

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2019-0015
WASTE DISCHARGE REQUIREMENTS

FOR

UNIVERSITY OF CALIFORNIA, DAVIS
CENTER FOR AQUATIC BIOLOGY AND AQUACULTURE AQUATIC CENTER
PUTAH CREEK FACILITY
YOLO COUNTY

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) finds that:

1. On 3 August 2017, University of California, Davis (Discharger or UCD) submitted a Report of Waste Discharge (RWD) that describes wastewater production and disposal at the Center for Aquatic and Aquaculture Putah Creek Facility (Facility), an academic fish aquaculture testing and research laboratory. Additional information was submitted on 30 May 2018, 5 June 2018, and 19 December 2018.
2. The Discharger owns and operates the Facility and is responsible for compliance with these WDRs.
3. The Facility is located at 840 Wildlife Way, Davis, in Section 24, T8N, R1E, MDB&M. The Facility occupies Assessor's Parcel Number (APN) 037-190-09, as shown on Attachment A, which is incorporated herein and made part of this Order by reference.
4. WDR Order R5-2012-0053 (NPDES Permit CA0083348) and Time Schedule Order (TSO) R5-2012-0054, adopted on 8 June 2012, prescribed requirements for the Facility to discharge to four retention ponds and Putah Creek. The Discharger ceased discharge to Putah Creek in November 2014 and since then only discharges to a series of on-site retention ponds. WDRs Order R5-2012-0053 also regulated wastewater discharge from the Center for Aquatic and Aquaculture Aquatic Center, which is now regulated under separate WDRs. Therefore, Order R5-2012-0053 and TSO R5-2012-0054 will be rescinded and replaced with this Order.

Existing Facility and Discharge

5. The Facility is an academic aquaculture research facility, which is focused on nutrition, physiology, engineering, and related research of many fish varieties. The Facility consists of a wide array of aboveground tanks ranging in size from less than 10 gallons to over 2,500 gallons. Most of the tanks are used to breed and raise fish on an as-needed basis. These tanks operate under continuous flow conditions and may be in operation year-round. A designated sub-group of tanks are used to study nutrition and physiological factors (e.g., salt concentration, temperature, or turbidity) on fish. These tanks operate under partial recirculation and contain biological filtration media to remove ammonia and nitrate.
6. The Facility operates year-round and maintains a continuous flow of water with minimal recirculation, with a typical influent flow rate of 0.4 million gallons per day (MGD) based on historical water use from 2010 to 2015, with a maximum capacity of 1.4 MGD.

7. Source water for the Facility is provided by groundwater from Supply Well G6A and surface water from a campus irrigation water basin. Supply Well G6A was installed in 2017 and is operated, maintained, and monitored by the UCD Utilities Department. Supply Well G6A was installed to a total depth of 355 feet below ground surface (bgs) and is screened from 205 to 225 feet and 240 to 260 feet bgs. The groundwater supply from G6A is high in dissolved nitrogen gas and low in dissolved oxygen. The Facility adds oxygen and removes nitrogen by routing the well water through a column aerator/degassing system prior to use in the tanks. Previously, groundwater was provided by Well G6. The water quality of the two supply wells is similar. Well G6 is only used as an emergency backup water source as this older well has begun producing sand and gravel.

Surface water is supplied to the Facility by the Solano County Water Agency from Lake Berryessa. Water from Lake Berryessa flows into Putah Creek, gets diverted to UCD via an underground pipeline, and is stored in an irrigation basin adjacent to the Facility. The basin serves as an emergency backup if the active pipeline fails.

Generally, the surface water supply is of better quality with lower levels of nitrogen, total dissolved solids and electrical conductivity, and higher levels of oxygen compared to the groundwater. However, high turbidity in the surface water supply occurs during periods of heavy rainfall and during late spring irrigation. The Solano County Water Agency also periodically applies copper sulfate as an algacide during the summer months. During these times, a lower ratio of surface water to groundwater may be used. Source water quality of Well G6A and surface water is summarized in the table below.

Constituent	Units	Well G6A ¹	Surface Water Supply ²
Fixed Dissolved Solids	mg/L	220	200
Electrical Conductivity	µmhos/cm	560	412
Total Kjeldahl Nitrogen as N	mg/L	<0.1	0.51
Ammonia Nitrogen as N	mg/L	<0.1	<0.11
Nitrate as N	mg/L	3.3	1.9
pH	pH Units	7.7	7.8
Total Chromium	µg/L	26	1.0

¹ Average concentration from monitoring results sampled in February and March 2017.

² Monitoring results from May 2016.

8. The following table summarizes the amendments that are added to fish holding tanks for various uses.

Amendment	Use	Maximum Concentration
Commercial Fish Feed	Maintaining fish broods	
Iodine	Disinfectant to prevent cross-contamination between fish species	60 mg/L
Sodium hypochlorite (bleach)	Tank equipment disinfectant	200 mg/L at application point

Amendment	Use	Maximum Concentration
Sodium metabisulfite	Neutralize bleach after cleaning	540 mg/L at application point
Sodium chloride	Used occasionally to reduce fish stress and as an ectoparasite treatment.	<ul style="list-style-type: none"> • 3,000 mg/L concentration in a single tank to mimic natural conditions for stress relief. • 5,000 mg/L in tanks for treatment of ectoparasites.
Muriatic Acid	Hard water scale removal	200 mg/L at application point

In addition, the occasional use of various aquaculture pharmaceuticals and chemicals is necessary to support the health and productivity of cultured aquatic stocks. Chemicals or pharmaceuticals authorized by the Central Valley Water Board are listed in the table below:

Ammonium Chloride	Amoxicillin	Chloramine T	ChlorAm-X by Hikari
Erythromycin	Florfenicol	Formaldehyde	Hydrogen peroxide
Ich-X by Hikari	Instant Ocean Sea Salt	Methylene Blue	Metronidazole
MS-222	Natural Solar Salt	Ovadine	Oxytetracycline
Ozone	Potassium Permanganate	PraziPro by Hikari	Prime by Seachem
Romet-30	Sodium Thiosulfate	Stress-X by Hikari	

Based on information provided in the RWD, the periodic use and resulting concentrations of these chemicals are not expected to pose a threat to groundwater.

9. Wastewater from the tanks is discharged to a series of unlined retention ponds. The ponds are subgrade and named Beaver Pond, Curve Pond, Basin 1, Basin 2, and Basin 3. As shown on Attachment B, wastewater is initially discharged to Beaver Pond. Effluent from Beaver Pond flows to Curve Pond and then depending on the water levels to either Basin 1 or Basin 2. Water can flow from Basin 1 to either Basin 2 or Basin 3.

The following table summarizes the pond design data provided in the RWD submitted in August 2017.

Pond	Surface Area (feet ²)	Depth (feet)	Infiltration Capacity (MGD) ¹	Depth to Groundwater (feet)
Beaver Pond	38,765	6	0.06	44.1
Curve Pond	13,044	6	0.02	43.1
Basin 1	102,861	6	2.0	44.1
Basin 2	28,911	6	0.57	44.1
Basin 3	121,625	2	3.2	48.1

¹ Based on 2015 infiltration testing and soils data in the area.

