CITY OF MIDDLETON

SOLIDS MANAGEMENT PLAN ADDENDUM

APPROVED

By Dan Smith

State of Idaho
Department of Environmental Quality

Date: Mar 17, 2020

Prepared for

CITY OF MIDDLETON
1103 West Main Street
Middleton, ID 83644

Prepared by

Civil Dynamics, PC
305 Cornell St
Middleton, ID 83644

March 2020

Civil Dynamics
305 Cornell St. ◆ Middleton, Idaho 83644 ◆ 208.453.2028

March 17, 2020

Dan Smith, PE
Idaho Department of Environmental Quality
1445 North Orchard
Boise, ID 83706

Subject: City of Middleton – Solids Management Plan Addendum

Dan:

On behalf of the City of Middleton (City), Civil Dynamics, PC is submitting a Solids Management Plan Addendum. This submittal revises the approved Solids Management Plan to address the change in dewatering conditions that the City and I discussed with you on the morning of March 16th. Specifically, it addresses installing a temporary rotating screen thickener (RST) to complete the dewatering since the geotubes, from the original scope, are full. The temporary RST system will be the first step towards the long-term solids handling system as outlined in the Wastewater Master Plan.

Thank you for your time and review of this submittal. Please call me at 208-453-2028 or mike@civildynamics.net if you have any questions.

Sincerely,

Civil Dynamics, P.C.

By: Michael Martin, PE

Cc: Chad Beverage, City of Middleton (e-file)
Bruce Bayne, City of Middleton (e-file)

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Table of Contents

List of Figures

List of Tables

Appendices

1. INTRODUCTION

1.1. Background

The City of Middleton (Middleton) operates a wastewater treatment facility to handle industrial and domestic wastewater. The wastewater is treated and discharged under the National Pollutant Discharge Elimination System (NPDES) with the Environmental Protection Agency. The NPDES permit, ID-002183-1, has been administratively extended and currently being reviewed and permitted by the Idaho Department of Environmental Quality (DEQ).

The wastewater treatment plant (WWTP) includes fine screens, two sequencing batch reactors, grit removal, equalization storage, and ultra-violet disinfection. Waste activated sludge is pumped to a sludge settling pond. Currently, there is no sludge dewatering system. Sludge is allowed to settle with decant water returning to the headworks building for retreatment.

1.2. Purpose and Report Organization

This report outlines a plan to manage the sludge buildup within the sludge settling pond. The report is composed of five sections: ownership information, sludge characterization, application of sludge, and non-compliance issues.

2. OWNERSHIP INFORMATION

2.1. Ownership

The wastewater treatment plant (WWTP) is owned and operated by Middleton. Figure 1 highlights Middleton's property ownership around the WWTP.

