“G”

Water and Wastewater Management Plan

Upper Valley Disposal Service P16-00180
Planning Commission Hearing March 7, 2018

Water and Wastewater Management Plan for Upper Valley Recycling Facility, Saint Helena, California

Prepared for Upper Valley Disposal Service
1285 Whitehall Lane
Saint Helena, CA 94574

Prepared by CB&I Environmental and Infrastructure
180 Promenade Circle, Suite 320
Sacramento, California 95834

Project No. 154343
Date: April 2017

TABLE OF CONTENTS

LIST OF FIGURES AND APPENDICES

Figures

Appendices

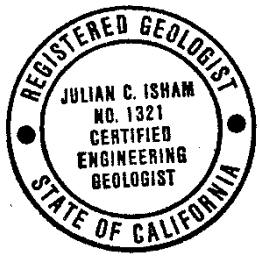
CERTIFICATION PAGE

I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information.

Please feel free to call the undersigned if you have any questions or comments.

Sincerely,

CB&I Environmental and Infrastructure, Inc.



J.C. Isham, PG, CEG, CHG
Geology Manager
925-457-1130

Michael Anderson, PE, QSP/QSD
Civil Engineer
916-565-4361

I. INTRODUCTION

This Water and Wastewater Management Plan (Plan) describes how water and wastewater associated with compost operations will be managed at the Upper Valley Recycling Center, Solid Waste Facility Permit (SWFP) 28-AA-0026 (Facility) in Saint Helena, California, in accordance with General Order WQ 2015-0121-DWQ, General Waste Discharge Requirements for Composting Operations (General Order). Specifics include descriptions of:

- Site grading
- Precipitation controls and containment structures for controlling run-on and runoff from the working surfaces
- Site detention basins and a water balance demonstrating compliance with the Design, Construction and Operation Requirements section of the General Order
- Maintenance and operation of the precipitation controls and containment structures
- Collection and use of water and wastewater in the compost process
- Best management practices to reduce and control wastewater
- A contingency plan for water and wastewater control failure or inadequacy

The Facility discharges clean stormwater in accordance with the existing site Stormwater Pollution Prevention Plan (SWPPP) WDID number 2 28I000730, in accordance with California's General Permit for Stormwater Discharges Associated with Industrial Activities, Order No. 2014-0057-DWQ (Stormwater General Permit). Pollution controls presented in the SWPPP are referenced throughout this Plan. See the SWPPP for detailed guidance on preventing contaminant discharges.

This Plan was updated in January 2017 to include considerations for a proposed 15,000 square foot blending barn, Compressed Natural Gas (CNG) refueling station, and truck stalls that were not included in the original July 2016 release. This Plan was further updated in April 2017 to reroute Area 5 to the Wastewater Pond (discussed below) and address comments by Napa County.

Site Description

A vicinity map of the Facility is presented in Figure 1. The Facility is located at 1285 Whitehall Lane, Saint Helena, California, designated as assessor parcel number 27-450-27 and operates under Solid Waste Facility Permit 28-AA-0026. The Facility comprises approximately 44.2 acres and includes industrial activities consisting of recycling and composting operations, experimental vineyards, equipment storage, and an 8.3 million gallon Wastewater Pond. Composting operations and the associated Wastewater Pond total approximately 13.8 acres. A solid waste recycling facility is located adjacent to the composting operations with a footprint of approximately 8.5 acres. Access to the composting operations is off the Saint Helena Highway, located approximately 2,000 feet southwest, through an access road passing between vineyards and a winery, across a bridge over an unnamed surface tributary to Bale Slough.

The Facility is generally flat with the surrounding area sloping from west to east. The natural elevation of the site is approximately 180 to 160 feet. Surface tributaries to Bale Slough run south-eastwardly on the northeastern and southwestern boundaries of the Facility. Bale Slough runs eastwardly and discharges into the Napa River approximately 1.5 miles to the east of the Facility.

The recycling operation is located to the west of composting operations and includes indoor and outdoor material sorting and recovery, and outdoor equipment storage. To the west, north, northeast, and southeast are vineyards, with a winery located to the east. Additional wineries and vineyards are located in the immediate area. Directly to the southwest of the Facility is the Cottage Garden Nursery.

Operations Background

Composting operations have been ongoing since 1974 and, after environmental review, received a solid waste facility permit in 1995. Conference and office facilities, vehicle maintenance and storage, and equipment storage supporting vineyard, recycling, and composting operations are located throughout the site.

Composting operations occur seasonally with a currently permitted capacity of 34,000 tons per year. Incoming feedstock is generally delivered and processed from mid-August to mid-October. The Facility now conducts composting operations in one main working area, has an adjacent amendment and finished product area, and has a third area for soil, amendment, and equipment storage.