10. Below is a summary of effluent data collected quarterly from 2012-2014 and one additional sampling event in 2016:

Constituent	Units	Average Effluent Quality (2012-2014) ¹ (Min. – Max.)	Effluent (May 2016)
Hardness, Ca (as CaCO ₃)	mg/L	346 (325 – 389)	---
Biochemical Oxygen Demand	mg/L	---	<6
Total Dissolved Solids	mg/L	382 (295 – 510)	423
Total Suspended Solids	mg/L	9.7 (5.0 – 27)	---
Fixed Dissolved Solids	mg/L	---	330
Electrical Conductivity	µmhos/cm	657 (603 – 768)	676
Chloride	mg/L	19 (14 – 26)	
Iron	mg/L	143 (20 – 430)	---
Total Kjeldahl Nitrogen as N	mg/L	---	0.47
Ammonia Nitrogen as N	mg/L	---	0.14
Nitrate as N	mg/L	---	5.2
pH	pH Units	8.0 (8.0 – 8.1)	7.9
Sodium hypochlorite	mg/L	---	<2
Muriatic Acid	mg/L	---	<2
Chromium (VI)	µg/L	11.5 (7.8 – 15)	13.5
Total Chromium	µg/L	---	15.4

¹ Monitoring data collected from 2012 through 2014 from GW-001 and GW-002 under the NPDES No. CA0083348.

11. Storm water runoff is maintained on site and the RWD provides a water balance based on a 100-year annual precipitation storm event. Based on the water balance, the maximum disposal capacity of the ponds is 5.7 MGD. The Facility's maximum discharge rate is 1.4 MGD, which is below the disposal capacity of the ponds. Based on data collected at the reference weather station Davis C records (Station No. 24863) from 1908 to 2017, the 100-year return period annual total is 36 inches of rain, which occurred in the 2016-2017 water year. The Discharger states the water level in all ponds did not exceed the 2-foot freeboard mark during the 2016-2017 water year.
12. Domestic wastewater generated from the Facility is discharged to on-site septic systems permitted through Yolo County.
13. On 16 January 2019, the Discharger submitted a Flow Meter Installation and Calibration Report documenting that a flow meter has been installed downstream of the wastewater discharge before entering Beaver Pond. This flow meter will be used in determining compliance with the Flow Limitations of this Order.

Site-Specific Conditions

14. The Facility is located west of Highway 113 and is part of the West Campus of UCD located in the Putah Creek Plain of the Sacramento River Valley. The disposal ponds are not located within Zone-A of the Federal Emergency Management Agency (FEMA) 100-year flood plain according to the 2017 FEMA map.
15. Soils are composed of sediment from erosion of the Sierra Nevada in the east, and the Coast Range west deposited in the Sacramento River Valley by rivers and streams. Sediments that form these alluvial fan deposits consist primarily of silts and clays with coarse-grained sediments occurring locally. The thickness of the alluvial fan deposits is reported to be between 140 feet and 180 feet. Soils are characterized as having a moderate to high percolation rate. The Discharger conducted infiltration tests and determined infiltration rates for the disposal ponds are between 0.2 to 3.54 feet per day according to the RWD.
16. The Facility is located in the west campus area with agriculture research fields to the west and a former Class III UCD landfill to the north and east, as shown on Attachment B. The agricultural field crops change regularly based on research needs. The former landfill began operations in 1966 and consists of two waste management units (WMU-1 and WMU-2), which were closed in 2011. The landfill is currently regulated under Title 27 post-closure conditions, which includes groundwater monitoring near and to the west of the WMUs. The west campus area also contains various research facilities and an airport. Basin 1, Basin 2, and Basin 3 were previously used as storm water storage ponds for the WMU-1 under the statewide General Permit for Storm Water Discharges Associated with Industrial Activities, State Water Board Order 2014-0057 DWQ. Since 2000, WMU-1 has been formally closed and is now operated under an approved post-closure maintenance plan. A vegetation layer has been well established, and storm water runoff from the WMU-1 is no longer directed to Basins 1, Basin 2, or Basin 3.

Groundwater Conditions

17. The 2011 Groundwater Monitoring and Reporting Program Evaluation for the former Class III UCD landfill was included as part of the RWD. There are 40 groundwater monitoring wells associated with the former landfill to the east. The evaluation states that groundwater beneath the Facility has three hydrostratigraphic units referred to as the A-zone, B-zone, and C-zone. The A-zone and B-zone form the upper and lower units, respectively, of the Putah Creek Fan. The C-zone forms the lower unit of the Tehama Formation. The A-zone is composed predominantly of fine-grained silts and clays. The average gradient value for the A-zone is 0.0027 feet/feet and the average seepage velocity ranges from 40 feet per year to 70 feet per year.

The B-zone and C-zone are composed of the coarser gravel deposits and represent aquifers that are used as a source of water for UCD. The lower unit of the Putah Creek Fan (B-zone) is very permeable whereby wells completed in this unit have high specific capacities. The average gradient value for B-zone is 0.0015 feet/feet and the average seepage velocity is 1,214 feet per year. Wells completed within the gravel unit of the Tehama Formation (C-zone) are reported to have lower specific capacities than those completed within the B-zone. The 2011 groundwater evaluation report indicated that the average gradient for the C-zone is 0.0028 feet/feet and the average seepage velocity is 375 feet per year.

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18. A 2017 Technical Memorandum for Groundwater Degradation Evaluation was also included as part of the RWD to evaluate potential impacts presented by groundwater recharge resulting from the discharge to Basins 1, Basin 2, and Basin 3. Information provided in the Technical Memorandum demonstrated that discharge to Basins 1, Basin 2, and Basin 3 has not impacted the shallow groundwater gradient flow direction or the migration in groundwater of constituents of concern associated with the former UCD landfill.
19. The Facility has four groundwater monitoring wells GW-001, GW-002, GW-006, and GW-007 to characterize groundwater at the site. GW-006 and GW-007 are located close to the former landfill (as shown in Attachment B) and are included in the groundwater monitoring program for the former landfill. The average depth to groundwater is 53.5 feet bgs, based on monitoring data from 2012 to 2016. The highest groundwater elevation in the groundwater monitoring wells was 35.5 feet amsl, corresponding to a depth to groundwater of 38.7 feet bgs in monitoring well GW-001. The downgradient direction of groundwater is to the east.
20. Groundwater monitoring data for GW-001 and GW-002, GW-006 and GW-007 are summarized below. Monitoring well GW-001 is the most upgradient and was also used to provide an indication of background groundwater quality at the Facility.

Constituent	Units	Groundwater Quality Avg. (Min. – Max.)			
		GW-001 ¹	GW-002 ¹	GW-006 ²	GW-007 ²
pH	pH units	7.5 (7.4–7.7)	7.3 (7.2–7.5)	7.1 (6.7–7.3)	6.8 (6.6–7.1)
Total Nitrogen	mg/L	3.5 (nd –8.7)	2.1 (1.1–3.1)		
Nitrates (as N)	mg/L	3.0 (nd–8.7)	2.1 (1.0–3.1)	4.0 (2.3–5.1)	12 (1.4–33)
Total Kjeldahl Nitrogen (as N)	mg/L	0.26 (nd–0.38)	0.25 (nd–0.33)		
Total Dissolved Solids	mg/L	383 (206 – 485)	502 (364 – 632)	482 (350 – 695)	622 (425 – 840)
Electrical Conductivity	umhos/cm	676 (540–940)	885 (700–1200)	840 (620–1200)	1044 (722–1500)
Chromium (VI)	µg/L	7.4 (1.9 – 13)	14 (nd – 69)	2.2 (nd – 4)	8.0 (nd – 11)
Chromium Total	µg/L	24 (7.0 – 147)	47 (5.8 – 540)	35 (nd – 330)	44 (nd – 370)

¹ Monitoring data collected from 2007 through 2018 from GW-001 and GW-002 under the NPDES No. CA0083348.

² Monitoring data collected from 2012 through 2016 from GW-006 and GW-007 for the Class III Landfill Monitoring Requirements, and monitoring data collected from 2012 through 2018 under the NPDES No. CA0083348.

