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MEMORANDUM

TO: City of Stanwood
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FROM: Jeff Christner, P.E.
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SUBJECT: McDay Holdings, Inc.

Proposed Septage Receiving Facility and Class A Biosolids Processing Facility
Report to Document Sewage Treatment and Discharge to the City of Stanwood System

JOB NO.: 2015-135

DATE: July 28, 2016

McDay Holding's proposed Septage Receiving Facility and Class A Biosolids Processing Facilities are discussed below. This is provided to the City of Stanwood to summarize the anticipated project and to document anticipated sewage flows and loads which will be discharged to the City of Stanwood.

PROPOSED SEPTAGE FACILITY CONSTRUCTION INFORMATION:

Standard construction methods per WSDOT 2016 Standard Specifications are proposed for the Facility piping, access road, storage tanks, equipment, and building. The site is located in a floodplain and all structures are to be either elevated 1' above the 100-year floodplain elevation or designed to be submerged in water without compromising the operational requirements. Tankage will be cast-in-place reinforced concrete (Mt Baker Silo or equal). Piping will be subject to standard hydrostatic pressure test requirements. Due to the soft soil conditions, piles will be used to support structure foundations. Piles are proposed under all 3 concrete tanks, the septage receiving structure, the pump station, and the Control Building. The Control Building will include room for the biosolids processing equipment from FKC, Inc. (package unit including flocculation tank, polymer dosing station, rotary drum thickener, screw press, boiler, conveyor equipment, and controls). Control Building will also include an office, restroom, and stair

access. No elevators are included in the preliminary layout. Finish floor elevation of the proposed building will be located approximately 10-ft above existing grade (1' above the 100-year floodplain elevation).

The Septage Facility System will be designed to (1.) Accept raw septage from tanker trucks, (2.) Pretreat septage with an automatic grit removal/screening facility (Honey Monster, or equal), (3.) Transfer liquid septage to a 90,000+/- gallon equalization tank, (4.) Transfer liquid septage from the equalization tank to a 75,000+/- gallon processing tank, (5.) Dose liquid septage with powdered quick lime, (6.) After 24 hours and satisfactory pH test results, septage is to be transferred to the flocc/thickener/dewatering equipment area, (7.) Polymer is to be dosed in the flocc tank, just prior to the thickening process (rotary drum thickener), (8.) Steam is to be dosed to the biosolids as the dewatering process begins, raising biosolids temperature to 72 degrees C, (9.) Filtrate/Pressate are to be discharge to the City Sewer System, (10.) Dewatered biosolids (cake) is to be conveyed and discharged to an on-site truck with trailer.

Projected Quantities:

Lime Dose:

Typically 300 to 400 lbs quick lime per dry ton of biosolids.
For a 5 dry ton batch, anticipate **2000 lbs. lime** needed per batch

Polymer Dose:

Typically 25 lbs. active polymer per dry ton of biosolids.
Anticipate using a neat polymer emulsion with 50% active polymer (approx.), therefor 50 lbs. neat polymer per dry ton. For a 5 dry ton batch, anticipate 50 x 5 = 250 lbs. neat polymer emulsion needed per batch.
250 lbs. / 8.5 lbs. per gallon = **30 gallons neat polymer emulsion** needed per batch

Make down water dose:

Dilute polymer to 0.5% concentration.
30 gallons at 50% = 3,000 gallons at 0.5%.
For a 5 dry ton batch, anticipate **3,000 gallons of potable water** (City Water) needed per batch

Shower Water dose:

Anticipate 9 gpm of shower water supply during dewatering operations. 9 gpm x 18 hours = **10,000 gallons of potable water** (City Water) needed per batch (approx.)

Septage Pre-Screening Equipment (Honey Monster) Spray Water dose:

Anticipate 46 gpm of spray water, 15 minutes to unload each truck, 20 trucks per day. 46 gpm x 15 min. x 20 trucks = **14,000 gallons of potable water** (City Water) needed per day (approx.)

Filtrate, Pressate, and Screen Spray:

The volume of filtrate and pressate is typically 90% of the raw sewage volume + make down + shower water + spray water volume. 40,000 gallons + 3,000 gallons + 10,000 gallons + 14,000 gallons = 67,000 gallons x 90% = **60,000** (To City Sewer System) gallons per batch.