Incoming green waste is ground and added to compost feedstock and amendments. Aerated static pile composting is used at the facility, under tarps, with forced air piped under the piles. Once composting is complete for a pile, the tarp is removed and the material is further screened to achieve a final product. Larger, rejected material is sent for disposal at a municipal solid waste landfill.

Compost and amendment piles are covered with plastic low-permeability tarps prior to rain events to prevent contamination of stormwater runoff. As a general rule, tarps are typically installed by December 1 and removed in early April to prevent the need to repeatedly cover and uncover piles. For the purposes of this Plan, tarps are assumed installed from December 1 to April 1, and this time period is defined as “Winter”. This “Winter” designation differs from the General Order “wet season” period of October 1 through April 30. An exception to the tarp rule is future food waste composting which may not be covered prior to rain events.

For the purposes of this Plan, composting, storage, drainage, and access areas have been assigned "Area" designations which do not appear on other site documents. Area 3, the main compost working area, is separated by an interior access road (Area 2) from a southwestern storage area (Area 1), and southeastern storage and curing area (Area 5.) Area 3 is further segregated into compost piles which are covered during the winter (Area 3A) and the remaining uncovered portion of the compost area (Area 3B.) The southwestern Area 1 is used primarily to store amendments and finished product, while Area 5 also stores soil, clean roll-off boxes, and additional items as required by site operations. Two additional areas are the Wastewater Pond (Area 4) and a water retention basin for clean stormwater runoff (Area 6.) A proposed 15,000 square foot blending barn, CNG refueling station, and truck stalls (Area 7) are not yet constructed but are included in this Plan for consideration. Areas 1 through 7 are shown on Figure 2.

Future food waste composting is proposed to occur in Area 7, in a portion of Area 3 which is currently used for green waste processing and composting. When food waste composting is begun at the Facility, food waste will be initially received and processed in an organics building before being placed in the northern quarter of Area 3. The organics receiving and processing building, currently in the design and permitting phase, consists of a 15,000 square-foot, concrete-floored, covered organics blending building. Misters installed inside the building will supply moisture during blending. The

incorporation of this new organics blending building will alter the types of feedstocks used without increasing total site tonnage. Food waste will be added to other incoming materials, in accordance with new site permits, and composted under intermittent carbonaceous bio filter cover in the northern quarter of Area 3. The carbonaceous bio filter cover will consist of finished compost or other similar alternatives.

Table 1 summarizes the feedstock utilized at the Facility.

Table 1: Feedstock

Current Feedstock and Amendments Used in Composting	Feedstock and Amendment Use After Incorporation of Organics Blending
Grape Pomace (34,000 ton/year permit maximum)	Grape Pomace (34,000 ton/year permit maximum)
Bulking Agents: Green Material (8,500 ton/year permit maximum)	Co-Collected Green Waste/ Residential Food Waste, and Source-Separated Green Waste (8,500 ton/year permit maximum)
	Commercial Food Waste (8,000 ton/year permit maximum)
Total: 34,000 ton/year permit maximum	Total: 34,000 ton/year permit maximum

Other amendments and products are potentially temporarily stockpiled on site for resale and use to fulfill special orders. These amendments and products are stored in areas segregated from compost operations, typically Area 5, and are typically covered during the winter. These other amendments and products may include:

- Wood shavings
- Gypsum
- Limestone
- Mulch
- Other custom blended products

Site Updates for the General Order

The Facility is currently operating according to solid waste facility permit number 28-AA-0026 and has adopted General Order WQ 2015-0121-DWQ. With the incorporation of this Plan into the 2016 Technical Report, and acceptance of the Technical Report by the appropriate regulatory authorities, the Facility will operate under the new General Order WQ 2015-0121-DWQ.

Three minor upgrades to Facility drainage are proposed to ensure Facility compliance with the new General Order. An earthen berm, constructed of local clays meeting the hydraulic conductivity requirements stipulated in the General Order, will be constructed as a run-on barrier for Area 1. The earthen catchment for compost runoff in Area 3 will be concrete-lined to aid water removal and act as an impermeable barrier to groundwater. Drainage from Area 5 will be rerouted from the retention basin to the Wastewater Pond. Upgrades are discussed in detail in the following sections.

II. PRECIPITATION CONTROLS AND CONTAINMENT

In accordance with the new General Order and SWPPP, the Facility grounds will continue to be graded and maintained as necessary to provide adequate drainage to runoff/wastewater conveyances. Clean stormwater will continue to be discharged into the eastern retention basin, and ultimately to the Bale Slough tributary to the east of the site in accordance with the SWPPP. Wastewater and selected clean rainwater will continue to be pumped to the 8.3 million gallon Wastewater Pond. Wastewater and clean rainwater comingled in the Wastewater Pond will continue to be used for composting operations and dust control as required by the Facility.

