

Franklin WRF Project Update

Solar Sludge Drying System Preselection



Presented to Board of
Mayor and Aldermen

June 9, 2015



**CDM
Smith**®

Franklin WRF Project Update

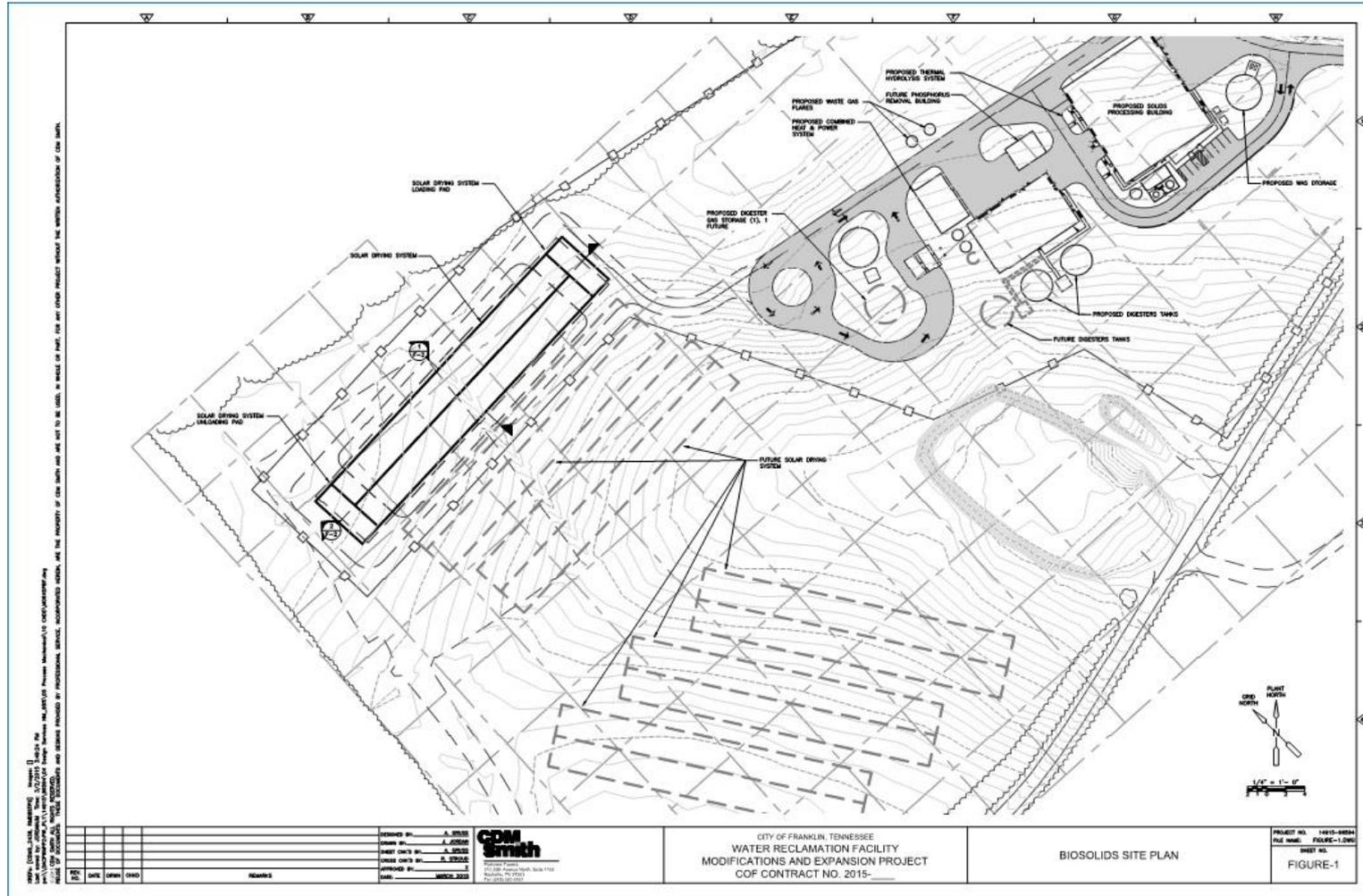
Design Parameters

Solar Sludge Drying System Design Parameters

Type of Sludge	Dewatered, thermally hydrolyzed, anaerobically digested sludge
Sludge Delivered to Solar Dryer, lbs./dry solids/day	7,400 lbs.
Solids Concentration of Sludge to Dryer (minimum)	25 percent
Solids Concentration of Dried Product (annual average)	75 percent

