

State of Idaho
Department of Water Resources
Water Right License
WATER RIGHT NO. 63-33676

PRIORITY: July 26, 2012

Maximum Diversion Rate: 0.16 CFS

Maximum Diversion Volume: 38.9 AF

It is hereby certified that:

CITY OF BOISE
DEPT OF PARKS & RECREATION
1104 ROYAL BLVD
BOISE ID 83706-2898

has complied with the terms and conditions of the permit, issued pursuant to Application for Permit dated July 26, 2012, and has submitted Proof of Beneficial Use on May 31, 2017. An examination confirms water is diverted from:

SOURCE: GROUND WATER

and a water right has been established as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL DIVERSION VOLUME</u>
DIVERSION TO STORAGE	01/01 to 12/31	0.16 CFS	
MUNICIPAL STORAGE	01/01 to 12/31		38.9 AF
MUNICIPAL FROM STORAGE	03/01 to 11/15		36.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER SE¼SW¼ Sec. 15, Twp 03N, Rge 02E, B.M. ADA County

PLACE OF USE: MUNICIPAL STORAGE AND MUNICIPAL FROM STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	02E	15												X					

CONDITIONS OF APPROVAL

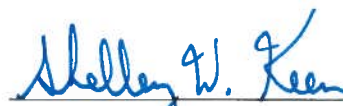
1. Place of use is located within Terry Day Park.
2. The right holder shall make full beneficial use of all surface water available to the right holder for irrigation of lands within the authorized place of use for this right. The right holder may use water stored pursuant to this right to irrigate land with appurtenant surface water rights when the surface water supply is not reasonably sufficient to irrigate the place of use for this water right or is not available due to drought, curtailment by priority, or the seasonal startup and shutoff or maintenance schedule for canal company deliveries. The right holder shall not use water stored pursuant to this right for irrigation purposes if use of the surface water supply is intentionally discontinued or reduced (for example abandoned, forfeited, sold, disallowed by court decree, or leased to the Water Supply Bank), or is not deliverable due to non-payment of annual assessments, without an approved transfer pursuant to Section 42-222, Idaho Code, or other Department approval.

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WATER RIGHT NO. 63-33676

3. This right when combined with all other rights shall provide no more than 4.5 afa per acre at the field headgate for irrigation of the place of use.
4. This right authorizes multiple fills of the storage facility, up to a cumulative annual total of 38.9 af.
5. Rights 63-33579 and 63-33676 when combined shall not exceed a total annual maximum diversion and storage volume of 38.9 af or a total annual use from storage volume of 36.0 af.
6. To prevent injury to prior water rights appropriating water from the Boise River and/or the underlying shallow aquifer tributary to Boise River, the new well used as a point of diversion for this water right located within Township 3N, Range 2E, Section 15 shall be constructed and maintained with unperforated casing and sealed into the first significant confining layer located 200 feet or more below ground surface.
7. Water bearing zone to be appropriated is 216 to 296 feet.
8. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.
9. When ordered by the Director, the right holder shall provide mitigation acceptable to the Director to offset depletion of lower Snake River flows needed for migrating anadromous fish. The amount of water required for mitigation, which is to be released into the Snake River or a tributary for this purpose, will be determined by the Director based upon the reduction in flow caused by the use of water pursuant to this right. Any order of the Director issued in accordance with this paragraph shall be in conformance with applicable rules allowing the right holder due process as the need for mitigation and the amount of mitigation are determined.

This license is issued pursuant to the provisions of Section 42-219, Idaho Code. The water right confirmed by this license is subject to all prior water rights and shall be used in accordance with Idaho law and applicable rules of the Department of Water Resources.

Signed this 2nd day of November, 2017.



SHELLEY W. KEEN
Water Rights Section Manager

State of Idaho
Department of Water Resources
Attachment to Water Right License
63-33676

This map depicts the MUNICIPAL STORAGE place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.

02E



-  Point of Diversion
-  Place Of Use Boundary
-  Townships
-  PLS Sections

0 0.035 0.07 0.14 Miles



State of Idaho
Department of Water Resources
Attachment to Water Right License
63-33676

This map depicts the MUNICIPAL FROM STORAGE place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



-  Point of Diversion
-  Place Of Use Boundary
-  Townships
-  PLS Sections

0 0.0425 0.085 0.17 Miles





State of Idaho

DEPARTMENT OF WATER RESOURCES

322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098

Phone: (208) 287-4800 • Fax: (208) 287-6700 • Web Site: www.idwr.idaho.gov

GARY SPACKMAN
Director

C.L. "BUTCH" OTTER
Governor

November 8, 2017

CITY OF BOISE
DEPT OF PARKS & RECREATION
1104 ROYAL BLVD
BOISE ID 83706-2898

RE: License Nos. 63-33579 & 63-33676

Issuance of Licenses

Dear Water Right Holder(s):

The Department of Water Resources has issued the enclosed Water Right Licenses confirming that water rights have been established in accordance with your permits. Please be sure to thoroughly review the conditions of approval and remarks listed on your licenses.

