

## Scum Concentration System Installation Profiles

Plant Name/Location	Consulting Engineer	Description
City of Manchester, NH Water Pollution Control Facility	Hayden, Harding & Buchanan	Two (2) 4' x 18' carbon steel scum concentrator tanks, malleable iron chain and redwood flights. The system includes two (2) 6" dia. x 14' deep preparation tanks with turbine mixer. Installation – 1975.
Genesee County Michigan Anthony Ragnone WWTP Montrose, MI	Consoer Townsend Envirodyne Engineers	Two (2) 6' x 25' carbon steel scum concentrator tanks, stainless steel discharge hopper, non-metallic chain and stainless steel flights.
City of Lancaster, Ohio	Malcolm Pirnie	One (1) 6' x 18' carbon steel scum concentrator tanks, stainless steel discharge chute, non-metallic chain and stainless steel flights.
City of Portage, Indiana	McDonough Associates	One (1) 4' x 18' carbon steel scum concentrator tanks, malleable iron chain and redwood flights.
Salem, Massachusetts South Essex Sewerage District	Metcalf & Eddy (1976) Camp Dresser & McKee (1977)	Two (2) 4' x 18' carbon steel scum concentrator tanks, malleable iron chain and stainless steel flights. Two (2) 6' dia. x 8' deep preparation tanks with turbine mixer.
Portage County, Ohio Streetsboro WWTP	CT Consultants	One (1) 6' x 18' carbon steel scum concentrator tanks, removable fiberglass discharge chute, malleable iron chain and stainless steel flights.

# INSTALLATION PROFILE

## SCUM CONCENTRATION SYSTEM

### City of Manchester

Manchester, New Hampshire

#### CONSULTING ENGINEER:

Hayden, Harding & Buchanan

The City of Manchester's Water Pollution Control Facility is the largest in New Hampshire, providing wastewater treatment for not only Manchester but also surrounding towns of Londonderry, Bedford and Goffstown. The facility has an average/wet weather design flow of 34/70 mgd and provides primary treatment and secondary treatment via the activated sludge process. The treated wastewater is disinfected and then de-chlorinated before it is discharged into the Merrimack River. Primary and waste activated sludge are co-thickened in gravity thickeners, dewatered on belt filter presses and incinerated.

Raw wastewater and septage are screened, degrittied and flow to the primary settling tanks. The majority of plant skimmings are collected at the primary settling tanks and pumped along with skimmings collected at the secondary settling tanks to two scum concentrators.

The scum concentrators were placed into operation in 1975. Each scum concentration tank has nominal dimensions of 4' wide x 18' long x 5' deep, providing a nominal water surface area of 50 square feet and a nominal working volume of 600 gallons. Each tank is designed for 100 gpm of blended scum flow. Each tank is fabricated from 1/4" minimum thickness carbon steel and discharges scum to a mixed and heated holding tank. The scum collector chain is malleable iron and the flights are redwood. Each holding tank is fabricated from 1/4" minimum thickness carbon steel and has nominal dimensions of 6' diameter by 14' deep and a capacity of 2,000 gallons.

The concentrated scum from the holding tanks, which typically contains 40-50% dry solids, is pumped by open throat, progressing cavity

pumps equipped with high torque limit switches and adjustable speed drives to the fluidized bed incinerator. The pumps can also recirculate decanted liquid from the holding tanks back to the scum concentration tanks. Each holding tank has a turbine mixer to homogenize the concentrated scum and a factory installed resistance-heating system fixed to the exterior of the cone bottom. The heating elements are protected by an insulated, removable, steel cover. A thermostat mounted on each holding tank regulates the temperature of the concentrated scum. A high-level alarm switch is provided for each holding tank.



Plant staff is pleased with the operation of the scum concentrators. The scum concentrators need only routine maintenance, and very infrequently is it necessary to replace the scum collector chain and flights. In addition to the scum concentrators significantly lowering handling and problematic disposal costs by reducing scum weight and volume, the concentrated scum is a highly effective supplemental fuel for the incinerator, reducing the demand for fuel oil.