³ Only one sample was analyzed for the monitoring parameter between 2011 and 2016.

Basin Plan, Beneficial Uses, and WQOs

21. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, (Basin Plan) designates beneficial uses, establishes WQOs, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Board. Pursuant to Water Code section 13263(a), waste discharge requirements must implement the Basin Plan.
22. Local drainage is to Putah Creek, the beneficial uses of which (per the *Basin Plan*) include: municipal and domestic supply (MUN); agricultural supply (AGR); industrial process supply (PRO); hydropower generation (POW); water contact recreation (REC-1); non-contact water

recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); wildlife habitat (WILD); and spawning, reproduction, and/or early development (SPWN).

23. The beneficial uses of underlying groundwater as set forth in the Basin Plan are municipal and domestic supply (MUN), agricultural supply (AGR); industrial service supply (IND); and industrial process supply (PRO).
24. The Basin Plan establishes narrative WQOs (WQO) for chemical constituents, tastes and odors, and toxicity in groundwater. It also sets forth a numeric objective for total coliform organisms.
25. The Basin Plan's numeric WQO for bacteria requires that the most probable number (MPN) of coliform organisms over any seven-day period shall be less than 2.2 per 100 mL in MUN groundwater designated as supporting the MUN beneficial use.
26. At a minimum, the Basin Plan's narrative WQO for chemical constituents, requires waters designated as supporting the MUN beneficial use to meet the MCLs specified in California Code of Regulations, title 22 (Title 22). The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.
27. The narrative WQO for toxicity requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, animal, plant, or aquatic life associated with designated beneficial uses.
28. Quantifying a narrative WQO requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses. The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numeric limits in order to implement the narrative objective.

In the absence of specific numeric WQO, the Basin Plan methodology is to consider any relevant published criteria. General salt tolerance guidelines, such as Water Quality for Agriculture by Ayers and Westcot and similar references indicate that yield reductions in nearly all crops are not evident when irrigation water has an EC less than 700 $\mu\text{mhos/cm}$. There is, however, an eight- to ten-fold range in salt tolerance for agricultural crops and the appropriate salinity values to protect agriculture in the Central Valley are considered on a case-by-case basis.

29. The Central Valley Water Board adopted Basin Plan amendments incorporating new programs for addressing ongoing salt and nitrate accumulation in the Central Valley at its 31 May 2018 Board Meeting. These programs, once effective, could change how the Central Valley Water Board permits discharges of salt and nitrate. For nitrate, dischargers that are unable to comply with stringent nitrate requirements will be required to take on alternate compliance approaches that involve providing replacement drinking water to persons whose drinking water is affected by nitrates. Dischargers could comply with the new nitrate program either individually or collectively with other dischargers. For salinity, dischargers that are unable to comply with stringent salinity requirements would instead need to meet performance-based requirements and participate in a basin-wide effort to develop a long-term

salinity strategy for the Central Valley. This Order may be amended or modified to incorporate any newly-applicable requirements.

30. The stakeholder-led Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative has been coordinating efforts to implement new salt and nitrate management strategies. The Board expects dischargers that may be affected by new salt and nitrate management policies to coordinate with the CV-SALTS initiative.

Antidegradation Analysis

31. State Water Resources Control Board's (State Water Board) *Statement of Policy with Respect to Maintaining High Quality Waters of the State*, Resolution 68-16 (Antidegradation Policy) prohibits degradation of groundwater unless it has been shown that such degradation:
 - a. Is consistent with the maximum benefit to the people of the State of California;
 - b. Will not unreasonably affect present and anticipated future beneficial uses of water;
 - c. Will not result in water quality less than as prescribed in State Water Board and Central Valley Water Board policies (including violation of WQOs); and
 - d. Is minimized through application of best practicable treatment or control (BPTC).
32. Because the Discharger began monitoring groundwater quality at the site in 2007, it is impossible to determine pre-1968 groundwater quality with existing data. Therefore, determination of compliance with the Antidegradation Policy for the Facility must be based on background groundwater quality.
33. Based on the provided effluent and groundwater data, the discharge has shown no increase in electrical conductivity, total dissolved solids, or nitrate nitrogen when compared to background and source water quality; therefore the discharge is not expected to cause degradation of groundwater. Monitoring data for GW-007 has shown increased level of electrical conductivity, total dissolved solids, or total nitrate, which may be affected by the nearby agriculture research fields and close proximity to the former landfill. Effective source control, treatment, and control measures are required to be implemented to maintain current effluent quality.
34. Based on the 2017 Groundwater Degradation Evaluation, the infiltration of effluent from the Facility has not resulted in the degradation of groundwater quality, particularly with respect to chloroform. Increasing effluent discharge to infiltration basins up to Facility's permitted annual flow limit of 511 MG will not result in degradation of groundwater.
35. Aquaculture chemicals for tank cleaning or antibiotics for aquatic husbandry are used in batches and are discharged at concentrations not expected to pose a threat to groundwater. However, the use of these chemicals, as listed in Finding. No. 8 and any additional chemicals upon approval from the Central Valley Water Board, must be reported as specified in the Monitoring and Reporting Program (MRP) No. R5-2019-0015.
36. This Order establishes effluent and groundwater limitations for the Facility that will not unreasonably affect present and anticipated beneficial uses or result in groundwater quality that exceeds WQOs set forth in the Basin Plan.

37. The Discharger provides treatment and control of the discharge that incorporates:
 - a. Adding minimal chemical amendments to the source water during fish experiments to maintain a healthy environment.
 - b. Adding oxygen and removing nitrogen by routing the source well water through a column aerator/degassing system prior to use in the tanks.
38. The activities described above represent BPTC of the discharges of wastewater authorized under this Order. This Order also establishes operational requirements, limitations, and prohibitions that will ensure that the discharge will not unreasonably affect present and anticipated beneficial uses of groundwater or result in groundwater quality less than that prescribed in state and regional policies.

Other Regulatory Considerations

39. Pursuant to Water Code section 106.3, subdivision (a), it is “the established policy of the state that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.” Although this Order is not necessarily subject to Water Code section 106.3 because it does not revise, adopt or establish a policy, regulation or grant criterion (see § 106.3, subd. (b)), it nevertheless promotes that policy by requiring discharges to meet MCLs designed to protect human health and ensure that water is safe for domestic use.
40. For the purposes of California Code of Regulations, title 23 (Title 23), Facility’s discharges have a threat-complexity rating of “3C,” where:
 - a. Threat Category 3 reflects “discharges of waste that could degrade water quality without violating WQOs, or could cause a minor impairment of designated beneficial uses as compared with Category 1 and Category 2.”
 - b. Complexity Category C is assigned to “[a]ny discharger for which waste discharge requirements have been prescribed pursuant to Section 13263 of the Water Code not included in Category A or Category B as described above. Included are dischargers having no waste treatment systems or that must comply with best management practices, dischargers having passive treatment and disposal systems, or dischargers having waste storage systems with land disposal.”
41. This Order, which prescribes WDRs for discharges of wastewater, is exempt from the prescriptive requirements of California Code of Regulations, title 27, section 20005 et seq. (See Cal. Code Regs., tit. 27, § 20090, subd. (b).)
42. Statistical data analysis methods in the U.S. EPA’s 2009 *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance (Unified Guidance)* or other equivalent statistical approach are appropriate for determining whether the discharge complies with Groundwater Limitations of this Order.

