations, the three day temporary flow rate of 100 cfs that SPF included in the water budget was excluded from the IDWR estimate. Coarse sand deposits can be observed along the entire length of the channel down to Indian Creek Reservoir, indicating that not all of the surface flow seeps into the aquifer within the capture area during high flow events.

Table 3. Comparison of Low Aquifer Recharge Estimates

Water Budget Component	Annual volume (acre-feet) SPF	Annual volume (acre-feet) IDWR	Comments
Precipitation in ground water contributing basin	37,180	14,633	SPF assumed arbitrary 2-mile buffer for the ground water contributing basin. IDWR contributing basin was delineated with analytic element model.
Areal infiltration in assumed ground water contributing basin	1,860	439	SPF estimated infiltration as 5% of the precipitation in the SPF ground water contributing basin. Based on USGS model, IDWR estimated infiltration as 3% of the precipitation in the IDWR ground water contributing basin.
Indian Creek seepage	4,200	2,065	SPF estimate based on a single field observation of flow during 2008 runoff season and estimate of additional flow volume from rain-on-snow events. IDWR estimate based on eight flow measurements during 2008 run-off season and extrapolation of data using hydrograph for a similar, nearby watershed.
Low aquifer recharge estimate	6,060	2,504	Indian Creek seepage plus areal infiltration.

Aquifer Outflow
SPF identifies two aquifer outflow components: 1) withdrawal by wells, and 2) underflow to the Snake River (p. 26). They estimate that the annual discharge to currently permitted wells, including 1,815 acre-feet for wells under permit 63-32225, is approximately 2,627 acre-feet. The SPF report does not include an estimate for underflow to the Snake River, however, and this aquifer outflow component is not considered in the water budget that is used to determine the amount of water that is available for appropriation. Although this approach is consistent with statutory guidelines which specifically requires consideration only of the "*reasonably anticipated rate of future natural recharge*" (Idaho Code, Section 42-237a.g.), failing to consider all aquifer outflow components makes the so-called "*water budget*" incomplete and effectively precludes evaluation of the potential for water level declines.

Prior to February of 2007, the annual discharge rate from ground water wells for the "*contributing basin for aquifers in the project area*" was 812 acre-feet. In February of 2007, water right 63-32225 was approved that authorized an additional 1,815 acre-feet to be withdrawn annually. The inclusion of water right 63-32225 increased the annual withdrawal from the area by more than 300%. The points of diversion for water right 63-32225 are for a proposed development that is within one mile of the borders for the subject property for this application. Assuming an average annual project demand of 3,956 acre-feet (SPF, 2007, p. 6), the approval of application 63-32499 would result in a total annual withdrawal within the capture area of 6,583 acre-feet, which, in combination with water right 63-3225, represents an increase of over 800%.

Summary
The results of the SPF and IWDR analyses indicate the annual average recharge volume for the capture area ranges from 2,504 to 31,590 acre-feet. SPFs range of aquifer recharge estimates is higher than the corresponding IDWR range of estimates. Differences in the estimates are due to differences in the underlying assumptions. The most significant differences are as follows:

1) The method of estimating the area of ground water capture. The SPF water budget is based on the assumption of an arbitrary two-mile capture area for each of the production wells. This approach significantly increases the area in which recharge is assumed to be available for the production wells, resulting in a higher recharge volume. The corresponding IDWR water budget is based upon delineation of the 10-year capture area using data that was provided by SPF concerning the hydrogeology in the area, the rates of withdrawal, and the geometry of the proposed well field. The more conservative IDWR approach substantially reduces the size of the aquifer recharge area, resulting in a lower volume.

2) The method for estimating ET (affects only the high estimate of aquifer recharge). SPF assumed that a preliminary SEBAL-derived estimate for rangeland in the Boise River Valley during the 2000 growing season also applies to the Indian Creek watershed. Because SEBAL is better suited for estimating ET on irrigated

cropland and because a preliminary, partial season ET for a different basin is unlikely to be representative of the average annual value in the Indian Creek watershed, IDWR used the average ET for the Indian Creek watershed based on ET Idaho data for the years 1904 through 2004.

3) The rate of infiltration. SPF used a 5% infiltration rate that is not supported by any documentation. The IDWR estimate is based on the assumption that infiltration is 3% of total precipitation, which is the same assumption that was made by the USGS for the project area in their model of the western Snake River Plain aquifer (Newton, 1991).

4) The average annual volume of Indian Creek seepage (only affects the low estimate of aquifer recharge). The SPF low average annual recharge estimate is based on a visual estimate of runoff and an assumed peak flow with no supporting flow measurements. The IDWR estimates are based on eight flow measurements during a relatively normal water year (2008), and extrapolation of the flow at other times based on the runoff pattern in a nearby drainage of similar elevation.

Because of uncertainty in the magnitude of aquifer recharge, there also is considerable uncertainty in the amount of water that's available for appropriation. Estimates of the available amount ranges from slightly negative to a large multiple of the estimated project demand. The slightly negative value indicates the aquifer has already been fully appropriated and suggests that additional ground water development could cause significant water level declines. On the other hand, a positive value implies that the recharge rate for the area exceeds the current rate of withdrawal and that there is water available for appropriation. Both possibilities are considered plausible given our current, albeit limited, knowledge about the hydrogeologic setting.

