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# Rodney WPCP Upgrades

## Basis of Design Report

May 5, 2022

Prepared for:



MUNICIPALITY OF  
**West Elgin**

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# Rodney Water Pollution Control Plant Upgrades

## Basis of Design Report

## Municipality of West Elgin

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**RVA 215817**

**May 5, 2022**

## Rodney WPCP Upgrades Basis of Design Report

### TABLE OF CONTENTS

<b>1.0</b>	<b>PROJECT BACKGROUND .....</b>	<b>2</b>
<b>2.0</b>	<b>OBJECTIVES .....</b>	<b>3</b>
<b>3.0</b>	<b>ASSESSMENT OF THE EXISTING SYSTEM PERFORMANCE.....</b>	<b>4</b>
<b>4.0</b>	<b>RODNEY WASTEWATER TREATMENT REVIEW .....</b>	<b>6</b>
4.1	Historic Influent Flowrates and Characteristics .....	6
4.2	Effluent Compliance Limits and Objectives.....	7
4.3	Effluent Characteristics.....	8
<b>5.0</b>	<b>CURRENT AND FUTURE OPERATION DESKTOP ANALYSIS AND BIOWIN MODELING .....</b>	<b>9</b>
<b>6.0</b>	<b>UPGRADE DESIGN CRITERIA.....</b>	<b>11</b>
6.1	Aeration System Upgrade .....	11
6.2	Screen Upgrade .....	12
6.3	Secondary Clarifier Mechanism Replacement .....	13
6.4	Alum Storage Tank Replacement.....	13
<b>7.0</b>	<b>PROJECT STAGING.....</b>	<b>14</b>
<b>8.0</b>	<b>COST ESTIMATE.....</b>	<b>16</b>

#### Table of Tables

Table 4.1 – Rodney WPCP Historic Influent Flowrates .....	6
Table 4.2 – Rodney WPCP Historic Influent Characteristics .....	6
Table 4.3 – Plant Current and Plant rated Capacity Flowrates.....	7
Table 4.4 – Rodney WPCP CofA Effluent Compliance Limits and Objectives.....	7
Table 4.5 – Rodney WPCP Historic Effluent Data .....	8
Table 8.1 - Range for Cost Opinions .....	16
Table 8.2 – Rodney WPCP Upgrades Cost Estimation....	<b>Error! Bookmark not defined.</b>

#### List of Figures

Figure 6.1 – Air Blowers and Main Air Discharge Pipeline Layout.....	12
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## 1.0 PROJECT BACKGROUND

The Rodney Water Pollution Control Plant (WPCP) is located at 22590 Pioneer Line. It is an activated sludge facility consisting of an off-site sewage pumping station, mechanical bar screen, extended aeration, secondary clarifier, tertiary filtration, and ultra-violet (UV) disinfection. A sludge lagoon is adjacent to the plant and is used for sludge storage. The treated effluent is discharged directly to Sixteen Mile Creek. The facility has a rated capacity of 590 m<sup>3</sup>/day.

The sewage pumping station is located at 155 Furnival Road and contains two (duty / standby) submersible pumps rated at 27 L/s. The pumps are controlled with an ultrasonic level controller and backed-up with floats. The flow is conveyed to the WPCP or to the sludge lagoons via a 200mm forcemain. A stand-by power diesel generator provides back-up power in emergency situations.

The plant receives flow from the aforementioned pumping station through the screen inlet channel and a mechanical bar rake screen designed for a peak flow rate of 2,190 m<sup>3</sup>/d screens the flow. Flow is then split into two (2) aeration tanks with mechanical surface aerators. Each extended aeration tank contains three (3) mechanical surface aerators rated at 7.6 kW each.

The mixed activated liquor then flows to a single center-feed, column supported secondary clarifier. Solids are settled and collected via the sludge collector mechanism and are returned to the aeration tanks via two (2) return sludge pumps. Scum is collected with a skimmer arm connected to the sludge collector mechanism and is pumped to the lagoon.

The secondary clarifier effluent flows to four (4) continuous backwash sand filters with a total surface area of 9.3 m<sup>2</sup>. The filters are serviced with two compressors rated at 18.9 L/s at 860 kPa and two (2) filter backwash pumps rated at 1.5 L/s. The filter effluent is directed to the UV disinfection system located in the same building as the final filters.

