

APPENDIX E

HELMSBURG RSD DESIGN SUMMARY

II. DESIGN DATA

1. **Current Population:** 176
2. **Design Year and Population:** 2,015 and 200
3. **Design P.E.:** 208
4. **Design Flow:**
 - A. **Domestic:** 24,500 gpd
 - B. **Industrial/Commercial:** 500 gpd
 - C. **Infiltration/Inflow:** 0 Pressure System
5. **Average Design Peak Flow:** 110,880 gpd
6. **Maximum Plant Flow Capacity:** 86,400 gpd
7. **Design Waste Strength:**
 - A. **CBOD:** 200 mg/l
 - B. **TSS:** 200 mg/l
 - C. **NH -N** 25 mg/l
8. **NPDES Permit Limitation on Effluent Quality:**

	<u>Summer</u>	<u>Winter</u>
A. CBOD:	15 mg/l	25 mg/l
B. SS:	18 mg/l	30 mg/l
C. NH-N:	1.3 mg/l	1.9 mg/l
D. Chlorine Residual:	< .05 mg/l	
E. pH:	6.0 to 9.0	
F. D.O.:	6.0 mg/l	5.0 mg/l
9. **Receiving Stream:**
 - A. **Name:** Bean Blossom Creek
 - B. **Tributary to:** Lake Lemon
 - C. **Stream Uses:** Recreational, Partial Body Contact
 - D. **7-day, 1-in-10 year low flow:** 0.0 cfs

III. TREATMENT UNITS

FLOW EQUALIZATION

1. Number and size of units: 1 Unit 11'-11" x 9'-3" x 9'-6" SWD
7,500 Gallons
2. Method of flow diversion to unit: In-line
3. Air and mixing provided: Yes 1 - 1 HP Blower Rated at 20 cfm at 5 PSI
4. Method and control of flow return: 2 - Submersible Pumps Rated at 30 GPM at
15 feet TDH Each
5. Method of sludge removal: Drain Piping

FLOW METERS:

1. Type: 1-inch Parshall Flume with Ultra Sonic Meter
2. Location: Effluent Metering Manhole
3. Indicating, Recording and Totalizing: Yes

SCREENS:

1. Type: Course Bar
2. Number and Capacity: 1 and 100,000 gpd
3. Bar spacing and slope: 1-inch and 45°
4. Method of cleaning: Manual
5. Disposal of screenings: Dumpster

ACTIVATED SLUDGE

1. Type of activated sludge process: Extended Aeration with Single Stage Nitrification.
2. Number and size of units: 1 Unit 37'-9" x 11'-11" x 9'-6" SWD
31,250 Gallons or 4,178 C.F.
3. Detention time (hours): 30 Hours

4. Organic Loading (lb BOD/1,000 cf): 9.78 lb BOD/1,000 cf
5. Type of aeration equipment: Coarse Bubble
6. Type and size of blowers: 2 Blowers 5 HP each and rated at 150 cfm at 5 PSI each
7. Air required (itemize, cfm):

BOD	34.0 cfm
NH-N	13.2 cfm
Airlifts	10.0 cfm
Post Air	10.0 cfm
Sludge Holding	<u>10.2 cfm</u>
Total	77.4 cfm
8. Provision for Speed adjustment: Belt and Sheeve
9. Air provided: 150 cfm with largest blower out of service
10. Number and capacity of return sludge pump: 2 - 2½ inch airlifts; 0 to 26 gpm capacity each
11. Method of return sludge rate control: Air valves
12. Return sludge rate as % of design flow: 0% to 150%
13. Provisions for return rate metering: Sludge metering box
14. Location of return sludge discharge: Aeration Tank

SECONDARY CLARIFIERS:

1. Type of clarifiers: Dual Hopper Clarifier
2. Number and size of units: 1 Unit
5,320 Gallon Clear Water Zone
1,545 Gallon Sludge Blanket Capacity
3. Surface settling rate (gpd/sf):

A. at the design flow:	262 gpd/sf
B. at the equalized flow:	452 gpd/sf
C. at the peak influent Pumping rate	904 gpd/sf
4. Detention time (hours): 5.1 hours
5. Type of sludge removal mechanism: 2 - 2½ inch airlifts

6. Weir overflow rate: 3,125 gpd/lf
7. Disposal of scum: Aeration tank

RAPID SAND FILTRATION:

1. Number and size of filters: 2 filter cells 5' x 3.5' x 6' depth each
8.68 sf filter area each
2. Filtration rate:
 - A. at peak flow rate: 3.4 gpm/sf
 - B. at average flow rate: 1.0 gpm/sf
3. Type, depth, and grain size of filter media: Sand, 8", 0.80 to 1.20 MM
Anthracite, 12", 1.08 MM
4. Backwash rate: 10.25 gpm/sf
5. Air scour: Provided 20 cfm at 4 PSI
6. Capability to chlorinate ahead of the filter: No
7. Backwash pumps (number and capacity): 2 pump, 1 HP each
89 gpm at 17' TDH each
8. Source and capacity of backwash water: Source: Sand Filter Filtrate
Size of Clearwell: 8.92' x 3' x 6.5
depth; 1,303 Gallons
9. Holding capacity of dirty water tank: 1,368 Gallons
10. Facilities for unit isolation: Yes

POST AERATION:

1. Type of Aeration: Course Bubble Diffuser
2. Number of Units: 1 unit
3. Size of Units: 3' x 1' x 5'-4" SWD, 120 Gallons
4. Aeration Provided: 10 cfm
5. Expected Effluent DO: 6 mg/l

DISINFECTION:

1. Type of disinfection used: Chlorine Tablets
2. Size of contact tank: 521 gallons
3' x 3.8' x 6' Depth
3. Contact time: 30 Min. at Average Flow Rate
18 Min. at Equalized Flow Rate
4. Type of disinfection feeders: Tablet feeder
5. Capacity of the feeders: 50,000 gpd
6. Disinfectant dosage: 8 mg/l
7. Drain for tank: Yes

DECHLORINATION:

1. Chemical used: Sodium bisulfite
2. Type of feeders: Tablet
3. Capacity of feeders: 50,000 gpd
4. Dosage: 1.46 mg/l per 1 mg/l chlorine residual
5. Diffuser location: Effluent end of chlorine contact tank
6. Equipment location: In-line mounted

SLUDGE HOLDING TANK:

1. Number and size of units: 1 Unit - 11'-11" x 3' x 9.5' swd
340 cf or 2,500 Gallons
2. Detention time: 19 day SRT
3. Organic Loading: 61.18 lbs VSS/1,000 cf
4. Air supply: 10.2 cfm
5. Decanting method: Overflow Pipe

SLUDGE DISPOSAL:

1. **Ultimate disposal method of sludge:** Nashville, Indiana WWTP
2. **Expected solids content of sludge (by the principal method of disposal):** 3%
3. **Availability of sludge transport Equipment:** Local Septic Hauler

IV. SEWER COLLECTION SYSTEM

SEWER:

1. **Type of sewer material:** PVC SDR 21 Low Pressure Force Main
2. **Diameter and length of sewer (indicate length for each size):**

Size	Length
1.25"	1,428 L.F.
1.50"	1,189 L.F.
2.00"	2,189 L.F.
2.50"	1,119 L.F.
3.00"	1,792 L.F.
4.00"	1,110 L.F.
8.00" (Outfall)	1,792 L.F.

3. **Stream, highway, and railroad crossing:** 1 - Highway Crossing
1 - Railroad Crossing
4. **Separation of combined sewer or new sewer:** New Sewers
5. **Number of manholes:** 5 Manholes, 1 Metering Manhole
6. **Water main protection:** 10 Feet Horizontal Separation , 18-Inch Vertical Separation

INDIVIDUAL GRINDER PUMPS:

1. **Location:** As shown on the Plans
2. **Number of pumps:** 59
3. **Capacity of pumps:** 15 gpm at 0 TDH, 9 gpm at 138 TDH
4. **RPM and TDH:** 1,725 RPM, 138 TDH
5. **Volume of the wet well:** 23.5 Gallons
6. **A gate valve and a check valve in the discharge line:** Yes
7. **Ventilation:** Yes
8. **Alarm:** Visual

V. MISCELLANEOUS

- A. Laboratory Equipment: (Contracted)
- B. Safety Equipment: Yes
- C. Plant Site Fence: Yes
- D. Handrail for the tanks: Yes
- E. Units, unit operation, and plant bypasses: Unit Bypass only
- F. Flood elevation (10, 25, or 100 year flood): 657 MSL (100 year)
- G. Consistency with EPA Reliability Technical Bulletin: Yes
- H. Standby power equipment: Yes
- I. ~~Site inspection~~: Sanco Engineering & Associates, Inc.
- J. ~~Statement in the specifications as to the protection against any adverse environmental effect (e.g., dust, noise, soil erosion) during construction~~: Yes
- K. ~~Hoists for removing heavy equipment~~: No
- L. Adequate sampling facilities: Yes
- M. Hydraulic Gradient: Provided