As previously discussed, SPF's high estimate of annual average aquifer recharge (31,590 acre-feet) is not supported by field measurements and, because it relies upon a preliminary, relatively uncertain estimate of ET for a partial year in a different basin, potentially grossly overestimates the amount of water available for appropriation Our estimates using more conservative assumptions indicate the amount of water currently available for appropriation ranges from -123 to 10,134 acre-feet per year (Table 4).

Table 4. Comparison of Water Budget Estimates

Water Budget Component	Annual Volume (acre-feet) SPF	Annual Volume (acre-feet) IDWR	Comments
High recharge estimate	31,590	12,761	Areal infiltration seepage plus the estimated infiltration in ground water contributing basin.
Low recharge estimate	6,060	2,504	Indian Creek seepage plus estimated infiltration in ground water contributing basin.
Current discharge to wells	2,627	2,627	Sum of historical diversions (812 acre-feet) and 1,815 acre-feet associated with W.R. 63-32225.
High estimate of water available for appropriation	28,963	10,134	High recharge estimate minus current discharge to wells.
Low estimate of water available for appropriation	3,433	-123	Low recharge minus current discharge to wells.
Mayfield Townsite Project demand	3,956	3,956	Average annual consumptive use.

Summary of Water Levels

SPF indicates that most water levels in the Mayfield area are either stable or slightly rising (SPF, 2007, pgs. ii, v, and 13). This conclusion is based on IDWR monitoring well data for 16 wells within a 10 mile radius of the development. However, only three of these wells have monitoring data through 2007. Of these three wells, two appear to have increasing trends and the third well appears to be experiencing a declining trend (Figure 4).

It is agreed that the general water level conditions in the Mayfield area are stable or slightly increasing. However, the significance of this trend should not be overemphasized, as it has been shown that the aquifer in this area has historically not experienced significant withdrawal volumes. A significant increase in ground water use in the area has the potential to create declining water levels, similar to those experienced in the Cinder Cone Critical Ground Water Area.

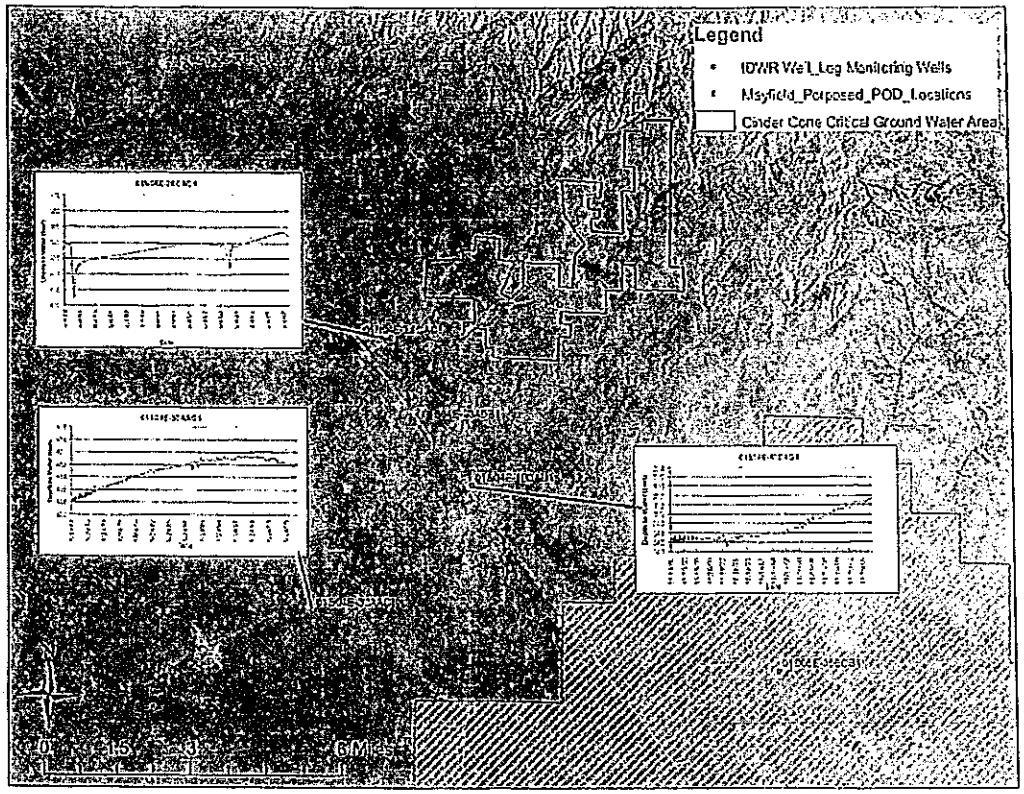


Figure 4. Water levels in three wells near the Mayfield area with current monitoring data.

Response to Questions

1) Does the study describe possible impacts this water right will have on the aquifer? If so, are those impacts significant?

The SPF report asserts that the aquifer can most likely support an additional withdrawal of approximately 3,960 acre-feet per year without significantly impacting the aquifer. However, our analysis indicates that this assertion is not warranted given the magnitude of the proposed aquifer withdrawal increase (>800% since February 2007) and the current level of uncertainty in the water budget. In addition to uncertainty regarding quantification of individual water budget components, there exists considerable uncertainty regarding the hydrogeologic conceptual model. Additional aquifer characterization is required in order to evaluate potential impacts and to assess their significance.