43. Water Code section 13267(b)(1) states:

[T]he regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region ... shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

44. The technical reports required by this Order and the attached MRP No. R5-2019-0015 are necessary to ensure compliance with these WDRs. The burden of producing such reports is also reasonable relative to the need for their submission.
45. Existing Department of Water Resources (DWR) standards for the construction and destruction of groundwater wells, as well as any more stringent standards that are subsequently adopted, shall apply to all monitoring wells used to monitor impacts of wastewater storage or disposal governed by this Order. (See Cal. *Well Stds. Bulletin 74-90* [DWR, June 1991]; *Water Well Stds. Bulletin 94-81* [DWR, Dec. 1981].)
46. The Central Valley Water Board's adoption of this Order, which prescribes WDRs for existing discharges from an existing facility, is exempt from the California Environmental Quality (CEQA), in accordance with the CEQA Guidelines. (See Cal. Code Regs., tit. 14, § 15301.)
47. Compliance with this Order will mitigate or avoid significant impacts to water quality.
48. Pursuant to Water Code section 13263, subdivision (g), the ability to discharge waste is a privilege, not a right, and adoption of this Order shall not be construed as creating a vested right to continue discharging waste.

Public Notice

49. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.
50. The Discharger and interested agencies and persons have been notified of the Central Valley Water Board's intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity to submit written comments and an opportunity for a public hearing.
51. All comments pertaining to the discharge were heard and considered in a public hearing.

IT IS HEREBY ORDERED that Order R5-2012-0053 and Time Schedule Order R5-2012-0054 are rescinded and, pursuant to Water Code sections 13263 and 13267, the University of California, Davis, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.
2. Discharge of “hazardous waste”, as defined per Title 22, section 66261.1 et seq., is prohibited.
3. Discharge of waste at a location or in a manner different from that described in the Findings is prohibited.
4. The discharge of toxic substances into the wastewater ponds or basins is prohibited.
5. The discharge of storm water into the wastewater ponds or basins is prohibited.

B. Flow Limitations

1. **Effectively immediately**, wastewater discharge to the following discharge areas shall not exceed the specified flow limits:

Discharge Area	Total Annual Flow Limit ¹
Beaver Pond	511 MG

¹ As determined by the total flow for the calendar year.

C. Effluent Limitations

1. Wastewater discharged to the Beaver Pond shall not exceed the following effluent limit. Compliance shall be determined based on the effluent sampling location depicted in **Attachment B**.

Constituent	Units	Limit	Basis for Compliance Determination
Total Dissolved Solids	mg/L	500	Annual Average

2. Compliance with the above requirements shall be determined as specified in the MRP No. R5-2019-0015.

D. Discharge Specifications

1. No waste constituent shall be released, discharged, or placed where it will cause a violation of the Groundwater Limitations of this Order.
2. Wastewater treatment, storage, and disposal shall not cause pollution or a nuisance as defined by Water Code section 13050, subdivisions (l)-(m).
3. The discharge shall remain within the permitted wastewater treatment and containment structures at all times.

4. The Discharger shall operate all systems and equipment to optimize the quality of the discharge.
5. All conveyance, treatment, storage, and disposal systems shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
6. Operating freeboard for any pond or basin shall never be less than two feet (measured vertically from the lowest possible point of overflow). As a means of management and to discern compliance with this requirement, the Dischargers shall install and maintain in each pond a permanent staff gauge with calibration marks that clearly show the water level at design capacity and enable determination of available operational freeboard.
7. Wastewater treatment, storage, and disposal ponds or structures shall have sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration during the winter while ensuring continuous compliance with all requirements of this Order. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
8. On or about **1 October** of each year, available capacity shall at least equal the volume necessary to comply with Discharge Specifications D.6 and D.7.
9. All ponds and open containment structures shall be managed to prevent breeding of mosquitoes. Specifically:
 - a. An erosion control program shall be implemented to ensure that small coves and irregularities are not created around the perimeter of the water surface.
 - b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.
 - c. Dead algae, vegetation, and debris shall not accumulate on the water surface.
 - d. The Discharger shall consult and coordinate with the local Mosquito Abatement District to minimize the potential for mosquito breeding as needed to supplement the above measures.
10. Newly constructed or rehabilitated berms or levees (excluding internal berms that separate ponds or control the flow of water within a pond) shall be designed and constructed under the supervision of a California Registered Civil Engineer.

E. Groundwater Limitations

Release of waste constituents from any portion of the Discharger shall not cause groundwater to:

1. Contain constituents in concentrations that exceed either the Primary or Secondary MCLs established under Title 22.
2. Contain taste or odor-producing constituents, toxic substances, or any other constituents in concentrations that cause nuisance or adversely affect beneficial uses.

F. Provisions

1. The following reports shall be submitted pursuant to Water Code section 13267 and shall be prepared as described in Provision F.3:
 - a. **At least 90 days** prior to using new drugs or chemicals, the Dischargers shall submit a report the Central Valley Water Board. The report shall contain the following information:
 - i. The common name(s) and active ingredient(s) of the drug or chemical proposed for use and discharge;
 - ii. The purpose for the proposed use of the drug or chemical (i.e., list the specific disease for treatment and specific species for treatment);
 - iii. The amount proposed for use and the resulting calculated concentration in the discharge;
 - iv. The duration and frequency of the proposed use;
 - v. Material Safety Data Sheets and available toxicity information; and
 - vi. Any related Investigational New Animal Drug (INAD), New Animal Drug Application (NADA) information, extra-label use requirements, and/or veterinarian prescriptions.
2. A discharger whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment, collection, and disposal facilities. The projections shall be made in January, based on the last three years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in four years, the discharger shall notify the Central Valley Water Board by **31 January**.
3. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.
4. The Discharger shall submit the technical reports and work plans required by this Order for consideration by the Executive Officer and incorporate comments the Executive Officer may have in a timely manner, as appropriate. Unless expressly stated otherwise in this Order, the Discharger shall proceed with all work required by the foregoing provisions by the due dates specified.
5. The Discharger shall comply with MRP No. R5-2019-0015, which is part of this Order, and any revisions thereto as ordered by the Executive Officer. The submittal dates of

Discharger self-monitoring reports shall be no later than the submittal date specified in the MRP.

6. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and made part of this Order by reference. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."
7. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports. On or before each report due date, the Discharger shall submit the specified document to the Central Valley Water Board or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharger shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board in writing when it returns to compliance with the time schedule. Violations may result in enforcement action, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.
8. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also include adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the Discharger when the operation is necessary to achieve compliance with the conditions of this Order.
9. The Discharger shall use the best practicable cost-effective control technique(s) including proper operation and maintenance, to comply with this Order.
10. As described in the Standard Provisions, the Discharger shall report promptly to the Central Valley Water Board any material change or proposed change in the character, location, or volume of the discharge.
11. The Discharger shall not allow pollutant-free wastewater to be discharged into the wastewater collection, treatment, and disposal systems in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.
12. At least **90 days** prior to termination or expiration of any lease, contract, or agreement involving disposal or recycling areas or off-site reuse of effluent, used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Central Valley Water Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.
13. In the event of any change in control or ownership of the Facility, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.

14. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. If approved by the Executive Officer, the transfer request will be submitted to the Central Valley Water Board for its consideration of transferring the ownership of this Order at one of its regularly scheduled meetings.
15. A copy of this Order including the MRP, Information Sheet, Attachments, and Standard Provisions, shall be kept at the Facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.
16. The Central Valley Water Board will review this Order periodically and will revise requirements when necessary.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order may result in the assessment of Administrative Civil Liability of up to \$10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

I, PATRICK PULUPA, Executive Officer, hereby certify that the foregoing is a full true, and correct copy of an Order adopted by the California Regional Water Quality Control Board on 8 February 2019.