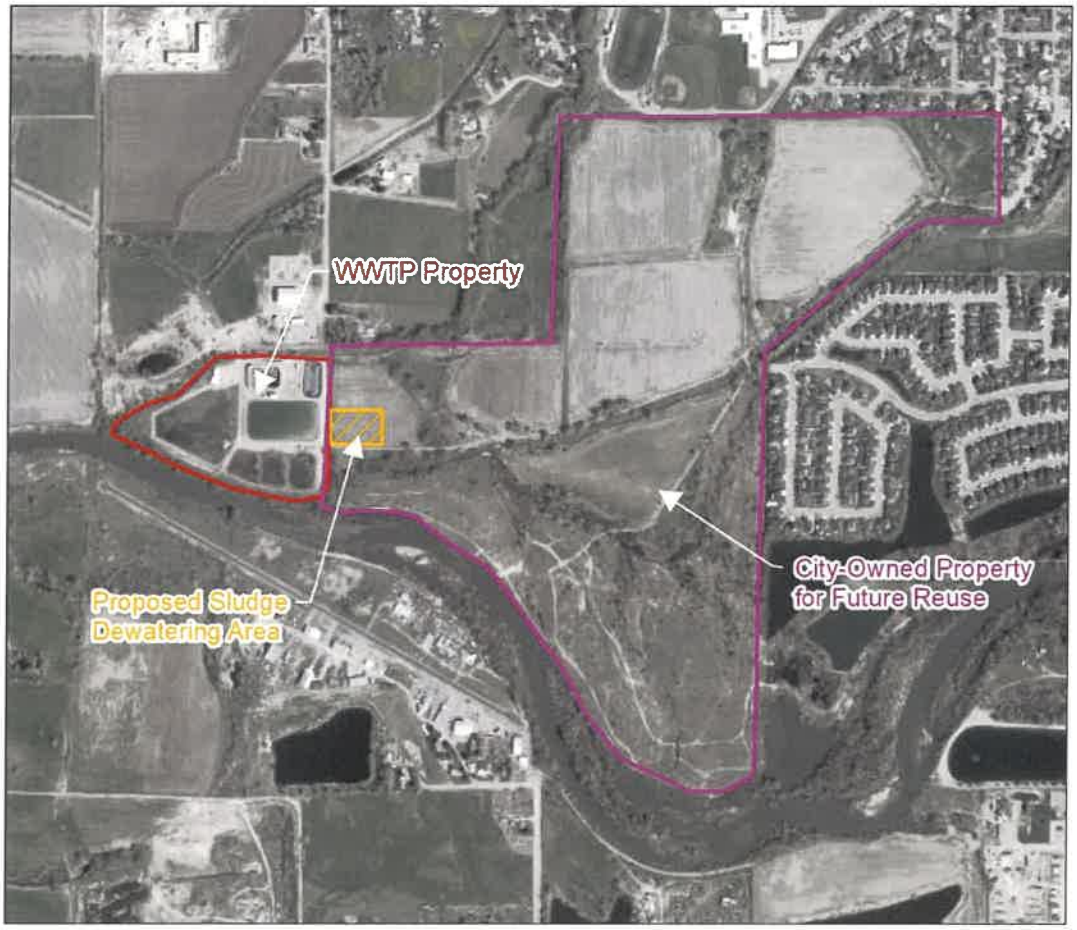


Figure 1 - Middleton Property Ownership.

2.2. Responsible Parties

Middleton is the responsible party for the Solids Management Plan, the generation of sludge and biosolids, and sludge and biosolids transportation. The contact information is listed below.

Bruce Bayne, PE
Public Works Superintendent

Or

Chad Beverage
Wastewater Operator

City of Middleton
1103 West Main Street
Middleton, ID 83644
(208) 585-6611

The operators for the WWTP and reuse site are shown in Table 1.

Operator	Licenses
Chad Beverage	WWT3-21600
Rodger Hawker	WWC1-20647 WWL-19756 WWT4-22155

Table 1 - Licensed Operators.

3. SLUDGE CHARACTERIZATION

3.1. WWTP Summary

The wastewater treatment plant (WWTP) consists of fine screens, two sequencing batch reactors (SBRs), grit removal, equalization storage, sludge settling pond, and ultra-violet disinfection. Figure 2 depicts the major components of the WWTP. The WWTP treats approximately 670,000 gallons per day.

Figure 2 - WWTP Components.

3.2. Sludge Removal and Treatment

3.2.1. Phase 1 - Geotubes

The proposed method for sludge is removal via geotubes. The overall dewatering process is outlined below.

1. Construct sludge dewatering area.
    a. Flat area with containment berm surrounding the area.

2. Place HDPE liner over sludge dewatering area.
3. Place geotube on HDPE liner.
    a. Filtrate water is returned to the WWTP.
4. Sludge pumped from sludge settling pond.
5. Polymer added to facilitate coalescing of sludge.
6. Sludge/Polymer pumped into geotube.
7. Sludge/Polymer captured within geotube.
8. Filtrate water exits geotube and returned to WWTP.

A conceptual plan is shown in Figure 3. This approach can be used for any lagoon for sludge dewatering. The key is to place the geotube and containment area along the east side of the WWTP to allow for maintenance vehicle access while the geotube/sludge is drying. Appendix A includes schematic for the sludge dewatering project.

