31-160
#1 - Carter & Sons Hog Farms
Jonathan Miller
8/23/2018
er: Sonar Boat
Range Pole
"core sampler": n/a
→ 1.98
alculate surface area. The lagoon may have nade.)
ith a maxium of
ne number of intersection as the estimated the lagoon grid so that data recorded at each
" (Appendix 2). Also, at the location of the top of sludge layer and record it on the
n Liquid Level to the Present
→ <u>1.60</u>
yel → 3.70
Level ):
uid surface level to the
uid surface level to the top  → 5.75
dge Layer:
ltem L):
ge Volume and Treatment Volume. If Item
Signature

Appendix 2. Sludge Survey Data Sheet

Revised August 2008

Lagoon Identification:	#1 - Carter & Sons Hog Farms	Date:	8/23/2018
Edgoor Identinoation.	- Williams Colla Hog Farms		Duned
Completed by:	Ronnie G. Kennedy	_	Signature
	Print Name		/ Signature/

	/ Oignete /		
(A)	(B)	(C)	(C) - (B)
Grid Point	Distance from liquid surface to top of sludge	Distance from liquid surface to lagoon bottom (soil)	Thickness of sludge layer
NO.	Feet (tenths)	Feet (tenths)	Feet (tenths)
1	101	PERSONAL PROPERTY OF THE PARTY	Branch Control
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3	And the arguments of the		
4	The same are a supplementary	- Little to is about it and chart.	e galeta novembrane e con-
5		the same of the same of the same of the same of	and results and the first
6			
7		20.07	From the of the house of the
8	To provide a design	on profestion - 5 a serior cons non	was any the training the training
9			
10	Soft (Lift on New Years) and AS III	lane and temperature and statement and a	nerses across a prende de la prima del la prima de la prima del la prima de la prima del la pri
11			mesmum yester 6 x 1 x
12	off to with a conventy has	shall covered ashar? In ones on	m hing supplied technical technical
13	ay their regist against to got at sa	tous houple must upoptable to the	PERSONAL DAY AND
14	1950	regist is training an illustration to secure	to every Taylor Manif. A white price
15	STREET THE SECOND VIOLET COME	THE STATE ASSETT WAS TRUE AS TO STATE AS THE	the three agests there
16		on I blicard Conference with milk and shown	and the second appropriate to the second second
17		(35 000) 00000 10% o	LO SYST ADMINISTRAÇÃO PAR
18	Comment of the second to	sens agent Level to Mammunia	LV not romast awaystel
19	All the state of t	(d)por slogu v. fr. z.	3 0 Lonepartin Novel 68
20	(899.2 Test)	grammed at lease sook in the in-	serve must sometable extending
21		THE ALEXANDER OF THE REAL PROPERTY.	AND DESCRIPTION OF BUILDING
22	Market and the second of the s	and the second second second second second	in a special of manufactures
23	and well of the more than the cold by	ency at the most new children and to write a	on one was such our new of the con-
24		provide the heart of the	The one of agous still
# of points with readings	3340	<b>X</b>	X
Average of points	5.75	8.54	2.79
At pump intake	5.00	X	X

<sup>\*</sup>All Grid Points and corresponding sludge layer thickness must be show on a sketch attached to this Sludge Survey Data Sheet.

## Appendix 3. Worksheet for sludge volume and treatment volume

**Revised August 2008** 

The average thickness of the sludge layer and the thickness of the existing liquid (sludge-free) treatment zone (are determined from information on the Lagoon Sludge Survey Form (Item O and P, respectively). If the lagoon has a designed sludge storage volume, see notes at end of the worksheet. The dimensions of the lagoon as measured and the side slope are needed for calculations of sludge volume and of total treatment volume. If the lagoon is a standard geometric shape, the sludge volume and treatment volume in the lagoon can be estimated by using standard equations. For approximate volumes of rectangular lagoons with constant side slope, calculate length and width at the midpoint of the layer, and multily by layer thickness to calculate layer volume. For irregular shapes, convert the total surface area to a square or rectangular shape. For exact volumes for lagoons with constant side slope, the "Prismoidal Equations" may be used.