## 2.0 OBJECTIVES

The Municipality of West Elgin (Municipality) retained RV Anderson Associates Limited (RVA) to:

- Review plant data and conduct BioWin modelling for the treatment train for sizing of the appropriate technology.
- Review headworks technology options based on cost, compatibility with current operation/constraints, and ease of operation and maintenance.
- Review fine bubble diffused aeration system technology options based on cost, compatibility with current operation/constraints, and ease of operation and maintenance.
- Review clarifier mechanism technology options based on cost, compatibility with current operation/constraints, and ease of operation and maintenance.
- Review the background information and the capacities of wastewater processes. The design parameters for the headworks and aeration upgrades will then be developed based on desktop and BioWin modeling as required.



### 3.0 ASSESSMENT OF THE EXISTING SYSTEM PERFORMANCE

RVA reviewed both “Visual Condition Assessment Report” completed by RVA in 2017, and “20 Year Capital Plan for Rodney WWTP” reported by OCWA 2019; RVA also visited the plant to investigate historic operational issues through discussions with operating staff. RVA concluded that some of the plant’s equipment, infrastructures, and units require an immediate upgrade and refurbishment to improve the plant operation and the safety of the operators, as well as reduce the plant maintenance requirement and power consumption.

The existing headworks facility including the mechanical screen, channel, and enclosure have been evaluated. The mechanical bar screen is showing signs of deterioration and rust, and the screenings removal is done manually with a rake and bucket which is no longer industry standard and exposes operators to undue risk. The screen enclosure shows significant signs of deterioration, and no heating is provided within the enclosure. RVA proposed to replace the existing screen with a new Shaftless Spiral Conveyor screen including Screen Discharge, Spiral brush, Screen frame-to-channel wall side seals, Washing spray jets, one control panel (outdoor installation), and one Custom FRP Enclosure. With the new screening system, there will be no involvement of the operators in picking up the screenings manually and will prevent passing large particles to downstream aeration tanks.

The existing mechanical surface aerators show some signs of deterioration and rust. Operators noted aerators experience frequent breakdowns and require routine repair. A new fine bubble diffused aeration system is proposed to replace the existing surface aerators. Two duty and one dedicated for each tank of a common standby air blower are proposed for this application along with fine bubble diffusers and air supply piping. The new aeration system will include DO sensors and VFDs to control the air blowers’ operation and optimized the power consumption of the plant base on dissolved oxygen concentration in the aeration tanks.

During the latest site visit, the existing enclosure of the secondary clarifier did not help with a clear assessment of the existing secondary clarifier mechanism system. However, previous reports indicated that it is not functioning properly, and the scum collection chamber is always clogged. A new clarification mechanism is proposed to replace the existing one. The existing FRP enclosure on top of the clarifier tank will be removed to allow for removal of the existing mechanism and the installation of the new mechanism. The existing FRP enclosure has no useful function and further it makes it difficult for the operators to access the clarifier for maintenance and it lacks lighting and ventilation.

The existing Phosphorus removal chemical storage tank freezes in winter and indoor totes are used in the winter to avoid freezing. The outdoor chemical tank containment area is filled with rainwater with no drain provided and the sump pump is not functioning to empty the containment. A new polyethylene chemical storage tank with proper heat tracing is proposed to replace the existing chemical tank.

## 4.0 RODNEY WASTEWATER TREATMENT REVIEW

### 4.1 Historic Influent Flowrates and Characteristics

Rodney WPCP historical influent data 2017-2020 was analyzed to determine the average influent flow and characteristics. Table 4.1 and 4.2 summarize the historic influent flows and characteristics. The average day flow, (ADF) equates to 359 m<sup>3</sup>/d and the max day flow (MDF) equates to 1,792 m<sup>3</sup>/d.

The ECA indicates that the existing lifting pumping station has two submersible pumps (1 duty / 1 standby) each with capacity of 27 L/s, hence it is assumed that the current Peak Instantaneous Flow (PIF) is equal to 27 L/s (i.e. 2,333 m<sup>3</sup>/d), and it is also assumed in worst case the current Peak Hourly Flow (PHF) is equal to PIF equates to 2,333 m<sup>3</sup>/d.

