WHAT IS CLAIMED IS:

1. A method for selecting and retaining solids with superior settling characteristics, the method comprising:

feeding wastewater to an input of a processor that carries out a treatment process on the wastewater;

outputting processed wastewater at an output of the processor;

feeding the processed wastewater to an input of a gravimetric selector that selects solids with superior settling characteristics; and

outputting a recycle stream at a first output of the gravimetric selector.

2. The method of claim 1, further comprising:

outputting a waste stream at a second output of the gravimetric selector to solids handling, where solids handling includes at least one thickening, stabilizing, conditioning, and dewatering.

3. The method of claim 1, further comprising:

supplying the recycle stream from the first output of the gravimetric selector to the processor.

4. The method of claim 3, wherein the recycle stream comprises solids with superior settling characteristics.

5. The method of claim 2, wherein the waste stream is rejected and the recycle stream is returned to the processor.

6. The method of claim 4, wherein the waste stream comprises solids with poor settling and filtration characteristics or that have increased potential for membrane fouling.

7. The method of claim 1, wherein the treatment process comprises:

a suspended growth activated sludge process;

a granular process;

an integrated fixed-film activated sludge process;

a biological nutrient removal process;

an aerobic digestion process; or

an anaerobic digestion process.

8. The method of claim 1, wherein the treatment process comprises a biological treatment process.

9. The method of claim 8, wherein the biological treatment process comprises an in-line solid-liquid separation process.

10. The method of claim 1, wherein the processor includes a membrane separator.

11. The method of claim 1, wherein the processor comprises a cyclone that accelerates the wastewater and provides shear-force to the wastewater to separate solids with good settling characteristics from solids with poor settling and filtration characteristics.

12. The method of claim 1, wherein the processor comprises a centrifuge that provides centrifugal and shear force to separate solids with good settling characteristics from solids with poor settling and filtration characteristics in the wastewater.

13. The method of claim 11, wherein a feed rate to and a geometry of the cyclone are configured to adjust a velocity of the wastewater in the cyclone to:

select for larger or more dense solids; or

increase the time available for separation in the cyclone.

14. The method of claim 1, wherein the feeding the processed wastewater to the input of the gravimetric selector comprises:

feeding the processed wastewater to an input of a separator that separates the wastewater into an underflow and effluent;

receiving the underflow from the separator; and

gravimetrically selecting solids with superior settling characteristics from the underflow and supplying the recycle stream to the first output.

15. The method of claim 11 further comprising:

controlling a velocity of the wastewater in the cyclone so that solids of a predetermined size or density are retained.

16. The method of claim 11 further comprising:

controlling a hydraulic loading rate to select settling solids of a predetermined size or density.

17. An apparatus that selects and retains solids with superior settling characteristics, the apparatus comprising:

a processor that comprises an input and an output, the processor being configured to carry out a treatment process; and

a gravimetric selector that comprises an input, a waste stream output and a recycle stream output,

wherein the recycle stream output of the gravimetric selector is coupled to the input of the processor.

18. The apparatus of claim 17, wherein the input of the gravimetric selector is coupled to the output of the processor.

19. The apparatus of claim 17, wherein the input of the gravimetric selector is coupled to an underflow output of a separator.

20. The apparatus of claim 17, wherein the recycle stream output of the gravimetric selector supplies a recycle stream to the processor, the recycle stream comprising solids with superior settling characteristics.

21. The apparatus of claim 17, wherein the treatment process comprises:

a suspended growth activated sludge process;

a granular process;

an integrated fixed-film activated sludge process;

a biological nutrient removal process;

an aerobic digestion process; or

an anaerobic digestion process.

22. The apparatus of claim 17, wherein processor comprises:

a bioreactor.

23. The apparatus of claim 21, wherein the bioreactor process comprises an in-line solid to liquid separation process.

24. The apparatus of claim 17, wherein the processor comprises a cyclone that accelerates the wastewater and provides shear-force to the wastewater to separate solids with good settling characteristics from solids with poor settling and filtration characteristics.