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Conceptual Site Plan



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Proposals

5 Submittals Received from 4 Vendors

- Infilco Degremont Heliantis™
- Huber Solar Dryer
- Parkson Sludge Manager
- Parkson Thermo System™
- Kruger Solia Flow™

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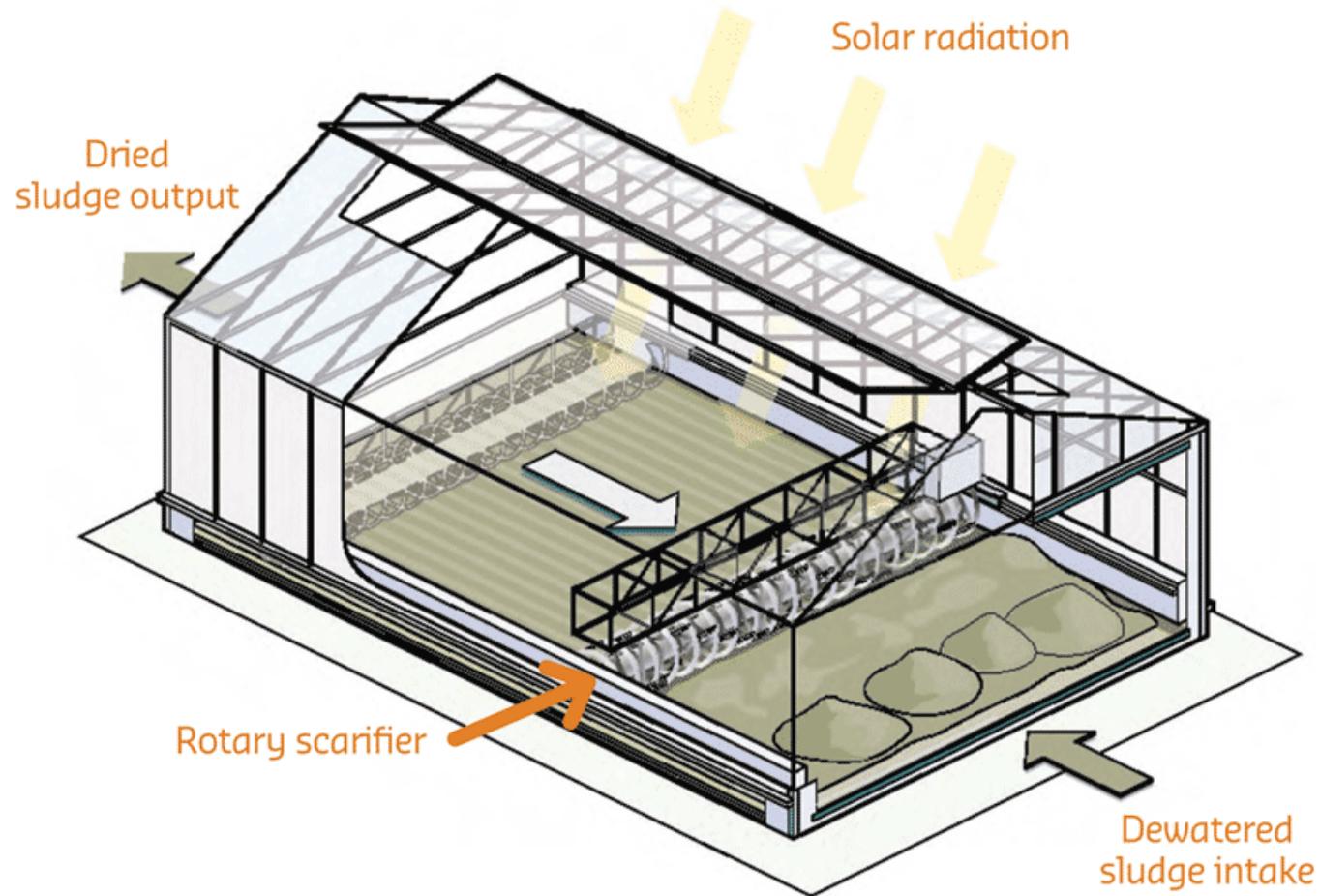
Equipment and Services Costs

Solar Sludge Dryer System Supplier	Footprint of Solar Sludge Drying System (SF)	Summary of Bid Form Items 1 - 4 ³
Infilco Degremont	35,690	\$1,848,450
Huber Solar Dryer ¹	36,540	\$1,525,000
Parkson Sludge Manager	36,432	\$1,556,040
Parkson Thermo System	36,288	\$1,860,350
Kruger Solia Flow ²	66,245	\$5,097,000