The plant rated capacity is 590 m<sup>3</sup>/d and its (PIF) will equal to the lifting pump capacity of 27 l/s (i.e. 2,333 m<sup>3</sup>/d) and it is also assumed that the PDF and PHF of the plant rated capacity equal to PIF equates to 2,333 m<sup>3</sup>/d. Table 4.3 illustrates the current and plant rated capacity flowrates

**Table 4.1 – Rodney WPCP Historic Influent Flowrates**

Year	Unit	Influent Average Day Flow, ADF	Influent Max Day Flow, MDF
2017	m <sup>3</sup> /d	348	588
2018	m <sup>3</sup> /d	396	1,560
2019	m <sup>3</sup> /d	363	1,972
2020	m <sup>3</sup> /d	327	727
Average / Max	m <sup>3</sup> /d	359	1,972

**Table 4.2 – Rodney WPCP Historic Influent Characteristics**

Year	Unit	BOD5	TSS	TKN	TP
2017	mg/L	109	116	29.5	3.5
2018	mg/L	101	128	26.9	3.0
2019	mg/L	110	110	27.0	2.6
2020	mg/L	117	123	32.9	3.3
Average	mg/L	109	119	29.1	3.1
Average Max Month	mg/L	235	263	43	4.7



**Table 4.3 – Plant Current and Plant rated Capacity Flowrates**

Year	Unit	Average Day Flow, ADF	Max Day Flow, MDF	Peak Hourly Flow, PHF	Peak Instantaneous Flow, PIF
Plant Current Flowrate	m <sup>3</sup> /d	360 <sup>(1)</sup>	1,972 <sup>(1)</sup>	2,333 <sup>(3)</sup>	2,333 <sup>(3)</sup>
Plant Rated Capacity	m <sup>3</sup> /d	590 <sup>(2)</sup>	2,333 <sup>(3)</sup>	2,333 <sup>(3)</sup>	2,333 <sup>(3)</sup>

(1) Historic Data

(2) ECA

(3) Assumed

## 4.2 Effluent Compliance Limits and Objectives

Rodney WPCP operates under CofA 3-0871-88-949 which specifies the effluent compliance limits and the design objectives for the existing works. Table 4.4 details the CofA effluent compliance limits and objectives of Rodney WPCP.

**Table 4.4 – Rodney WPCP CofA Effluent Compliance Limits and Objectives**

Effluent Parameters	Compliance Limits		Objectives	
	Monthly Average Concentration (mg/L)	Average Loading (kg/d)	Monthly Average Concentration (mg/L)	Average Loading (kg/d)
CBOD <sub>5</sub> Non-Freezing Period Freezing Period		6.9		3.9
	10.0		5.0	
	15.0		10.0	
total Suspended Solids TSS Non-Freezing Period Freezing Period		6.9		3.9
	10.0		5.0	
	15.0		10.0	
Total Phosphorus Non-Freezing Period Freezing Period		0.4		0.28
	0.5		0.3	
	1.0		0.8	
Total Ammonia Nitrogen Non-Freezing Period Freezing Period		2.2		1.57
	3.0		2.0	
	5.0		4.0	
Total Chlorine Residual	0.01			
Dissolved Oxygen	> 4	N/A	> 5	N/A
<i>E. Coli</i>	<200 organisms/100 mL	N/A	<150 organisms/100 mL	N/A

### 4.3 Effluent Characteristics

Rodney WPCP historical effluent data of 2017-2020 were analyzed to determine the average effluent characteristics. Tables 4.5 summarizes the effluent characteristics