Although there is considerable uncertainty, it can be concluded that aquifer recharge is limited in the surrounding area, as evidenced by the existence of two nearby GWMAs and one CGWMA, and caution is warranted in approving water rights based both upon SPF and IDWR calculations of recharge. These calculations indicate that the proposed

water right possibly would result in total withdrawals exceeding the average rate of recharge to the aquifer. In addition, the stream flow data that IDWR collected suggests that the low estimate of aquifer recharge presented by SPF is unrealistically high assuming that all other assumptions are correct. Lastly, SPF's high estimate of annual average aquifer recharge is not supported by field measurements and, because it relies upon a preliminary, relatively uncertain estimate of ET for a partial year in a different basin, potentially grossly overestimates the amount of water available for appropriation

2) *Does the study describe possible impacts this water right and water right 63-32225 will have on the aquifer? If so, are those impacts significant?*

The SPF report does not specifically address the possible impacts that water right 63-32225 will have on the aquifer other than including the withdrawal volume in their calculation of the amount of water that's available for appropriation. According to SPF, no significant impacts are anticipated from either water right. However, our analysis suggests that the approval of water right 63-32225 quite possibly caused the water resource to be fully allocated. Moreover, our ability to predict the impacts from additional aquifer withdrawals is poor because of hydrogeologic uncertainty and it can only be accomplished after the fact based on evaluation of long-term water level monitoring data.

3) *What is the probability of the 10 cfs diversion rate from this right causing the borders of the Mountain Home Ground Water Management Area to migrate and/or change?*

The project site is located along the western edge of the Mountain Home Ground Water Management Area, approximately 3.5 miles northwest of the Cinder Cone CGWA, and approximately 8.5 miles from the Southeast Boise Ground Water Management Area (Figure 2). Detailed information concerning the hydrogeologic setting in the Mayfield Townsite area is not presented in the SPF report, but the climate and geology in these management areas are similar to the climate and geology within the project area. In the absence of evidence to the contrary, the aquifer proposed for development is assumed to be in hydraulic communication with the aquifers in the management areas. Moreover, our modeling indicates significant water level drawdown at the boundaries of both the Mountain Home GWMA (~130 ft) and the Cinder Cone CGWA (~ 80 ft). Although there is uncertainty in these predictions, drawdown values of this magnitude suggest that the boundaries of both management areas possibly would need to be expanded as the result of a large ground water diversion at the Mayfield Townsite.

4) *What is the probability of the 10 cfs diversion rate from this right and the 10 cfs diversion rate from 63-32225 causing the borders of the Mountain Home Ground Water Management Area to migrate and/or change?*

Currently, water levels in the area appear stable, but the anticipated total average annual withdrawal that would result from approval of both 63-32225 and 63-32499 (~6,580 acre-feet) represents an approximate 800% increase in the amount of water being

withdrawn from aquifers in project area since February of 2007. There is insufficient data at the present time to support the assumption that these new stresses on the aquifer will not negatively impact the management area. Additional monitoring of the water table under the increased use from 63-32225 needs to be completed before a final assessment of the impacts can be made. If monitoring indicates that water level declines are significant, then it may be justified to expand the boundaries of the management area to include the study area.

5) *Does this study show that mining of the aquifer will not occur and that there is sufficient proof of the long-term sustainability of the water supply for this project?*

Based on their calculations of aquifer recharge, SPF concludes that there is additional water available for appropriation in the Mayfield Townsite area. However, our calculations using the same methodology with different assumptions suggest that the aquifer possibly has been fully appropriated already and that additional withdrawals could cause mining of the aquifer (i.e., more or less permanent declines in aquifer water levels). Both conclusions are premised on numerous assumptions and involve considerable uncertainty, however. Failing to account for aquifer outflow in the water budget is a potentially significant omission which precludes our ability to evaluate the long-term sustainability of the water supply.

Due to hydrogeologic uncertainty, the estimated aquifer recharge was presented as a range. The estimated average annual project demand (3,956 acre-feet) exceeds the lower end of the recharge range as estimated both by SPF and IDWR. Currently, data does not exist in this area to be able to determine with confidence whether the aquifer can handle the additional withdrawals being proposed.

On-going monitoring needs to be completed and water levels need to be analyzed in order to assess the impacts from pumping under water right 63-32225. Additional allocations may be warranted if water levels remain stable or if additional information is developed which indicates that aquifer withdrawals will not exceed the reasonably anticipated future rate of natural recharge. Collection of hydrogeologic data which would help to make this determination will be the focus of an upcoming hydrogeologic characterization program.

<u>Conclusions</u>

SPF has done an admirable job of attempting to quantify and compare current and proposed future aquifer withdrawals to aquifer recharge in the project area. They describe and attempt to quantify most, but not all, components of the water budget in the "*ground water capture area*". They acknowledge that "*The ultimate ground-water supply in the Mayfield area is limited*" (p. 28). They also acknowledge that there is uncertainty in their estimates of aquifer recharge and, accordingly, they present a range of aquifer recharge estimates. Because of hydrogeologic uncertainty, the boundaries of the ground water capture area were arbitrarily assumed, however, and SPFs range of estimated aquifer recharge varies by a factor of five. Moreover, our Indian Creek flow measurements

suggest that SPFs low estimate of recharge is unrealistically high assuming all other assumptions are correct.