The Facility is partially located in a FEMA designated Zone A, with 1% annual chance of flooding and 26% change of flooding over a 30-year period. As a result, flood protection berms and a supplemental drainage pipe for the eastern Bale Slough tributary were installed at the Facility. These flood protection improvements are referenced in the following sections where applicable. Additional requirements for flood protection are called for in the Conditional Use Permit number 92061-UP and include maintaining berms around composting operations that are a minimum 1-foot above the 100-year flood level and set back a minimum 50-feet from the Bale Slough tributaries.

Stormwater and wastewater conveyances at the Facility were constructed to handle the 25-year, 24-hour design storm, which satisfies requirements of the General Order and Napa County standards. Further, Napa County requires the Wastewater Pond has the capacity to receive wastewater flows and stormwater runoff for the 100-year, 24-hour design storm from new and reconstructed impervious areas (Area 7) in addition to the existing contributing areas. As part of this Plan, CB&I evaluated the existing conveyances and water storage and determined they are expected to meet the requirements of the new General Order and Napa County's requirements. Wastewater/runoff conveyances, site drainage, and the Wastewater Pond are presented in Figure 2 and discussed in the following sections.

Working Surfaces

The working surfaces for Areas 1, 3, and 5 are constructed of minimum 1-foot compacted local clayey soils to resist damage from equipment and pile weight as discussed in the *Report of Composting Site Information*, Emcon Associates, June 1994, which is presented in the Technical Report. The exception to the soil working surface design is the northern quarter of Area 3 which is constructed of 1-foot of crushed concrete rubble. The local clayey soils underlie the working surfaces in a compacted layer which is a minimum 1-foot in depth, but typically 3-feet in depth or greater, and form the low permeability layer required by the General Order.

Hydraulic conductivity of the local soils was investigated by CB&I in a May 2016 site investigation. Test results from undisturbed samples taken 1 to 3-feet below the surface comprising the low permeability layer indicate a hydraulic conductivity range of between 1.52×10^{-7} and 4.0×10^{-9} cm/s, exceeding the 1.0×10^{-5} cm/s requirement in the General Order. A map showing sample location, test results are included as part of the 2016 Technical Report, in accordance with the General Order.

Existing grading for Areas 1, 3, and 5 is sufficient for providing adequate drainage to minimize ponding and infiltration of liquids, maximize transmission of runoff to containment structures for storage or discharge, protect material piles and working areas from degradation or inundation by surface flows, and meet the additional requirements for working surfaces listed in the General Order.

Working surfaces will be maintained at a minimum of 0.5% slope, with some areas as high as 3% slope, to ensure proper drainage is maintained.

Runoff Control

Runoff from working surfaces routed differently in the winter than the summer as shown in Appendix A - Drainage Paths and Figure 2. During the summer, the southwestern storage area (Area 1) is graded to drain though sheet-flow to 2, 1-foot diameter PVC drainage pipes set in a depression and installed under the access road (Area 2). These pipes then drain into Area 3. The interior access road (Area2) largely drains via sheet-flow into Area 3. Area 3 is graded to drain through sheet-flow, or in directed flows between piles, to an eastern earthen ditch along the retention basin berm which slopes to a stormwater/runoff catchment at the northeastern corner of Area 3. This catchment is piped via gravity flow to the Compost Runoff Sump which utilizes one 7.5-horsepower pump and one 5-horsepower pump to discharge water to the Wastewater Pond (Area 4). The catchment will be concrete-lined to facilitate water flow to the Compost Runoff Sump and provide an impermeable barrier to groundwater.

The earthen ditch and catchment are constructed of compacted local clay soils, as verified in a 2016 May site investigation by CB&I. The hydraulic conductivity of an undisturbed soil sample obtained during the site investigation from the catchment displayed a hydraulic conductivity of 2.1×10^{-8} cm/s, exceeding the General Order requirement for conveyances of 1×10^{-5} cm/s. Soils used to construct the earthen ditch were obtained from the same location as the soils used to construct the catchment and are expected to exhibit similar hydraulic conductivity properties. A map showing sample locations and test results for the site investigation are included as part of the 2016 Technical Report, in accordance with the General Order.

During the winter between December 1st and April 1st, storage piles in Area 1 and compost piles in Area 3A are covered with low-permeability tarps. The low-permeability tarps installed on compost, finished product, and amendment piles prevent contamination of runoff and ensure proper moisture conditions in the piles is maintained. Pile tarps are fitted to prevent run-on of contaminated water from the surrounding working surfaces.

