



City of Fort Bragg

416 N Franklin Street
Fort Bragg, CA 95437
Phone: (707) 961-2823
Fax: (707) 961-2802

Meeting Agenda Public Works and Facilities Committee

Tuesday, November 24, 2020

3:00 PM

Town Hall, 363 N. Main Street

MEETING CALLED TO ORDER

ROLL CALL

1. APPROVAL OF MINUTES

- 1A. [20-690](#) Approve Minutes of March 11, 2020.

Attachments: [PWM 03112020.pdf](#)

2. PUBLIC COMMENTS ON NON-AGENDA ITEMS

- 2A. [20-932](#) Public Comments on Non-Agenda Items

Attachments: [Attachment 1- Public Comment](#)

3. CONDUCT OF BUSINESS

- 3A. [20-927](#) Receive Report and Provide a Recommendation to the City Council Regarding Future Capital Improvement Program Project Priorities to Provide Additional Raw Water Storage

Attachments: [11242020 Raw Water Storage Report](#)
[Att 1 - 5 Year CIP for Water Projects](#)

- 3B. [20-930](#) Receive Report and Provide Direction to Staff Concerning Wastewater Treatment Plant Biosolids Handling

Attachments: [11242020 Biosolids Report](#)
[Att 1 - Huber Technology Greenhouse Proposal](#)
[Att 2 - Huber Technology Thermal Method Proposal](#)

4. MATTERS FROM COMMITTEE / STAFF

ADJOURNMENT

STATE OF CALIFORNIA)
)ss.

COUNTY OF MENDOCINO)

I declare, under penalty of perjury, that I am employed by the City of Fort Bragg and that I caused this agenda to be posted in the City Hall notice case on _____, 2020.

INSERT NAME HERE

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- *Such documents are also available on the City of Fort Bragg's website at <http://city.fortbragg.com> subject to staff's ability to post the documents before the meeting*

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Text File

File Number: 20-690

Agenda Date:

Version: 1

Status: Business

In Control: Public Works and Facilities Committee

File Type: Committee Minutes

Agenda Number: 1A.

Approve Minutes of March 11, 2020.



City of Fort Bragg

416 N Franklin Street
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Phone: (707) 961-2823
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Meeting Minutes Public Works and Facilities Committee

Wednesday, March 11, 2020

3:00 PM

Town Hall, 363 N. Main Street

MEETING CALLED TO ORDER

Meeting called to order by Chair Will Lee at 3:01 p.m.

ROLL CALL

Present: 2 - Will Lee and Jessica Morsell-Haye

1. APPROVAL OF MINUTES

1A. [20-573](#) Approve Minutes of January 8, 2020

Minutes approved as presented by Chair Lee, seconded by Committee Member Morsell-Haye, that these Committee Minutes be approved for Council review.

2. PUBLIC COMMENTS ON NON-AGENDA ITEMS

Public comment received from:
-Jenny Shattuck

3. CONDUCT OF BUSINESS

The following items were presented

3A. [20-652](#)

Receive Report and Make Recommendation Regarding Traffic Committee Item for the Installation of a Passenger Loading zone in the Central Business District

Staff presented item. Questions and answers exchanged between committee and staff. Public comment received opposing project approval and recommending stricter guidelines in public parking and enforcement actions in the down town area. Installation of a ramp was proposed. Director Varga to meet with Police Chief regarding parking enforcement extension throughout the year and bring back to committee.

Committee members to revisit item during next committee meeting prior to referring to City Council.

3B. [20-615](#)

Review the Potential Expansion of the Municipal Improvement District Wastewater Facilities and City of Fort Bragg Water Facilities on the East Side of the Fort Bragg City Limits and Improvement District Boundary

Director Tom Varga presented item. Questions regarding legality binds, possible short falls,

future development issues, County and City financial negative impacts were exchanged between committee members and staff. Public comment received from several members of the public in support of annexation of services. Out of service agreement comparison to full annexation discussed. Director Varga surveyed audience regarding sewer needs are most critical in the potential area. Committee recommended to Director Varga to craft additional research to make sewer and water service available to the area and bring to City Council for further direction on annexation in the next months.

Refer to City Council

3C. [20-620](#) Receive Report and Provide Direction to Staff Concerning the Guest House Museum Post Clock Replacement

Staff presented item and communicated to committee clock was repaired as of that morning by performing a bypass method of electrical computer and installing a manual operating power switch. Staff suggested a decision be made should clock bypass not function for long. Committee agreed no decision at this time considering clock remains operational however, would like exterior post refinished. Public comment received suggesting a sun dial clock should be installed instead.

No actions to be taken

4. MATTERS FROM COMMITTEE / STAFF

Street lights are not working on Franklin Street near post office. Director Varga to report location of street lights to PG&E for repair. No other matters discussed.

ADJOURNMENT

Meeting adjourned by Chair Lee at 4:27 PM.



City of Fort Bragg

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Text File

File Number: 20-932

Agenda Date: 11/24/2020

Version: 1

Status: Business

In Control: Public Works and Facilities Committee

File Type: Report

Agenda Number: 2A.

Public Comments on Non-Agenda Items

From: [Gonzalez, Joanna](#)
To: [Arellano Sandy](#); [O'Neal, Chantell](#)
Cc: [Smith, John](#)
Subject: FW: Special Public Works and Facilities Committee Agenda 11/24/2020
Date: Monday, November 23, 2020 8:18:22 AM

Public Comment

From: Paul Clark <pclark@fortbraggrealty.co>
Sent: Monday, November 23, 2020 7:25 AM
To: Paul Clark <pclark@fortbraggrealty.co>
Cc: Gonzalez, Joanna <JGonzalez@fortbragg.com>; Lemos, June <Jlemos@fortbragg.com>
Subject: Special Public Works and Facilities Committee Agenda 11/24/2020

As a property owner at 31260 Cedar Street, two parcels away from the shiny new 1.5 million gallon tank, I thought this would be a good time to see what if anything the city plans on doing to reduce the horrific glare from both the top and sides of this new tank? I have and can send several photos. I have often been to the point I can not see anything when looking East from my home when the sun is reflecting off the tank. You would think it would not be bad for long but with the design of the top it goes on for hours.

I had asked for a meeting of the nearby property owners, so will do so again. Our property values have been damaged with this reflective tank. I did not complain when it was being processed, in fact helped facilitate construction with allowing use of a property I own next to the city yard. As most citizens, I had faith in the city. No where in this city would this shiny tank have been approved, nowhere. This thing puts the North Cliff to shame. I happen to have an airplane, and I can assure you this shiny tank is visible for miles in the air, and if you drive up Cedar Street early in the day or late also, you won't need anyone to point out the tank. Often is blinding to an East bound driver. And of course Cedar Street is quite popular for pedestrian traffic. I noted at one point the City had painted some of the worst part with black paint, helped but was not continued. The sides are baked on enamel I think so may never subside, as the top was supposed to, but even in this salty air area, no luck so far, and it has been several years.

I will look forward to any comments on this serious issue. I will attach a photo or two.