1. Huber did not provide 2-Year Warranty Bond and took most exceptions to RFP
2. Kruger system is almost twice the size and cost of the other vendors and was dropped from consideration
3. Vendor assistance with installation varied between vendors, accounting for some of the cost difference

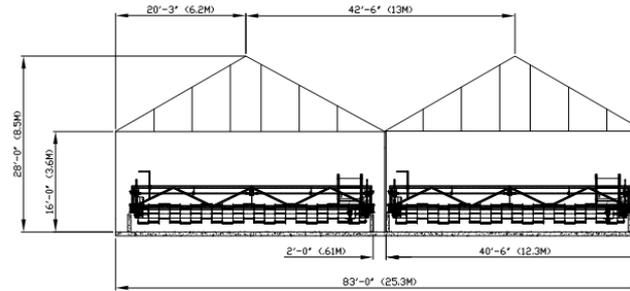
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Infilco Degremont Solar Dryer Structure

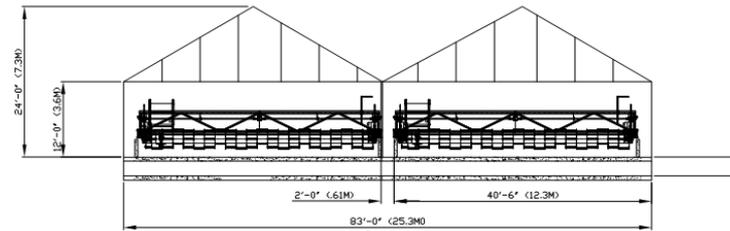


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Infilco Degremont System

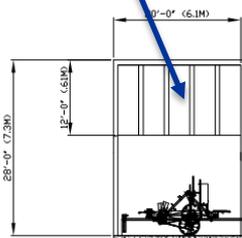


FRONT ELEVATION

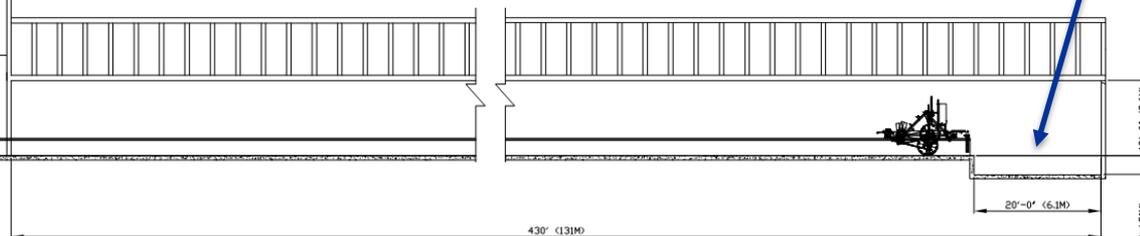


REAR ELEVATION

Dewatered Sludge Unloading



Dry Sludge Storage and Output



SIDE ELEVATION

- Two drying beds, single greenhouse
- Two tilling machines
- Plug Flow

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REV	REVISION DESCRIPTION	DRAWN	CHECKED	APP	DATE	REV	REVISION DESCRIPTION	DRAWN	CHECKED	APP	DATE
-	ORIGINAL ISSUE							VAB	SV	SV	3/14

PROJECT INFORMATION
 For FRANKLIN WWT/P
 FRANKLIN, TN
 Proposed Ord. No. 50115981