- Original signed by -

PATRICK PULUPA, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2019-0015

FOR

UNIVERSITY OF CALIFORNIA, DAVIS
CENTER FOR AQUATIC BIOLOGY AND AQUACULTURE AQUATIC CENTER
PUTAH CREEK FACILITY
YOLO COUNTY

The Monitoring and Reporting Program (MRP) for University of California Davis (Discharger) is issued pursuant to Water Code Section 13267. A glossary of terms used in this MRP is included on the last page.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. Except as specified otherwise in this MRP, grab samples will be considered representative of water, wastewater, soil, solids/sludges, and groundwater.

The time, date, and location of each sample shall be recorded on the sample chain of custody form. All analyses shall be performed in accordance with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements*, 1 March 1991 ed. (SPRRs). Field test instruments (such as those used to measure pH, electrical conductivity, dissolved oxygen, wind speed, and precipitation) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. The instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of the MRP.

Laboratory analytical procedures shall comply with the methods and holding times specified in the following (as applicable to the medium to be analyzed):

- *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA);
- *Test Methods for Evaluating Solid Waste* (EPA);
- *Methods for Chemical Analysis of Water and Wastes* (EPA);
- *Methods for Determination of Inorganic Substances in Environmental Samples* (EPA);
- *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF); and
- *Soil, Plant and Water Reference Methods for the Western Region* (WREP 125).

Approved editions shall be those that are approved for use by the U.S. Environmental Protection Agency or the State Water Resources Control Board's Environmental Laboratory Accreditation Program (ELAP). The Dischargers may propose alternative methods for approval by the Executive Officer. Where technically feasible, laboratory reporting limits shall be lower than concentrations that implement applicable water quality objectives/limits for the constituents to be analyzed.

If monitoring consistently shows no significant variation in a constituent concentration or parameter after at least 8 consecutive monitoring events, the Dischargers may request this MRP be revised to reduce monitoring frequency. The proposal must include adequate technical justification for reduction in monitoring frequency. The Dischargers shall not implement any changes to this MRP unless and until the Central Valley Water Board adopts, or the Executive Officer issues, a revised MRP.

EFFLUENT MONITORING

Monitoring of Effluent

Effluent samples shall be collected upstream of the point of discharge to Beaver Pond as indicated in Attachments B. At a minimum, effluent shall be monitored as specified below:

Parameter	Units	Type of Sample	Monitoring Frequency	Reporting Frequency
Flow Volume	gpd	Meter reading	Daily	Quarterly
Total Dissolved Solids	mg/L	Grab	Monthly	Quarterly

Monitoring Use of Aquaculture Chemicals and Drugs

The use of all aquaculture chemicals and drugs shall be recorded at the time of use and submitted in the quarterly monitoring reports. The following information shall be submitted for each chemical or antibiotic used during the quarterly monitoring period:

- a. Product trade name(s) and list of active ingredient(s),
- b. Date(s) of application,
- c. Purpose and duration of the application,
- d. Whether the application was static or flow-through,
- e. Working concentration of each active ingredient,
- f. Volume of wastewater containing the working concentration of active ingredient(s),
- g. Estimated concentration of active ingredient(s) at the point of discharge after dilution using the following equation:

$$C_d = C_w \cdot \frac{F_w}{F_T}$$

- Where
- C_d = Concentration of active ingredient at point of discharge after dilution, mg/L
 - C_w = Working concentration of active ingredient, mg/L
 - F_w = Flow rate of wastewater containing working concentration of active ingredient, MGD
 - F_T = Total wastewater flow rate, MGD

WASTEWATER POND AND BASIN MONITORING

The Beaver Pond, Curve Pond, Basin 1, Basin 2 and Basin 3 shall be monitored in accordance with the following. Sampling will be conducted from permanent monitoring locations that will provide samples representative of the wastewater in the ponds and basins. Freeboard shall be measured vertically from the water surface to the lowest elevation of pond berm (or spillway/overflow pipe invert), and shall be measured to the nearest 0.10 feet. If any pond or basin is dry, the monitoring report shall so state. Pond monitoring shall include, at a minimum, as specified below:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Freeboard	0.1 feet	Staff Gage	Weekly	Quarterly
Berm Condition	--	Observation	Weekly	Quarterly
Odors	--	Observation	Weekly	Quarterly

GROUNDWATER MONITORING

The Discharger shall maintain the groundwater monitoring well network. If a groundwater monitoring well is dry for more than four consecutive sampling events or is damaged, the Dischargers shall submit to the Central Valley Water Board a workplan and proposed time schedule for its replacement, and the well shall be replaced immediately following approval of the workplan.

Prior to construction of any additional groundwater monitoring wells, the Dischargers shall submit plans and specifications to the Central Valley Water Board for review and approval. Once installed, all new monitoring wells shall be appropriately incorporated into monitoring conducted under this MRP, and shall be monitored on a semiannual basis for a minimum of eight consecutive sampling events before a reduction in monitoring frequency can be considered.

The previous groundwater monitoring well network consists of GW-001, GW-002, GW-006, and GW-007. Groundwater monitoring data from 2011 to 2018 indicate that groundwater quality of GW-007 is affected by surrounding agriculture fields and the former UCD landfill site, therefore GW-007 is not a representative downstream groundwater monitoring location for the discharge. The Order removes GW-007 from the compliance wells. For the purpose of determining compliance with the Groundwater Limitations of the WDRs, GW-001 is designated as the background monitoring well and all other remaining monitoring wells are compliance wells.

Prior to sampling, the groundwater elevations shall be measured. Depth to groundwater shall be measured to the nearest 0.01 feet. Samples shall be collected using standard EPA methods. Low or no-purge sampling methods are acceptable, if described in an approved Sampling and Analysis Plan. Groundwater monitoring shall include, at a minimum, the following constituents:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Depth to Groundwater	0.01 feet	Measurement	Annually	Annually
Groundwater Elevation ¹	0.01 feet	Calculated	Annually	Annually
Gradient	feet/feet	Calculated	Annually	Annually

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Gradient Direction	degrees	Calculated	Annually	Annually
Total Dissolved Solids	mg/L	Grab	Annually	Annually
Nitrate Nitrogen	mg/L	Grab	Annually	Annually

¹ Groundwater elevation shall be determined based on depth-to-water measurements using a surveyed measuring point elevation on the well and a surveyed reference elevation.

REPORTING

All monitoring reports should be converted to a searchable Portable Document Format (PDF) and submitted electronically. Documents that are less than 50MB should be emailed to: centralvalleysacramento@waterboards.ca.gov.

Documents that are 50 MB or larger should be transferred to a CD, DVD, or flash drive and mailed to the following address:

Central Valley Regional Water Quality Control Board
ECM Mailroom
11020 Sun Center Drive, Suite 200
Rancho Cordova, California 95670

To ensure that your submittal is routed to the appropriate staff person, the following information should be included in the body of the email or transmittal sheet:

Attention: Compliance/Enforcement Section
University of California, Davis
Center for Aquatic Biology and Aquaculture Aquatic Center, Putah Creek Facility
Yolo County
CIWQS Place ID: 206105

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., wastewater, groundwater, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the MRP shall be reported in the next scheduled monitoring report.

In addition to the requirements of Standard Provision C.3, monitoring information shall include the method detection limit (MDL) and the Reporting limit (RL) or practical quantitation limit (PQL). If the regulatory limit for a given constituent is less than the RL (or PQL), then any analytical results for that constituent that are below the RL (or PQL) but above the MDL shall be reported and flagged as estimated. For a Discharger conducting any of its own analyses, reports must also be signed and certified by the chief of the laboratory.