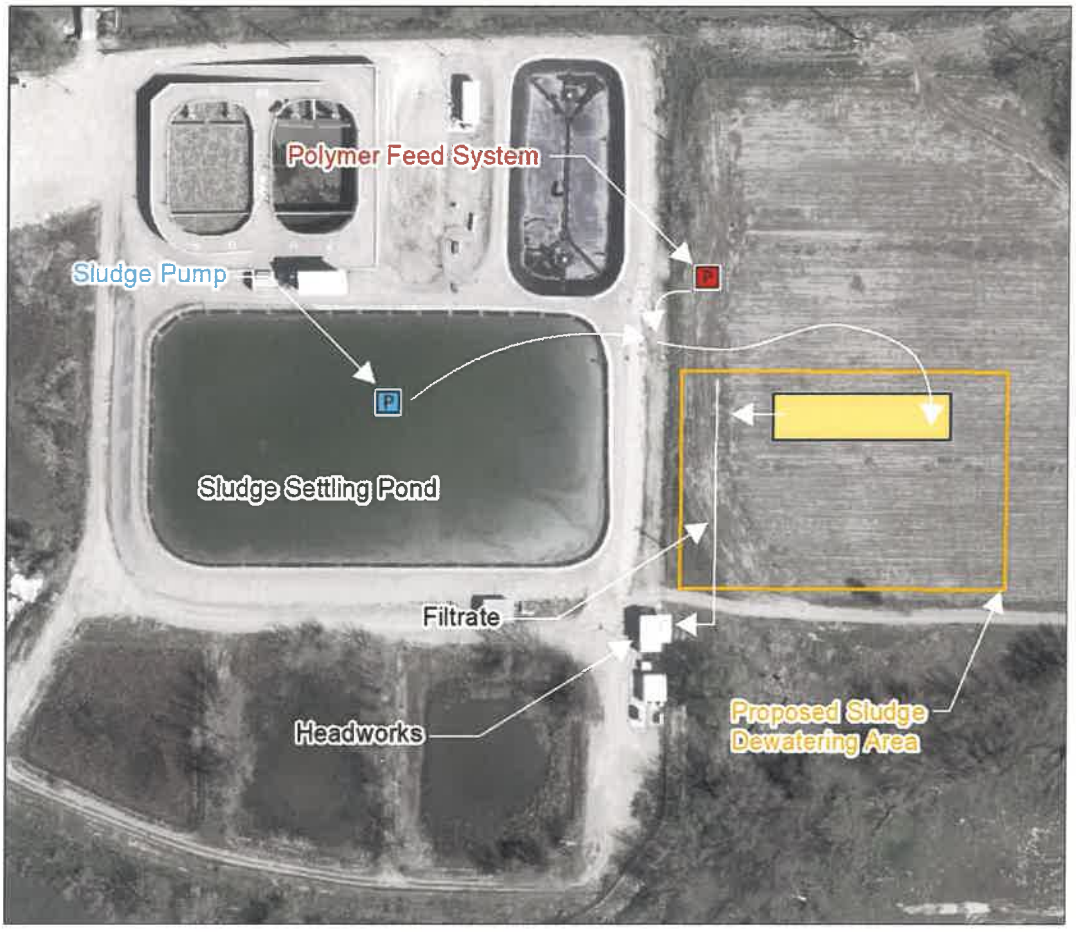


Figure 3 - Conceptual Plan for Phase 1 Geotubes.

3.2.2. Phase 2 – Temporary Rotating Screen Thickener

With most of the sludge removed and stored in the geotubes, the City plans to install a temporary rotating screen thickener (RST) system to remove the remaining sludge from the Sludge Settling Pond. The RST system will be sized to process the current and future WAS flows as outlined in the approved Wastewater Master Plan. The overall dewatering process is outline below.

1. Complete Phase 1 dewatering
2. Begin wasting to Sludge Settling Pond
3. Install temporary RST system
    a. Construct temporary RST building, polymer system, and containment system
4. Begin dewatering with temporary RST system
    a. WAS and sludge from Sludge Settling Pond
5. Filtrate water is recycled to the SBRs for retreatment
6. Sludge/Polymer is captured containment unit

A conceptual plan is shown in Figure 4. This approach will utilize the existing WAS and Sludge Settling Pond lines to efficiently remove and process sludge from the WWTP. The location will allow for easy access and removal of a containment unit that can be hauled to the landfill.

Figure 4 - Conceptual Plan for Phase 2 Temporary RST.

3.3. Containment

3.3.1. Phase 1 - Geotubes

The sludge dewatering area perimeter will be bermed to contain any spills during the project. Any spills within the sludge dewatering area will be retreated at the WWTP as shown in Figure 3. Since the filtrate will be returned to the headworks of the WWTP, City staff will be able to track the increase in flow during the project. City staff will be able to identify any leak in the containment area based on the flow tracking. If a leak is suspected, the project will be halted and inspection of the liner will commence. Repairs to the liner will be made prior to restarting the process. DEQ will be notified if leaks are detected.

3.3.2. Phase 2 – Temporary RST

The temporary RST system will have a collection drain system to capture any WAS, sludge, and polymer. This collection drain system will pump any waste to the SBRs for retreatment.

3.4. Sludge Characterization

The wastewater consists mostly of domestic waste from the City's collection system. A composite sludge sample was taken for 503 parameters prior to jar testing and geotube feasibility analysis. Results indicate the sludge will be Class B for metals and pathogens. Appendix B includes the results.