DRAWN	BY	DATE
VAB	SV	3/14
CHECKED	SV	3/14
APP	SV	3/14
REV	SV	3/14

DO NOT SCALE
SCALE NONE

BUILDING ELEVATIONS		
GREENHOUSE SOLAR DRYER		
NO	50115981-001	

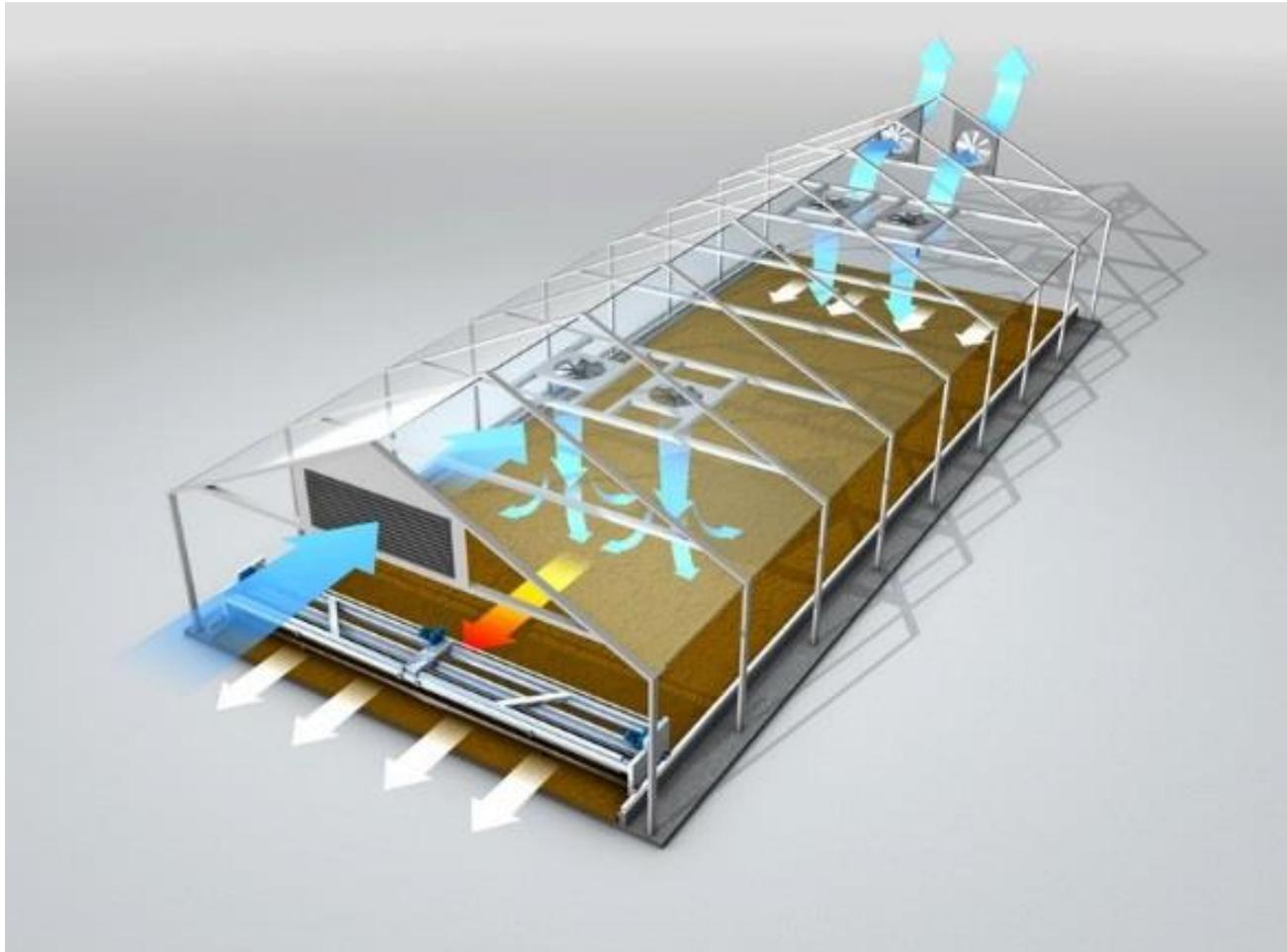
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Infilco Degremont Tilling Mechanism



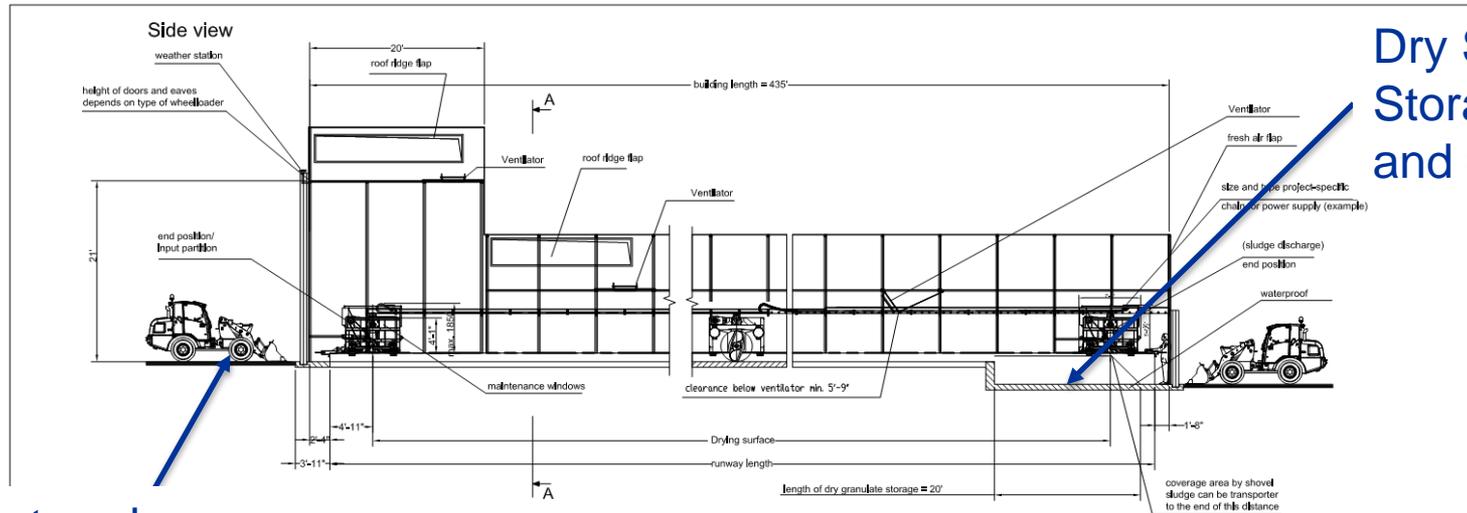
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Huber Solar Dryer Structure