		Lagoon
1 Average Sludge La	ayer Thickness (T):	2.79 ft.
	om top of bank to bottom soil surface (D):	11.00 ft.
3 Slope = horizontal	/vertical side slope (S):	3.00
4 Length at top insid	le bank (L):	360.00 ft.
5 Width at top inside	e bank (W):	240.00 ft.
6 Length at midpoin	t of sludge layer ( <i>Lm</i> ) = <i>L</i> - 2 <i>S</i> ( <i>D</i> - ( <i>T</i> /2)):	302.37 ft.
7 Width at midpoint	of sludge layer (Wm) = W - 2 S (D - (T/2)):	182.37 ft.
8 Volume of sludge		153,849.58 ft³
9 Volume in gallons	Vsg = V (7.5 gal./ft³):	1,153,871.81 gal.
10 Thickness of exist	ting liquid tmt. zone (Y)	2.31 11.
	treatment zone $(Z) = T + Y$	5.70 ft.
	t of total tmt. zone $Lz = L - 2(S)(D-(Z/2))$	311.10 ft.
13 Width at midpoint	of total tmt. Zone Wz = W - 2(S) (D -(Z/2)	191.10 ft.
	eatment zone (Vz) = Lz Wz Z	338,758.50 ft <sup>3</sup>
	ge layer volume to total Treatment volume R = Vs/Vz	0.45

If the ratio exceeds 50%, than a sludge Plan of Action may be required. Check with DWQ for information on filing the Plan of Action.

Note: If the lagoon has a designed sludge storage volume (DSSV), subtract that volume from both the volume of sludge (Vs) (Item 8) and from the volume of total treatment zone (Vz) (Item 14), and take the ratio:

16 Design sludge storage volume (DSSV)			ft	3
	sludge layer volume to treatment volume adju		0.45	
Lagoon Identification:	#1 - Carter & Sons Hog Farms	Date:	8/23/2018	

Completed by:

Ronnie G. Kennedy
Print Name

Signature

Appendix 1. Lagoon Sludge Survey Form	Rev	rised August 2008
A. Farm Permitor DWQ Identification Number:	31-160	
B. Lagoon Identification:	#2 - Carter & Sons Hog Farms	
C. Person(s) taking Measurements:	Jonathan Mill	er
D. Date of Measurements:	8/23/2018	A Landa de anna
E. Methods/Devices Used for Measurement of:		
a. Distance from the lagoon liquid surface to the top of the slu	odge layer: So	nar Boat
b. Distance form the lagoon liquid surface to the bottom soil of	of lagoon: Ra	nge Pole
c. Thickness of the sludge layer if making a direct measurem	ent with "core sampler":	n/a
F. Lagoon Surface Area (using dimensions at inside to of bank):		1.59
(Draw a sketch of the lagoon on separate sheet, list dimension been built different than designed, so measurements should be a support of the lagoon on separate sheet, list dimension been built different than designed, so measurements should be a support of the lagoon on separate sheet, list dimension been built different than designed, so measurements should be a support of the lagoon on separate sheet, list dimension been built different than designed, so measurements should be a support of the lagoon of the lago		lagoon may have
G. Estimate number of sampling points:		
a. Less than 1.33 acre, use 8 points:  b. If more than 1.33 acre, surface area acres x 6 = sampling p	points, with a maxium of	12
<ul> <li>(Using sketch and dimensions, develop a uniform grid that has number of sampling points needed. Number the intersection pocan be easily matched.)</li> <li>H. Conduct sludge survey and record data on "Sludge Survey Data pump intake, take measurement of distance from liquid surplate Sheet (last row); this must be at least 2.5 ft. when irrighted.</li> </ul>	ta Sheet" (Appendix 2). Also, at the	e location of the
At time of sludge survey, also measure the distance from the N Liquid Level (measure at the lagoon gage pole):		t 0.57
J. Determine distance from top of bank to the Maximum Liquid Le (use lagoon management plan or other lagoon records):		1.60
K. Determine distance from Maximum Liquid Level to Minimum Liquid Level to Min	iquid Level	2.90
L. Calculate distance from present liquid surface level to Minimum (Item K - Item I, assuming present liquid level is below Max. L	n Liquid Level .iq. Level):	2.33
M. Record from sludge survey data sheet the distance from the prilagoon bottom (average for all the measurement points):	resent liquid surface level to the	9.83
N. Record from sludge survey data sheet the distance from the proof the sludge layer (average for all the measurement points):	resent liquid surface level to the top	5.72
O. Record from sludge survey data sheet the average thickness of	of the Sludge Layer:	4.11
P. Calculate the thickness of the existing Liquid Treatment Zone (	Item N - Item L):	3.39
Q. If Item O is greater than Item P, proceed to the Worksheet O is equal to or less than Item P, you do not have to determ		t Volume. If Item
Completed by: Ronnie G. Kennedy Print Name	Signature	