Paul Clark
31260 Cedar Street
Fort Bragg, CA 95437
707-964-0811
DRE 00640014

Photos by Paul Clark





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Text File

File Number: 20-927

Agenda Date: 11/24/2020

Version: 1

Status: Business

In Control: Public Works and Facilities Committee

File Type: Staff Report

Agenda Number: 3A.

Receive Report and Provide a Recommendation to the City Council Regarding Future Capital Improvement Program Project Priorities to Provide Additional Raw Water Storage



CITY OF FORT BRAGG

416 N. FRANKLIN, FORT BRAGG, CA 95437
PHONE 707/961-2823 FAX 707/961-2802

COUNCIL COMMITTEE ITEM SUMMARY REPORT

MEETING DATE: NOVEMBER 24, 2020
TO: PUBLIC WORKS AND FACILITIES COMMITTEE
FROM: JOHN SMITH; PUBLIC WORKS DIRECTOR
AGENDA ITEM TITLE: RECEIVE REPORT AND PROVIDE A
RECOMMENDATION TO THE CITY COUNCIL
REGARDING FUTURE CIP PROJECT PRIORITIES TO
PROVIDE ADDITIONAL RAW WATER STORAGE

BACKGROUND AND OVERVIEW:

The City of Fort Bragg's water supply has been challenged by a worthy opponent. The current drought has provided an excellent test of our source water supply. There has been great concern by some about available water during the summer months from mid-July through October. Community based water resiliency is especially important in our remote area. Great progress has been made to increase water storage in order to bridge interruption of flow from source waters. The current Capital Improvement Program (CIP) provides an aggressive schedule to complete projects that fortify existing infrastructure. In addition to the approved CIP, staff has been looking into other water storage and new source options. It is the City's continued goal to prepare for emergency situations, such as earthquakes and drought, by improving existing infrastructure and continuing to look for additional creative water sources.

ANALYSIS:

Water Supply and Capacity

Fort Bragg's current water supply system relies solely on three surface water sources: Waterfall Gulch (tributary to Hare Creek), Newman Gulch (tributary to Noyo River), and the Noyo River (diversion at Madsen Hole). In 2015 the City's water supply system was able to store 6.6 million gallons of water that provided enough to maintain proper water system pressure and to provide a safety margin for fire-fighting flows. Five years later, the City has made great progress with water storage by including an additional 1.5 million

gallon finished water storage tank and the Summers Lane Reservoir with a raw water capacity of 14.7 million gallons, bringing our total water storage to 22.8 million gallons.

Below are our water sources and the average water provided by each under normal conditions:

Waterfall Gulch, 150 gallons per minute (gpm)

Newman Gulch, 150 gpm

Noyo River pumping, 300-400 gpm (as needed)

Summers Lane Reservoir, during the rainy season, rain capture is approximately 100,000 gallons per inch of rainfall.

During the winter and spring, pumping of the Noyo River is used only to supplement the Waterfall Gulch and Newman Gulch sources. The two tributary sources generally provide a higher quality of raw water and they gravity-feed to the water treatment plant, whereas water from the City's Noyo River diversion must be pumped. As summer progresses and the flows in the tributary streams diminish, the Noyo River diversion is used more frequently and in greater quantities. During the current drought, our new reservoir and the new finished water tank provided relief from what had caused a stage 3 water emergency in 2015. The extreme low flows during the drought combined with high tides did not allow us to pump from the Noyo river for extended periods of time. This cut our influent water supply in half. Throughout this drought season, the Summers Lane Reservoir has provided the three million gallons of water needed to bridge the low flow/high tide gaps in water supply.

Priority Water Enterprise Capital Improvement Projects (identified in 5-Year CIP)

The City's water supply is one part of a larger system that includes treatment and distribution and are all necessary to bring finished water from the source to our customers. Water supply planning operates within the context of this larger system. The majority of the projects reflected by the water system improvements as summarized below from the 5-Year CIP are to ensure infrastructure resilience and water conservation:

1. Madsen Hole Ranney Design - \$185,000 - FY 22/23

This project will provide plans and specifications for the replacement of the existing degraded subsurface collector system. During high flows this system of pipes provides preliminary treatment at the Noyo River prior to pumping the water to the treatment plant. During the design phase of this project we will include a feasibility study to see if we are able to pull subsurface brackish water from below the river at this location.

2. Water Treatment Plant Rehabilitation - \$1,900,000 - FY 20/21

The existing filters and clarifiers are 30 years old and the time has come for a full scale rehabilitation of these facilities. This work will include the following items:

- Production efficiency enhancement of both treatment units;
- Completing structural repairs and reroof the main building;

- The addition of liners to reduce potential raw water losses from the raw water ponds, which currently has a semi pervious bottom;
 - Demolition of an existing concrete clarifier that is not in use; and
 - Design only for #2 water tank rehabilitation. This will include a fresh coat of paint inside and out and plumbing adjustments to place the fill and discharge lines on the exterior.
3. Raw Water Line Replacement (all segments) - \$6,500,000 - FY 22/23
The City of Fort Bragg has three raw water sources, two of which deliver water to the water treatment facility through the use of a transmission line. Parts of the line have been in place for decades and are ready for replacement.
 4. Pudding Creek Water Main Relocation - \$1,669,000 - FY 22/23
The relocations project will eliminate the on-going risk to the water main crossing the Pudding Creek Dam. The line will be relocated to the Pudding Creek Bridge simultaneously with Caltrans bridge widening project.
 5. Water Meter Replacement - \$2,900,000 – FY 20/21
If funded, this project will replace and upgrade water meters throughout the City. The current meters are nearing the end of their useful life. The new meters are far more accurate and will provide up to date water use to the customer and save water by alerting customers of water leaks.
 6. #2 Water Tank Rehabilitation - \$850,000 – FY unknown
The City owns and operates three 1.5 million gallon finished water tanks at the water treatment plant. Tank #2 is in need of maintenance. Design is expected to be completed by the engineering firm completing the Water Treatment Rehabilitation as described in CIP #1 above. This will provide a shovel ready project for future funding opportunities.

Projects to consider for future expansion of the water system

I. Additional Reservoir

With the successful completion of the Summers Lane Reservoir, the City has a good idea of what constructing a new reservoir would require. The addition of a second raw water reservoir would provide additional water storage during periods of source water low flow periods and/or additional storage during other emergencies. This option would provide the least amount of operation and maintenance cost with construction cost expected to be funded through grants.

II. Shallow Groundwater

Staff has been working with equipment suppliers to identify small package treatment plants that may be used for shallow ground water purification. Ultrafiltration (UF) is a variety of membrane filtration in which hydrostatic pressure forces a liquid against a semi permeable membrane. The suspended solids are retained leaving a purified product.

Other uses for this unit could include filtration of brackish influent from the Noyo River. Mobile water filtration units provide needed flexibility during emergency situations as well.

III. Wastewater Reclamation

The new Wastewater Treatment Facility has been upgraded to provide an effluent worthy of reclamation. Additional steps are needed to provide reclaimed water to customers. Improved filtration equipment at the Wastewater Treatment Plant will be required to clarify the water to the proper effluent quality. A project of this nature would require approval from the Regional Water Quality Control Board (RWQCB) and necessitate changes to our National Pollution Discharge Elimination System (NPDES) permit. The City could move forward with use of this water if end use customers are identified. It may be possible to exchange our reclaimed water for use of existing private shallow groundwater wells. These locations may also provide an opportunity to use mobile UF water treatment plants and inject that water directly into the distribution system.