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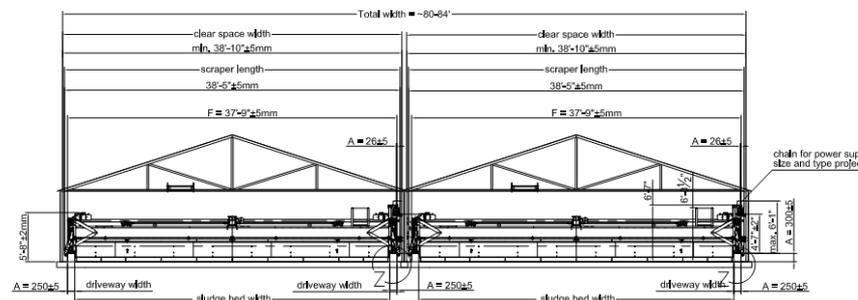
Huber System



Dry Sludge Storage and Output

Dewatered Sludge Unloading

Section: A-A



- Two drying beds, single greenhouse
- Two tilling machines
- Plug Flow

Dimensions are for reference only!
For binding dimensions please refer to the final installation drawings

HUBER TECHNOLOGY WASTE WATER Solutions		FRANKLIN, TN	
Fig No. 2/3	SRT 11	Scale 3/4" = 1'-0"	
Project No.		Drawing No. TN_FRA_SRT_150407_0.dwg	

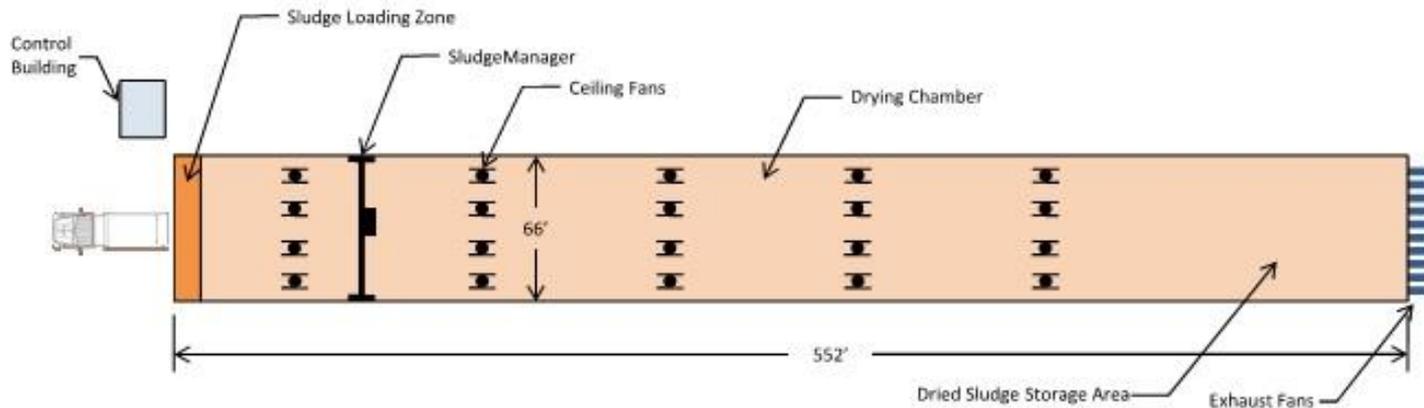
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Huber Tilling Mechanism