The *Ground-Water Supply Evaluation* shows that there is a potential for mining of the aquifer to occur if aquifer development proceeds and the actual recharge rates are in the lower part of the range of recharge estimates. Given the large amount of uncertainty, the probability of this occurring is unknown and it seems prudent for the department to monitor the impacts of recently approved water right 63-32225 prior to allowing an additional increase of nearly 200% in the annual withdrawal rate within the SPF capture area. Sequentially approving applications for several large water rights without first collecting and evaluating monitoring data to evaluate the impacts of the first water right on aquifer water levels is unadvisable given the existence of two GWMAs and once CGWMA in the surrounding area and uncertainty that exists concerning the long-term sustainability of the resource.

As recommended by SPF, monitoring of aquifer water levels should be ongoing prior to and during water resource development and the data should be incorporated into IDWRs upcoming aquifer characterization study. SPF opines that "*As with many aquifers, the best way for determining ultimate ground-water availability is to begin development while carefully monitoring ground-water level responses*" (p. 28). This, in fact, is what IDWR has done in authorizing and beginning to monitor the impacts of permit 63-32225. Approval at this time of another large ground water appropriation would not, in our opinion, allow for "*carefully monitoring ground-water level responses*".

In addition, well-to-well impacts have not yet been evaluated. Multiple domestic wells exist in the area of the proposed development with the potential to be impacted by large-scale production wells. Specific details regarding aquifer characteristics, well completion, and aquifer withdrawals needs to be provided by the applicant in order to assess the potential impacts to existing wells in the area.

References

Freeze, R.A. and J.A. Cherry, 1979. Groundwater. Prentice-Hall, Inc. 604 pp.

Javandel, I. And C.F. Tsang, 1986, *Capture Zone Type Curves: A Tool for Aquifer Cleanup*. Ground Water, v. 24, no. 5, pp. 616-624.

Kramber, B., 2008. Personal communication regarding the application of METRIC and SEBAL data in a foothills environment.

Morse A., Allen, R.G., Tasumi, M., Kramber, W.J., and R. Trezza, 2003. *Preliminary Computation of Evapotranspiration by Land Cover Type Using Landsat TM Data and SEBAL*, Proceedings of the 2003 International Geophysical and Remote Sensing Syposium, Toulouse, France. July.

Newton, G. D., 1991. Geohydrology of the Regional Aquifer System, Western Snake River Plain, Southwestern Idaho. U.S. Geological Survey Professional Paper 1408-G.

United States Environmental Protection Agency (EPA), 2007. Wellhead Analytical Element Model (WhAEM), Office of Research and Development and the Office of Ground Water and Drinking Water.

United States Geologic Survey (USGS), 2008. National Water Information System, http://waterdata.usgs.gov/id/nwis/rt.

FORM 202 RECEIVED

SEP 28 2006

WATER RESOURCES WESTERN REGION

Ident. No. 61-12090 12/99

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

APPLICATION FOR PERMIT

To appropriate the public waters of the State of Idaho

*

1. Name of Applicant Boise-Highland Development Co. Phone (208)853-1222
   Mailing address 6100 Pierce Park Ln., Boise, ID 83703
2. Source of water supply ground water which is a tributary of _____
3. Location of point of diversion is Township 01S Range 04E Sec. 11, in the _____ ¼, SW ¼, NE ¼, Govt. Lot _____, B.M., _____ County;
   additional points of diversion if any: 01S, 04E, S02, SESE; 01S, 04E, S11, NWSE; 01S, 04E, S11, NENE
4. Water will be used for the following purposes:
   Amount 5.0 cfs (cfs or acre-feet per annum) for municipal purposes from 1/1 to 12/31 (both dates inclusive)
   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)
   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)
   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)
   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)
   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)
5. Total quantity to be appropriated is (a) 5.0 (cubic feet per second) and/or (b) _____ (acre feet per annum)
6. Proposed diverting works:
   a. Describe type and size of devices used to divert water from the source up to 4 wells with electric pumps
   b. Height of storage dam _____ feet; active reservoir capacity _____ acre-feet; total reservoir capacity _____ acre-feet
   c. Proposed well diameter is 16 inches; proposed depth of well is 700 feet
   d. Is ground water with a temperature of greater than 85°F being sought? No
   e. If well is already drilled, when? _____; Drilling firm _____;
      Well was drilled for (well owner) _____; Drilling Permit No. _____
7. Time required for completion of works and application of water to proposed beneficial use is 5 years (*minimum 1 year*)
8. Description of proposed uses (*if irrigation only, go to item 9*):
   a. Hydropower; show total feet of head and proposed capacity in kW. _____
   b. Stockwatering; list number and kind of livestock. _____
   c. Municipal; show name of municipality. Sterling Sage Subdivision
   d. Domestic; show number of households. _____
   e. Other; describe fully. _____

* Assigned to NEVIO LLC 10/17/07

EXHIBIT 5

9. Description of place of use:

a. If water is for irrigation, indicate acreage in each subdivision in the tabulation below.

b. If water is used for other purposes, place a symbol of the use (*example: D for Domestic*) in the corresponding place of use below. See instructions for standard symbols.