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# INSTALLATION PROFILE

## SCUM CONCENTRATION SYSTEM

### **GENESEE COUNTY, MICHIGAN**

#### **ANTHONY RAGNONE WWTP**

Montrose, Michigan

#### **CONSULTING ENGINEER:**

Consoer Townsend Envirodyne Engineers

The Anthony Ragnone Wastewater Treatment Plant has an average/maximum design flow of 28/40 mgd and provides primary and secondary treatment with phosphorus and ammonia removal, via the activated sludge process. The treated wastewater is disinfected and then dechlorinated before it is discharged to the Flint River. Primary sludge and dissolved air flotation thickened waste activated sludge are conditioned by adding lime to bring the pH to 12, and hauled away for sub-surface injection into agricultural land as a soil conditioner and fertilizer.

Raw wastewater is degritted and pumped to the primary settling tanks. Skimmings are collected at the primary settling tanks and pumped on an intermittent basis to two (2) scum concentrators located on the second floor of the Grit and Scum Building. The aeration tanks have an anoxic zone to remove phosphorus. Skimmings collected at the secondary settling tanks are pumped on an intermittent basis to the influent end of the plant.

Skimmings from the scum concentrators are discharged by gravity to open containers.

Each scum concentrator tank has nominal dimensions of 6' wide x 25' long x 7' deep, providing a nominal water surface area of 125 square feet and a nominal working volume of 2500 gallons. Each tank is designed for primary tank skimmings delivered once per shift at a maximum rate of 600 gpm for 36 minutes at three shifts per day. Each tank is fabricated from ¼" minimum thickness carbon steel and is provided with a removable, ¼" minimum thickness stainless steel discharge hopper having a capacity of 350 gallons. Each tank also has a mechanically adjustable effluent level control assembly operated by a hand lever accessible from the service platform. The assembly is capable of varying the liquid level 3". The scum collector chain is polymeric and the flights are stainless steel.

Plant staff indicates they are pleased with the operation of the scum concentrators.



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# INSTALLATION PROFILE

## SCUM CONCENTRATION SYSTEM

### **CITY OF LANCASTER, OHIO**

**CONSULTING ENGINEER:**

Malcolm Pirnie

The City of Lancaster Water Pollution Control Facilities have an average/peak design flow of 10/18 mgd and use a two-stage biological system consisting of trickling filters followed by the conventional air activated sludge process to provide advanced secondary treatment with nitrification. The treated wastewater is disinfected, post aerated and discharged to the Hocking River. Gravity thickened primary sludge is anaerobically digested and waste activated sludge is gravity belt thickened. All sludge is then dewatered on a belt filter press, lime stabilized and hauled away for land application.

Raw wastewater is degrittied and pumped to the primary settling tanks. Skimmings are collected at the primary settling tanks and the primary sludge gravity thickener and pumped on an intermittent basis to the scum concentrator. Skimmings from the final settling tanks are pumped on an intermittent basis to the aeration tanks. Skimmings from the scum concentrator are discharged by gravity to either an open container or an open truck.

The scum concentrator tank has nominal dimensions of 6' wide x 18' long x 5' deep, providing a nominal water surface area of 75 square feet and a nominal working volume of 875 gallons. The tank is designed for a 150 gpm flow rate and has a maximum hydraulic capability of 250 gpm. The tank is fabricated from ¼" minimum thickness carbon steel and is provided with a removable, 3/16" minimum thickness stainless steel discharge chute and removable, 16 gauge stainless steel odor abatement covers. The discharge end of the tank extends into the Screen Building Garage and is supported from the roof beam above with support hangers. The tank also has a mechanically adjustable effluent level control assembly operated by a hand lever accessible from the service platform. The assembly is capable of varying the liquid level 3". The scum collector chain was originally malleable iron and the flights stainless steel. However, due to corrosion the chain was replaced with stainless steel chain approximately one year after start-up.

Plant staff indicates they are pleased with the operation of the scum concentrator.