During the winter, runoff from Area 1 is piped under the interior access road to discharge onto pile tarps in Area 3A. The combined runoff from Areas 1 and 3A is treated as clean stormwater runoff and is fed directly into the retention basin through PVC pipes attached to the pile tarps which pass through the basin sidewall. Water in the retention basin is then pumped via two 25-horsepower pumps into the Bale Slough tributary as clean stormwater from a centrally located sump. In the case contaminated water enters the retention basin, the basin can instead be emptied into the compost runoff drainage system by opening short PVC pipes which extend through the basin side wall. Runoff from Area 2 and the remaining un-tarped portion of Area 3 drainage is pumped to the Wastewater Pond as during the summer.

Materials in the southeastern curing and storage area (Area 5) are covered during the winter and prior to rain events. Despite materials being covered, the entirety of Area 5 runoff is proposed to be re-routed from the retention basin to the Wastewater Pond during site upgrades. The western portion of Area 5 currently drains eastwardly internally, then toward an earthen ditch on the southeastern edge. The earthen ditch is constructed of the same 1-foot minimum compacted clay soils as the Area 5 working pad, exhibiting a hydraulic conductivity range between 1×10^{-8} cm/s and 4.0×10^{-9} cm/s as identified during the May 2016 CB&I investigation. Adjacent vineyards to the south are positioned

several feet in elevation above Area 5's surface and further restrict runoff or overtopping of the earthen ditch. The earthen ditch flows toward the northeast where it discharges into a concrete-lined ditch, then drains through an 18-inch corrugated HDPE pipe under the access road. This 18-inch pipe will be re-routed from flowing into the retention basin (Area 6) to the Wastewater Pond. A pumping station will be installed near the access road to provide sufficient head to discharge the Area 5 flow to the earthen ditch on the edge of Area 3, then the sump and ultimately the Wastewater Pond.

The proposed Area 7 will consist of a 15,000 square foot barn, CNG refueling station, and truck parking. Roof downspouts will be installed on the barn, and grading and drainage channels will be constructed for the CNG station and truck parking, to drain completely into Area 3 and ultimately the Wastewater Pond. Drop inlets located in the proposed truck parking portion of Area 7 will be capped to prevent runoff entering the existing site stormwater transmission system and bypassing the Wastewater Pond.

Run-On Control

Run-on to Areas 1, 2, 3, and 5 is controlled to the north by the recycling operation's dedicated stormwater system and site grading. The recycling operation's runoff drains locally to drop-inlets which feed into an underground stormwater transmission system and bypass composting operations. The transmission system drains to the supplemental drainage pipe for the Bale Slough tributary which runs underground along the eastern edge of the Facility. Alternatively, the transmission system pipe can be capped to direct flows to the earthen catchment and Compost Runoff Sump at the northeastern corner of Area 3.

Run-on to the proposed Area 7 will be controlled by altering the parking area grading and/or installing grade breaks, as needed. Run-on diverted by the altered grading and/or grade breaks will enter the Facility's stormwater transmission system.

An earthen berm comprised of local clay soils will be constructed at the northern edge of Area 1 to provide additional protection from run-on. The earthen soils used will be sampled prior to construction to verify they meet the hydraulic conductivity requirements for design listed in the General Order.

Run-on from the east and west is controlled by 100-year flood protection berms and tributaries for Bale Slough. Run-on from the east is further prevented by a supplemental drainage pipe for the eastern tributary, permitted in 1994, which increases the transmission capacity of the tributary. Documents describing flood protection berms and the supplemental drainage pipe, titled *Request for 401 Water Quality Certification Waiver for Installation of 36-inch Pipeline and Inlet and Outlet into the Waters of the U.S.*, is included in Appendix B - Water Quality Certification Waiver.

Run-on from the south and southeast is controlled by the adjacent vineyard surface grading and elevation. The vineyard is several feet higher than the working surface and slopes away from the Facility to a downstream portion of the Bale Slough tributaries.

Minor run-on from the access road (Area 2) sheet flows onto Area 3 and becomes part of the managed runoff from Area 3.

Groundwater at the facility maintained at a maximum elevation of approximately 5-feet below ground surface for the majority of the site and 2-feet below ground surface at the extreme low point of the

northeastern corner of Area 3. Percolation to the surface is controlled via the retention basin, located between the Bale Slough tributary and Area 3, which has a permeable base to allow percolation of groundwater to the surface. This groundwater is then pumped into the Bale Slough tributary via two 25-horsepower pumps located at the basin center.