**Table 4.5 – Rodney WPCP Historic Effluent Data**

Year	Climate	BOD <sub>5</sub>	Total Suspended Solids, TSS	Total Ammonia- Nitrogen, TAN	Total Phosphorus, TP
		(mg/L)	(mg/L)	(mg/L)	(mg/L)
<b>Average 2017</b>	Non-Freezing	2.0	2.1	0.11	0.09
	Freezing	3.1	3.4	0.11	0.11
<b>Average 2018</b>	Non-Freezing	2.3	3.5	0.10	0.10
	Freezing	3.5	6.2	0.17	0.16
<b>Average 2019</b>	Non-Freezing	2.1	3.8	0.11	0.10
	Freezing	4.2	7.3	0.10	0.20
<b>Average 2020</b>	Non-Freezing	2.4	4.0	0.12	0.10
	Freezing	5.3	7.4	0.55	0.17
<b>Total Average</b>	Non-Freezing	2.2	3.4	0.11	0.10
	Freezing	4.0	6.1	0.23	0.16

## 5.0 CURRENT AND FUTURE OPERATION DESKTOP ANALYSIS AND BIOWIN MODELING

Rodney WPCP current and plant rated capacities were analyzed and modeled via BioWin software to determine the required aeration for both biological oxidation and tank's mixing, also to check whether the existing clarifier size is enough for the plant rated capacity and the max month loadings.

The historic average day flow of 360 m<sup>3</sup>/day and historic average influent characteristics and average max month characteristics summarized in table 5.2, were used to calibrate the BioWin models of the plant current operation for both average influent temperature of 12 °C and max influent temperature of 21 °C.

The objective of the model was to establish the historic average and max-month conditions to identify the required aeration for the biological oxidation for both average influent temperature of 12 °C and the max influent temperature of 21 °C.

Plant historic data was used to prepare a calibrated BioWin model for the plant rated capacity (590 m<sup>3</sup>/day) operation. See Appendix 1 – for current and plant rated capacity BioWin Modeling and desktop analysis.

The plant has two aeration tanks, each aeration tank has volume of 410 m<sup>3</sup> which is enough to handle the current flowrate of 360 m<sup>3</sup>/day and provides 27 h of HRT (MECP guideline: extended aeration HRT equals or larger than 15 h). One aeration tank is also enough to handle the plant rated capacity of 590 m<sup>3</sup>/day and provides 17 h of HRT. It is recommended that the municipality operate one aeration tank at a time to lower energy consumption.

The BioWin models show that at the current plant operation with average influent characteristics, the required aeration for the tank mixing (300 m<sup>3</sup>/hr) is greater than the required aeration for the biological oxidation, while the required aeration for biological oxidation at the max month loading and at the summer season with influent temperature of 21 °C is 332 m<sup>3</sup>/hr. Therefore, three air blowers were selected to operate the plant, two duty and one standby. One duty air blower will be dedicated for each aeration tank with capacity of 332 m<sup>3</sup>/hr which is enough to supply the required aeration for the maximum biological oxidation for max month loading and aeration tank mixing.

The Surface Overflow Rates (SOR)s at the peak hourly flow (PHF) of the secondary clarifier were calculated and found equates to 32 m<sup>3</sup>/m<sup>2</sup>-d which is less than 37 m<sup>3</sup>/m<sup>2</sup>-d (MECP guidelines) for both current and plant rated capacity (refer to Appendix A for details).

The Solids Loading Rates (SLR)s of the secondary clarifier at the peak day flow (PDF) were also calculated and found to be less than  $170 \text{ m}^3/\text{m}^2\text{-d}$  (MECP guidelines) for average and max loading for both current and plant rated capacity. This would indicate that the existing secondary clarifier has enough capacity to handle the current and the plant rated capacity flowrates at both average and max-month influent loadings.

## **6.0 UPGRADE DESIGN CRITERIA**

### **6.1 Aeration System Upgrade**

The existing surface aerators will be replaced with a new aeration system which consists of air blowers, air discharge main header, air distribution piping, and fine-bubble diffusers.

Three air blowers are proposed, 2 duty/1 standby. All blowers will be installed in the garage of the main building and the discharge air pipeline will run out of the garage and to the aeration tanks. Power to the blowers will be from the existing MCC in the MCC room. The discharge of each blower will have a butterfly valve for isolation and all blowers will be interconnected to two discharge headers. The two discharge headers (one dedicated for each tank) will be buried from the garage to the tanks. The headers will be interconnected to provide redundancy, should one of the lines fail. Figure 7.1 illustrates the proposed layout of the air blowers and the main air discharge pipeline.