IV. Desalination System

Coleman Engineering provided a Technical Memorandum that provided good information about the desalination process and costs associated. With a price tag \$5.2 million and high annual maintenance costs, and lack of a current customer base to justify the cost benefit analysis, staff recommends pursuit of other options before this expenditure. However, staff will include the search for brackish water when completing the design our Ranney Collector System at the Noyo River as discussed above in the CIP section. This may provide brackish water that could be pumped to the water plant through existing conduit for treatment at the Water Plant. By overlapping these projects, we may be able to reduce startup costs.

V. Additional Water Tank

The City currently operates and maintains three 1.5 million gallon water tanks. The addition of a new water tank would likely cause taste and odor issues caused by a lack of turnover throughout the tanks. Keeping the water fresh and as cool as possible provides a better tasting water and reduces chlorine use. It is not recommended that the City add another finished water tank based on the current daily demands of customers and the ratio of inflow and outflow of finished water available.

Cost Comparison for Future Projects

Project	Initial Cost	O&M Cost	Environmental Cost
Additional Reservoir	Medium - \$2,200,000	Low	Medium
Shallow Groundwater	Medium - \$1,000,000	Medium	Low
Wastewater Reclamation	High - \$6,000,000	Medium - High	Low - Medium
Desalination System	High - \$5,500,000	High	Medium - High

The future is looking brighter for the City of Fort Bragg after completing a number of projects over the last five years including the Summers Lane Reservoir and new water tank. As we look toward the future of water supply resilience, the primary factors include water security for existing customers, potential new customers, funding opportunities, and staffing to support, start and maintain our precious water systems.

RECOMMENDATION:

Provide a recommendation to the City Council regarding future CIP project priorities to provide additional raw water storage.

ALTERNATIVES:

Combining different items from the above menu may provide similar results.

ATTACHMENTS:

1. 5 Year CIP for Water projects

FY 2021-2025 CAPITAL IMPROVEMENT PROGRAM BY CATEGORY											
Fund	Project	Funding Source	Prior FY(s)	FY 20/21 Proposed Budget	FY 21/22 Projected	FY 22/23 Projected	FY 23/24 Projected	FY 24/25 Projected	5 year CIP Total	Beyond CIP	Total Project Costs
MUNICIPAL FACILITIES											
416	Guest House Rehabilitation	ISF	\$ 263,625		83,000	50,000			\$ 396,625	\$ 70,000	\$ 466,625
417	City Hall - Roofing & Carpeting	ISF	93,233		91,500				\$ 184,733	50,000	234,733
418	E. City Hall, Rehabilitation & Stabilization	ISF	60,750			250,000			\$ 310,750		310,750
	Town Hall Exterior Painting	ISF			65,000				\$ 65,000		65,000
	Main St Fire Station Rehab	U/I		35,000					\$ 35,000	2,300,000	2,335,000
	Highway 20 Fire Station	U/I							\$ -	515,000	515,000
	Police Department Roof Replacement	U/I						70,000	\$ 70,000	70,000	140,000
	Total Municipal Facilities		417,608	35,000	239,500	300,000	-	70,000	1,062,108	3,005,000	4,067,108
PARKS & COMMUNITY SERVICES											
419	Bainbridge Park Improvements	U/I							-	670,000	670,000
	Pomo Bluffs Park - Parking lot rehabilitation	U/I				50,000			50,000		50,000
	Total Parks & Community Services		-	-	-	50,000	-	-	50,000	670,000	720,000
STREET MAINTENANCE & TRAFFIC SAFETY											
420	Downtown Crosswalk Rehabilitation	SST	-						-	62,300	62,300
422	South Main St Bike & Ped Improvements	STIP	45,000	110,000	1,330,000				1,485,000		1,485,000
	Rule 20 Project (undergrounding utilities)	Grant							-	1,250,000	1,250,000
	Street Striping Project	RSTP D1		206,405					206,405		206,405
	Street Rehabilitation 2021			200,000		1,700,000			1,900,000		1,900,000
420	Maple Street SD & Alley Rehabilitation	LPP & 250	173,000	1,650,000					1,823,000		1,823,000
	Total Street Maint. & Traffic Safety		218,000	2,166,405	1,330,000	1,700,000	-	-	5,414,405	1,312,300	6,726,705
CV STARR ENTERPRISE											
810	LED Lighting Project	CV Starr		102,000					102,000		102,000
	Total CV Starr Enterprise		-	102,000	-	-	-	-	102,000	-	102,000
WATER ENTERPRISE											
	Madsen Hole Ranney - Design	Water Ent				185,000			185,000		185,000
	Water Treatment Plant Overhaul	Water Ent	-	1,900,000					1,900,000		1,900,000
	Pudding Creek Water Main Relocation		-	210,000	1,500,000				1,710,000		1,710,000
	Raw Water Line Engineering, Phases II through V	Water Ent		680,000					680,000		680,000
	Raw Water Line Replacement: Phase II Noyo River to Water Treatment Facility	Water Ent			1,680,000				1,680,000		1,680,000
	Raw Water Line Replacement: Phase III - Newman Reservoir to Noyo River	U/I					3,120,000		3,120,000		3,120,000
	Raw Water Line Replacement: Phase IV - Hare Creek to SR 20	U/I						2,640,000	2,640,000		2,640,000
	Raw Water Line Replacement: Phase V - Forest Road 450 to Hare Creek	U/I				1,440,000			1,440,000	1,440,000	2,880,000
	Water Meter Replacement	CDBG		3,000,000					3,000,000		3,000,000
	Cedar Street Water Distribution Line Replacement	U/I							-		-
	Extend Water System into E Fort Bragg				100,000	600,000			700,000		700,000
	Water Tank #1 Replacement								-	2,000,000	2,000,000
	Water Tank #2 Rehabilitation				850,000				850,000		850,000
	East FB Pressure Zone (EFBPZ), Ph:1	U/I						570,000	570,000		570,000
	EFBPZ - Phase 2	U/I							-	330,000	330,000
	EFBPZ - Phase 3	U/I							-	580,000	580,000
	Total Water Enterprise		-	5,790,000	4,130,000	2,225,000	3,120,000	3,210,000	18,475,000	4,350,000	22,825,000
WASTEWATER ENTERPRISE											
716	WW Treatment Facility Upgrade	Grant/WW	17,296,400	307,000					17,603,400	-	17,603,400
	Lift Station Rehab (3 Stations)	IL	1,461,030						1,461,030	-	1,461,030
	Collection System Condition Assessment	WW		300,000					300,000	-	300,000
	Sewer Main Rehabilitation - CIPP	WW/CDBG PI	115,000	-	130,000				245,000	-	245,000
	Sanderson Way Sewer Main Replacement - Oak to Cedar	U/I				280,000			280,000	-	280,000
	Total Wastewater Enterprise		18,872,430	607,000	130,000	280,000	-	-	19,889,430	-	19,889,430
STORM WATER											
423	Trash Capture Devices	U/I, Streets		705,000				705,000	1,410,000		1,410,000
	Total Storm Water		-	705,000	-	-	-	705,000	1,410,000	-	1,410,000
Grand Total			\$ 19,508,038	\$ 9,405,405	\$ 5,829,500	\$ 4,555,000	\$ 3,120,000	\$ 3,985,000	\$ 46,402,943	\$ 9,337,300	\$ 55,740,243



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Text File

File Number: 20-930

Agenda Date: 11/24/2020

Version: 2

Status: Business

In Control: Public Works and Facilities Committee

File Type: Staff Report

Agenda Number: 3B.