25. The apparatus of claim 17, wherein the processor comprises a centrifuge that provides centrifugal and shear force to separate solids with good settling characteristics from solids with poor settling and filtration characteristics in the wastewater.

26. The apparatus of claim 24, wherein a feed rate and a geometry of the cyclone are configured to adjust a velocity of the wastewater in the cyclone to:

select for larger or more dense solids; or

increase a time available for separation in the cyclone.

27. The apparatus of claim 17, further comprising:

a separator that has an input coupled to the output of the processor.

28. The apparatus of claim 24, wherein the cyclone controls a velocity of the wastewater to adjust an overflow rate so that settling solids of a predetermined size or density are retained.

29. The apparatus of claim 24, wherein the cyclone controls a hydraulic loading rate to select settling solids of a predetermined size or density.

30. A method for selecting and retaining solids with superior settling characteristics, the method comprising:

receiving wastewater from a wastewater supply;

processing the wastewater to provide processed wastewater;

gravimetrically selecting solids with settling characteristics from the processed wastewater; and

supplying the selected solids to a processor to further process the selected solids together with further wastewater received from the wastewater supply.

WHAT IS CLAIMED IS:

1. A method for selecting and retaining solids with superior settling characteristics, the method comprising:

feeding wastewater to an input of a processor that carries out a treatment process on the wastewater;

outputting processed wastewater at an output of the processor;

feeding the processed wastewater to an input of a gravimetric selector that selects solids with superior settling characteristics; and

outputting a recycle stream at a first output of the gravimetric selector,

wherein a waste stream is rejected and the recycle stream is supplied to the processor.

2. A method for selecting and retaining solids with superior settling characteristics, the method comprising:

feeding wastewater to an input of a processor that carries out a treatment process on the wastewater;

outputting processed wastewater at an output of the processor;

feeding the processed wastewater to an input of a gravimetric selector that selects solids with superior settling characteristics;

outputting a recycle stream at a first output of the gravimetric selector; and

outputting a waste stream at a second output of the gravimetric selector to solids handling, where solids handling includes at least one thickening, stabilizing, conditioning, and dewatering.

3. The method of claim 1, wherein the recycle stream is supplied from the first output of the gravimetric selector to the processor.

4. The method of claim 1, wherein the recycle stream comprises solids with superior settling characteristics.

5. The method of claim 2, wherein the waste stream is rejected and the recycle stream is returned to the processor.

6. The method of claim 4, wherein the waste stream comprises solids with poor settling and filtration characteristics or that have increased potential for membrane fouling.

7. The method of claim 1, wherein the treatment process comprises:

a suspended growth activated sludge process;

a granular process;

an integrated fixed-film activated sludge process;

a biological nutrient removal process;

an aerobic digestion process; or

an anaerobic digestion process.

8. The method of claim 1, wherein the treatment process comprises a biological treatment process.

9. The method of claim 8, wherein the biological treatment process comprises an in-line solid-liquid separation process.

10. The method of claim 1, wherein the processor includes a membrane separator.

11. A method for selecting and retaining solids with superior settling characteristics, the method comprising:

feeding wastewater to an input of a processor that carries out a treatment process on the wastewater;

outputting processed wastewater at an output of the processor;

feeding the processed wastewater to an input of a gravimetric selector that selects solids with superior settling characteristics; and

outputting a recycle stream at a first output of the gravimetric selector,

wherein the gravimetric selector comprises a cyclone that accelerates the wastewater and provides shear-force to the wastewater to separate solids with good settling characteristics from solids with poor settling and filtration characteristics.

12. A method for selecting and retaining solids with good settling characteristics, the method comprising:

feeding wastewater to an input of a processor that carries out a treatment process on the wastewater;

outputting processed wastewater at an output of the processor;

feeding the processed wastewater to an input of a gravimetric selector that selects solids with good settling characteristics; and

outputting a recycle stream at a first output of the gravimetric selector,

wherein the gravimetric selector comprises a centrifuge that provides centrifugal and shear force to separate solids with good settling characteristics from solids with poor settling and filtration characteristics in the wastewater.