Water Detention

Runoff from the compost working pads, storage areas, and interior access road are directed to the Wastewater Pond and retention basin as discussed in earlier sections of this Plan. Runoff from the proposed Area 7 and re-routed Area 5 will also drain to the Wastewater Pond. The original Wastewater Pond design and construction documentation are presented in Appendix C - True Engineering Wastewater Pond Documentation. Aerator design for the Wastewater Pond is included in Appendix D - Summit Pond Aeration Design. An as-built figure which assesses the current operational capacity of the Wastewater Pond is presented in Figure 3. As-built information on the Wastewater Pond is based on 2015 field measurements by CB&I.

The Wastewater Pond is constructed of compacted local clay soils as discussed Appendix C and in the *Report of Composting Site Information*, Emcon Associates, June 1994. The bottom surface of the pond is lined with a minimum of 1.5-feet of compacted clay, and 1.5 to 2-feet of compacted clay line the sides. Clay was compacted during construction to 90 percent of optimum and demonstrates hydraulic conductivities ranging from 2.24×10^{-5} to 2.97×10^{-8} cm/s. Local soils underlying the compacted clay layers are of the same clay material and are expected to exhibit similar hydraulic conductivity characteristics.

Two primary 25-horsepower aeration pumps and four secondary 7.5-horsepower aeration pumps are installed in the Wastewater Pond to maintain a minimum 1.0 milligram per liter dissolved oxygen concentration in the upper 1-foot to prevent the water from becoming anoxic and causing detrimental microbial growth and harsh odors. In accordance with the General Order, the Wastewater Pond will continue to be kept clean and free of plant growth to prevent areas where water may become stagnant and provide mosquito breeding opportunities. Retained water samples required by the General Order will be obtained from the lower side of the Wastewater Pond, as shown on Figure 2.

The existing Wastewater Pond design has adequately prevented subsurface releases of contaminants from contained wastewater as demonstrated through ongoing monitoring and sampling of adjacent groundwater monitoring wells, in accordance with Napa County Use Permit No. 92061-UP. Therefore, CB&I endorses the existing clay-lined pond design and groundwater monitoring well system as an equivalent engineered alternative to the detention pond liner and lysimeter leak detection design requirements stated in the General Order. Groundwater monitoring wells located adjacent to the Wastewater Pond are shown on Figure 2. The most recent quarterly monitoring report at the time of this Plan for the Facility is presented in the Technical Report. The quarterly monitoring report shows no contamination to groundwater has been observed as a result of composting operations at the Facility.

The retention basin located at the eastern extent of Area 3 will accept and temporarily retain clean stormwater from the covered compost piles in Areas 1 and 3A. Appendix E - EMCON Retention Basin Design contains the original design for the retention basin, which currently also accepts clean stormwater runoff from Area 5 until site upgrades are complete. The western sidewalls of the retention basin bordering Area 3 are equipped with PVC pipes which are opened and connected to tarps coving

piles in Area 3A during the winter. The floor of the retention basin is constructed to be permeable to groundwater to prevent groundwater from impacting the lower-elevation portions of the eastern edge of Area 3. A sump equipped with two 25-horsepower discharge pumps is located in the center of the detention basin for discharging clean stormwater and groundwater to the adjacent Bale Slough tributary's supplemental drainage pipe. The retention basin is pumped to dry or near-dry whenever water is present.

As the retention basin does not contain or transmit wastewater, the permeability design requirements for wastewater conveyances in the General Order do not apply. However, according to best management practices, the retention basin sidewalls were constructed of compacted local clay soils with low hydraulic conductivities to prevent infiltration of wastewater from the adjacent working areas. The basin sidewall soils were sampled in May 2016 during a site investigation by CB&I and tested for undisturbed hydraulic conductivity. The basin side walls were found to have a hydraulic conductivity of 1.7×10^{-8} cm/s, exceeding the 1.0×10^{-5} cm/s requirement in the General Order for wastewater conveyances.

Water Balance

Appendix F - Water Balance and Pond Sizing Analysis contains an assessment of the Wastewater Pond's and retention basin's capacities, and a water balance for the Facility. Table 2 summarizes the Wastewater Pond's and retention basin's characteristics.

Table 2: Wastewater Pond and Retention Basin Characteristics

Characteristic	Wastewater Pond	Retention Basin
Primary Use	Runoff/wastewater storage for use	Clean runoff retention for discharge; Groundwater French Drain
Full Top Surface Dimensions	2.22 acre	0.33 acre
Depth	16 ft (includes 2 ft freeboard)	8 ft (includes 2 ft freeboard)
Volume	21.52 acre-ft / 7 million gallon (25.50 acre-ft / 8.3 million gallon including freeboard)	0.98 acre-ft / 320,000 gallon (1.57 acre-ft / 512,000 gallon including freeboard)
Contributing Drainage Area	Areas 1, 2, 3, 4, 5, 7 (13.66 acres, summer) (9.08 acres, winter)	Areas 1, 3A, 6 (0.54 acres, summer) (5.11 acres, winter)
25-Year, 24-Hour Storm Runoff Volume and Percent Full from Empty[1]	5.78 acre-ft; 26.9% (summer) 3.99 acre-ft; 18.5% (winter)	0.30 acre-ft; N/A[1] (summer) 2.87 acre-ft; N/A[1] (winter)
100-Year, 24-Hour Storm Runoff Volume and Percent Full from Empty[1]	7.12 acre-ft; 33.1% (summer) 4.91 acre-ft; 22.8% (winter)	0.37 acre-ft; N/A[1] (summer) 3.53 acre-ft; N/A[1] (winter)
Maximum Possible Storm Retained from Drainage Area, from Empty[1]	500-Year, 10-Day (summer) 500-Year, 30-Day (winter)	N/A[1] (Will actively discharge)