Receive Report and Provide Direction to Staff Concerning Wastewater Treatment Plant Biosolids Handling



CITY OF FORT BRAGG

416 N. FRANKLIN, FORT BRAGG, CA 95437
PHONE 707/961-2823 FAX 707/961-2802

COUNCIL COMMITTEE ITEM SUMMARY REPORT

MEETING DATE: NOVEMBER 24, 2020
TO: PUBLIC WORKS AND FACILITIES COMMITTEE
FROM: ALDEN RAMOS; WASTEWATER LEAD
**AGENDA ITEM TITLE: RECEIVE REPORT AND PROVIDE DIRECTION TO
STAFF CONCERNING BIOSOLIDS**

BACKGROUND AND OVERVIEW:

On April 2, 2020, the new AeroMod wastewater activated sludge process began discharging. The process is comprised of two separate process trains connected by a selector chamber. Each train has first and second stage aeration basins, an aerobic digester, and a final clarifier. Air supplied by blowers and compressors complete all functions of the process with no moving parts other than valve solenoids. This process is far more effective at reducing target pollutants from the effluent. This higher quality effluent results in greater volumes of waste biosolids that need to be dewatered and hauled away. Currently the Wastewater Plant sends out biosolids for beneficial reuse as fertilizer to agricultural fields for feed crop. On May 18, 2020, the plant was ready to start dewatering from its aerobic digesters. Initially, representatives from AeroMod had set a target of 80,000 to 100,000 gallons per week that would need to be removed from the digesters. Soon after dewatering operations started, it was clear that this volume was not sufficient to keep up with removal rates. From June to August, the volume being dewatered had increased to 185,000 gallons per week. From August to mid-October, the plant peaked at 199,000 gallons. The average during this time was 182,000 gallons per week. While the volume needed to be dewatered is currently on the decline, we have still been dewatering around 140,000 to 190,000 gallons per week. The volume of sludge being dewatered is approximately 2-2.5 times more tonnage than the old system.

The old system used anaerobic digestion which translates to “in the presence of zero oxygen”. The sludge was heated via propane boilers to 98 degrees for around 60 days, a process which removes a large amount of volume through biological volatile solids reduction. The byproduct of that system was methane gas which needs to be flared to reduce greenhouse gas emissions.

The new system provides aerobic digestion which requires oxygen injection for biological reduction of solids volume. This process takes 10-20 days and its byproduct is inert

nitrogen gas. The compounding effect of more material being removed from the effluent and the aerobic digestion process being less effective at reducing organic solids volume is the cause of the current greater tonnage and odor.

Both the new and old dewatering systems were able to easily reduce solids to 15-20%. An interesting characteristic of the aerobically digested biosolid is that it appears to be able to dry significantly quicker than the anaerobic biosolids could on the drying beds. Previous data from the old process provided a maximum percent solid to 18%. The aerobic biosolids that were produced between May 18, 2020 and August 21, 2020 were further dried on drying beds until October 1, 2020 when it was hauled away. During that time the quantity of solids was increased from ~20% to approximately 70%. During the winter this extra drying is not possible. The greater the percent solids, the cheaper it is to haul it off due to the lower water content (i.e. lower weight).

Between mid-May and August 2020 (95 days), staff sent 1,749,000 gallons of sludge to the belt press. This sludge is approximately 2% solids. The belt press is able to turn this sludge into a 20% solid. If no further drying was available at this point it would weigh 730 tons and cost \$84,000 to haul. Luckily we were able to achieve ~ 68% percent solids from evaporation on the drying beds aided with regular mixing. This reduced the weight of the sludge to 215 tons with a new cost of \$24,700. If this sludge was able to be dried to 100% it would be 146 tons and cost around \$17,000 to haul. We will only be able to achieve this amount of drying during the summer months. The cooler temperatures and rain through winter will stop any further drying thus increasing disposal cost.

It is staff's understanding that the excessive odor occurs when the biosolids are between 40% - 55% dry. That is the point in which the ammonia compounds in the biosolids start to evaporate. Mixing the piles when the biosolids are in this range releases these vapors more readily and increases the smell.

SUMMARY:

Staff is seeking direction from the Public Works and Facilities Committee to decide on the options available to assist with handling biosolid quantities and reduction of smell in an effort to reduce additional costs associated with the daily operations and management of the City's Wastewater Treatment Plant.

RECOMMENDATION:

Staff recommends the construction of a solar drying greenhouse to achieve high level percent solids throughout the year due to their covered design. Staff foresees a solid content of 50-60% during the winter, and over 70% during the summer by means of a solar drying greenhouse. The Huber proposal claims that 70-90% solids are possible however, unlikely do to our sizing constraints. The greenhouses have 18 +/- ventilation fans to circulate the air. They also have automatic sludge turning arms to continuously mix the biosolids during the day, which is supposed to reduce the smell by drying the biosolid quickly and making the release continuous instead of all at once like with our current drying bed mixing. This process may also have the ability to produce a class A biosolid. This system is estimated to require ~ 73,000 kWh/yr, which is a little more than the new plant uses per month.

ALTERNATIVES:

Thermal dryers and belt dryers -

These are guaranteed to produce 80-90% solids year round, produce a class A biosolid product, and take up significantly less space than the greenhouse. The down sides are that they cost about the same or more as a greenhouse but also require a building to put it in which is not included in the quote, they use large amounts of propane/natural gas, and they require significantly more labor to maintain. Rio Del, our sister plant, has a thermal dryer and they have a hard time maintaining their boiler. The City's unit would need to be 2-3 times bigger than theirs. Staff has been told that they are not a 'green' option and it can be more difficult to get grants.

Electro Osmosis Dewatering system -

These advertise 40-60% solids, have a fairly small footprint, cost less than half that of the greenhouse or thermal dryer, and would work with our current belt press configuration. The negatives, are that if we are only able to achieve 40% solids that is not a lot of bang for the buck. This technology is only available from one company and is extremely new. When staff last talked to them, they had completed some pilot programs in the US but had no permanent installations completed. This system runs the biosolid between an anodic drum and a cathodic belt and applies a voltage. The voltage pushes the water out of the belt and retains the solids. This system requires our sludge to have optimal ionic charge characteristics in order to be efficient. I am currently scheduling to send them a sample for testing.