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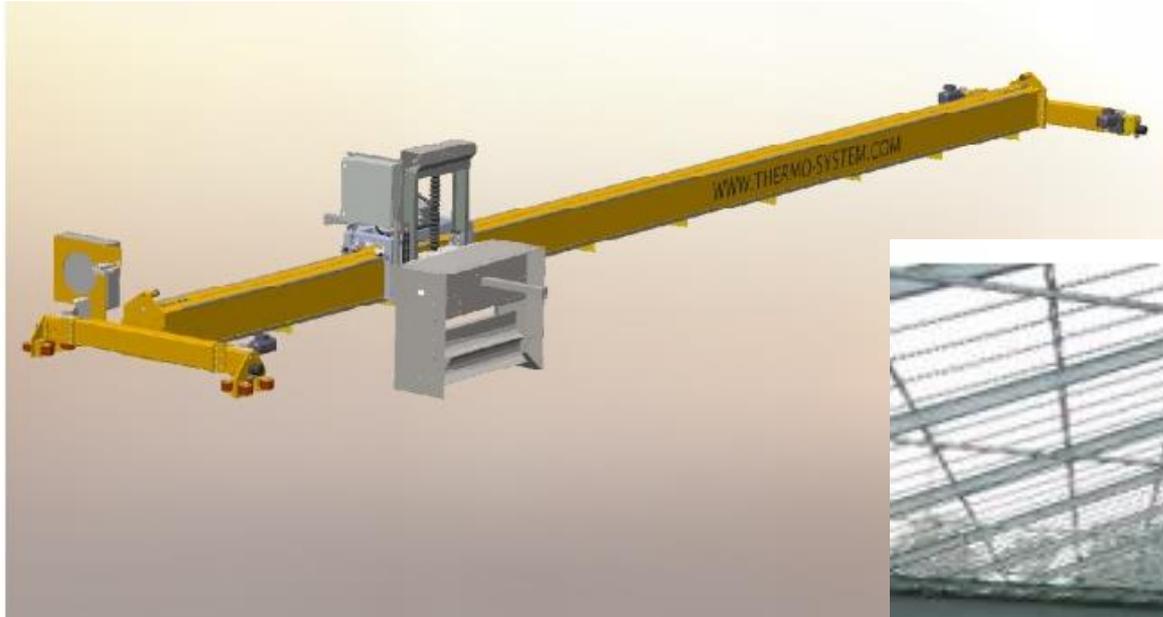
Parkson Sludge Manager



- Single Drying Bed and Greenhouse
- Single Tilling Machine
- Tilling machine moves in two directions
- Plug Flow

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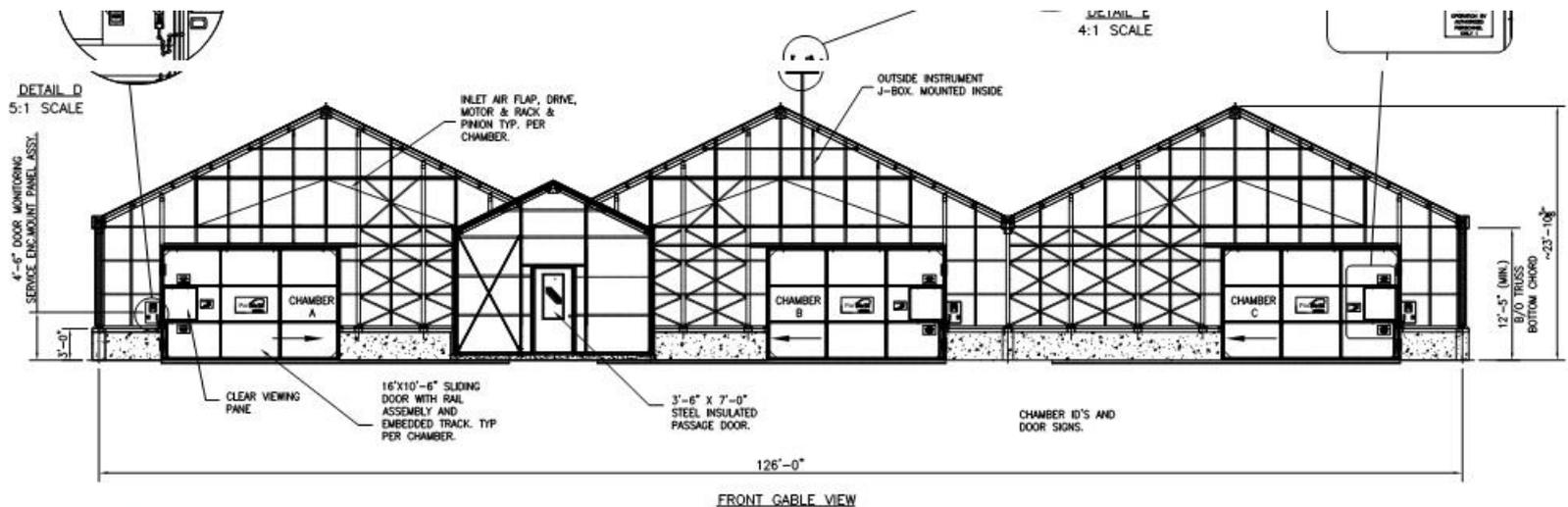
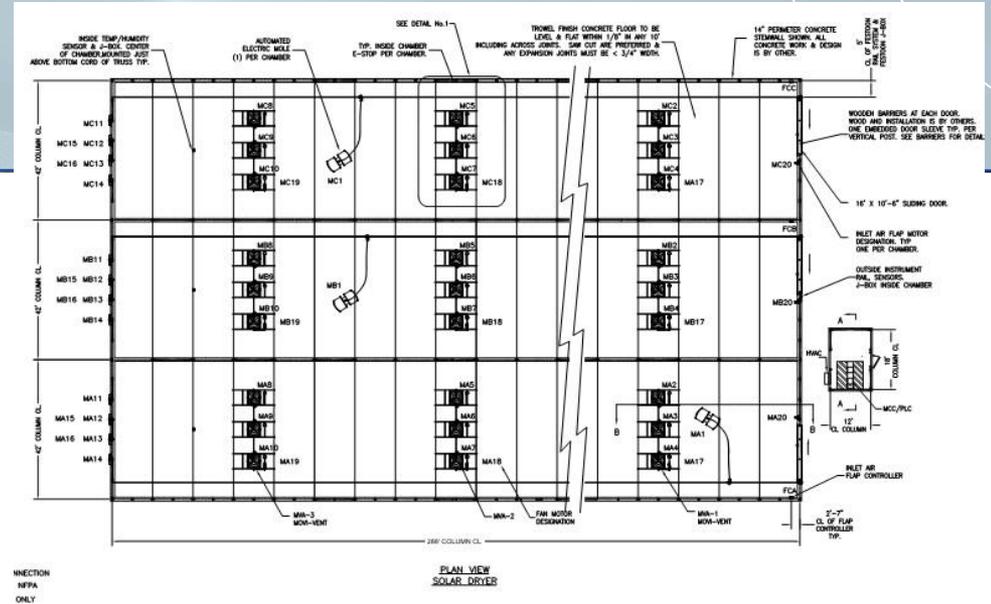
Parkson Sludge Manager