The licenses are PRELIMINARY ORDERS issued by the Department pursuant to section 67-5243, Idaho Code. They can and will become final orders without further action by the Department unless a party petitions for reconsideration or files an exception and/or brief within fourteen (14) days of the service date as described in the enclosed information sheet.

Please note that water right owners are required to report any change of water right ownership and/or mailing address to the Department within 120 days of the change. Failure to report these changes could result in a \$100 late filing fee. Contact any office of the Department or visit the Department's homepage on the Internet to obtain the proper forms and instructions.

If you have any questions, please contact me at 208-287-4951.

Sincerely,

A handwritten signature in cursive script that reads "Pamela Skaggs".

Pamela Skaggs, Water Rights Supervisor
Water Right Permits Section

Enclosure(s)

c: ROBERT MAYNARD

CERTIFICATE OF SERVICE

I hereby certify that on November 9, 2017 I mailed true and correct copies, postage prepaid, of the foregoing PRELIMINARY ORDERS (**Approved Licenses**) to the person(s) listed below:

RE: WATER RIGHT NOS.

63-33579 & 63-33676

**ROBERT MAYNARD
PERKINS COIE LLP
1111 W JEFFERSON STE 500
PO BOX 737
BOISE ID 83701-0737**

**CITY OF BOISE
DEPT OF PARKS & RECREATION
1104 ROYAL BLVD
BOISE ID 83706-2898**

A handwritten signature in black ink, reading "Darla Block", is written over a horizontal line.

Darla Block
Technical Records Specialist

EXPLANATORY INFORMATION TO ACCOMPANY A PRELIMINARY ORDER

(To be used in connection with actions when a hearing was not held)

(Required by Rule of Procedure 730.02)

The accompanying order or approved document is a "Preliminary Order" issued by the department pursuant to section 67-5243, Idaho Code. It can and will become a final order without further action of the Department of Water Resources ("department") unless a party petitions for reconsideration, files an exception and brief, or requests a hearing as further described below:

PETITION FOR RECONSIDERATION

Any party may file a petition for reconsideration of a preliminary order with the department within fourteen (14) days of the service date of this order. **Note: the petition must be received by the department within this fourteen (14) day period.** The department will act on a petition for reconsideration within twenty-one (21) days of its receipt, or the petition will be considered denied by operation of law. See Section 67-5243(3) Idaho Code.

EXCEPTIONS AND BRIEFS

Within fourteen (14) days after: (a) the service date of a preliminary order, (b) the service date of a denial of a petition for reconsideration from this preliminary order, or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration from this preliminary order, any party may in writing support or take exceptions to any part of a preliminary order and may file briefs in support of the party's position on any issue in the proceeding with the Director. Otherwise, this preliminary order will become a final order of the agency.

REQUEST FOR HEARING

Unless a right to a hearing before the Department or the Water Resource Board is otherwise provided by statute, any person aggrieved by any final decision, determination, order or action of the Director of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Director and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

ORAL ARGUMENT

If the Director grants a petition to review the preliminary order, the Director shall allow all parties an opportunity to file briefs in support of or taking exceptions to the preliminary order and may schedule oral argument in the matter before issuing a final order. If oral arguments are to be heard, the Director will within a reasonable time period notify each party of the place, date and hour for the argument of the case. Unless the Director orders otherwise, all oral arguments will be heard in Boise, Idaho.

CERTIFICATE OF SERVICE

All exceptions, briefs, requests for oral argument and any other matters filed with the Director in connection with the preliminary order shall be served on all other parties to the proceedings in accordance with IDAPA Rules 37.01.01302 and 37.01.01303 (Rules of Procedure 302 and 303).

FINAL ORDER

The Director will issue a final order within fifty-six (56) days of receipt of the written briefs, oral argument or response to briefs, whichever is later, unless waived by the parties or for good cause shown. The Director may remand the matter for further evidentiary hearings if further factual development of the record is necessary before issuing a final order. The department will serve a copy of the final order on all parties of record.

Section 67-5246(5), Idaho Code, provides as follows:

Unless a different date is stated in a final order, the order is effective fourteen (14) days after its service date if a party has not filed a petition for reconsideration. If a party has filed a petition for reconsideration with the agency head, the final order becomes effective when:

- (a) The petition for reconsideration is disposed of; or
- (b) The petition is deemed denied because the agency head did not dispose of the petition within twenty-one (21) days.