ATTACHMENTS:

1. Electro Osmosis: <https://www.elode.co/elode>
2. Huber Technology Proposal

Budgetary Proposal

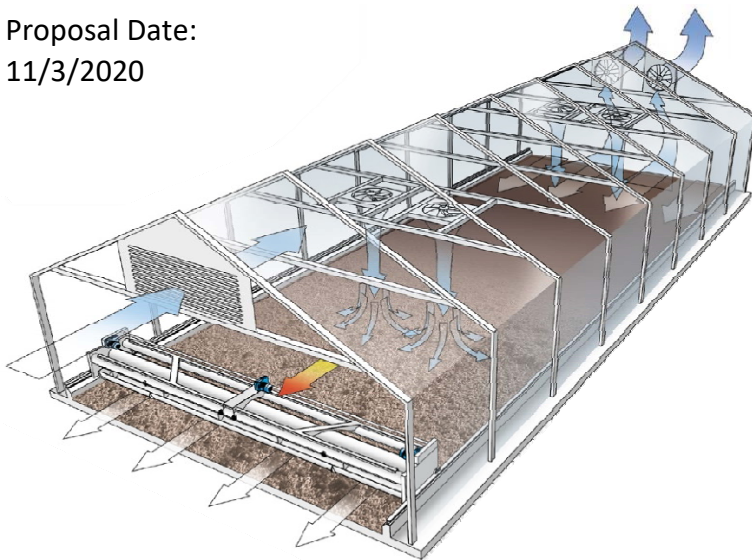
Project Name:
Fort Bragg, CA

Proposal Number:
460254

Equipment Type:
Solstice SRT 9

90% Product Dryness

Proposal Date:
11/3/2020



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WASTE WATER Solutions

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Solstice Design Summary

Fort Bragg, CA

November 3, 2020

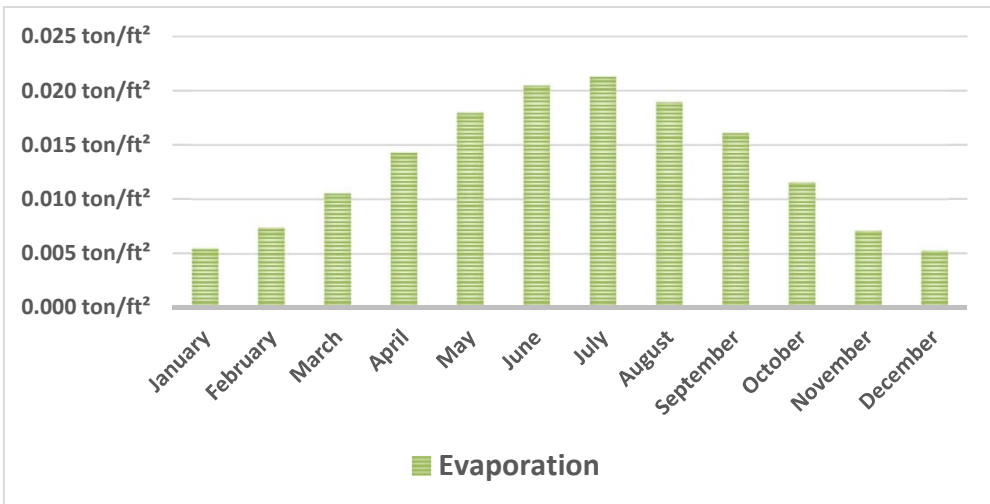
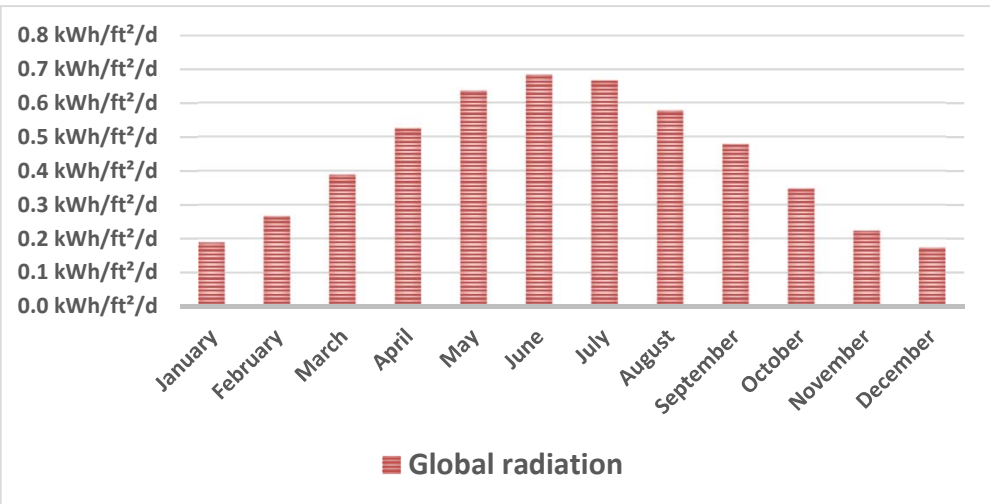
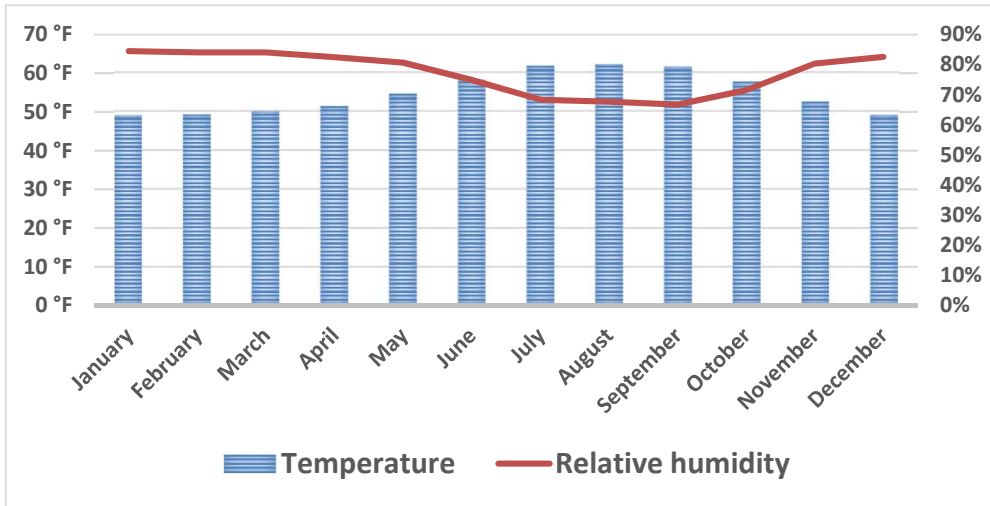
Sludge Characteristics:

Upstream Process: Activated Sludge with Secondary Clarifier
Digestion Process: Aerobic Digester
Sludge Type: Waste Activated Sludge
Sludge VSS: Information not provided
Sludge Protein Content: Information not provided

Project Design Parameters:

Sludge Feed Rate (given): 672 ton/yr
Inlet Cake Concentration: 20%
Calculated Sludge Loading Rate: 672 dry ton/yr (600 dry tonne/yr)
3,361 wet ton/yr (2,700 wet tonne/yr)