Appendix 2. Sludge Survey Data Sheet

**Revised August 2008** 

Lagoon Identification:

#2 - Carter & Sons Hog Farms

Date:

8/23/2018

Completed by:

Ronnie G. Kennedy

Print Name

(A)	(B)	(C)	(C) - (B)
Grid Point	Distance from liquid surface to top of sludge	Distance from liquid surface to lagoon bottom (soil)	Thickness of sludge layer
140.	Feet (tenths)	Feet (tenths)	Feet (tenths)
1	pe.N	or a registropies of the same water was to all	
2	"test that stop," Obt	Beergouse on South suggests (1.2.5)	ar reporter as to creat a cart a
3			
4	The second second second second second	service of otherwise and control of	The state of the s
5	the second secon	Mission dinament are as on her al-	Samuel and the second control of the
6			
7			
8	B. With a charlest of	ng grigeria " Lagina di Lagi	man man bili. I ar mendi bila a
9			
10	the real entance makes with man	who washing and and make the	AND AND PARTY AND ADDRESS OF BEHAVIOR OF
11			pertitor into the same
12	MS Reports 21 America 24	strict gavitud egociet an altab cras	er old serverapped det ck
13	to the regal against to quit or an	thes blood spot soutch to tee	nemienskip after Arstelf giller
14		THE SALE POST ABOVE THE R. P. STATE OF THE PARTY.	AN TOTAL NEWS THESE CONTROL OF SEC.
15	about the of court theps with	THE STATE OF STATE SATE THE SALE	
16		have been combined to some the sound	and county and property for the contract of
17	Andrew Comments	or offert again a reason to the	neit lager neite eet, collect elle
18	A REAL PROPERTY.	in the land of the	Jakenior deserva from Max.
19		(SOISTAL AND SOUTH	with the supplier of the same
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21		The state of the s	of the course of the course product the course of the cour
22	Service of the service of the service of the service of	and the second of the second o	En en a comment continue concert
23	and artist level and or have tested to	and the street and street and the	who are the state of the world recognist
24		(with the first endance in 1979 St.	of medicinal revolutions of the
# of points with readings	2400	harmon X bus his bases a	X
Average of points	5.72	9.83	4.11
At pump intake	4.00	X	x

<sup>\*</sup>All Grid Points and corresponding sludge layer thickness must be show on a sketch attached to this Sludge Survey Data Sheet.

## Appendix 3. Worksheet for sludge volume and treatment volume

**Revised August 2008** 

The average thickness of the sludge layer and the thickness of the existing liquid (sludge-free) treatment zone (are determined from information on the Lagoon Sludge Survey Form (Item O and P, respectively). If the lagoon has a designed sludge storage volume, see notes at end of the worksheet. The dimensions of the lagoon as measured and the side slope are needed for calculations of sludge volume and of total treatment volume. If the lagoon is a standard geometric shape, the sludge volume and treatment volume in the lagoon can be estimated by using standard equations. For approximate volumes of rectangular lagoons with constant side slope, calculate length and width at the midpoint of the layer, and multily by layer thickness to calculate layer volume. For irregular shapes, convert the total surface area to a square or rectangular shape. For exact volumes for lagoons with constant side slope, the "Prismoidal Equations" may be used.

	Lagoon
1 Average Sludge Layer Thickness (T):	4.11 ft.
2 Depth of lagoon from top of bank to bottom soil surface (D):	12.00 ft.
3 Slope = horizontal/vertical side slope (S):	3.00
4 Length at top inside bank (L):	337.00 ft.
5 Width at top inside bank (W):	205.80 ft.
6 Length at midpoint of sludge layer (Lm) = L - 2 S (D - (T/2)):	277.33 ft.
7 Width at midpoint of sludge layer (Wm) = W - 2 S (D - (T/2)):	146.13 ft.
8 Volume of sludge (Vs) = Lm Wm T:	166,562.82 ft <sup>3</sup>
9 Volume in gallons $Vsg = V (7.5 \text{ gal./ft}^s)$ :	1,249,221.13 gal.
10 Thickness of existing liquid tmt. zone (Y)	3.39 ft.
11 Thickness of total treatment zone (Z) = T + Y	7.50 ft.
12 Length at midpoint of total tmt. zone Lz = L - 2(S)(D-(Z/2)	287.49 ft.
13 Width at midpoint of total tmt. Zone Wz = W - 2(S) (D -(Z/2)	156.29 ft.
14 Volume of total treatment zone (Vz) = Lz Wz Z	336,838.82 ft <sup>3</sup>
15 Ratio (R) of sludge layer volume to total Treatment volume R = Vs/Vz	0.49

If the ratio exceeds 50%, than a sludge Plan of Action may be required. Check with DWQ for information on filing the Plan of Action.