APPEAL OF FINAL ORDER TO DISTRICT COURT

Pursuant to sections 67-5270 and 67-5272, Idaho Code, if this preliminary order becomes final, any party aggrieved by the final order or orders previously issued in this case may appeal the final order and all previously issued orders in this case to district court by filing a petition in the district court of the county in which:

- i. A hearing was held,
- ii. The final agency action was taken,
- iii. The party seeking review of the order resides, or
- iv. The real property or personal property that was the subject of the agency action is located.

The appeal must be filed within twenty-eight (28) days of this preliminary order becoming final. See section 67-5273, Idaho Code. The filing of an appeal to district court does not itself stay the effectiveness or enforcement of the order under appeal.

MEMORANDUM

DATE: November 2, 2017

TO: Water Right Files 63-33579 and 63-33676

FROM: Shelley W. Keen *SWK*

RE: Licensed beneficial use

Permits 63-33579 and 63-33676 proposed a combined total of 50 AF of municipal storage and 36 AF of municipal use from storage. The applications explained that the water would be used for an aesthetic pond and for supplemental irrigation use at Terry Day Park. The right holder, the City of Boise, developed the permit consistent with the application, i.e. 5 acres of supplemental irrigation and a 4.9 AF pond.

The two rights are being licensed for a combined storage volume of 38.9 AF, calculated by adding the pond fill volume (4.9 AF), the annual seepage losses from the pond (10 AF), the annual evaporation losses from the pond (1.5 AF), and the maximum intended usage for supplemental irrigation from the pond (22.5 AF). If these were rights for irrigation from storage, they would be limited to a total annual maximum use from storage of 22.5 AF. However, these rights were permitted for municipal use from storage, not for irrigation from storage. Idaho has traditionally recognized that for municipalities serving incorporated cities, "the extent of beneficial use established under a non-RAFN permit should be determined based on the installed capacity developed and operational during the development period of the permit." *Application Processing Memorandum No. 18*. Because the permitted water use from storage was for municipal purposes, which encompasses a variety of beneficial uses, and not just for irrigation on a set number of acres, the City of Boise's developed capacity should be viewed as the entire 38.9 AF. However, since the permits proposed a total collective use from storage of 36.0 AF, the permits will be limited to the permitted volume.

The permitted season of use from storage will be left at 3/1/ to 11/15 to remain consistent with the permits.

The size of the pond need not be limited because the permits did not require mitigation for evaporation losses and fill volume, which would necessitate limiting the pond to match the mitigation provided.

MEMORANDUM

TO: Water Right File 63-33676 & 63-33579
FROM: Chelsey Serrano, EIT

DATE: September 28, 2017

SUBJECT: Licensing Review of Water Right 63-33676 & 63-33579

This field exam was performed by Certified Field Examiner Terry Scanlan of SPF Engineering Inc. He prepared a review of irrigated areas and one storage pond at Terry Day Park, located at 1225 S Federal Way. He recommended that the water right limit municipal storage volume to 38.6 afa, the municipal from storage to 22.5 afa, and a combined diversion rate of 0.20 cfs.

History:

In September 2011, City of Boise Parks and Recreation applied for permit 63-33579 to construct a small pond and well, to fill the pond, and supply supplemental irrigation to Terry Day Park. The pond would be filled with the proposed well water. New York Irrigation District water would also be diverted into the pond to irrigate Terry Day Park. The well would supply supplemental irrigation when needed for the park. Permit 63-33579 had an approved a diversion rate of 0.04 cfs, 50 af for municipal storage, and 36 af for municipal from storage. The from storage portion of this permit was allowed for supplemental irrigation of 8 acres. We identified that a diversion rate of 0.04 cfs can only supply a maximum of 29 af ($0.004 \text{ cfs} * 1.835 * 365 = 29.95$). Therefore, permit 63-33579 should not be licensed for more than the 29 af the diversion rate allows.

In order to fully supply the volume requested, an additional 0.16 cfs was requested by permit 63-33676. This permit requested additional diversion to storage so that the permit holder could supply the necessary volume to meet the 50 af for municipal use and 36 af municipal from storage. Both rights should be given the full volume amounts developed based on the diversion rates, but should be conditioned to limit the total use to the total combined volumes developed.

Acres and Place of Use:

The park is located in Township 3N, Range 2E, Section 15, SESW. Mr. Scanlan reported that the pond has a surface area of 0.66 acres. Using 2015 and 2016 imagery I recreated the shape of the pond and found that a surface area of 0.66 is reasonable. The report proposed an irrigation area of 5 acres. I created a shapefile of irrigated areas, being sure to exclude parking areas, buildings, and the tennis court. I found that the irrigated acres amounted to approximately 5.3 acres. This is similar enough to the reported irrigation area, so I agree that 5 acres should be licensed. The shapefile I created can be referenced on the attached map.