As required by the Business and Professions Code sections 6735, 7835 and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Professional Engineer or Geologist and signed by the registered professional.

A. Quarterly Monitoring Reports

Quarterly monitoring reports shall be submitted to the Central Valley Water Board on the **1st day of the second month after the quarter** (i.e. the January-March quarterly report is due by **1 May**). The fourth quarter monitoring report may be submitted as part of the corresponding annual monitoring report, provided that it includes the additional information required for annual reporting. At a minimum, the report shall include:

1. Results of Effluent Monitoring in tabular format for each month during the reported quarter.
2. Results of Wastewater Pond and Basin Monitoring in tabular format for each month during the reported quarter.
3. Results of Flow Monitoring in tabular format for each month during the reported quarter, including calculated values for the total flow and average daily flow for each month and total annual flow to date.
4. A comparison of monitoring data to the requirements of the WDRs and an explanation of any violation of those requirements.
5. Copies of laboratory analytical report(s).
6. A copy of inspection log page(s) documenting inspections completed during the quarter.
7. A copy of calibration log page(s) verifying calibration of all hand-held monitoring instruments performed during the quarter.

B. Annual Monitoring Report

An Annual Report shall be submitted by **1 February of each year**, and shall include the following:

Flow Monitoring

1. Total annual flow discharged to Beaver Pond and determination of compliance with the annual flow limitation of the WDRs.

Groundwater Monitoring

1. A narrative description of all preparatory, monitoring, and sample and handling, for groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDRs Order R5-2019-0015, this MRP, and the SPRs.
2. A field log for each well documenting depth to groundwater; method of purging, parameters measured before, during, and after purging; sample preparation (e.g., filtering); and sample preservation. Low or no-purge sampling methods are acceptable if described in an approved Sampling and Analysis Plan.
3. Summary data tables of historical and current water table elevations and analytical results, comparison with previous flow direction and gradient data, and discussion of seasonal trends if any.
4. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to an appropriate datum (e.g., NGVD).
5. Copies of the laboratory analytical data reports shall be maintained by the Dischargers and provided upon request by the Central Valley Water Board.

Additional Reporting

1. A discussion of compliance and the corrective action taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the WDRs.
2. Monitoring equipment maintenance and calibration records, as described in Section C.4 of the SPRRs, shall be maintained by the Dischargers and provided upon request by the Central Valley Water Board.
3. A discussion of the following:
 - a. Waste constituent reduction efforts implemented in accordance with any required workplan;
 - b. Other treatment or control measures implemented during the calendar year either voluntarily or pursuant to the WDRs, this MRP, or any other Order;
 - c. A discussion of anticipated pond sludge removal in the coming year, and if so, include anticipated schedule for cleaning, drying, and disposal; and
 - d. Based on monitoring data, an evaluation of the effectiveness of the treatment or control measures implemented to date.
4. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring network or reporting program.

A letter transmitting the self-monitoring reports shall accompany each report. The letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the submitting Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the submitting Discharger, or its authorized agent, as described in the Section B.3 of the SPRRs (General Reporting Requirements).

The Discharger shall implement the above monitoring program as of the date of this Order.

I, PATRICK PULUPA, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of a Monitoring and Reporting Program issued by the California Regional Water Quality Control Board, Central Valley Region on 8 February 2019.

- Original signed by -

PATRICK PULUPA, Executive Officer

GLOSSARY

BOD ₅	Five-day biochemical oxygen demand
CaCO ₃	Calcium carbonate
DO	Dissolved oxygen
EC	Electrical conductivity at 25° C
FDS	Fixed dissolved solids
NTU	Nephelometric turbidity unit
TKN	Total Kjeldahl nitrogen
TDS	Total dissolved solids
TSS	Total suspended solids
Continuous	The specified parameter shall be measured by a meter continuously.
24-hr Composite	Samples shall be a flow-proportioned composite consisting of at least eight aliquots over a 24-hour period.
Daily	Every day except weekends or holidays.
Twice Weekly	Twice per week on non-consecutive days.
Weekly	Once per week.
Twice Monthly	Twice per month during non-consecutive weeks.
Monthly	Once per calendar month.
Bimonthly	Once every two calendar months (i.e., six times per year) during non-consecutive months.
Quarterly	Once per calendar quarter.
Semiannually	Once every six calendar months (i.e., two times per year) during non-consecutive quarters.
Annually	Once per year.
mg/L	Milligrams per liter
mL/L	Milliliters [of solids] per liter
µg/L	Micrograms per liter
µmhos/cm	Micromhos per centimeter
gpd	Gallons per day
mgd	Million gallons per day
MPN/100 mL	Most probable number [of organisms] per 100 milliliters
MTF	Multiple tube fermentation

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2019-0015

WASTE DISCHARGE REQUIREMENTS

FOR
UNIVERSITY OF CALIFORNIA, DAVIS
CENTER FOR AQUATIC BIOLOGY AND AQUACULTURE AQUATIC CENTER
PUTAH CREEK FACILITY
YOLO COUNTY

INFORMATION SHEET

Facility Description

University of California, Davis (Discharger or UCD) is the owner and operator of the Center for Aquatic Biology and Aquaculture Putah Creek Facility (Facility). The Facility operations consist of aquaculture research. A series of tanks ranging in unit size from less than 10 gallons to over 2500 gallons are in use at the Facility to raise and conduct studies on aquatic fishes. The Facility operates continuously year-round. based on historical water use from 2010 to 2015, the Facility uses a continuous flow of fresh water with minimal recirculation at a typical influent flow rate of 0.4 million gallons per day (MGD) and a maximum capacity of 1.4 MGD.

Routine research operations and maintenance activities at the Facility include the care and feeding of aquatic animals, cleaning of holding tanks, and dead fish removal and disposal. Holding tanks are cleaned of algae buildup, as needed, according to each species' preference for environmental enrichment, and disinfected with sodium hypochlorite or iodine when vacated. The disinfectant is always neutralized with static sodium bisulfite before discharge.

The Facility discharges wastewater to five retention ponds (Beaver Pond, Curve Pond, Basin 1, Basin 2, and Basin 3), as shown in Attachment C. The water flows from Beaver Pond to Curve Pond, then depending on the water levels to either Basin 1 or Basin 2. Water can flow from Basin 1 to either Basin 2 or Basin 3. The retention ponds are managed as a natural habitat; therefore, vegetation is retained and aquatic vegetation is generally not removed. The Discharger coordinates with Yolo County Mosquito and Vector Control to prevent conditions that lead to breeding of mosquitos in all areas with ponded water.

Historically, water from Beaver Pond was conveyed to Putah Creek via a vertical pipe inlet; however, a riser was installed in 2014 to cease water from flowing into Putah Creek. The retention ponds and the levee to Putah Creek are composed of native fill.

Groundwater Conditions

The current groundwater monitoring well network consists of GW-001, GW-002, GW-006, and GW-007. For the purpose of determining compliance with the Groundwater Limitations of the WDRs, GW-001 is designated as the background monitoring well and all other monitoring wells are compliance wells. The monitoring wells had an average depth to groundwater of 53.5 feet bgs, based on the monitoring data from 2012 to 2016. The highest groundwater elevation in the groundwater monitoring wells was 35.5 feet amsl, corresponding to a depth to groundwater of 38.7 feet bgs in monitoring well GW-001. The groundwater gradient flows east with a gradient of 0.0015 to 0.0028 feet/feet.