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Parkson Thermo System

- Batch System
- Three drying beds, single greenhouse
- Three tilling machines
- Load and unload at same end



SAMPLE
FINAL DESIGN MAY VARY

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Parkson Thermo Tilling Mechanism



The Electric Mole

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General Comments Regarding Evaluation

- IDI took the fewest exceptions to the RFP
- Huber did not provide the 2-Year Warranty Bond while all other suppliers did
- Huber took the most exceptions to the RFP
- The Parkson Sludge Manager is a single drying bed design and provides no redundancy
- The Parkson Thermo System, while the most predominate in the US, is a batch system while all others are plug flow
- The product samples provided by IDI had the most uniform appearance

Franklin WRF Project Update

Capital Cost Summary

Cost Factor		IDI	Huber	Parkson Sludge Manager	Parkson Thermo System
Base System Cost					
Solar Dryer System		\$897,000	\$1,295,000	\$1,500,890	\$1,805,200
I&C Components and Programming		\$580,000	\$155,000	Included	Included
Electrical Components		\$55,000	\$0	Included	Included
Other Items		\$122,000	\$75,000	\$55,150	\$55,150
Additional Line Item		\$194,450	NA	NA	NA
Additional Items					
Warranty Bond		\$14,000	\$0	\$3,180	\$4,000
Payment and Performance Bonds		\$22,000	\$15,000	\$11,130	\$14,000
Additional Project Requirements					
Concrete Slab (Estimated)		\$354,260	\$363,530	\$361,620	\$435,230
Concrete Walls (Estimated)		\$89,340	\$36,670	\$43,110	\$90,000
Equipment Installation (Estimated)	20%	\$465,610			
	30%		\$582,060		
	35%			\$691,278	\$841,253
Electrical/I&C (Estimated)	Varies	\$307,303	\$302,671	\$346,627	\$843,657
Total Direct Costs		\$3,100,963	\$2,824,931	\$3,012,985	\$4,088,490
Permits	0.5%	\$15,505	\$14,125	\$15,065	\$20,442
Sales Tax	9.5%	\$170,982	\$141,063	\$143,934	\$172,082
Builder's Risk	0.5%	\$9,069	\$8,262	\$8,811	\$11,957
General Liability	1.0%	\$18,138	\$16,523	\$17,623	\$23,914
Bonds & Insurance	1.5%	\$27,206	\$24,785	\$26,434	\$35,870
Subtotal Prior to OH&P		\$3,341,862	\$3,029,687	\$3,224,852	\$4,352,755
General Conditions	10%	\$334,186	\$302,969	\$322,485	\$435,276
Contractor's Overhead & Profit	10%	\$334,186	\$302,969	\$322,485	\$435,276
Subtotal with OH&P		\$4,010,234	\$3,635,625	\$3,869,822	\$5,223,306
Construction Contingency	25%	\$1,002,558	\$908,906	\$967,456	\$1,305,827
Total Cost at Today's Dollars		\$5,012,792	\$4,544,531	\$4,837,278	\$6,529,133
Escalation to Midpoint of Construction	5.09%	\$255,128	\$231,296	\$246,195	\$332,303
TOTAL CAPITAL COST		\$5,268,000	\$4,776,000	\$5,083,000	\$6,861,000