TWP	RGE	SEC	NE				NW				SW				SE				TOTALS
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
01S	04E	2													M		M	M	
		11	M	M	M	M										M			

Total number of acres to be irrigated _____

10. Describe any other water rights used for the same purposes as described above. _____

11.a. Who owns the property at the point of diversion? Betsy Binnendijk-Zijderlaan

b. Who owns the land to be irrigated or place of use? Betsy Binnendijk-Zijderlaan

c. If the property is owned by a person other than the applicant, describe the arrangement enabling the applicant to make this filing: business contract

12. Remarks: The proposed 5.0 cfs municipal diversion rate assumes diversion of 0.60 cfs for in-house domestic use, 2.76 cfs for irrigation, and 0.04 cfs for commercial uses. The domestic use estimate is based on 176 residential units using IDWR's standard chart. The irrigation estimate is based on 176 residential units with an average irrigated area of 0.5 acre per unit, and a diversion rate of 0.02 cfs/acre plus the irrigation of approximately 50 acres of common area with a diversion rate of 0.02 cfs/acre. The commercial use is associated with a small equestrian center. The municipal use also includes fire protection flow at the rate of 2.2 cfs, per International Fire Code.

13. **MAP OF PROPOSED PROJECT REQUIRED** - Attach an 8½"x11" map clearly identifying the proposed point of diversion, place of use, section #, township & range. (A photocopy of a USGS 7.5 minute topographic quadrangle map is preferred.)

BE IT KNOWN that the undersigned hereby makes this application for permit to appropriate the public waters of the State of Idaho as herein set forth.

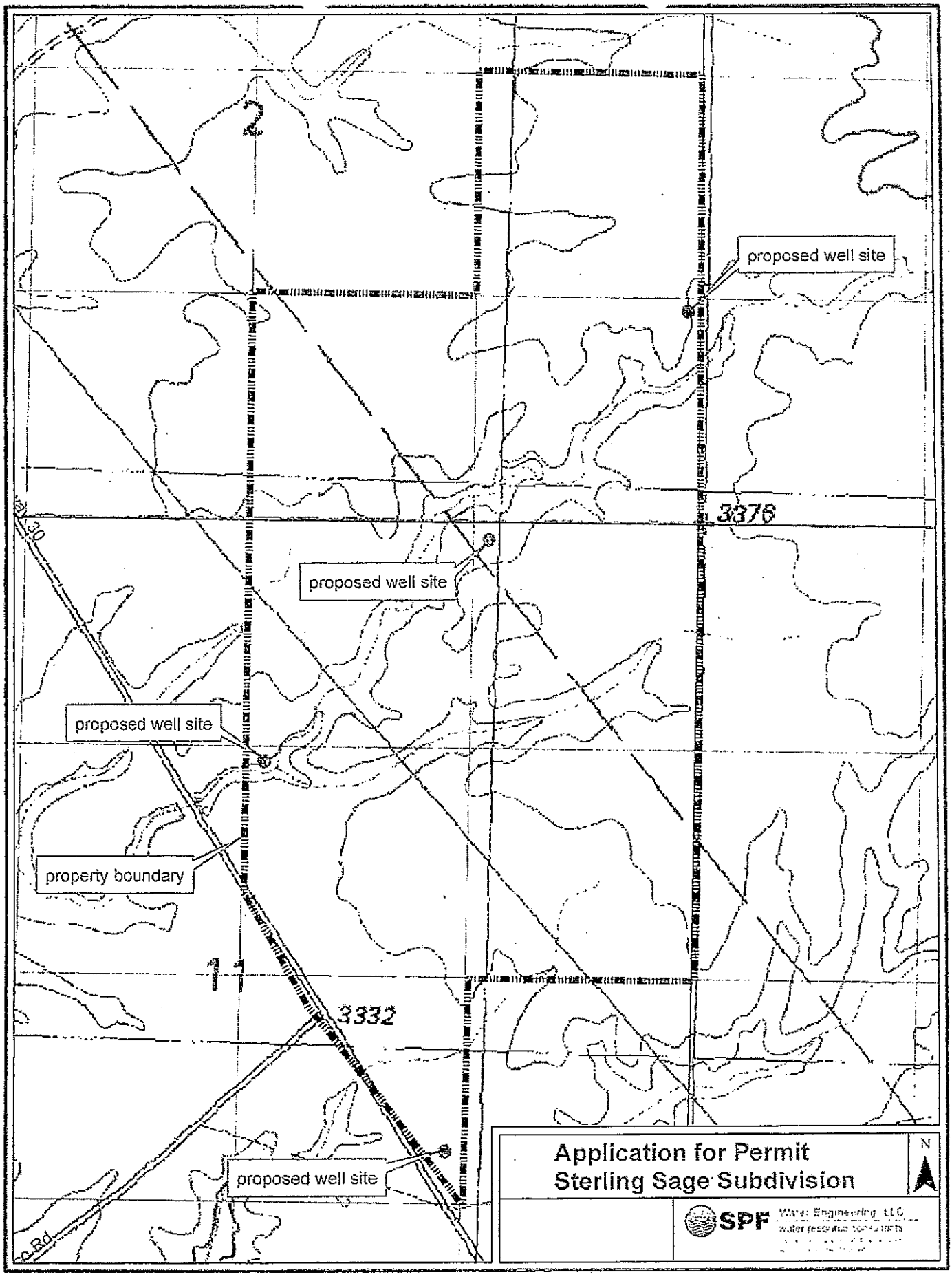
Signature of Applicant (and title, if applicable)