[1]Retention basin is designed to actively discharge, see Appendix H.

The existing Wastewater Pond provides excess storage over that necessary to contain the 25-year, 24-hour storm for the compost areas contributing to wastewater runoff as required by the General Order. Further, the Wastewater Pond provides excess storage for stormwater runoff over that necessary to contain the 100-year, 24-hour storm as required by Napa County. From an empty state, the Wastewater Pond is capable of containing the 500-year, 10-day event during the summer, while maintaining 2-feet freeboard. During the winter, when compost piles are covered and runoff from tarps is piped to discharge from the retention basin, the Wastewater Pond is capable of containing the 500-year, 30-day event with 2-feet freeboard.

The water balance contained in Appendix F analyzes the Facility stormwater runoff storage under three main scenarios. The first scenario is the average monthly rainfall for a typical year where approximately 6.96 acre-feet of rainwater are retained at the end of the year. The second scenario is the 25-year, 24-hour storm occurring during the height of the winter when the Wastewater Pond is expected to be at maximum capacity. In this scenario, the Wastewater Pond is able to contain the Facility-wide runoff from the 25-year, 24-hour storm with 2-feet freeboard, during March, in addition to average annual rainfall through March. The third scenario has the 25-year, 24-hour event occurring during the summer when compost piles in Areas 1 and 3A are uncovered. In this third scenario in April, the Wastewater Pond will exceed capacity when containing runoff for the 25-year, 24-hour storm, in addition to average annual rainfall through April, and maintain approximately only 1.64-feet of freeboard. The water balance assumes stormwater and wastewater is retained from compost and storage areas that are not draining to the retention basin. Table 3 summarizes the Wastewater Pond's performance for each scenario

Table 3: Wastewater Pond Performance for 25-Year, 24-Hour Storm with Annual Rainfall

Scenario	Percent Full After Storm	Remaining Volume Available, Maintaining 2-feet Freeboard	Volume Retained at End of Year
Average Monthly Rainfall	N/A (78% maximum full level from average rainfall)	N/A (4.80 acre-ft remaining at maximum full level)	6.96 acre-ft
25-Year, 24-Hour Storm During Winter	96%	0.89 acre-ft	10.44 acre-ft
25-Year, 24-Hour Storm During Summer	104% (0.92 acre-ft over capacity)	0 acre-ft (1.64 ft freeboard remaining)	12.04 acre-ft

The remaining estimated volume retained at the end of each analysis year is expected to be used as process water, approximately 10.76 acre-feet, and/or properly disposed of in accordance with site permits. See Section III.

The methods and calculations used in the water balance and basin sizing are contained in Appendix F. Storm precipitation depth for the 25- and 100-year, 24-hour design storm events (6.73-inches and 8.29-inches) and average monthly rainfalls were obtained from the NOAA Atlas 14, Volume 6, Version 2 for the Helena station. Pan evaporation values used in calculating evaporation from basins was obtained from the Western Regional Climate Center list of Evaporation Stations for Markley Cove

(61.67 annual inches). A pan evaporation coefficient of 0.7 was applied to provide more realistic evaporation data for calculations (Kohler et al. 1955, 1958).

Verification of Site Stormwater System Sizing

The stormwater management system at the Facility was sized for the 25-year, 24-hour prior to construction, according to original design documents presented in Appendix G - EMCON Surface Drainage Assessment. The original drainage design was altered to satisfy Facility operations. CB&I conducted a rational method analysis of the updated site drainage to determine if runoff and wastewater conveyances are adequate in meeting the requirements of the 25-year, 24-hour storm event. The rational method analysis was based on rain data from the NOAA Atlas 14, Volume 6, Version 2 data set for the nearby Saint Helena station and is presented in Appendix H - Rational Method and Conveyance Sizing Analysis.

CB&I determined that the pipe culverts under the interior access road draining Area 1, and in the concrete ditch in Area 5 (to be rerouted with existing characteristics to drain to the Area 3 sump), will adequately drain runoff from the 25-year, 24-hour rain event. Both pipe culverts are capable of transmitting flows in excess of the anticipated design storm flow.