Based on similar process data, it is noted that the filtrate & pressate concentration will typically fall into a range of 170 to 750 mg/L BOD and a range of 34 to 84 mg/L TSS. Based on this data, we anticipate the average concentration will be 460 mg/L BOD and 59 mg/L TSS. This will be discharged through a pumped sewage system with 4" flow meter device and to the City sewer.

SEPTAGE FACILITY OPERATION INFORMATION:

Operation time: Septage will be received during day #1. Anticipate 40,000+/- gallons of septage delivered to the site each day. Individual truck loads will range from 1,000 gallons/load to 6,000 gallons/load. Septage will be stored in a 90,000 gallon concrete equalization tank. Each batch will be limed during day #2. Lime process will take 24 hours. Each batch will be thickened/dewatered during day #3. Anticipate that this process will take a period of 18 to 24 hours. Anticipate 3 days needed to process a single batch; however, a new batch can be started on each consecutive day. For planning purposes, anticipate that 5 batches will be processed per week. Each batch to consist of approx. 40,000 gallons of raw septage with 1.5% to 3.0% solids concentration (approx.).

Maximum production: 5 dry tons of Biosolids produced per day x 5 days per week x 50 weeks per year = **1,250 tons per year**.

Based on WAC 173-308-150, quarterly sampling (4 times per year) will be required for biosolids monitoring. This monitoring includes vector attraction reduction requirements (WAC 173-308-180), pathogen density requirements (WAC 173-308-170), and biosolid pollutants listed in Tables 1, 2, and 3 of WAC 173-308-160.

Proposed method for Vector Attraction Reduction = WAC 173-308-180(4) Alternative 4: pH Adjustment. The pH of the biosolids must be raised to twelve or higher by alkali addition and, without the addition of more alkali, must remain at twelve or higher for two hours and then at 11.5 or higher for an additional twenty two hours.

Proposed method for Pathogen Reduction = WAC 173-308-170(1) Class A – Alternative 1: Time and Temperature. Temperature = 72 degrees C. Time = 30 minutes. Percent solids = less than 7%.

Percent Solids anticipated:

- Flocc Tank: 1.5% to 3.0%
- Rotary Drum Thickener: 8% to 10%
- Screw Press: 25% to 40%

SEPTAGE FACILITY MONITORING AND REPORTING:

This Septage Facility will require a Biosolids Permit per WAC 173-308 – Biosolids Management. The required monitoring and reporting are identified in this WAC, including an annual report which must be submitted to the Department of Ecology by March 1 of each year (WAC 173-308-295).

The final design plans and specifications will be included with the Biosolids Permit, and submitted to the Department of Ecology. The Department of Ecology anticipates a 180 day processing timeframe for the Biosolids Permit.

SUMMARY:

Water:

- Anticipated Max. Daily Water usage = 3,000 gallons (polymer make down) + 10,000 gallons (dewatering equipment shower water) + 14,000 gallons (pre-screening spray water) + 1,000 gallons (misc. needs) = 28,000 gallons (City Potable Water).

- Anticipated Water Flow = 100 gpm max. Anticipate one 1.5" water meter with a 3" service line.

- Anticipated Water Flow Sources: Shower Equipment (10 gpm) + Polymer Make Down (25 gpm) + Screen Spray (46 gpm) + Misc (15 gpm) = 96 gpm.
  Max. Instantaneous Demand = 100 gpm

Sewer:

- Anticipated Max. Daily Sewer Discharge = 60,000 gallons (filtrate/pressate/spray) + 1,000 gallons (misc. needs) = 61,000 gallons (To City Sewer System)

- Anticipated Sewer Concentration = 460 mg/L BOD; 59 mg/L TSS.

- Anticipated Sewer Flow = Pumped to City through a 4" flow meter. Pump Rate = 200 gpm. Pump Time = 5 hours per day.

Should you have any questions or require additional information, please feel free to give me a call.

Sincerely,
Wilson Engineering, LLC

Jeff Christner, PE