Diversion Rate:

The permit application for 63-33579 had requested 0.04 cfs be diverted to storage, and a follow

up application (permit 63-33676) requested an additional 0.16 cfs diverted to storage. This combines to a limit of 0.20 cfs of water diverted to storage from a groundwater well. In order to determine the beneficial use to storage, Mr. Scanlan used the Timed Fill Method. Mr. Scanlan measured the time for water from the pump to fill a 5-gallon bucket and 32 gallon trash bin. The flow was measured at around 0.20 to 0.21 cfs after both timed fills. I looked over and recalculated Mr. Scanlan's measurement calculations and agree with his methodology and can conclude that the math is accurate. Therefore, permit 63-33579 should be licensed for 0.04 cfs and permit 63-33676 should be licensed for 0.16 cfs.

Volume:

Mr. Scanlan recommended an annual storage volume of 38.6 afa. This was determined by finding the sum of the volume needed for irrigation, the pond volume, the anticipated evaporation loss, and the seepage loss. I reviewed each of these four factors, and addressed concerns with Mr. Scanlan in order to determined acceptable volumes.

Irrigation: Mr. Scanlan found that this property would need an irrigation volume of 22.5 afa, and this was assigned a beneficial use of "Municipal from Storage." Initially I was unsure of whether the beneficial use should be municipal or irrigation. A review of Idaho Code 42-202B confirmed that the use should be assigned as "municipal" because they will be irrigating parks and open space. In order to determine the irrigation requirement, Mr. Scanlan recommended 4.5 ft./yr. of water to the 5 acres of irrigated landscape, amounting to an annual volume of 22.5 afa (4.5 ft./yr. * 5 acre = 22.5 afa). I created a shapefile to determine the amount of acres irrigated. After removing driveways, buildings, parking areas, and a tennis court I found about 5.3 acres of irrigated area. This is close enough to Mr. Scanlan's irrigated acres approximation to agree on an annual volume of 22.5 afa.

Pond Volume: Mr. Scanlan reported that the volume of the pond should be 4.6 acre-ft. He measured the area of the pond and multiplied this by the average depth. Using the Pond Loss Calculation Spreadsheet, I was able to confirm Mr. Scanlan's calculated volume. Using the spreadsheet confirmed Mr. Scanlan's calculation, as I entered the values provided in the report for average pond depth (7ft) and surface area (0.66acre). I checked the area provided by creating a shapefile and found that 0.66 acres was a good approximation. To check the average depth I multiplied the maximum depth by 0.4. Using the Pond Grading Plan (pg. C-102), I could calculate that the difference between the high water level (2764.8) and the bottom of the pond (2751) was about 14 ft. (2764.8 ft. - 2751 ft. = 13.8 ft) . This resulted in an average depth of 5.6 ft. (0.4 * 14 ft. = 5.6 ft.). The resulting pond capacity calculated was about 3.7 af (5.6ft * .66acre = 3.7 af). This difference (about 1 af) was significant enough to check with Mr. Scanlan about how he found the average depth of the pond.

After reviewing my findings with Mr. Scanlan, he stated that they evaluated the design topography using CAD and found that the pond would have a volume of 5.7 af. He adjusted this to account for the high water mark labeled on the pond grading plan. We concluded that a volume of 4.9 af would be most appropriate volume, as the park keeps the water level at the high

water mark, not at the top of the berms. (See email correspondence attached.)

Evaporation Loss:

In order to check the evaporation loss provided by Mr. Scanlan, I used the Pond Loss Calculation Spreadsheet and pulled in precipitation deficit data from ET Idaho. The total deficit (ft./year) was multiplied by the surface area (acres) resulting in evaporation loss of 1.5 AFA. This matched the calculated evaporation loss presented by Mr. Scanlan.

Seepage Loss: Mr. Scanlan cited a design maximum seepage rate of ½ inch/day which was used to determine the annual seepage loss. Initially, I found this to be a very high approximation, due to primarily clay layers below the pond. After following up with Mr. Scanlan, he identified underlying sands and gravels which would be an area prone to seepage. Using NRCS Web Soil Survey I was able to confirm that between 38-60 inches there are sandy/gravelly soils that would facilitate seepage. With this confirmation it was determined that a seepage rate of ½ inch/day is appropriate. This amounts to 10 afa.

Recommendations: After reviewing each component of the annual storage volume, I recommend that 63-33579 be licensed for 29 af of storage and 22.5 af from storage. I recommend 63-33676 be licensed for 38.9 storage and 22.5 af from storage. When combined, the two water rights should be limited to 38.9 storage and 22.5 af from storage.

Overlapping Water Rights:

The two permits addressed here (63-33676 & 63-33579) will be overlapping water rights. In order to assure that this doesn't lead to expansion, during licensing they should be conditioned with a combined limit of 0.20 cfs. New York Irrigation District (NYID) water also overlaps with these water rights. Surface water from NYID is used to fill the pond and to be used for irrigation. This park falls within City of Boise limits, and there are several City of Boise municipal water rights that overlap, but will not impact these water rights.