3.4.1. Phase 1 - Geotubes

The sludge will be allowed to dry within the geotubes during the summer. Additional drying time allows for further dewatering of the sludge. The sludge will be sampled as one unit (from the geotubes) since the project includes dewatering from only the sludge settling pond. The sludge will be analyzed for metals, nitrogen, phosphorus, percent solids, and fecal coliform. Metals will be specifically sampled for the federal 40 CFR 503 regulations. Appendix C includes the 503 regulations for metals and pollutants.

3.4.2. Phase 2 – Temporary RST

Once the containment unit is full, the sludge will be sampled as one unit. The sludge will be analyzed for metals, nitrogen, phosphorus, percent solids, and fecal coliform. Metals will be specifically sampled for the federal 40 CFR 503 regulations.

3.5. Record Keeping

Documentation of the sludge dewatering project, estimated dewatered sludge, drying times, and sample results should be maintained for a minimum of five years. In addition, weigh tickets and delivery load counts to Pickles Butte Landfill should be documented.

4. APPLICATION OF SLUDGE

4.1. Sludge Generation

The sludge settling pond settles the waste activated sludge from the WWTP. Based on sludge depth within the pond, there is approximately 250 cubic yards of sludge to be dewatered (at 1.2% solids). Appendix D includes calculations on the sludge dewatering project.

Once all sludge is removed from the Sludge Settling Pond, the temporary RST will be used to process only the WAS. Once seepage testing is complete, the Sludge Settling Pond will be used as back up system should the RST system need repairs.

4.2. Sludge Drying

Once the dewatered sludge is contained within the geotube, Middleton plans to dry the sludge over the summer and possibly over the winter. The heat and freeze-thaw cycle will further dewater the sludge. The geotube material allows water to leave and prevents water (ie. precipitation) from re-entering the geotubes. The geotubes will remain on the liner to capture and return any geotube seepage to the headworks for the WWTP.

No additional drying will take place with the temporary RST system.

4.3. Transportation of Solids

The proposed landfill is Pickles Butte landfill in Canyon County. Coordination with Pickles Butte landfill prior to hauling will include 1) sampling results and 2) scheduling disposal.

4.3.1. Phase 1 - Solids, Geotubes, and Liner Material

The dried sludge/solids, geotubes, and liner material will be loaded into a dump trailer for hauling to the landfill. City staff has contacted Pickles Butte to confirm acceptance of the sludge, geotubes, and liner material.

4.3.2. Phase 2 - Solids within Containment Unit

The containment unit and dewatered sludge/solids will be loaded on a trailer for hauling to the landfill. The solids will be dumped at the landfill and the containment unit will be returned to the WWTP.

5. COMPLIANCE ISSUES

5.1. Spill Containment

In the event of a spill during transportation, the spill area will be fenced off and the area posted if there is a potential for public contact. The spilled sludge will be reloaded into the dump trailer or containment unit and transported to Pickles Butte landfill. City equipment includes a skid steer and two backhoes. Once the sludge is reloaded in the dump trailer or containment unit, City staff will remove the residual sludge with their vacuum truck.

5.2. Contact and Notification

Emergency and non-compliance issues shall be orally reported to the Boise Regional (BRO) DEQ office within 24-hours of an event that poses a risk to public health. In addition, a written notification will be reported to the BRO DEQ office within five days of an event. BRO DEQ contact information is below.