Note: If the lagoon has a designed sludge storage volume (DSSV), subtract that volume from both the volume of sludge (Vs) (Item 8) and from the volume of total treatment zone (Vz) (Item 14), and take the ratio:

16 Design sludg	e storage volume (DSSV)		π-	
17 Ratio (R) of	sludge layer volume to treatment volume adju	sted for (DSSV).	0.49	
agoon Identification:	#2 - Carter & Sons Hog Farms	Date:	8/23/2018	

Completed by:

Ronnie G. Kennedy

Print Name

Appendix 1. Lagoon Sludge Survey Form	Revised August 2000	
A. Farm Permitor DWQ Identification Number:	→ <u>31-160</u>	
B. Lagoon Identification:	#3 - Carter & Sons Hog Farms	
C. Person(s) taking Measurements:	Jonathan Miller	
D. Date of Measurements:	8/23/2018	
E. Methods/Devices Used for Measurement of:		
a. Distance from the lagoon liquid surface to the top of the sludge	layer: Sonar Boat	
b. Distance form the lagoon liquid surface to the bottom soil of lag	goon: Range Pole	
c. Thickness of the sludge layer if making a direct measurement v	with "core sampler": n/a	
F. Lagoon Surface Area (using dimensions at inside to of bank):	1.96	
(Draw a sketch of the lagoon on separate sheet, list dimensions an been built different than designed, so measurements should be		
G. Estimate number of sampling points:		
<ul> <li>a. Less than 1.33 acre, use 8 points:</li> <li>b. If more than 1.33 acre, surface area acres x 6 = sampling point</li> </ul>	ts, with a maxium of	
24:	same number of intersection as the estimated	
<ul> <li>(Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)</li> <li>H. Conduct sludge survey and record data on "Sludge Survey Data St</li> </ul>	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the	
24:  (Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the se to top of sludge layer and record it on the	
<ul> <li>(Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)</li> <li>H. Conduct sludge survey and record data on "Sludge Survey Data St pump intake, take measurement of distance from liquid surface."</li> </ul>	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the ce to top of sludge layer and record it on the ng.	
<ul> <li>24: (Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)</li> <li>H. Conduct sludge survey and record data on "Sludge Survey Data Sheump intake, take measurement of distance from liquid surface Data Sheet (last row); this must be at least 2.5 ft. when irrigating the At time of sludge survey, also measure the distance from the Maximus description.</li> </ul>	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the ce to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  0.65	
24:  (Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)  H. Conduct sludge survey and record data on "Sludge Survey Data Sheump intake, take measurement of distance from liquid surface Data Sheet (last row); this must be at least 2.5 ft. when irrigating.  At time of sludge survey, also measure the distance from the Maximum Liquid Level (measure at the lagoon gage pole):	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the ce to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  0.65	
<ul> <li>(Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)</li> <li>H. Conduct sludge survey and record data on "Sludge Survey Data St pump intake, take measurement of distance from liquid surfact Data Sheet (last row); this must be at least 2.5 ft. when irrigating. At time of sludge survey, also measure the distance from the Maximulation Liquid Level (measure at the lagoon gage pole):         <ul> <li>J. Determine distance from top of bank to the Maximum Liquid Level (use lagoon management plan or other lagoon records):</li> <li>K. Determine distance from Maximum Liquid Level to Minimum Liquid</li> </ul> </li> </ul>	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the se to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  0.65  1.60  d Level  2.20	
24:  (Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)  H. Conduct sludge survey and record data on "Sludge Survey Data Sheump intake, take measurement of distance from liquid surface Data Sheet (last row); this must be at least 2.5 ft. when irrigating. At time of sludge survey, also measure the distance from the Maximum Liquid Level (measure at the lagoon gage pole):  J. Determine distance from top of bank to the Maximum Liquid Level (use lagoon management plan or other lagoon records):  K. Determine distance from Maximum Liquid Level to Minimum Liquid (use lagoon management plan or other lagoon records):  Calculate distance from present liquid surface level to Minimum Liquid Level to Minimum Liquid (use lagoon management plan or other lagoon records):	same number of intersection as the estimated son the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the se to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  0.65  1.60  Level  quid Level  1.55	
(Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)  H. Conduct sludge survey and record data on "Sludge Survey Data Sheump intake, take measurement of distance from liquid surface Data Sheet (last row); this must be at least 2.5 ft. when irrigating. At time of sludge survey, also measure the distance from the Maximum Liquid Level (measure at the lagoon gage pole):  J. Determine distance from top of bank to the Maximum Liquid Level (use lagoon management plan or other lagoon records):  K. Determine distance from Maximum Liquid Level to Minimum Liquid (use lagoon management plan or other lagoon records):  Calculate distance from present liquid surface level to Minimum Liquid (Item K - Item I, assuming present liquid level is below Max. Liq. Limum Record from sludge survey data sheet the distance from the present liquid level is below Max. Liq. Limum Record from sludge survey data sheet the distance from the present liquid level is below Max. Liq. Limum Record from sludge survey data sheet the distance from the present liquid level is below Max. Liq. Limum Record from sludge survey data sheet the distance from the present liquid level is liqu	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the se to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  1.60  d Level  quid Level  evel):  nt liquid surface level to the  9.75	
<ul> <li>(Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)</li> <li>H. Conduct sludge survey and record data on "Sludge Survey Data Sheump intake, take measurement of distance from liquid surface Data Sheet (last row); this must be at least 2.5 ft. when irrigating. At time of sludge survey, also measure the distance from the Maximum Liquid Level (measure at the lagoon gage pole):  J. Determine distance from top of bank to the Maximum Liquid Level (use lagoon management plan or other lagoon records):  K. Determine distance from Maximum Liquid Level to Minimum Liquid (use lagoon management plan or other lagoon records):  L. Calculate distance from present liquid surface level to Minimum Liquid (ltem K - Item I, assuming present liquid level is below Max. Liq. Liquid Max. Liq. Liquid Level (ltem K - Item I) assuming present liquid level is below Max. Liq. Liquid Max. Liq. Liquid Level (ltem Survey data sheet the distance from the present lagoon bottom (average for all the measurement points):  N. Record from sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon from sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon bottom sludge survey data sheet the distance from the present lagoon sludge survey data sheet the dis</li></ul>	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the se to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  0.65  1.60  2.20  quid Level  evel):  nt liquid surface level to the  9.75  nt liquid surface level to the top  5.46	
(Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)  H. Conduct sludge survey and record data on "Sludge Survey Data Sheump intake, take measurement of distance from liquid surface Data Sheet (last row); this must be at least 2.5 ft. when irrigating. At time of sludge survey, also measure the distance from the Maximum Liquid Level (measure at the lagoon gage pole):  J. Determine distance from top of bank to the Maximum Liquid Level (use lagoon management plan or other lagoon records):  K. Determine distance from Maximum Liquid Level to Minimum Liquid (use lagoon management plan or other lagoon records):  L. Calculate distance from present liquid surface level to Minimum Liquid (ltem K - Item I, assuming present liquid level is below Max. Liq. Liquid Record from sludge survey data sheet the distance from the present lagoon bottom (average for all the measurement points):  N. Record from sludge survey data sheet the distance from the present of the sludge layer (average for all the measurement points):	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the se to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  0.65  1.60  2.20  quid Level  evel):  nt liquid surface level to the  9.75  nt liquid surface level to the top  E Sludge Layer:  4.29	
(Using sketch and dimensions, develop a uniform grid that has the number of sampling points needed. Number the intersection points can be easily matched.)  H. Conduct sludge survey and record data on "Sludge Survey Data Sheump intake, take measurement of distance from liquid surface Data Sheet (last row); this must be at least 2.5 ft. when irrigating. At time of sludge survey, also measure the distance from the Maximum Liquid Level (measure at the lagoon gage pole):  J. Determine distance from top of bank to the Maximum Liquid Level (use lagoon management plan or other lagoon records):  K. Determine distance from Maximum Liquid Level to Minimum Liquid (use lagoon management plan or other lagoon records):  L. Calculate distance from present liquid surface level to Minimum Liquid (ltem K - Item I, assuming present liquid level is below Max. Liq. Liming M. Record from sludge survey data sheet the distance from the present lagoon bottom (average for all the measurement points):  N. Record from sludge survey data sheet the distance from the present of the sludge layer (average for all the measurement points):	same number of intersection as the estimated s on the lagoon grid so that data recorded at each heet" (Appendix 2). Also, at the location of the se to top of sludge layer and record it on the ng.  mum Liquid Level to the Present  0.65  1.60  d Level  2.20  quid Level  evel):  nt liquid surface level to the  9.75  nt liquid surface level to the top  s Sludge Layer:  1.55  1.55  1.60  2.20  3.91  Sludge Volume and Treatment Volume. If Item	