Received by DB Date 9-28-06 Time 11:30 am Preliminary check by _____

Fee $ 410- Receipted by DB # W034738 Date 9-28-06

Publication prepared by DB Date 4/9/08 Published in MTN HOME NEWS; APRIL 16 & 23, 2008

Publication approved _____ Date _____


proposed well site
3376
proposed well site
proposed well site
property boundary
3332
proposed well site
Application for Permit
Sterling Sage Subdivision
N
SPF

61-12090

ARTICLE VI
OPERATING AGREEMENT

The rules, regulations and procedures governing the operations of the Company shall be set forth in an Operating Agreement which shall be adopted by the members of the Company.

IN WITNESS WHEREOF, the undersigned has executed these Articles of Organization this 29 day of November, 2005.

Roger Hoffman, Manager and Registered Agent

STATE OF UTAH)
: ss.
COUNTY OF UTAH)

I, a Notary Public, do hereby certify that on this 6 day of December, 2005, personally appeared before me, Roger Hoffman, who is known to me to be the person whose name is subscribed to the foregoing document and who acknowledged to me that he executed the same.

Notary Public

MISTY L JENKS
Notary Public
(Stamp) State of Utah
My Comm. Expires Oct.11, 2008
[illegible] American Fork UT 84003

IN WITNESS WHEREOF, the undersigned has executed these Articles of Organization this 29 day of November, 2005.

Alice Culver, Manager

STATE OF IDAHO)
: ss.
COUNTY OF ADA)

I, a Notary Public, do hereby certify that on this 29th day of November, 2005, personally appeared before me, Alice Culver, who is known to me to be the person whose name is subscribed to the foregoing document and who acknowledged to me that he executed the same.

Notary Public
Eagle, Idaho my Commission expires 2/10/2011

DANA D. HARRIS
NOTARY PUBLIC
STATE OF IDAHO

846188/01

Signature Page
for
Operating Agreement
of
Boise – Highland Development Company, LLC

(continued)

IN WITNESS WHEREOF, this Operating Agreement has been executed on the date hereinabove first written by the following Manager and Members, whose respective mailing addresses are set forth opposite their signatures. By their signatures below said Manager and Members do hereby affirm that they have read the foregoing Operating Agreement and are familiar with its contents and they do hereby verify the truthfulness thereof.

Mailing Address:

MANAGERS:

12 West 100 North, Suite 201A
American Fork, Utah 84003

Roger Hoffman

6100 Pierce Park Lane
Boise, Id. 83714

Alice Culver

Mailing Addresses:

MEMBERS:

The Nexus Group, III, P.C.

By its President, Roger Hoffman

5726 W. 9970 North
Highland, Ut. 84003

Alice Culver

6100 Pierce Park Lane
Boise, Id. 83714

846168/01

18. Execution:

18.1 This Agreement is executed by the undersigned on the date so inscribed by their respective signatures. This Agreement shall become effective on the latest date executed which shall serve as the "execution date" as provided under this Agreement.

"CULVER"

Allice Culver 11-29-05

By: Allice Culver Date

"NEXUS"

12-6-05

By: Roger Hoffman, President, The Nexus Group, P.C. Date

RECEIVED
OCT 17 2007
WATER RESOURCES
WESTERN REGION

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

ASSIGNMENT OF APPLICATION FOR PERMIT

To change the ownership of an application for permit

I, on behalf of Boise Highland Development Co., hereby assign to Nevid LLC

of 1349 Galleria Dr., Suite 200, Henderson, NV 89014 (702) 433-9696
(Full Address) (Phone)

All my right, title, and interest in and to Application for Permit No. 61-12090 to appropriate the public waters of the State of Idaho.

OR (for partial assignments)

The following described portion of my right, title, and interest in and to Application for Permit No. _____ to appropriate the public waters of the State of Idaho. (See attached description of portion of the application for permit assigned, listing the number of acres in each 40-acre tract, point of diversion location, and amount of water in cubic feet per second.)

Made this 25th day of September, 2007.

Applicant

Applicant

State of Idaho)
) ss
County of Ada)

On this 25th day of September, 2007, personally appeared before me the signer(s) of the above instrument, who duly acknowledged to me that he/she/they executed the same.

DANA D. HARRIS
NOTARY PUBLIC
STATE OF IDAHO

SEAL

Notary Public

Residing at Eagle, Idaho

My commission expires 2/10/2011

✓ updated 10/19/07 DB

EXHIBIT 6A

RECEIVED
OCT 17 2007
WATER RESOURCES
WESTERN REGION

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

ASSIGNMENT OF APPLICATION FOR PERMIT

To change the ownership of an application for permit

I, on behalf of Boise Highland Development Co., hereby assign to Nevid LLC

of 1349 Galleria Dr., Suite 200, Henderson, NV 89014 (702) 433-9696
(Full Address) (Phone)

All my right, title, and interest in and to Application for Permit No. 61-12090 to appropriate the public waters of the State of Idaho.

