CLAIMS

1. An apparatus for wastewater treatment comprising

an equalization tank arranged to receive wastewater for treatment and operable to function as an anaerobic hydrolysis reactor in addition to performing the equalization function;

at least one mechanical agitator operable to prevent suspended solids from settling in the equalization tank;

a first clarifier coupled with the equalization tank, the first clarifier operable to separate wastewater from anaerobic hydrolysis microorganisms within the equalization tank;

an aerobic bioreactor coupled with the first clarifier to receive wastewater from the first clarifier; the aerobic bioreactor operable to further process the wastewater from the first clarifier; and

a second clarifier operable to receive treated wastewater from the aerobic bioreactor, the second clarifier further operable to separate treated wastewater from aerobic biosludge;

wherein a portion of aerobic biosludge separated by the second clarifier is recycled back to the equalization tank.

2. An apparatus according to claim 1, wherein the anaerobic hydrolysis reactor function of the equalization tank comprises chemical oxygen demand (COD) removal.

3. An apparatus according to claim 1, wherein the first clarifier is built into the equalization tank.

4. An apparatus according to claim 3, wherein the first clarifier comprises a first portion to receive anaerobic sludge arising from the anaerobic hydrolysis and a second portion to receive separated wastewater.

5. An apparatus according to claim 4, wherein the second portion is in the form of a trough positioned upstream relative to the aerobic bioreactor.

6. An apparatus according to any one of the claims 3 to 5, wherein the first clarifier comprises a submersible pump for directing the separated anaerobic sludge back to the equalization tank or out of the system.

7. An apparatus according to claim 5, wherein there comprises a baffle between the first clarifier and the second portion to prevent the anaerobic sludge from flowing into the second portion.

~~8. An apparatus according to any one of the preceding claims, wherein the equalization tank comprises at least one mechanical agitator operable to prevent suspended solid from settling in the equalization tank.~~

~~9~~8. An apparatus according to any one of the preceding claims, wherein the first clarifier is formed using concrete, carbon steel, stainless steel or fibre reinforced plastic (FRP).

~~10~~9. An apparatus according to any one of the preceding claims, wherein the equalization tank is operably maintained at an anaerobic condition with dissolved oxygen (DO) of less than 0.5ppm.

~~11~~10. An apparatus according to any one of the preceding claims, wherein the anaerobic hydraulic retention time (HRT) of equalization tank is from six hours to two days.

~~12~~11. An apparatus according to any one of the preceding claims, wherein the anaerobic hydraulic retention time of the first clarifier is from 1 hour to 4 hours.

~~13~~12. An apparatus according to any one of the preceding claims, wherein the mixed liquor suspended solids (MLSS) in the equalization tank range from 1000ppm to 10,000ppm.

~~14~~13. An apparatus according to any one of the preceding claims, wherein the equalization tank accepts industrial wastewater with a pH range of 5 to 10.

~~15~~14. An apparatus according to any one of the preceding claims, wherein the equalization tank comprises an access cover.

~~16~~15. A method for wastewater treatment comprising the following steps:

(a.) equalizing the fluctuation of water quality and quantity in an equalization tank;

(b.) hydrolysing wastewater anaerobically with anaerobic microorganisms within the equalization tank;

(~~b~~c.) separating hydrolysed wastewater from the anaerobic microorganisms within the equalization tank;

(~~c~~d.) processing the hydrolysed wastewater aerobically, the processing forming aerobic biosludge; and

(~~d~~e.) recycling a portion of the aerobic biosludge for hydrolysis in step (~~a~~b.)

~~17~~16. A method according to claim 15, wherein the step of hydrolysing wastewater is targeted to reduce the chemical oxygen demand (COD) within the wastewater.

~~18~~17. A method according to claims 15 or 16, wherein the step of separating hydrolysed wastewater from the anaerobic microorganisms includes the use of a clarifier.