Conditions: 63-33579 & 63-33676

943 The right holder shall make full beneficial use of all surface water available to the right holder for irrigation of lands within the authorized place of use for this right. The right holder may divert ground water under this right to irrigate land with appurtenant surface water rights when the surface water supply is not reasonably sufficient to irrigate the place of use for this water right or is not available due to drought, curtailment by priority, or the seasonal startup and shutoff or maintenance schedule for canal company deliveries. The right holder shall not divert ground water for irrigation purposes under this right if use of the surface water supply is intentionally discontinued or reduced (for example abandoned, forfeited, sold, disallowed by court decree, or leased to the Water Supply Bank), or is not deliverable due to non-payment of annual assessments, without an approved transfer pursuant to Section 42-222, Idaho Code, or other Department approval.

WB7 This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor exceed a combined annual maximum diversion volume of 22.5 af at the field headgate for the place of use.

259 Right(s) 63-33676 & 63-33579 authorize the storage of an annual total of 38.9 acre-feet, 4.9 acre-feet to be used for the initial filling or carryover storage of the pond for the replacement of losses due to seepage and evaporation, and up to 22.5 acre-feet for additional refills for municipal from storage use.

220 The single pond established by the storage of water under this right shall not exceed a total capacity of 38.9 acre-feet or a total surface area of 0.7 acre(s).

(No Code) Municipal use is for a pond and supplemental irrigation of Terry Day Park.

165 To prevent injury to prior water rights appropriating water from the underlying shallow aquifer, the well used as a point of diversion for this water right shall be constructed and maintained with unperforated casing and sealed into the first significant confining layer located 200 feet or more below ground surface.

930 Water bearing zone to be appropriated is 216 to 296 feet.

01M After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.

103 When ordered by the Director, the right holder shall provide mitigation acceptable to the Director to offset depletion of lower Snake River flows needed for migrating anadromous fish. The amount of water required for mitigation, which is to be released into the Snake River or a tributary for this purpose, will be determined by the Director based upon the reduction in flow caused by the use of water pursuant to this right. Any order of the Director issued in accordance with this paragraph shall be in conformance with applicable rules allowing the right holder due process as the need for mitigation and the amount of mitigation are determined.

Serrano, Chelsey

From: Serrano, Chelsey
Sent: Friday, September 22, 2017 8:48 AM
To: 'Terry Scanlan'
Subject: RE: Beneficial Use Field Report- Terry Day Park

Terry,

Okay. Thanks very much for your input.

Chelsey

From: Terry Scanlan [mailto:TScanlan@spfwater.com]
Sent: Friday, September 22, 2017 8:37 AM
To: Serrano, Chelsey <Chelsey.Serrano@idwr.idaho.gov>
Cc: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
Subject: RE: Beneficial Use Field Report- Terry Day Park

Chelsey

The pond gets to the high water mark 2764.8 (which is below the top of the berms). So you probably ought to base the volume on a full pool of 2764.8. Thanks.

Terry

From: Serrano, Chelsey [mailto:Chelsey.Serrano@idwr.idaho.gov]
Sent: Friday, September 22, 2017 8:33 AM
To: Terry Scanlan <TScanlan@spfwater.com>
Cc: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
Subject: RE: Beneficial Use Field Report- Terry Day Park

Terry,

Thank you for your prompt response. With that additional information about underlying gravels, we will move forward using a seepage rate of 0.5 inches per day. I see how you found pond capacity. From your trip there, would you say the water is kept at the high water level mark, or is it likely that they will store water to the top of the berms? Depending on this, we will assign the volume accordingly. Thanks again,

Chelsey Serrano

From: Terry Scanlan [mailto:TScanlan@spfwater.com]
Sent: Thursday, September 21, 2017 12:13 PM
To: Serrano, Chelsey <Chelsey.Serrano@idwr.idaho.gov>
Cc: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>; Lori Graves <LGraves@spfwater.com>
Subject: RE: Beneficial Use Field Report- Terry Day Park

Chelsey –

The pond was excavated through surface soils into underlying gravels. The attached soil report on page 13 lists permeability (Ksat) of the most limiting layer of the natural soils at 0.2 to 0.57 inches per hour (4.8 to 13.7 inches per day). The surface soils were then used to line the pond along with any imported material necessary to slow leakage. Our specification was for ½ inch per day, but we were not involved in the construction management of the pond and are not aware that a seepage test was ever conducted. So my best guess was that the seepage rate was reduced to the specified 0.5 inches per day. Without a seepage test, it may actually be higher.