Appendix 2. Sludge Survey Data Sheet

**Revised August 2008** 

Lagoon Identification: #3 - Carter & S

#3 - Carter & Sons Hog Farms

Date: 8/23/2018

Completed by:

Ronnie G. Kennedy

Print Name

(A)	(B)	(C)	(C) - (B)
Grid Point No.	Distance from liquid surface to top of sludge	Distance from liquid surface to lagoon bottom (soil)	Thickness of sludge layer
	Feet (tenths)	Feet (tenths)	Feet (tenths)
1	161		
2	fullation show the	CEPPOSE CALLED A COMMENT D. O.	
3	Participation of		
4	All Specials	Ontrol to the Land Marketon	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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13	on this important with the city of at	President and activities to less	commende transfer a
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23	And with all lates a souther process to	and the second s	te to refer in a control of the law or received in where
24		ishas midusika sijik	Free Common Applications and the
# of points with readings	1265	<b>X</b>	X
Average of points	5.46	9.75	4.29
At pump intake	4.00	X	x

<sup>\*</sup>All Grid Points and corresponding sludge layer thickness must be show on a sketch attached to this Sludge Survey Data Sheet.

## Appendix 3. Worksheet for sludge volume and treatment volume

Revised August 2008

The average thickness of the sludge layer and the thickness of the existing liquid (sludge-free) treatment zone (are determined from information on the Lagoon Sludge Survey Form (Item O and P, respectively). If the lagoon has a designed sludge storage volume, see notes at end of the worksheet. The dimensions of the lagoon as measured and the side slope are needed for calculations of sludge volume and of total treatment volume. If the lagoon is a standard geometric shape, the sludge volume and treatment volume in the lagoon can be estimated by using standard equations. For approximate volumes of rectangular lagoons with constant side slope, calculate length and width at the midpoint of the layer, and multily by layer thickness to calculate layer volume. For irregular shapes, convert the total surface area to a square or rectangular shape. For exact volumes for lagoons with constant side slope, the "Prismoidal Equations" may be used.

	Lagoon
1 Average Sludge Layer Thickness (T):	4.29 ft.
2 Depth of lagoon from top of bank to bottom soil surface (D):	12.00 ft.
3 Slope = horizontal/vertical side slope (S)	2.50
4 Length at top inside bank (L):	450.00 ft.
5 Width at top inside bank (W):	190.00 ft.
6 Length at midpoint of sludge layer $(Lm) = L - 2 S (D - (T/2))$	400.73 ft.
7 Width at midpoint of sludge layer (Wm) = W - 2 S (D - (T/2)):	140.73 ft.
8 Volume of sludge (Vs) = Lm Wm T:	241,921.79 ft <sup>3</sup>
9 Volume in gallons $Vsg = V(7.5 \text{ gal./ft}^3)$ :	1,814,413.42 gal.
10 Thickness of existing liquid tmt. zone (Y)	
11 Thickness of total treatment zone (Z) = T + Y	8.20 ft.
12 Length at midpoint of total tmt. zone $Lz = L - 2(S)(D-(Z/2))$	410.50 ft.
13 Width at midpoint of total tmt. Zone Wz = W - 2(S) (D -(Z/2)	150.50 ft.
14 Volume of total treatment zone (Vz) = Lz Wz Z	506,598.05 ft <sup>3</sup>
15 Ratio (R) of sludge layer volume to total Treatment volume R = Vs/Vz	0.48

If the ratio exceeds 50%, than a sludge Plan of Action may be required. Check with DWQ for information on filing the Plan of Action.

Note: If the lagoon has a designed sludge storage volume (DSSV), subtract that volume from both the volume of sludge (Vs) (Item 8) and from the volume of total treatment zone (Vz) (Item 14), and take the ratio:

16 Design sludge storage volume (DSSV)		π		
<b>17</b> Ratio (R) of	sludge layer volume to treatment volume adju	sted for (DSSV).	0,48	
Lagoon Identification:	#3 - Carter & Sons Hog Farms	Date:	8/23/2018	

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