CB&I determined that the sump pumps are adequately sized to discharge the 25-year, 24-hour storm event. Pumps in the Compost Runoff Sump will discharge runoff from the design storm within 21.9 hours of storm initiation for a storm occurring in the winter (within the 24-hours over which the storm occurs.) The Compost Runoff Sump will discharge the design storm runoff within 31.7 hours of storm initiation for a storm occurring in the summer, with excess runoff will retained in the earthen catchment in the northeast corner of Area 3 as intended.

Pumps in the retention basin will drain the entire runoff volume within 3.1 hours for a storm occurring in the winter and have a discharge rate greater than the design storm flow. No areas will drain to the retention basin during the summer. Minor excess runoff is expected to be retained in the retention basin for contributing events until pumps are initiated and runoff is discharged to the Bale Slough tributary.

Table 4 summarizes the current pumping capability at the Facility. Manufacturer pump curves are presented in Appendix H.

Table 4: Facility Sump Pumps

Location	Size	Model	Head	Capacity
Compost Runoff Sump to Wastewater Pond	7.5 HP	Barnes 4SE7534L	25 feet	540 GPM
	5 HP	Goulds WS5032D4	25 feet	450 GPM
Retention Basin to Tributary	25 HP	Ebara Model 300DL(F)U6184	8 feet	2,500 GPM
	25 HP	Ebara Model 300DL(F)U6184	8 feet	2,500 GPM
Groundwater Sump to Tributary OR to Compost Runoff Sump	3 HP	Goulds WS3032D3	14 feet (to tributary) 0 feet (to sump)	400 GPM

The stormwater conveyance system design for Area 7 has yet to be finalized, but is expected to consist of building down spouts and a single concrete channel discharging to Area 3. The building down spouts and concrete channel will be sized, at a minimum, for the 25-year, 24-hour storm based on the final design of the proposed organics blending barn, CNG refueling station, and truck parking.

Maintenance and Operation

All stormwater conveyances, the stormwater sump, the retention basin, and the Wastewater Pond will be inspected regularly and maintained in good working order. Piping, culverts, and ditches will be cleaned of debris and inspected regularly to ensure proper function. Any damage will be repaired in accordance with the General Order. Stormwater conveyances will be kept clear of debris which could impede stormwater flow.

Working surface grading will be repaired as needed on an ongoing basis. Any instances of rutting, ponding, or other indications of surface damage will be repaired to ensure proper drainage of the working surfaces.

Site grading adjacent to working surfaces will be maintained to prevent run-on. Soil mounds will be placed as necessary to repair ruts or depressions.

Pumps located in the sump, retention basin, and Wastewater Pond will be regularly inspected and maintained in good working order per site maintenance procedures. Damaged pumps will be repaired or replaced as necessary.

The water retention basin and Wastewater Pond will be maintained to prevent the creation of breeding grounds for mosquitos and other pests. Pumps in the Wastewater Pond will be operated to prevent the upper zone dissolved oxygen concentration from dropping below 1.0 milligram per liter.

Low-permeability tarps will be replaced as necessary when they develop punctures or tears which could cause stormwater contamination. Newer tarps with less wear will be placed in high-volume flow areas while older tarps will be placed on storage piles.

The Wastewater Pond will be operated to maintain liquid levels at or below depths needed to supply sufficient available volume to contain the 24-hour, 100-year storm event. Excess liquid will be disposed of according to site permits as discussed in Section V: Contingency Plans. Table 5 shows the required operational liquid levels. Level calculations are presented in Appendix F.

Table 5: Wastewater Pond Operational Levels to Contain 100-Year, 24-Hour Event

Season	Maximum Operational Liquid Depth	Note
Winter (December 1 – March 31)	11.8 ft.	Maximum fluid depth when compost piles are tarped and discharging to the retention basin.
Summer (April 1 – November 30)	10.5 ft.	Maximum fluid depth when compost is not tarped.

III. WATER AND WASTEWATER USE IN COMPOST OPERATIONS

Wastewater from the Wastewater Pond is used as necessary for composting operations and dust control. Water is pumped from the Wastewater Pond through PVC piping to a discharge port in an adjacent paved loading area. A water truck drives under the discharge port for filling, and then sprays water on compost piles to maintain moisture in the composting material. Leachate and run-off from the compost piles is minimized by controlling the volume of water applied to each pile.

According to site operator statements, the Facility typically uses half of the Wastewater Pond's total available volume each year for compost wetting and dust control. Conservatively, the water use volume is estimated at 10.76 acre-feet per year. Water application is expected to occur mainly March through October when compost piles are uncovered. Additional water is used during dry months for dust control as necessary. Water use is minimal during the rainy season when compost has already been processed and placed under tarps.