Groundwater monitoring data from 2011 to 2018 indicate that groundwater quality of GW-007 is affected by surrounding agriculture fields and the former UCD landfill site, therefore GW-007 is not a representative downstream groundwater monitoring location for the discharge. The Order removes GW-007 from the compliance wells.

The depth to groundwater from the bottom of the retention ponds is greater than 40 feet based on measurements of groundwater elevations collected over the last four years.

Effluent Limitations

Hexavalent chromium (Cr VI) concentrations in wells and effluent exceed the Maximum Contaminant Level (MCL) of 10 µg/L. Cr VI is naturally occurring in the area; the levels of Cr VI sampled in the City of Davis water system's groundwater wells ranges from non-detect to 39.5 µg/L in 2016 and 2017. Based on a decision by the Superior Court of Sacramento County on 31 May 2017, the Cr VI MCL has been invalidated. The State Water Board adopted amendments to remove the current MCL for the Cr VI found in drinking water on 1 August 2017 and Office of Administrative Law approved the proposal on 11 September 2017. Therefore, this Order does not include effluent limitations for Cr VI.

Legal Effect of Rescission of Prior WDRs or Orders on Existing Violations

The Board's rescission of prior waste discharge requirements and/or monitoring and reporting orders does not extinguish any violations that may have occurred during the time those waste discharge requirements or orders were in effect. The Central Valley Water Board reserves the right to take enforcement actions to address violations of prior prohibitions, limitations, specifications, requirements, or provisions of rescinded waste discharge requirements or orders as allowed by law.

Monitoring and Reporting Program

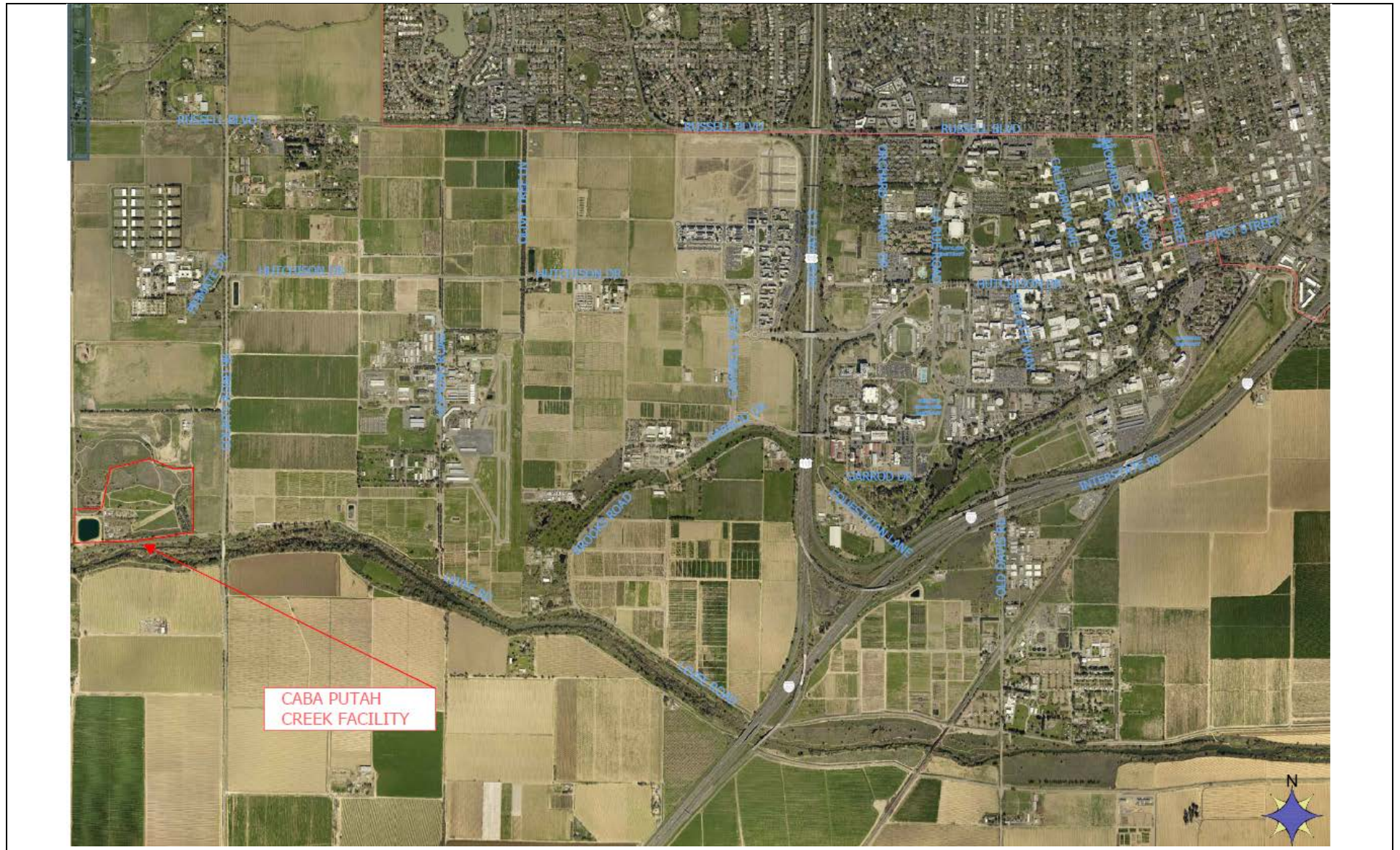
The Monitoring and Reporting Program accompanying this Order is designed to verify compliance with effluent and groundwater limitations and operational requirements of the WDRs.

Other Regulatory Considerations (CV-SALTS)

The Central Valley Water Board is developing amendments to the Basin Plan to incorporate new strategies for addressing ongoing salt and nitrate accumulation in the waters and soils of the Central Valley as part of the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative. The CV-SALTS Salinity Control Program currently being developed would subject dischargers that do not meet stringent salinity numeric values (700 µS/cm EC as a monthly average to protect the AGR beneficial use and 900 µS/cm EC as an annual average to protect the municipal and domestic beneficial uses of water) to performance-based salinity requirements, and would require these dischargers to participate in a basin-wide Prioritization and Optimization Study to develop a long-term strategy for addressing salinity accumulation in the Central Valley.

The level of participation required of dischargers whose discharges do not meet stringent salinity requirements will vary based on factors such as the amount of salinity in the discharge, local conditions, and type of discharge. The Central Valley Water Board anticipates that the CV-SALTS initiative will result in regulatory changes that will be implemented through conditional prohibitions and modifications to many WDRs region-wide, including the WDRs that regulate discharges from the Facility regulated under this Order. More information regarding this regulatory planning process can be found online (at the address below).

https://www.waterboards.ca.gov/centralvalley/water_issues/salinity/



DRAWING REFERENCE:

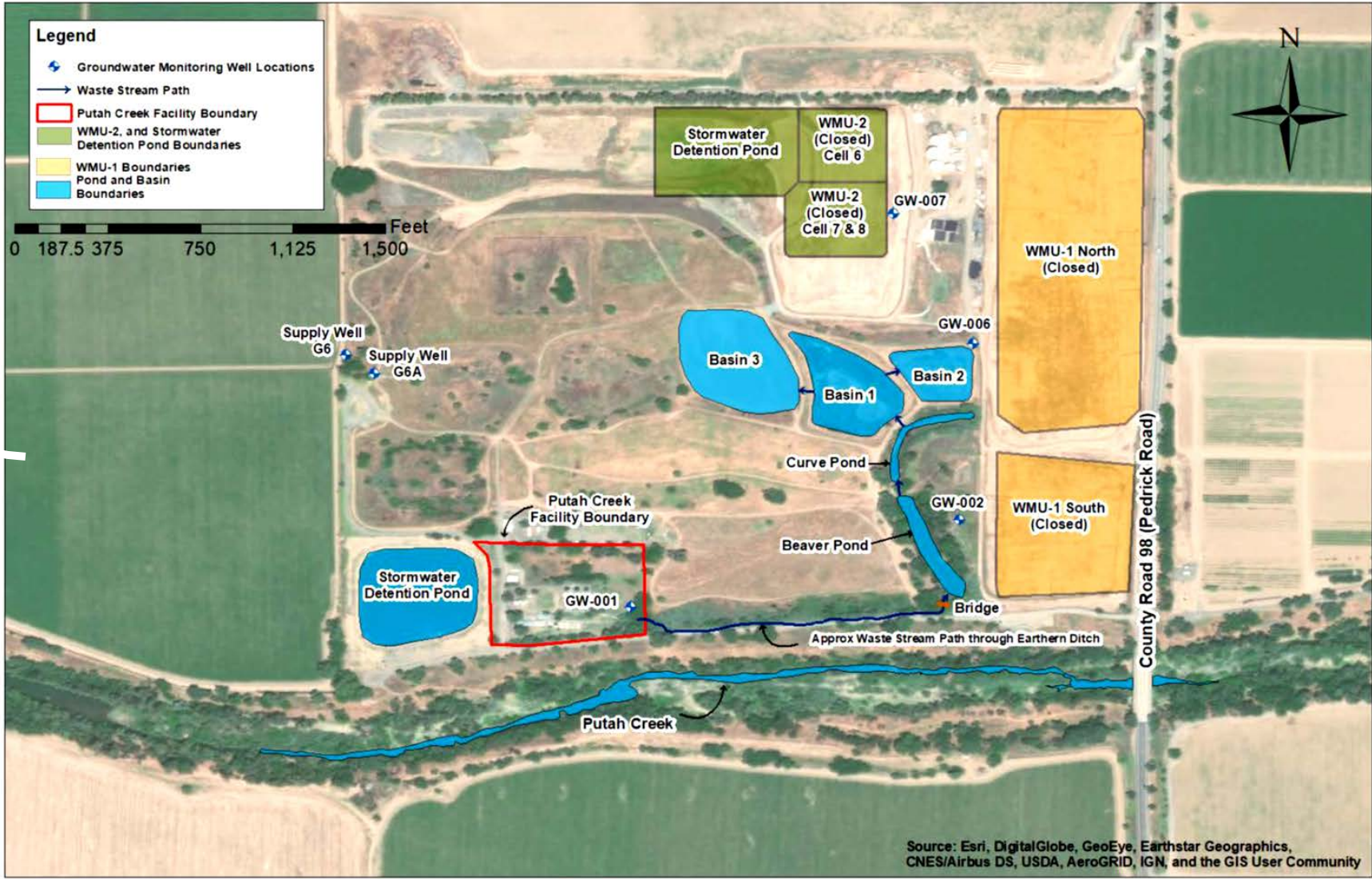
RWD, August 2017

Approximate Scale:

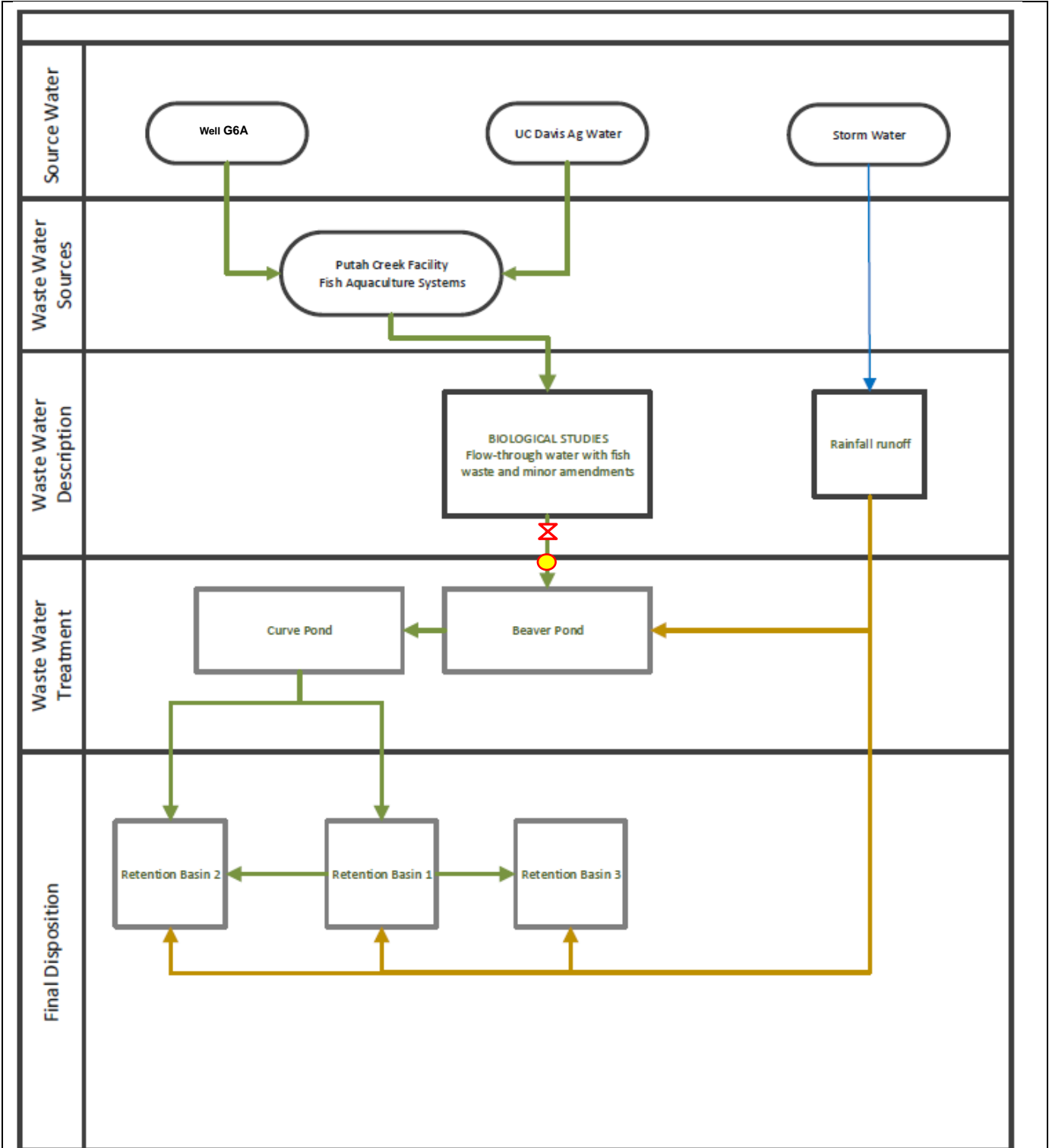
1 inch = 2,000 feet



SITE LOCATION

UNIVERSITY OF CALIFORNIA, DAVIS
CABA AQUATIC CENTER PUTAH CREEK FACILITY
YOLO COUNTY



FACILITY PLAN
 UNIVERSITY OF CALIFORNIA, DAVIS
 CABA AQUATIC CENTER, PUTAH CREEK FACILITY
 YOLO COUNTY



<p>DRAWING REFERENCE: RWD, August 2017</p>	<p>LEGEND</p> <ul style="list-style-type: none">  Effluent limit monitoring  Flow limit monitoring 	<p>FLOW DIAGRAM University of California, Davis CABA Aquatic Center, Putah Creek Facility Yolo County</p>
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