Table 8a: Manure Application Rate Calculation Worksheet[1] Based On Liquid Manure

Field I.D.:_____ Crop: _____ Target Yield: _____			
Step 1. Target Nutrient Rate			Units [2]
Nitrogen (based on soil test recommendation)	(A)	90	kg/ha
Phosphorus (as P_2O_5): 2x Crop Removal	(B1)	60	kg/ha
Phosphorus (as P_2O_5): 1x Crop Removal	(B2)	30	kg/ha
Other:	(B3)		kg/ha
Step 2. Manure Test Data			
Total Nitrogen	(C)	3.1	kg/m^3
Ammonium Nitrogen	(D)	1.9	kg/m^3
Organic Nitrogen = (C) - (D)	(E)	1.2	kg/m^3
Phosphorus	(F)	1.0	kg/m^3
P_2O_5 = (F) x 2.3	(G)	2.3	kg/m^3
Step 3. Amount of manure nitrogen available to crop:			
Application method	Incorporated within 1 day		
Volatilization losses due to application method (Table 6)	(H)	25%	
Ammonium nitrogen available = (D) x [100-(H)]% = 1.9 x 0.75 = 1.4	(I)	1.4	kg/m^3
Organic nitrogen available to the next crop = (E) x 0.25 = 1.2 x 0.25 = 0.3	(J)	0.3	kg/m^3
Total available N = (I) + (J) = 1.4 + 0.3 = 1.7	(K)	1.7	kg/m^3
Total available N in spring = (K) x 100% = 1.7 x 1.0 = 1.7	(L)	1.7	kg/m^3
Total Available N in fall = (K) x 83% = 1.7 x 0.83 = 1.4	(M)	1.4	kg/m^3
Step 4. Application rate based on N requirements:			
Spring N-based Application Rate = (A) ÷ (L) = 90 ÷ 1.7 = 52.9 or Fall N-based Application Rate = (A) ÷ (M) = 90 ÷ 1.4 = 64.3	(N)	64.3	m^3/ha
Amount of P_2O_5 applied = (G) x (N) = 2.3 x 64.3 = 147.9	(O)	147.9	kg/ha
P_2O_5 balance[3] (using 1x crop removal) = (O) - (B2) = 147.9 - 30 = 117.9	(P)	+117.9	kg/ha
Step 5. Applicaton rate based on P removal:			
2x crop removal P-based Application Rate[2] = (B1) ÷ (G) = 60 ÷ 2.3 = 26.1 or 1x crop removal P-based Application Rate[2] = (B2) ÷ (G) = 30 ÷ 2.3 = 13.0	(Q)	26.1	m^3/ha
Amount of available N applied in spring = (L) x (Q) = 1.7 x 26.1 = 44.4 or Amount of available N applied in fall = (M) x (Q) = 1.4 x 26.1 = 36.5	(R)	36.5	kg/ha
N balance[5] (N applied - N recomended) = (R) - (A) = 36.5 - 90 = -53.5	(S)	-53.5	kg/ha
Step 6. Compare N Rate (N) with P rate (Q):			
If soil test P is low to moderate (<60 ppm), apply manure at N rate (N)	64		m^3/ha
If soil test P is high)> 60 ppm), apply manure at P rate (Q)[6]	26		m^3/ha

[1] See Appendix C for imperial units and a blank template worksheet.

[2] 1 kg/m^3 = 1 kg/ 1000 L

[3] A positive value indicates that more P_2O_5 will be applied than the crop will remove (1x crop removal) when manure is applied based on N. A negative value indicates that less P_2O_5 will be applied than the crop will remove (1x crop removal) and the rate should be compared to the soil test recommendation to determine if the crop requirement for P will be met.

[4] When soil test phosphorus (STP) is low to moderate, manure can be applied based on N. When STP is high, a P-based application rate can be used up to 2X the crop removal of P_2O_5. At very high to excessive STP, no more than 1X crop removal of P_2O_5 should be applied.

[5] Positive value indicates N application rate is above soil test recommendation when manure is applied based on P_2O_5. Negative value indicates N application rate is below soil test recommendation and supplemental commercial fertilizer is required to meet crop requirements.

[6] If annual applications are too low, multi-year application rates and rotation of fields should be considered.