IV. BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) for controlling stormwater runoff and pollutant discharge used at the Facility are described in detail in the site SWPPP. A summary of these BMPs are included in this Plan but the SWPPP should be referenced during implementation.

Minimum BMPs described in the Stormwater General Permit are implemented at the Facility as described in the CASQA Stormwater BMP Handbook Portal: Industrial and Commercial Fact Sheets. These minimum BMPs include:

- Good housekeeping
- Preventative maintenance
- Spill and leak prevention and response
- Material handling and waste management
- Erosion and sediment control
- Employee training
- Quality assurance and record keeping

Specific CASQA BMP Fact Sheet numbers for implemented BMPs are listed in the SWPPP. The specific Fact Sheets are chosen based on Facility processes, materials, and site characteristics.

Additional advanced BMPs are enacted at the Facility to prevent discharge of contaminated runoff from the compost areas, as discussed in the SWPPP. These additional advanced BMPs include:

- Covering compost and amendments during the rainy season
- Storage of lubricants and other fluids used in equipment maintenance in a designated maintenance building
- Washing of vehicles in a covered wash bay

V. CONTINGENCY PLANS

In the event of a significant storm event, run-on and/or runoff to the Compost Runoff Sump may back up into the earthen catchment located in the northeastern corner of Area 3 and be retained until

pumped to the Wastewater Pond. In the event the site becomes inundated by water or the operational level of the Wastewater Pond reaches maximum depth, large tanks similar to 22,000-gallon baker tanks will be used to temporarily store water on-site as necessary. Water will be stored in the tanks until placed in the Wastewater Pond, transported to a local publicly-owned treatment works for treatment, or used in site operations. Wastewater from the Pond may also be directly pumped into tanker trucks for off-site disposal as needed.

If the two 25-horsepower pumps located in the retention basin are unable to immediately discharge surface flows into the Bale Slough tributary, the excess clean water will back into Area 3 for retention. All waters retained in Area 3 will be treated as wastewater and either pumped to the Wastewater Pond or sent offsite to a local publicly-owned treatment works for proper treatment and disposal.

Two pumps are present in the Compost Runoff Sump, and two pumps present in the central retention basin sump, to provide redundancy in the case of equipment failure. If a single pump fails, the other pump will continue to operate until site maintenance personnel are able to complete repairs. If a pump is unable to be repaired, or both pumps in a sump fail, then a temporary portable pump and tubing will be used to bypass the inoperable equipment.

VI. LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, expressed or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

References

Evaporation from Pans and Lakes, Kohler, M.A., Nordenson, T.J., and Fox, W.E U.S. Dept. Com., Weather Bur. Res. Paper 38. 21 pp., 1955.

Evaporation Stations, Davis 1 WSW, Western Regional Climate Center, February 2016.

Hydraulic Considerations for Corrugated Polyethylene Pipe, Pipe Plastics Institute, 2000.

Napa County Road and Street Standards, Napa County, California, Department of Planning, Building & Environmental Services, 2016.

NOAA Atlas 14, Volume 6, Version 2 Helena, Precipitation Frequency Data Server, May 2016.

Nationwide Permit Compliance Document, Request For 401 Water Quality Certification Waiver for Installation of 36-Inch Pipeline and Inlet and Outlet into the Waters of the U.S., E.I.P. Associates, June 1994.

Pan and lake evaporation, pp. 38-60, Kohler, M.A, Nordenson, T.J., and Fox, W.E. In: *Water Loss Investigations: Lake Mead Studies*, Geological Survey Prof. Paper 298, 112 pp., Harbeck, G.E. Jr., Kohler, M.A., Koberg G.E., and others, 1958.

Saint Helena, California (047643) Monthly Climate Summary, Western Regional Climate Center, May 2016.

Second Quarter 2016 Monitoring Report, Upper Valley Composting Facility, Napa, California, CB&I, 2016.

Stormwater Pollution Prevention Plan for Industrial Activities, Stormwater Monitoring Plan, Upper Valley Disposal and Recycling Facility, CB&I, June 2015.

Report of Composting Site Information, Emcon Associates, June 1994.

FIGURES

APPENDIX A – Drainage Paths

APPENDIX B – Water Quality Certification Waiver

APPENDIX C - True Engineering Wastewater Pond Documentation

APPENDIX D - Summit Pond Aeration Design

APPENDIX E - EMCON Retention Basin Design

APPENDIX F - Water Balance and Basin Sizing Analysis

APPENDIX G - EMCON Surface Drainage Assessment

APPENDIX H - Rational Method and Conveyance Sizing Analysis