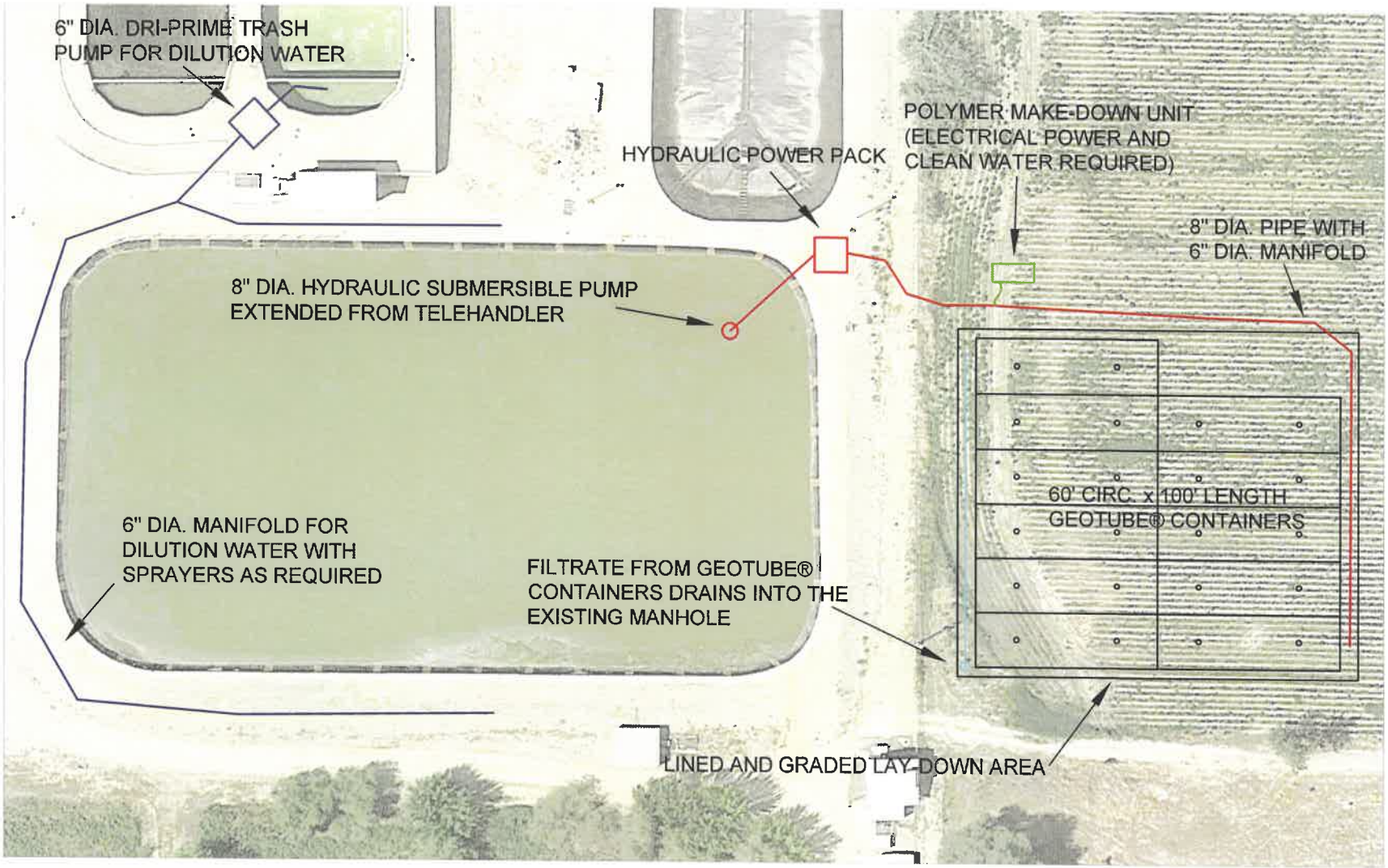
Idaho Department of Environmental Quality
Boise Regional Office
1445 N. Orchard St.
Boise, ID 83706
208-373-0550
888-800-3480

5.3. Seepage Testing

Seepage testing is required upon completion of the dewatering project per the Wastewater Rules. The Sludge Settling Pond will be seepage tested and be in compliance with the seepage limit of 0.250 inches per day prior to being returned into service. The anticipated order for seepage testing is list below.

- Installation of temporary solids handling system
- Completion of dewatering project
- Prepare seepage testing procedures report for DEQ review and approval
- Inspect and repair any noticeable defects in liner
- Fill sludge settling pond with treated effluent
- Seepage test
- Prepare seepage testing results report for DEQ review and approval
- Return sludge settling pond into service