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Operations and Maintenance Cost Summary

Cost Factor	IDI	Huber	Parkson Sludge Manager	Parkson Thermo System
Power Consumption				
Annual Power Consumption, kWh	65,600	100,000	108,000	108,000
Annual Power Cost @ \$0.11/kWh	\$7,223	\$11,010	\$11,891	\$11,891
Operation and Maintenance				
Annual Manhours	183	400	105	245
Total Labor Cost	6,725	14,700	3,859	9,004
Annual Parts Replacement	12,325	2,000	6,000	6,000
Total Annual O&M Cost	\$26,273	\$27,710	\$21,750	\$26,895

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Non-Cost Scoring Summary

Parameter	IDI	Huber	Parkson Sludge Manager	Parkson Thermo System
Raw Non-Cost Evaluation Score (out of 160 points)	48	94	101	65
Rank	1	3	4	2

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Final Scoring

Parameter		IDI	Huber	Parkson Sludge Manager	Parkson Thermo System
Calculation of Weighted Cost Score					
Total NPC		\$5,641,000	\$5,199,000	\$5,365,000	\$7,188,000
Percent of Highest NPC		78.5%	72.3%	74.6%	100.0%
Raw Cost Score (0 to 100 points)		78.5	72.3	74.6	100.0
<i>Weighted Cost Score (50% of Total Score)</i>	50%	39.2	36.2	37.3	50.0
Calculation of Weighted Non-Cost Score					
Raw Non-Cost Evaluation Score (0 to 160 points)		48	94	101	65
Normalized Non-Cost Evaluation Score (0 to 100 points)		30.0	58.8	63.1	40.6
<i>Weighted Non-Cost Score (50% of Total Score)</i>	50%	15.0	29.4	31.6	20.3
Calculation of Total Score					
Total Score (0 to 100 points)		54.2	65.5	68.9	70.3
Rank		1	2	3	4

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Sensitivity Analysis

Parameter		RANK			
		IDI	Huber	Parkson Sludge Manager	Parkson Thermo System
<i>Weighting of Cost/Non Cost Score</i>					
	50/50	1	2	3	4
	60/40	1	2	3	4
	70/30	1	2	3	4
	80/20	1	2	3	4
	90/10	3	1	2	4
<i>Add Warranty Bond Cost to Huber, Remove from Non Cost Items</i>					
	50/50	1	2	3	4
	60/40	1	2	3	4
	70/30	1	2	3	4
	80/20	2	1	3	4
	90/10	3	1	2	4

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Sensitivity Analysis

Parameter		RANK			
		IDI	Huber	Parkson Sludge Manager	Parkson Thermo System
<i>Remove System Redundancy Preference</i>					
	50/50	1	3	2	4
	60/40	1	3	2	4
	70/30	1	3	2	4
	80/20	1	3	2	4
	90/10	3	1	2	4
<i>Change Installation Weighting to US Installations</i>					
	50/50	1	2	3	4
	60/40	1	2	3	4
	70/30	2	1	3	4
	80/20	3	1	2	4
	90/10	3	1	2	4

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Sensitivity Analysis

Parameter		RANK			
		IDI	Huber	Parkson Sludge Manager	Parkson Thermo System
<i>Eliminate Appearance of Product from Ratings</i>					
	50/50	1	2	4	3
	60/40	1	2	3	4
	70/30	1	2	3	4
	80/20	1	2	3	4
	90/10	3	1	2	4
<i>Remove Company Financials from Ratings</i>					
	50/50	1	2	3	4
	60/40	1	2	3	4
	70/30	1	2	3	4
	80/20	2	1	3	4
	90/10	3	1	2	4