With regard to pond capacity, we have evaluated the design topography using CAD and found a pond volume of 5.7 acre feet between elevation 2766 and 2751. Assuming that the pond level is kept at 2764.8 as shown on the drawing, the volume will be approximately 4.9 acre feet. We did not conduct a bathymetric survey of the pond and cannot confirm that the pond was graded according to plan.

Terry

From: Serrano, Chelsey [<mailto:Chelsey.Serrano@idwr.idaho.gov>]
Sent: Thursday, September 21, 2017 9:07 AM
To: Terry Scanlan <TScanlan@spfwater.com>
Cc: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
Subject: Beneficial Use Field Report- Terry Day Park

Mr. Scanlan,

I've been reviewing the Beneficial Use Field Report prepared by you for Boise Parks and Recreation's Terry Day Park, water rights 63-33579 and 63-33676. When reviewing the report, I found a different the seepage loss rate and the pond volume. Specifically, I found that our pond depths differed enough to impact pond volume. I wanted to check the seepage rate because I could not find any specifications in the design that indicated a non-native soil, or any reference to the design max rate that you referenced under comments. If you would be able to provide additional information on how you determined these, I will be able to continue reviewing the exams for licensing. You can reference my calculations in the attached documents. Thank you in advanced for your help.

Sincerely,

Chelsey Serrano

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A A A

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AOI Inventory

- Component Description (Nontechnical)
- Component Legend
- Component Text Descriptions
- Descripción de la Unidad de Mapa
- Descripción de la Unidad de Mapa (Breve, Generada)
- Legend
- Map Unit Description
- Map Unit Description (Brief)
- Map Unit Description (Brief, Generated)
- Sagebrush Ecosystem Resilience and Resistance Soils Report
- Selected Soil Interpretation Description and Criteria Summary
- Selected Soil Interpretations
- Survey Area Data Summary
- Survey Area Map Unit Symbols and Names
- Water Quality Index (WQI) Soil Factors

Building Site Development

- Dwellings and Small Commercial Buildings
- Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Construction Materials

- Source of Reclamation Material, Roadfill, and Topsoil (ID)
- Source of Sand and Gravel (ID)

Disaster Recovery Planning

- AWM - Large Animal Disposal, Pit

Land Classifications

- Conservation Tree and Shrub Suitability Groups
- Forage Suitability Groups
- Hydric Soil List - All Components
- Hydric Soils
- Land Capability Classification
- NCCPI Overall
- Prime and other Important Farmlands
- Taxonomic Classification of the Soils

Land Management

- Damage by Fire and Seedling Mortality on Forestland
- Forestland Planting and Harvesting
- Forestland Site Preparation
- Haul Roads, Log Landings, and Soil Rutting on Forestland (ID)
- Hazard of Erosion and Suitability for Roads on Forestland (ID)
- Rangeland Fencing, Pygmy Rabbit Habitat, and Resistance to Fugitive Dust
- Rangeland Invasive Species Susceptibility
- Rangeland Mechanical Treatment by Chaining, Rolling Drum, and Shredder
- Rangeland Seeding and Rangeland Drill
- Rangeland Site Degradation and Fire Damage Susceptibility
- Rangeland Tillage, Compaction Resistance, and Soil Restoration

Soil Map

 Scale: 

Report -- Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007 (<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Ada County, Idaho

Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage pass-- sieve number--			
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	
							<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
<i>In</i>												
147—Purdam-Power-Urban land complex, 0 to 2 percent slopes												
Purdam, plowed	40	C	0-4	Silt loam	CL	A-6	0- 0- 0	0- 0- 0	95-100-100	90-100-100	95-100-100	
			4-10	Silt loam	CL	A-6	0- 0- 0	0- 0- 0	95-100-100	90-100-100	95-100-100	
			10-13	Silty clay loam, silt loam	CL	A-6, A-7	0- 0- 0	0- 0- 0	95-100-100	90-100-100	95-100-100	
			13-19	Silty clay loam, silt loam	CL	A-6, A-7	0- 0- 0	0- 0- 0	95-100-100	90-100-100	80-95-100	