OR (for partial assignments)

N/A

The following described portion of my right, title, and interest in and to Application for Permit No. _____ to appropriate the public waters of the State of Idaho. (See attached description of portion of the application for permit assigned, listing the number of acres in each 40-acre tract, point of diversion location, and amount of water in cubic feet per second.)

Made this 25TH day of SEPTEMBER, 2007.

ROGER HOFFMAN
Applicant

MANAGER, Applicant
BOISE-HIGHLAND DEVELOPMENT CO., LLC

State of UTAH)
) ss
County of UTAH)

On this 25 day of September, 2007, personally appeared before me the signer(s) of the above instrument, who duly acknowledged to me that he/she/they executed the same.

MISTY L JENKS
Notary Public
State of Utah
My Comm. Expires Oct 11, 2008
[illegible] Rd American Fork UT 84003

Notary Public

Residing at 476 W 170 S State Rd AF UT 84003

My commission expires Oct 11, 2008

EXHIBIT 6B

✓ updated 10/19/07 DB

MEMORANDUM

✓ Office Visit ____ Telephone ____ Meeting

TO F. Ilis

FROM SZ

DATE 11/15/07

RE Project overview + Appl. Processing - Elk Creek Canyon project

Met with:

consultant Roxanne Brown, SPF

developer Dennis Rider } 702-433-9696 Nevada

attorney John Erickson

designer Spencer Hafen

Overview:

- ± 8000 acres, phase 1 already purchased (±10M + already spent).
- ± 20,000 + homes.
- ± 10-20 yr. time frame.
- working with local P&Z & approvals.
- discussed with governor's office.

Expect follow up from them soon → 61-12090 "Sterling Ridge" now Nevill LLC, affiliated with Elk Creek Canyon, appl. to be amended, SPF preparing add'l info etc. ... for phase 1 of project.

61-12095 } filed later in time, for other
61-12096 } phases of project.
T. 73789

EXHIBIT 7

11/07

RECEIVED
MAY 02 2008
WATER RESOURCES
WESTERN REGION

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

NOTICE OF PROTEST

This form may be used to file a protest with the department under sections 42-108B, 42-203A, 42-203C, 42-211, 42-222 and 42-224, Idaho Code. The department will also accept a timely protest not completed on this form if it contains the same information.

1. Matter being protested Application for Permit No. 61-12090 in the Name of Nevid LLC.

2. Name of protestant Daniel S. Van Grouw.

3. Protestant's Representative for service (If different than protestant)

   Dana L. Hofstetter, Hofstetter Law Office, LLC.

4. Service mailing address 608 West Franklin Street, Boise, Idaho 83702.

5. Service telephone no. (208) 424-7800 Email Address: Dana@IdahoWaterLaw.com.

6. Basis of protest (including statement of facts and law upon which the protest is based)

   Potential impacts of the proposed water use to other water right holders. Protestant reserves the right to identify additional concerns as further information becomes available.

   (additional pages may be attached to describe nature of the protest)

   What would resolve your protest? Information about the proposed use that would establish no potential impacts to other water right holders. Denial or appropriate conditions, as needed, to address any such impacts.

I hereby, acknowledge that if I, or my designated representative, fails to appear at any regularly scheduled conference or hearing in the matter of which I have been notified at the address above, the department may issue a notice of proposed default against me in this matter for failure to appear. I also verify that I have served a copy of this protest upon the applicant.

Signed this 2nd day of May, 2008.

Protestant

Protestant's Representative

EXHIBIT 8

NOTE:

A protestant is required to timely file a protest with the department together with a $25.00 protest fee for each application being protested in order for the protestant to be considered a full party by the department. In addition, the department's Rule of Procedure, IDAPA 37.01.01203, requires a protestant to send a copy of a protest to the applicant.

INSTRUCTIONS

1. The matter being protested must be clearly identified. A typical matter is identified by the application number such as "Application for Permit No. _____ in the name of _____" or "Application for Transfer No. _____ in the name of _____."

2. Show the name of the protestant. Only one (1) protestant may be shown per protest form. If this protest form is signed by more than one person, the hearing officer will consider the first signer as the official protestant and the representative for service of documents.

3. If the protestant is represented by an attorney or other authorized representative, show the representative's name. The department then will serve documents on the representative and upon the protestant if specifically requested.

4. Show the address where the department is to serve the documents. This should be the address of the authorized representative unless the protestant does not designate a representative.

5. Show the telephone number of the authorized representative unless the protestant does not designate a service representative.