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# INSTALLATION PROFILE

## SCUM CONCENTRATION SYSTEM

### **CITY OF PORTAGE, INDIANA**

**CONSULTING ENGINEER:**

*McDonough Associates*

The City of Portage's Water Reclamation Facility has an average/peak capacity of 5.0/15.0 mgd and uses a combination oxidation ditch process and tertiary filtration for purifying the wastewater. The treated wastewater is polished by the tertiary sand filters, disinfected, and discharged to the Burns Waterway. Primary sludge and waste activated sludge are aerobically digested, gravity thickened, dewatered on a belt filter press and hauled away for land application.

Raw wastewater is degritted and pumped to the primary settling tanks. Skimmings are collected at the primary settling tanks and pumped on an intermittent basis through a grinder to the scum concentrator located in the existing screen building.

Skimmings from the final settling tanks are returned on an intermittent basis to either the oxidation ditch or the aerobic digester. Skimmings from the scum concentrator are discharged by gravity to an open container and eventually to a landfill.

The scum concentrator tank has nominal dimensions of 4' wide x 18' long x 5' deep, providing a nominal water surface area of 50 square feet and a nominal working volume of 600 gallons. The tank is designed for a 125-gpm-flow rate. The tank is fabricated from ¼" minimum thickness carbon steel. The scum collector chain is malleable iron and the flights are redwood.

Plant staff indicates they are pleased with the operation of the scum concentrator.



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# INSTALLATION PROFILE

## SCUM CONCENTRATION SYSTEM

### SALEM, MASSACHUSETTS

#### SOUTH ESSEX SEWERAGE DISTRICT

#### CONSULTING ENGINEER:

Metcalf & Eddy (1976); Camp Dresser & McKee (1997)

The South Essex Sewerage District Wastewater Treatment Facilities have an average/maximum design flow of 30/86 mgd and provide primary and secondary treatment with a pure oxygen activated sludge process with anaerobic selector. The treated wastewater is disinfected and then dechlorinated before it is discharged into Salem Harbor. Primary sludge and gravity belt thickened waste activated sludge are mixed in two sludge storage tanks, dewatered on belt filter presses and hauled away for disposal in a landfill. Alternatively, the dewatered sludge can be lime stabilized and hauled away for disposal by a vendor.

Raw wastewater and septage are degrittied and pumped to the primary settling tanks. The majority of plant skimmings is collected at the primary settling tanks by gravity and conveyed to two blended scum tanks. Skimmings collected at the secondary settling tanks are pumped every few days or so to the blended scum tanks. The blended scum is then pumped by four scum pumps through grinders to two scum concentrators located in the Thickener Room of the Operations Building.



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Two scum concentrators were installed in 1976 and each scum concentration tank had nominal dimensions of 4' wide x 18' long x 5' deep, providing a nominal water surface area of 50 square feet and a nominal working volume of 600 gallons. Each tank was designed for 100 gpm of blended scum flow. Each tank was fabricated from 1/4" minimum thickness carbon steel and discharged scum to a mixed and heated holding tank. The scum collector chain was malleable iron and the flights were redwood.



Each holding tank was fabricated from 1/4" minimum thickness carbon steel and had nominal dimensions of 5' diameter by 10' deep and a capacity of 600 gallons. The concentrated scum from the holding tanks, which typically contained 40-50% dry solids, was pumped by open throat, progressing cavity pumps equipped with high torque limit switches and adjustable speed drives to trucks and hauled away for disposal in a landfill. The pumps also recirculated decanted liquid from the holding tanks back to the scum concentration tanks. Each holding tank had a turbine mixer to homogenize the

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## Scum Concentration System Installation Profile – Salem, MA

concentrated scum and a factory installed resistance-heating system fixed to the exterior of the cone bottom. The heating elements were protected by an insulated, removable, steel cover. A thermostat mounted on each holding tank regulates the temperature of the concentrated scum. A high-level alarm switch is provided for each holding tank.