Appendix A: Proposed Dewatering Schematic



MIDDLETON, ID PROJECT

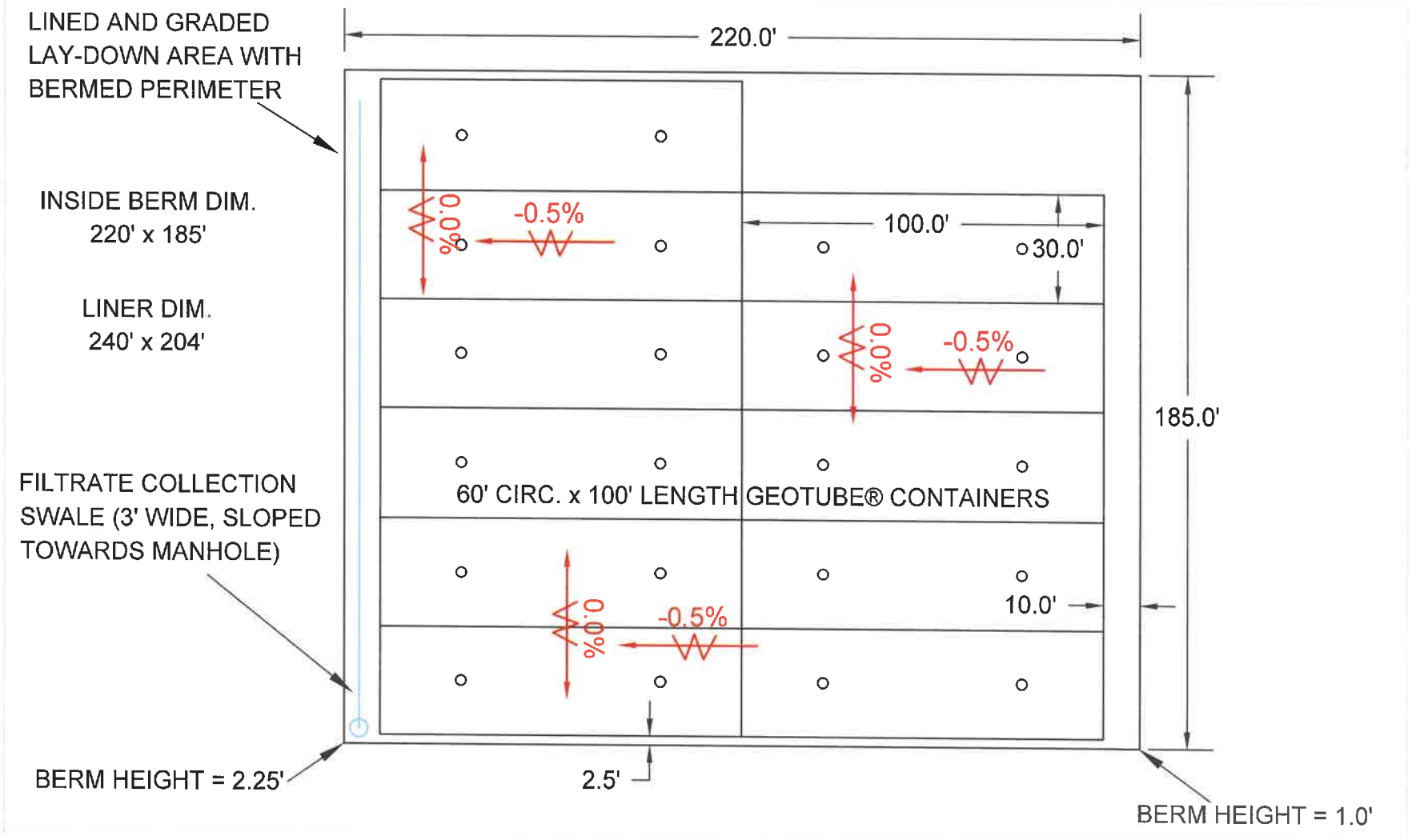
PRELIMINARY LAYOUT SKETCH

Drawn By:DVW

Date:10/22/2019

Scale:NTS

WaterSolve LLC



LAY-DOWN AREA NEEDS TO BE FLAT SIDE-TO-SIDE TO PREVENT GEOTUBE® CONTAINERS FROM ROLLING

MIDDLETON, ID PROJECT
GEOTUBE® LAYDOWN AREA SKETCH
Drawn By:DVW
Date:10/22/2019
Scale:NTS

WaterSolve LLC

Appendix B: 503 Sludge Results

Analytical Laboratories, Inc.
1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Laboratory Analysis Report

Sample Number: 1929623

Attn: CHAD BEVERAGE
CITY OF MIDDLETON
1103 W MAIN ST
MIDDLETON, ID 83644

Collected By: C. BEVERAGE
Submitted By: FLEETSTREET

Source of Sample: SLUDGE BASIN 503 GRAB

Time of Collection: 8:30:00
Date of Collection: 6/20/2019
Date Received: 6/20/2019
Report Date: 7/6/2019

PWS:

Field PH: Lab PH:
Field Temp: Temp in Lab:

Test Requested	MCL	Result	Units	MDL	Method	Completed	Analyst
Escherichia coli - 503		*2,200	MPN/g		SM 9221	6/22/2019	RK
*E. coli calculated as MPN/g dry weight.							
Fecal Coliform - 503		*10,000	MPN/g		SM 9221	6/22/2019	RK
*Fecal Coliform calculated as MPN/g dry weight.							
Arsenic 503		<1.0	mg/kg	1.0	SW 846 6010	6/26/2019	JMS
Cadmium 503		<0.05	mg/kg	0.05	SW 846 6010	6/26/2019	JMS
Chromium 503		<0.5	mg/kg	0.5	SW 846 6010	6/26/2019	JMS
Lead 503		<0.5	mg/kg	0.5	SW 846 6010	6/26/2019	JMS
Mercury 503		<0.02	mg/kg	0.02	SW 846 7471	6/21/2019	JD
Metals Digestion		*			SW 846 3050	6/21/2019	JD
Nickel 503		<0.2	mg/kg	0.2	SW 846 6010	6/26/2019	JMS
Selenium 503		<1.0	mg/kg	1.0	SW 846 6010	6/26/2019	JMS
Zinc 503		4.3	mg/kg	0.1	SW 846 6010	6/26/2019	JMS
DRY WT 503							
Total Solids		0.5	%	0.200	SM 2540 G	6/24/2019	GM
Volatile Solids-503		68.9	%		SM 2540 G	6/25/2019	GM

PRELIMINARY

Thank you for choosing Analytical Laboratories for your testing needs.
If you have any questions concerning this report,
please contact: **Brian McGovern**

Appendix C: 503 Regulations

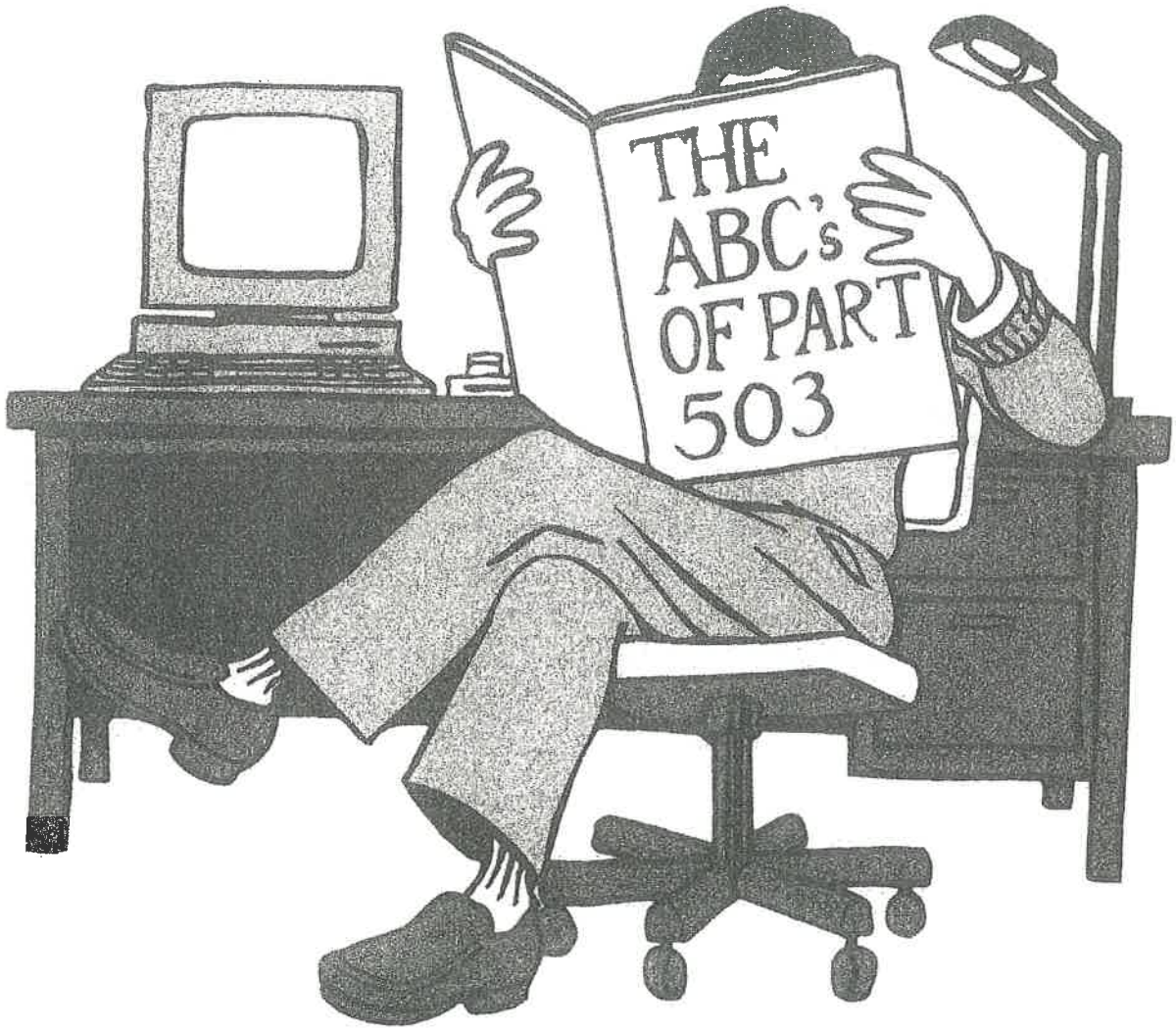
United States
Environmental Protection
Agency