6. Specifically describe the nature of the protest.

7. Describe the relief being sought by the protestant.

FOR DEPARTMENT USE ONLY

Received by _____ Date May 2.08 Time 1:30

$25.00 fee Receipted by _____ Receipt# WO36436 Date May 2.08

NEVID, LLC
PROPERTY BOUNDARY

400 ACRES

300 ACRES

1351 ACRES

NORTH

2000 0 1000 2000 4000
(IN FEET)
1 inch = 2000 ft.
DATE: 04/06/2009

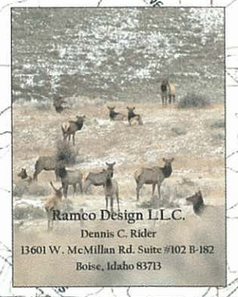


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EXHIBIT
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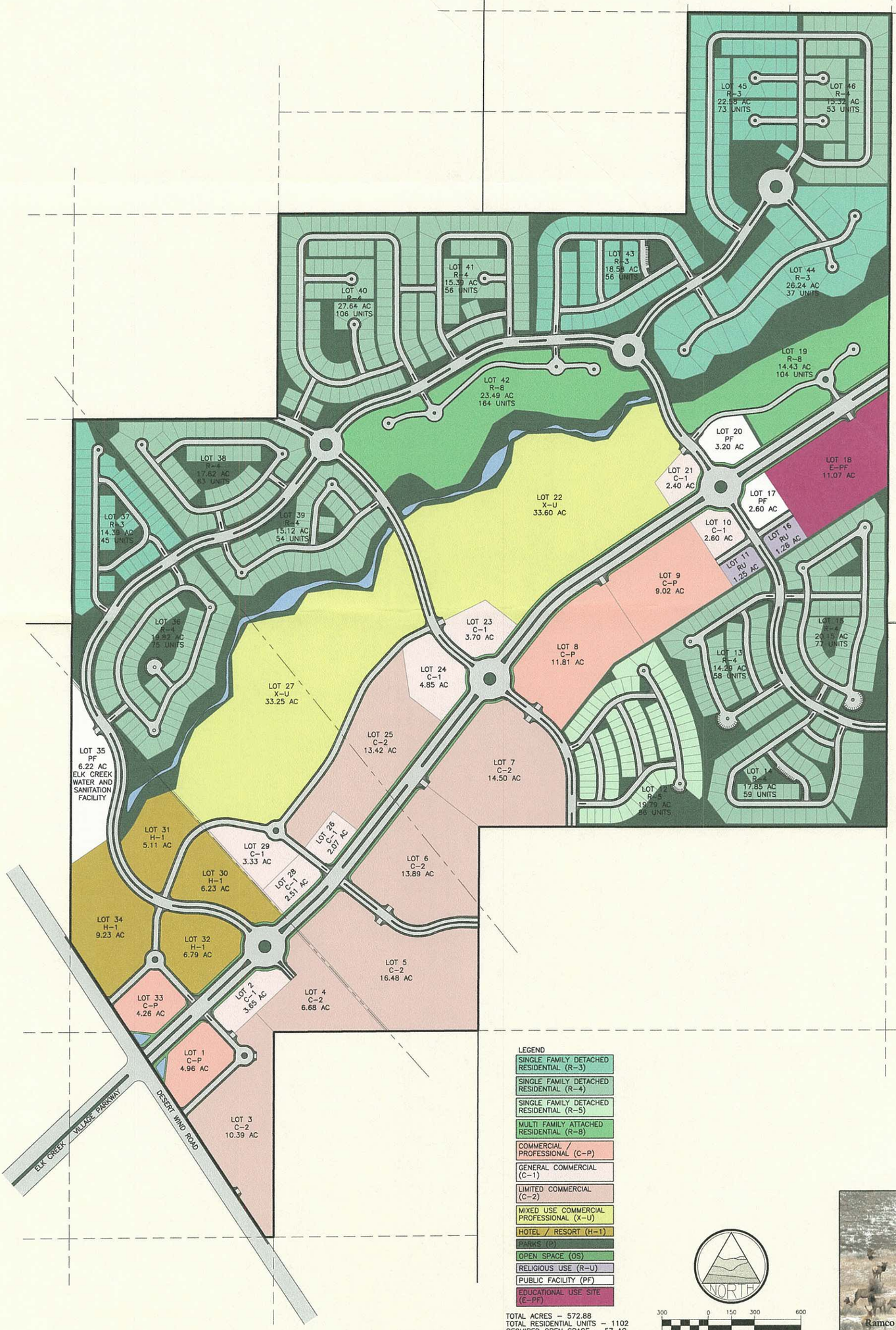
ELK CREEK VILLAGE

MASTER PLANNED SUBDIVISION

572.88 ACRES - 1166 LOTS

2.0 UNITS PER ACRE



LEGEND

- SINGLE FAMILY DETACHED RESIDENTIAL (R-3)
- SINGLE FAMILY DETACHED RESIDENTIAL (R-4)
- SINGLE FAMILY DETACHED RESIDENTIAL (R-5)
- MULTI FAMILY ATTACHED RESIDENTIAL (R-8)
- COMMERCIAL / PROFESSIONAL (C-P)
- GENERAL COMMERCIAL (C-1)
- LIMITED COMMERCIAL (C-2)
- MIXED USE COMMERCIAL PROFESSIONAL (X-U)
- HOTEL / RESORT (H-1)
- PARKS (P)
- OPEN SPACE (OS)
- RELIGIOUS USE (R-U)
- PUBLIC FACILITY (PF)
- EDUCATIONAL USE SITE (E-PF)

TOTAL ACRES - 572.88
TOTAL RESIDENTIAL UNITS - 1102
REQUIRED OPEN SPACE - 57 AC
REQUIRED ACREAGE IN DEVELOPED PARKS - 33

NORTH

300 0 150 300 600

(IN FEET)
1 inch = 300 ft.
DATE: 11/10/2008

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10