Two new replacement scum concentrators were installed in 1997 and each scum concentration tank has nominal dimensions of 4' wide x 18' long x 5' deep, providing a nominal water surface area of 50 square feet and a nominal working volume of 600 gallons. Each tank is designed for 100 gpm of blended scum flow. Each tank is fabricated from ¼" minimum thickness carbon steel and discharges concentrated scum to a mixed and heated holding tank. The scum collector chain is malleable iron and the flights are stainless steel. Each scum concentration tank also has a mechanically adjustable effluent level control assembly operated by a hand lever accessible from the service platform. Each holding tank is fabricated from ¼" minimum thickness carbon steel and has nominal dimensions of 6' diameter by 8' deep and a capacity of 750 gallons. The scum concentration tanks and the holding tanks have removable, 14 gauge galvanized steel safety containment covers. Unlike the 1976 units, liquid is not decanted from the holding tanks and recirculated back to the scum concentration tanks but rather the concentrated scum from the holding tanks is

pumped by open throat, progressing cavity pumps equipped with high torque limit switches and adjustable speed drives to the mixed sludge storage tanks where it is combined with the primary sludge and the gravity belt thickened waste activated sludge.

Each holding tank has a turbine mixer to homogenize the concentrated scum and a factory installed resistance-heating system fixed to the exterior of the cone bottom. The heating elements are protected by an insulated, removable, steel cover. The temperature of the concentrated scum in each holding tank is regulated by a thermocouple mounted on the tank and a temperature indicating controller mounted in the scum concentrator control panel. An ultrasonic level transmitter is provided for each holding tank. The panel contains a level indicating controller for each holding tank and each blended scum tank, speed indicating controllers for the four scum pumps and two concentrated scum pumps, and all other controls necessary for a complete operating system. From the panel, the operator can monitor and adjust the speed of these pumps. Each holding tank level-indicating controller has multiple set points for level control:

- High-High Level: Scum pump shutdown, heater shutdown and alarm
- High Level: Mixer shutdown
- Low Level: Heater shutdown and concentrated scum pump shutdown
- Low-Low Level: Mixer shutdown and alarm.

Audible and visible alarms are annunciated when the level within each scum holding tank rises above the high-high level set point or falls below the low-low level set point. All alarms must be reset manually before any pump can be operated.

Plant staff personnel indicate they have been and are still pleased with the operation of the scum concentrators.

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# INSTALLATION PROFILE

## SCUM CONCENTRATION SYSTEM

### PORTAGE COUNTY, OHIO

### STREETSBORO WWTP

CONSULTING ENGINEER:  
CT Consultants

Portage County's Streetsboro Wastewater Treatment Plant has an average/maximum capacity of 4.0/8.0 mgd and uses a combination biological process and tertiary filtration for purifying the wastewater. Following grit removal and screening, carbonaceous oxygen demand is reduced by the contact stabilization activated sludge process. Nitrogenous demand is reduced by nitrifying organisms in the nitrification towers. The treated wastewater is polished by the tertiary sand filters, disinfected, post aerated, and discharged to Tinker's Creek. Waste activated sludge is aerobically digested, dewatered on a belt filter press and hauled away for land application.

Raw wastewater is degritted in a traveling bridge aerated grit and grease separator. Grit slurry is dewatered on a screw classifier and discharged to an open container for removal. Grease and floatables are skimmed off to a scum collection well and eventually pumped on an intermittent basis to the scum concentrator located in the Blower Building. Mixed liquor from the aeration tanks is

settled in the final clarifiers and skimmings from the final clarifiers flow to a collection well and are pumped on an intermittent basis to the scum concentrator. Skimmings from the scum concentrator are discharged by gravity to an open container for removal.

The scum concentrator tank has nominal dimensions of 6' wide x 18' long x 5' deep, providing a nominal water surface area of 75 square feet and a nominal working volume of 875 gallons. The tank is designed for a 150 gpm flow rate and has a maximum hydraulic capability of 250 gpm. The tank is fabricated from 1/4" minimum thickness carbon steel and is provided with removable, 1/4" minimum thickness FRP discharge chute and odor abatement covers. The scum collector chain is malleable iron and the flights are stainless steel.

Plant staff indicates they are pleased with the operation of the scum concentrator.



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