	Temperature	Relative Humidity	Global radiation	Complete	External Input	Evaporation
January	48.8 °F	84.5%	0.19 kWh/ft ² /d	0.19 kWh/ft ² /d		0.005 ton/ft ²
February	49.1 °F	84.1%	0.26 kWh/ft ² /d	0.26 kWh/ft ² /d		0.007 ton/ft ²
March	49.9 °F	84.1%	0.39 kWh/ft ² /d	0.39 kWh/ft ² /d		0.011 ton/ft ²
April	51.3 °F	82.5%	0.52 kWh/ft ² /d	0.52 kWh/ft ² /d		0.014 ton/ft ²
May	54.5 °F	80.7%	0.63 kWh/ft ² /d	0.63 kWh/ft ² /d		0.018 ton/ft ²
June	58.1 °F	74.9%	0.68 kWh/ft ² /d	0.68 kWh/ft ² /d		0.020 ton/ft ²
July	61.6 °F	68.3%	0.66 kWh/ft ² /d	0.66 kWh/ft ² /d		0.021 ton/ft ²
August	62.0 °F	67.8%	0.58 kWh/ft ² /d	0.58 kWh/ft ² /d		0.019 ton/ft ²
September	61.3 °F	66.8%	0.48 kWh/ft ² /d	0.48 kWh/ft ² /d		0.016 ton/ft ²
October	57.5 °F	71.6%	0.35 kWh/ft ² /d	0.35 kWh/ft ² /d		0.012 ton/ft ²
November	52.4 °F	80.3%	0.22 kWh/ft ² /d	0.22 kWh/ft ² /d		0.007 ton/ft ²
December	48.9 °F	82.5%	0.17 kWh/ft ² /d	0.17 kWh/ft ² /d		0.005 ton/ft ²
Average			0.43 kWh/ft ² /d			0.013 ton/ft ²
Annually			156 kWh/ft ² /a			



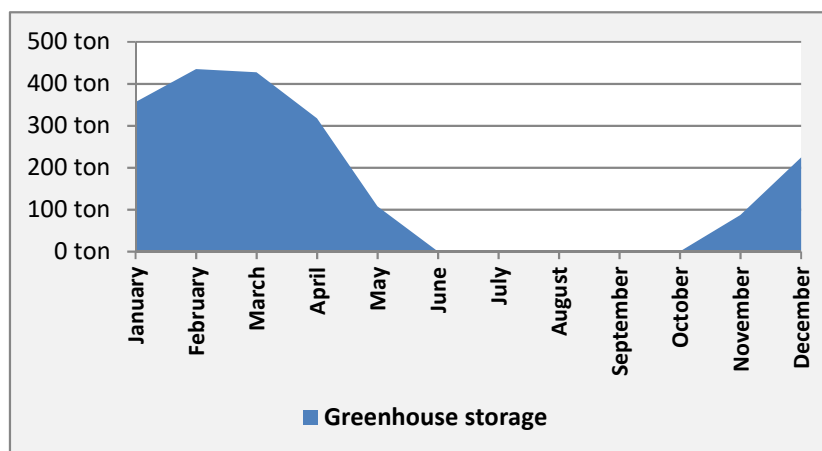
Equipment Recommendation:

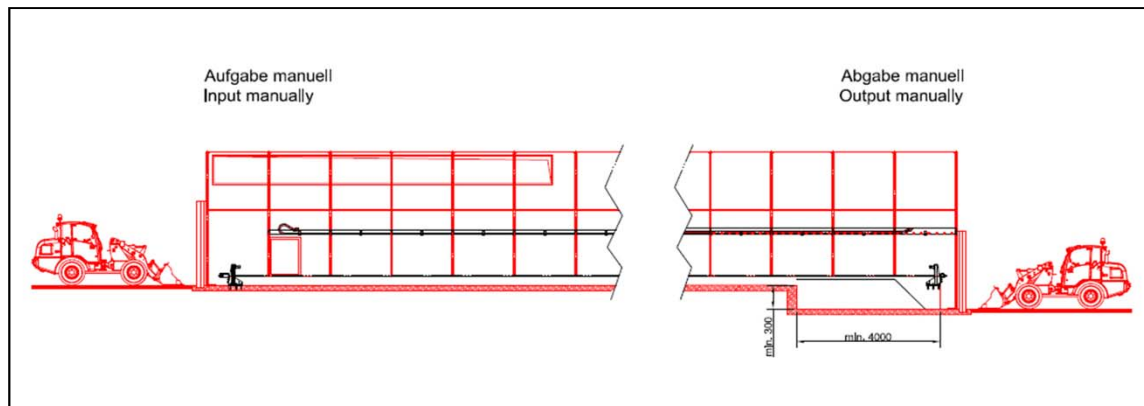
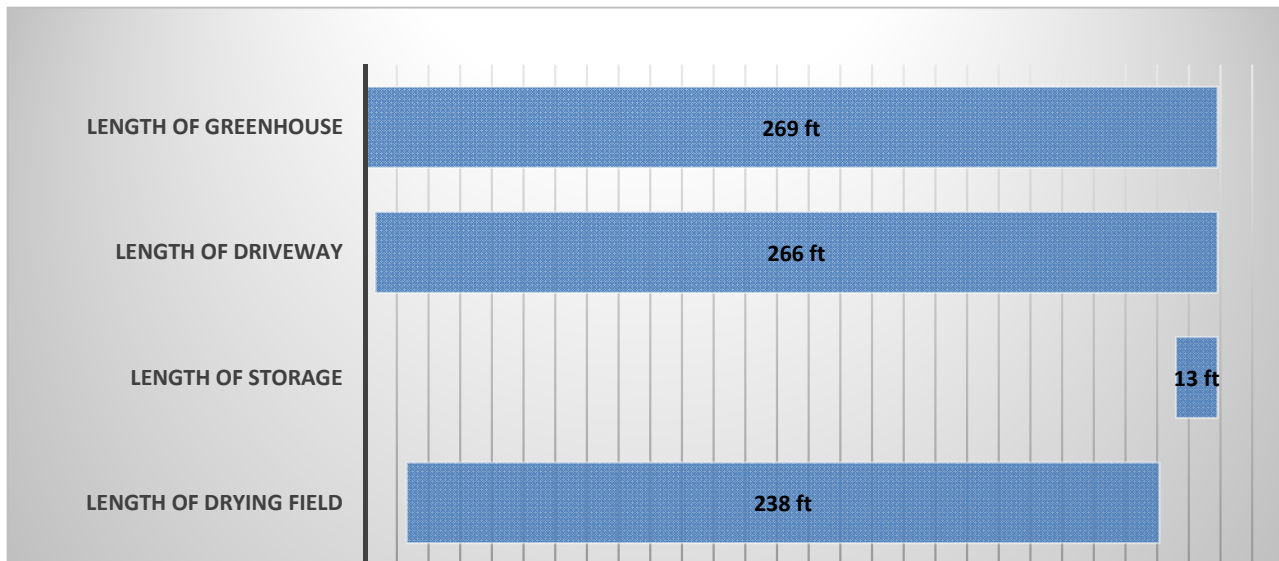
Recommended unit model:	Huber Dryer Solstice 9.1	
Recommended unit quantity:	3	
Recommended width of greenhouse:	98 ft	(30 m)
Recommended length of greenhouse:	269 ft	(82 m)
Length of drying field:	238 ft	(72 m)
Drying area (per unit):	7,093 ft ²	(659 m ²)
Total drying area (per greenhouse):	21,280 ft ²	(1,977 m ²)