13. The method of claim 11, wherein a feed rate to and a geometry of the cyclone are configured to adjust a velocity of the wastewater in the cyclone to:

select for larger or more dense solids; or

increase the time available for separation in the cyclone.

14. The method of claim 1, wherein the feeding the processed wastewater to the input of the gravimetric selector comprises:

feeding the processed wastewater to an input of a separator that separates the wastewater into an underflow and effluent;

receiving the underflow from the separator; and

gravimetrically selecting solids with superior settling characteristics from the underflow and supplying the recycle stream to the first output.

15. The method of claim 11 further comprising:

controlling a velocity of the wastewater in the cyclone so that solids of a predetermined size or density are retained.

16. The method of claim 11 further comprising:

controlling a hydraulic loading rate to select settling solids of a predetermined size or density.

17. An apparatus that selects and retains solids with superior settling characteristics, the apparatus comprising:

a processor that comprises an input and an output, the processor being configured to carry out a treatment process; and

a gravimetric selector that comprises an input, a waste stream output and a recycle stream output, the gravimetric selector being configured to select solids with superior settling characteristics,

wherein the recycle stream output of the gravimetric selector is coupled to the input of the processor, and

wherein the waste stream output of the gravimetric selector is coupled to solids handling, wherein solids handling includes at least one of thickening, stabilizing, conditioning, and dewatering.

18. The apparatus of claim 17, wherein the input of the gravimetric selector is coupled to the output of the processor.

19. The apparatus of claim 17, wherein the input of the gravimetric selector is coupled to an underflow output of a separator.

20. The apparatus of claim 17, wherein the recycle stream output of the gravimetric selector supplies a recycle stream to the processor, the recycle stream comprising solids with superior settling characteristics.

21. The apparatus of claim 17, wherein the treatment process comprises:

a suspended growth activated sludge process;

a granular process;

an integrated fixed-film activated sludge process;

a biological nutrient removal process;

an aerobic digestion process; or

an anaerobic digestion process.

22. The apparatus of claim 17, wherein processor comprises:

a bioreactor.

23. The apparatus of claim 21, wherein the bioreactor process comprises an in-line solid to liquid separation process.

24. The apparatus of claim 17, wherein the processor comprises a cyclone that accelerates the wastewater and provides shear-force to the wastewater to separate solids with good settling characteristics from solids with poor settling and filtration characteristics.

25. The apparatus of claim 17, wherein the processor comprises a centrifuge that provides centrifugal and shear force to separate solids with good settling characteristics from solids with poor settling and filtration characteristics in the wastewater.

26. The apparatus of claim 24, wherein a feed rate and a geometry of the cyclone are configured to adjust a velocity of the wastewater in the cyclone to:

select for larger or more dense solids; or

increase a time available for separation in the cyclone.

27. The apparatus of claim 17, further comprising:

a separator that has an input coupled to the output of the processor.

28. The apparatus of claim 24, wherein the cyclone controls a velocity of the wastewater to adjust an overflow rate so that settling solids of a predetermined size or density are retained.

29. The apparatus of claim 24, wherein the cyclone controls a hydraulic loading rate to select settling solids of a predetermined size or density.

30. A method for selecting and retaining solids with superior settling characteristics, the method comprising:

receiving wastewater from a wastewater supply;

processing the wastewater to provide processed wastewater;

gravimetrically selecting solids with superior settling characteristics from the processed wastewater and outputting a recycle stream and a waste stream;

supplying the recycle stream to a processor to further process the recycle stream together with further wastewater received from the wastewater supply; and

supplying the waste stream to solids handling, where solids handling includes at least one of thickening, stabilizing, conditioning, and dewatering.