Western Juniper Encroachment Potential (OR)	
Recreational Development	
Camp Areas, Picnic Areas, and Playgrounds	
Paths, Trails, and Golf Fairways	
Sanitary Facilities	
Landfills	
Sewage Disposal	
Soil Chemical Properties	
Chemical Soil Properties	
Soil Erosion	
Conservation Planning	
RUSLE2 Related Attributes	
Windbreaks and Environmental Plantings	
Soil Health	
Soil Health - Aggregate Stability (West US)	
Soil Health - Bulk Density and Texture	
Soil Health - Organic Matter	
Soil Physical Properties	
Engineering Properties	
View Description View Soil Report	
Options	
Include minor soils? ☐	
View Description View Soil Report	
Fragments on the Soil Surface	
Particle Size and Coarse Fragments	
Physical Soil Properties	
Soil Qualities and Features	
Soil Features	
Soil Locations	
Vegetative Productivity	
Forestland Productivity	
Forestland Productivity with Site Index Base	
Irrigated and Nonirrigated Yields by Map Unit Component	
Irrigated Yields by Map Unit Component	
Nonirrigated Yields by Map Unit Component	
Rangeland and Forest Vegetation Classification, Productivity, and Plant Composition	
Rangeland Productivity	
Rangeland Productivity and Plant Composition	
Waste Management	
Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge	
Agricultural Disposal of Wastewater by Irrigation and Overland Flow	
Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment	
Large Animal Carcass Disposal	
Water Features	
Hydrologic Soil Group and Surface Runoff	
Water Features	
Water Management	
Irrigation - General and Sprinkler	
Irrigation - Micro	
Irrigation - Surface	
Ponds and Embankments	

Ada County, Idaho

Power, plowed	30	C	19-24	Silt loam, loam, very fine sandy loam	CL, CL-ML	A-6, A-4	0-0-0	0-0-0	95-100	90-100	80-95
			24-38	Cemented material	—	—	—	—	—	—	—
			38-60	Stratified sand to loam	SC-SM, CL, SM	A-4, A-1	0-0-0	0-0-5	80-95	75-90	45-65
			0-6	Silt loam	CL	A-6	0-0-0	0-0-0	100-100	95-100	90-95
			6-9	Silt loam	CL	A-6	0-0-0	0-0-0	100-100	95-100	90-95
			9-12	Silty clay loam, silt loam	CL	A-7, A-6	0-0-0	0-0-0	100-100	95-100	90-95
			12-17	Silty clay loam, silt loam	CL	A-6	0-0-0	0-0-0	100-100	95-100	90-95
			17-21	Loam, silt loam	CL	A-4, A-6	0-0-0	0-0-0	100-100	95-100	90-95
			21-38	Paragravelly loam, loam, silt loam, very fine sandy loam, paragravelly silt loam	CL	A-4, A-6	0-0-0	0-0-0	100-100	95-100	90-95
			38-50	Loam, paragravelly silt loam, paragravelly loam, silt loam, very fine sandy loam	CL	A-6, A-4	0-0-0	0-0-0	100-100	95-100	90-95
50-60	Very fine sandy loam, fine sandy loam, loam, silt loam	CL-ML, CL	A-4, A-6	0-0-0	0-0-0	95-100	90-95	85-90			

Description — Engineering Properties

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007 (<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in

diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-33579
REVIEWER	Chelsey Serrano
DATE	9/8/2017

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:
P = Precipitation
ET = Evapotranspiration
P _d = Precipitation deficit
P _d = ET - P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at <X:/Spatial/Climate/ETIdahostations.shp>.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Boise WSFO Airport (NWS -- 101022)

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.66	31	0.00
Feb	0.08	28	2.24
March	0.74	31	22.94
April	2.01	30	60.30
May	2.65	31	82.15
June	4.05	30	121.50
July	4.79	31	148.49
August	4.05	31	125.55
September	2.79	30	83.70
October	1.54	31	47.74
November	-0.43	30	0.00
December	-0.89	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 694.61

$$[(694.61 \text{ mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

$$(694.61 \div 304.8) \times 0.66 = 1.5 \text{ AFA}$$

Seepage Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total annual seepage losses from a pond.

FILE NUMBER	63-33579
REVIEWER	Chelsey Serrano
DATE	9/8/2017

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.66	AC.
-------------------------	------	-----

Pond Surface Area (SQ. FT.)	28750	SQ. FT.
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I used the following method to obtain my Soil Classification information:	NRCS Web Soil Survey	
My Soil Classification is	GP	
Suggested Seepage Rate (FT./DAY)	0.2000	FT./DAY

Formula: (Surface Area X Seepage Rate) X 7.48 = Gallons Per Day Loss		
--	--	--

Convert to GPD	43009	GPD
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Total Seepage Loss (AFA)	48.2	AFA
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Though sand and gravel seepage rates may actually be higher, the maximum allowable rate is 0.2 ft/day, pursuant to Administrative Memo "Seepage Loss Standards for Ponds and Reservoirs."