Project Design Calculations:

Estimated Dry Cake Solids Out:	90%
Solids Loading Rate Out:	747 ton/yr
Annual Water Evaporation Requirement:	2,614 ton water/yr

	Input	DSIn	Output	DSOut	Water evaporation	Sludge level
January	280 ton	20%	33 ton	90%	116 ton	10 in
February	280 ton	20%	45 ton	90%	156 ton	12 in
March	280 ton	20%	64 ton	90%	224 ton	12 in
April	280 ton	20%	87 ton	90%	303 ton	9 in
May	280 ton	20%	109 ton	90%	381 ton	4 in
June	280 ton	20%	86 ton	90%	301 ton	2 in
July	280 ton	20%	62 ton	90%	218 ton	2 in
August	280 ton	20%	62 ton	90%	218 ton	2 in
September	280 ton	20%	62 ton	90%	218 ton	2 in
October	280 ton	20%	62 ton	90%	218 ton	2 in
November	280 ton	20%	43 ton	90%	150 ton	4 in
December	280 ton	20%	32 ton	90%	111 ton	7 in
Sum/average	3361 ton	20%	747 ton	90%	2614 ton	6 in





Electrical Consumption (Estimation):

	Numbers	Operation time	Effective power	Electrical consumption
Traction drive	3	1,957 h/a	2.20 kW	6,740 kWh
Sludge turning drives	6	979 h/a	1.50 kW	4,595 kWh
Lift drive shield	3	245 h/a	0.50 kW	37 kWh
Installation (estimation)	3	1,000 h/a	1.00 kW	3,000 kWh
Ventilators (all)	18	4,085 h/a	0.80 kW	58,824 kWh
SUM				73,195 kWh

Notes and Assumptions

Fort Bragg, CA

November 3, 2020

1. Equipment specification and drawings are available upon request.
2. If there are site-specific hydraulic constraints that must be applied, please consult the manufacturer's representative to ensure compatibility with the proposed system.
3. Huber Technology warrants all components of the system against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment, whichever
4. Budget estimate is based on Huber Technology's standard Terms & Conditions and is quoted in US dollars unless otherwise stated.
5. Equipment recommendations are based on information provided to Huber Technology.
Subsequent information which differs from what has been provided may alter the equipment
6. Pricing is based on Huber's standard control panel arrangement.
7. Greenhouse lengths may vary based on the required automation of the sludge input and discharge.
8. The offer is based on normal, homogenous municipal sludge with a minimum organic content of 45% and a maximum organic content of 70%. Sludge with organic content around 70% is assumed to have less than 45% protein value.
9. Feed sludge must be free of any pollutants which could be hazardous, toxic, radioactive, corrosive, flammable, or explosive.
10. Feed sludge must be free of lime which may have been added to stabilize or improve storage of the sludge. Sludge stabilized with lime can only be treated in drying plants which are specifically designed for this purpose.
11. Annual solids loading is based on 124,000 gal/wk at 2.5% feed solids to dewatering process with 100% capture rate.

Equipment Summary

Fort Bragg, CA

November 3, 2020

Dryer System:

Three (3) Huber SRT 9.1 Dryer, including:

- 316L stainless steel construction; pickled and passivated in acid bath
- Traction drive system and chain
 - 3HP, 460VAC, 3PH, 60Hz, VFD Motor
- Sludge turning unit
 - 10HP, 460VAC, 3PH, 60Hz, VFD Motor
- Galvanized steel rail system
- 12 Recirculation Fans
- 6 Exhaust Fans
- Dust Encapsulation
- Scraper Plate
 - 1.0HP, 460VAC, 3PH, 60Hz Motor

Control System - Solar Dryer, including:

- Solar Dryer Main Control Panel
- Solar Dryer Transfer Control Panel
- Junction Box

Greenhouse:

- Width and length to meet design criteria above
- Roof and side walls twin wall polycarbonate
- Anodized aluminum frame
- Two (2) passage doors
- Two (2) overhead doors

Freight and Startup:

- Standard Huber Recommended Start-up Services
- Freight to jobsite.

Total Price: \$ 2,240,000 (for all units)

Dryer Options

Fort Bragg, CA

November 3, 2020

Optional Items which can be supplied by Huber (but are not included in the above pricing):

- Cake conveyance to the dryer
- Discharge and Dry Storage System
- Odor Control System

Items Not Supplied by Huber

Fort Bragg, CA

November 3, 2020

Items not included in the above offering:

- Wiring and piping between all supplied equipment
- Installation
- Concrete work
- Site Preparation
- Maintenance platforms and cranes

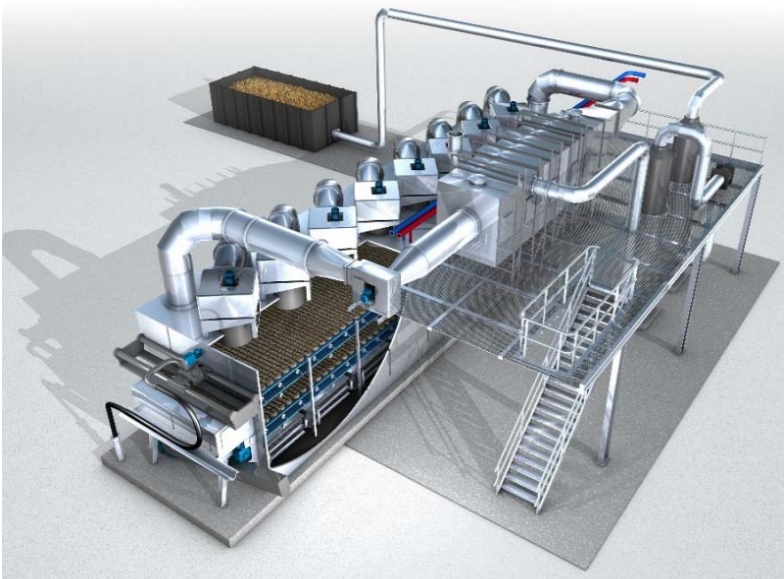
Budgetary Proposal

Project Name:
Fort Bragg, CA

Equipment Type:
BT 8 221°F
 105°C

Proposal Date:
9/15/2020

Proposal Number:
461135



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Belt Dryer Design Summary

Fort Bragg, CA

September 15, 2020

Sludge Characteristics:

Upstream Process:	Activated Sludge with Secondary Clarifier
Digestion Process:	Aerobic Digester
Sludge Type:	Waste Activated Sludge
Sludge VSS:	≤ 70%
Sludge Protein Content:	≤ 30%
Sludge Feed Density:	55 lb/cuft
Dried Sludge Density:	25 lb/cuft

Project Design Parameters:

Sludge Feed Rate:	1,084 dry ton/yr	(986 dry tonne/yr)
Inlet Cake Concentration:	20%	
Calculated Hydraulic Loading Rate (per unit):	5,421 wet ton/yr	(4,928 wet tonne/yr)

Equipment Recommendation:

Recommended unit model:	Huber Dryer BT 8
Recommended unit quantity:	1

Air Flow Design:

Fresh Air System

Project Design Calculations:

Sludge Feed Rate to the Dryer:	1,738 wet lb/hr	
Estimated Dry Cake Solids Out:	92%	
Annual Water Evaporation Requirement:	4,243 ton water/year	(3,857 tonne water/year)
Assumed Annual Operation Time:	6,240 hr/year	(24 hr/day, 5 days/wk, 52 wks/yr)
Hourly Water Evaporation Requirement:	0.68 ton water/hr	(0.62 tonne water/hr)
	1,360 lb water/hr	(617 kg water/hr)
Solids Loading Rate Out:	1,178 wet ton/year	(1,071 wet tonne/year)

Equipment Design Parameters:

Thermal Heat Source:	Hot Water Boiler (Propane)
Estimated Heat Supply Temperature:	221°F (105°C)

Equipment Requirements:

Estimated Heat Demand (at the dryer):	1,300 Btu/lb water evaporated 1.77 MMBTU/hr
Estimated Electrical Demand:	.03 kWh/lb water evaporated
Estimated Exhaust Air Flow:	10000 m3/hr 5900 CFM

Notes and Assumptions

Fort Bragg, CA

September 15, 2020

1. Equipment specification and drawings are available upon request.
2. If there are site-specific hydraulic constraints that must be applied, please consult the manufacturer's representative to ensure compatibility with the proposed system.
3. Huber Technology warrants all components of the system against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment, whichever occurs first.
4. Budget estimate is based on Huber Technology's standard Terms & Conditions and is quoted in US dollars unless otherwise stated.
5. Equipment recommendations are based on information provided to Huber Technology. Subsequent information which differs from what has been provided may alter the equipment recommendation.
6. Pricing is based on Huber's standard control panel arrangement.
7. The offer is based on normal, homogenous municipal sludge with a minimum organic content of 45% and a maximum organic content of 70%. Sludge with organic content around 70% is assumed to have less than 45% protein value.
8. Feed sludge must be free of any foreign matter to the greatest extent possible. Maximum particle size allowed is 8 mm (spherical diameter). A Huber Strainpress is recommended between the digester or sludge storage tank and the dewatering operation to provide this screening and to extend the operational life of the dryer's extruder.
9. Feed sludge must be free of any pollutants which could be hazardous, toxic, radioactive, corrosive, flammable, or explosive.
10. Dewatered cake feed characteristics have been assumed based on the information provided to Huber. Please notify Huber if the cake conditions will differ from those described in this proposal.
11. Annual solids loading is based on 200,000 gal/wk at 2.5% feed solids to dewatering process with 100% capture rate.

Equipment Summary

Fort Bragg, CA

September 15, 2020

Dryer System:

One (1) Huber BT 8 Dryer, including (each):

- One (1) Belts
 - Temperature Resistant Plastic
 - Upper Belt Drive
 - Max 5HP, 460VAC, 3ph motor, VFD
 - Lower Belt Drive
 - Max 1HP, 460VAC, 3ph motor, VFD
 - Belt Washing System for each belt with a common booster pump
 - Two (2) 0.5HP, 460VAC, 3ph motors for belt wash drive
 - 5HP, 460VAC, 3ph motor for booster pump
- Support Frame
 - Internal Frame: 316L Stainless Steel
 - Head Pieces: 316L Stainless Steel
 - Interior Panels: 316L Stainless Steel
 - Exterior Panels: Painted Steel
- Extruder System
 - Traction Drive System
 - Max 1.5HP, 460VAC, 3ph motor, VFD
 - Cutter Knife System
 - Max 7.5HP, 460VAC, 3ph motor, VFD
 - 316L Stainless Steel Construction
 - Feed Hose - 6" (connects at the end of the dryer, reference drawings)
- Heat Exchangers:
 - Eight (8) Main Heat Exchangers
 - Combination 316 Stainless Steel Construction, AIMg
 - Each with a modulated valve 120VAC
 - One (1) Preheat Heat Exchanger
 - Combination of Galvanized Steel, Copper and AIMg
 - Two (2) Heat Recovery Heat Exchangers with recirculation pump
 - Combination of 316 Stainless Steel, Galvanized Steel, Copper and AIMg
 - 1HP, 460VAC, 3ph motor
- Fans:
 - Four (4) Process Fans:
 - 316 Stainless Steel Materials
 - Drive Motors
 - 10HP, 460VAC, 3ph Drive Motor
 - Exhaust Fan:

- 316 Stainless Steel Casing Material
 - 50HP, 460VAC, 3ph Drive Motor
 - Outlet Conveyor:
 - 316 Stainless Steel Material
 - Shafted Screw
 - Carries Sludge to end of the dryer (reference drawings)
 - 2HP, 460VAC, 3ph motor
 - Instrumentation (Huber Standard*):
 - Inlet Moisture sensor
 - Discharge Moisture Sensor
 - Discharge Sludge Temperature Sensor
 - Two (2) transfer chamber level sensors
 - Three (3) Extruder Proximity Sensors
 - Extruder Pressure sensor
 - Extruder Camera
 - Two (2) Belt Wash proximity sensors
 - Two(2) Belt Motion Sensors
 - Two(2) Belt Proximity Sensors
 - One (1) access door safety switch
 - Five (5) Pressure sensors for each module
 - Two (2) Temperature and Moisture Sensors for fresh and exhaust air
 - One (1) Flow meter for heating water
 - One (1) Calorimeter for heating water
 - One (1) pressure sensor for heating water
 - Two (2) Temperature sensors - supply and return of heating water
 - Two (2) Temperature sensors - supply and return of heat recovery water
 - Eight (8) Temperature sensors - after each main heat exchanger
 - Eight (8) Flow control valves -one (1) for each main heat exchanger
- * - Instrumentation subject to change based on updated controls design of Huber Technology, Inc

Ancillary Equipment

- Control Panel with Allen Bradley PLC and HMI
- Heat Recovery and Cleaning Pump

Freight and Startup:

- Standard Huber Recommended Start-up Services
- Freight to jobsite.

Total Price: \$ 3,800,000 (per unit)

Items Not Supplied by Huber

Fort Bragg, CA

September 15, 2020

Items not included in the above offering:

- Piping between all supplied equipment
 - Pipes between boiler system and dryer
 - Pipes between boiler system and preheat heat exchanger
 - Pipes for water supply to belt cleaning system
 - Pipes for heat recovery system
 - Pipes for scrubber process water (if Required)
 - Pipes for sludge feed between Sludge Feed Pump and Dryer Extruder Hose
- Wiring between all supplied equipment
- Installation
- Building structures
- Site Preparation
- Required maintenance platforms and cranes
- Ductwork and insulation supplying fresh air to the dryer
- Ductwork and insulation for exhaust air to the odor control (if required)
- Boiler system fresh air duct and exhaust stack (if required)
- Gas Cleaning System for Digester Gas (if required)