Office of Wastewater
Management
(4204)

EPA/832/R-93/003
September 1994

EPA

A Plain English Guide to the EPA Part 503 Biosolids Rule



biosolids must also be met. In addition, there are general requirements, management practices, and frequency of monitoring, recordkeeping, and reporting requirements that must be met. Each of these land application requirements is discussed below.

Pollutant Limits, Pathogen and Vector Attraction Reduction Requirements

All biosolids applied to the land must meet ***the ceiling concentrations for pollutants,*** listed in the first column of Table 2-1. The ceiling concentrations are the maximum concentration limits for 10 heavy metal

TABLE 2-1
Pollutant Limits

Pollutant	Ceiling Concentration Limits for All Biosolids Applied to Land (milligrams per kilogram)[a]	Pollutant Concentration Limits for EQ and PC Biosolids (milligrams per kilogram)[a]	Cumulative Pollutant Loading Rate Limits for CPLR Biosolids (kilograms per hectare)	Annual Pollutant Loading Rate Limits for APLR Biosolids (kilograms per hectare per 365-day period)
Arsenic	75	41	41	2.0
Cadmium	85	39	39	1.9
Chromium	3,000	1,200	3,000	150
Copper	4,300	1,500	1,500	75
Lead	840	300	300	15
Mercury	57	17	17	0.85
Molybdenum[b]	75	—	—	—
Nickel	420	420	420	21
Selenium	100	36	100	5.0
Zinc	7,500	2,800	2,800	140
Applies to:	All biosolids that are land applied	Bulk biosolids and bagged biosolids[c]	Bulk biosolids	Bagged biosolids[c]
From Part 503	Table 1, Section 503.13	Table 3, Section 503.13	Table 2, Section 503.13	Table 4, Section 503.13

[a] Dry-weight basis

[b] As a result of the February 25, 1994, Amendment to the rule, the limits for molybdenum were deleted from the Part 503 rule pending EPA reconsideration.

[c] Bagged biosolids are sold or given away in a bag or other container.

Appendix D: Geotube Estimate

TENCATE Geotube

Geotube® Estimator

English Units Input - Known Volume

Version 15.0

Randy Wilcox

Project Name:	**Middleton, Idaho**
Location:	**Middleton, Idaho**
Contact:	**Mike Martin**
Date:	**rev 090419**
Type of Material:	**Biosolids**

Input		Units
Volume	3,000,000	Gallons
Specific Gravity	1.05	
% Solids in Place	2.1%	
% Solids During Pumping	1.0%	
Target dewatered % Solids	6%	
% Coarse grain & sand*	0.0%	

* % Coarse grain & sand is removed from the calculation for volume reduction due to dewatering and added back in at the end in required Geotube® volume.

Production:

Pumping Rate (GPM)	1,000
Hours per Day	12.0
% Efficiency	65%

Material type:

Silts and/or Organics

Percent of Maximum Filled Capacity

75%

Output		Units
Total Volume Pumped	**6,304,112**	Gallons
Wet Volume per day	**468,000**	Gallons
Wet Volume per day	**2,316.8**	CY
Total Bone Dry Tons	**263.0**	Tons
Estimated Pumping Days	**13.5**	Days
Estimated Dewatered Volume	**5,189.0**	CY
Estimated Dewatered Weight	**4,383.8**	Tons

Estimated Geotube® Quantity:

Circumference x Pumping Height	Feet	
60' X 7.5'	**1,081**	Selectable

For MDS Applications:

Legal Hauling Capacity		Tons

Estimated MDS Geotube® Units:

MDS Dimension	*Each*
22.5' X 22'	**#DIV/0!**