Suggested Seepage Rates for Different Soil Types:

GW, GP, GM, GC, SW, SP and SM (silty sand, sand silt mixtures and gravel mixtures) = 0.2 ft per day

OL and ML (inorganic silts - very fine sands, silty, or clayey fine sands) = 0.02 ft per day

SC (clayey sands, sand clay mixtures) = 0.007 ft per day

CL (Low to medium plasticity clays) = 0.003 ft per day

MH, OH, PT and CH (high plasticity clays) = 0.0003 ft per day

LINED PONDS (liners can be chemical, fabric, or bentonite) = 0 ft per day

Ponds Intercepting Groundwater (excavated ponds filled by ground water) = 0 ft per day

PLEASE NOTE: The initial basis for the Suggested Seepage Rates in the table above is found on Page 16 of Seepage from Fish Ponds, Bulletin 599, August 1989 Alabama Agricultural experiment Station, Auburn University, Auburn University Alabama. If you don't know the soil type, please refer to the map provided at the NRCS Web Soil Survey (Tab #1), an ArcMap Soil Classification Map (Tab #1.1), or published NRCS Soil Survey (Tab #1.2). Use "0" if the pond fill relies on the water table.

Total Storage Calculations

FILE NUMBER	63-33579
REVIEWER	Chelsey Serrano
DATE	9/8/2017

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total seepage, evaporation and fill capacity required for a pond.

User Input
Calculated value
Formula Explanations

Surface Area (AC.)	0.66	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	5.5	"Average Pond Depth" depicts the actual depth of the pond either measured or estimated. Note: If you know the maximum depth and not the average depth, the Field Examiner's Handbook suggests multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that seems reasonable to attain average depth.
Pond Capacity (AF)	3.63	Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth. If you know the capacity, divide the capacity by surface area and enter the average pond depth in the space above. Note: If pond capacity is determined using a method shown on the "Pond Capacity" sheet, the user may need to modify the value of "Pond Capacity" (cell B9) manually. Note that if the value is modified manually, the formula will be altered for future use.
Multiple Fill Volume Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (AF)	5	The "Multiple Fill Volume Above Initial Fill" is the acre-feet of water required to meet a <i>from storage</i> component if the <i>from storage</i> component exceeds a one time fill. This section should not include the amount of water needed to fill the pond initially or the amount of water needed to maintain the pond level due to evaporation or seepage. For example: if a pond has a capacity of 5 acre feet and 2.5 acre feet of seepage and evaporation, but the pond is used for irrigation that requires 10 acre feet of from storage for the irrigation use, then you would insert 5 acre feet into this location (10 acre feet needed - 5 acre feet from the initial fill = 5 acre feet of additional storage needed). Note: You must have a "From Storage" component exceeding the initial fill on the permit to include a volume in this space.
Estimated Seepage Loss (AF)	48.2	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	1.5	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	58.3	The "Total Volume Required" is calculated by adding the Pond Capacity, Multiple Fills, Seepage Loss, and Evaporation Loss amounts to determine the total amount of storage required.

Flow Rate into Pond (CFS)	1.00	The "Flow Rate into Pond" depicts the actual flow, either measured or estimated, into the pond. For offstream facilities, this will be equivalent to "diversion to storage" rate.
Highest Daily Evaporation Rate From Evaporation Tab. (mm/Day)	4.79	This number is carried over from the "Evaporation Loss" sheet. It is the highest recorded number in the "Precipitation Deficit Table".
Required Daily Maintenance Volume (AF/Day)	0.14	"Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year to maintain pond volume. It is calculated by adding the highest daily evaporation loss to the average daily seepage loss in acre feet. The average daily seepage loss is calculated by dividing the "Estimated Seepage Loss" by 365 days. This is acceptable, since the seepage rate shouldn't vary throughout the season unless the pond completely freezes over during the winter months. The highest daily evaporation loss is calculated by dividing the Highest Daily Evaporation Rate by the 304.8 conversion factor and multiplying this number by the pond surface area to attain a combined daily acre feet requirement.
Minimum Maintenance Flow (CFS)	0.07	The "Minimum Maintenance Flow" is the minimum amount of flow required to maintain the level of the pond. This number is determined by dividing the "Maximum Required Daily Maintenance Volume" by 1.9835. This flow can be used to determine if the flow rate into the pond is adequate to maintain the pond level.
Days Required to Fill the Pond	2	The "Days Required to Fill the Pond" is calculated by dividing the "Pond Capacity" by the "Flow Rate" minus "Minimum Maintenance Flow" multiplied by 1.9835. This section will assist you in determining if the flow rate being diverted to the pond is adequate to fill the pond while maintaining the pond level. The length of time to fill the pond will help determine if the flow rate is adequate for the size of pond being proposed. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond.
Days Required to Fill the Pond at 13,000 Gallons per Day	-35	Some water users may want to fill a pond under the 13,000 gallons per day domestic exemption. The "Days Required to Fill the Pond at 13,000 Gallons per Day" is calculated by converting the "Pond Capacity" and the "Required Daily Maintenance Volume" to gallons. The "Pond Capacity" is then divided by 13,000 gallons minus the "Required Daily Maintenance Volume" in gallons to determine the number of days to fill pond. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond. Negative values indicate that the supply of 13,000 gallons per day is not enough volume to overcome the required daily maintenance volume; the pond will never fill.