**Figure 6.1 – Air Blowers and Main Air Discharge Pipeline Layout.**

## 6.2 Screen Upgrade

The existing screen unit which consists of stationary screen with rotation scraper arm will be decommissioned, removed, and replaced with spiral conveyor screen to be fit within the existing channel. The existing FRP housing will also be removed and replaced with a new FRP housing which will include lighting, ventilation, heater, gas monitoring system, access and roll up doors.

The new screen will be sized for PIF of 27 L/s (2,333m<sup>3</sup>/d).

The new screen unit will be supplied with outdoor Control Panel, ultrasonic level sensor, float switch, and local E-stop station, and a Davit Crane System.



### **6.3 Secondary Clarifier Mechanism Replacement**

The existing secondary clarifier mechanism will be decommissioned, removed, and replaced with a new mechanism.

The new clarification mechanism will have the diameter of 9.75 m and will be placed in the existing clarifier tank. It will include a centre inlet column with 0.6 m diameter, influent stilling well with a minimum diameter of 1.94 m, peripheral effluent weir with approximate length of 29 m, sludge collector mechanism including a centre support column, collector arms, gear assembly drive unit and four siphon tubes, two per rake arm to remove settled sludge rapidly at a controlled rate, scum removal mechanism, scum chamber and one scum pump. This replacement process entails the removal of the existing FRP housing on top of the secondary clarifier to allow access to the existing clarifier mechanism.

### **6.4 Alum Storage Tank Replacement**

The existing Alum Storage Tank of 30,000 L capacity will be replaced with another PE Chemical Storage Tank of 10,000 L capacity which will be enough to store the required Alum solution enough for 3 – 6 months of the plant operation. The new tank will be heat traced to avoid crystallization of the solution in winter

## 7.0 PROJECT STAGING

Rodney WPCP upgrading process has to pass through certain execution sequence in order to maintain the operation of the current plant with the minimum disturbance.

Rodney WPCP does not have a redundant secondary clarifier tank, so the replacement of existing secondary clarifier mechanism requires a complete decommission of the clarification system and bypassing the influent to the lagoon. The secondary clarifier replacement process might roughly take up to two months before the completion of the replacement and commissioning of the new mechanism. The lagoon has the capacity to receive all plant influent during the replacement process and thus can be prepared a head of time by start decanting the lagoon and send the decant to the front end of the plant for treatment. Knowing that the existing decant pump is repeatedly clogged, a new wet well chopper type decant pump should be supplied to start decanting process ahead of time of clarifier mechanism replacement process.

The existing screening system will be removed once the new screening system arrives on site and is ready for installation. The new screening system can be installed after the removal of the existing screen or during the replacement of the secondary clarifier mechanism while the influent is diverted to the lagoon. The existing screen is currently non-operational, and its removal will not affect the current plant operation. An arrangement is needed to divert the influent directly to the aeration tanks to allow for the installation of the new screen without disturbance, also it is recommended to arrange for the readiness of the power supply and electrical connection of the new screen before its installation.

The processes of removal of existing surface aerators and installation of the new aeration system will be conducted in one aeration tank while directing the flow to the other tank and redirect the flow to the first tank upon completion of installation and commissioning of the first tank. The aeration tanks would also require cleaning from all rags and sludge that have accumulated over the years at the bottom of the tanks.

Three air blowers will be supplied and installed in the exiting empty garage in the main building.

It is recommended to order the required secondary clarifier mechanism, air blowers, aeration piping, fine bubble diffusers, and the screen in the early stage of the project. Also, it is recommended to uninstall the existing FRP enclosures of the secondary clarifier and the screen unit before the receipt of the ordered equipment.

Upon arrival of the ordered air blowers and aeration piping at the site, the installation of the air blowers and aeration piping up to the aeration tanks should be started before decommissioning of the existing secondary clarifier mechanism.

However, in order to reduce the time of influent diverting to the lagoon, the replacement of the secondary clarifier should be completed in shortest time as possible, and in the same period the two aeration tanks should be cleaned and have the aeration piping inside the tanks along with the fine bubble diffusers installed at least in one aeration tank. Upon completion of the equipment installation and re-commissioning of the plant the second aeration tank can be cleaned and has the installation of the aeration piping and fine bubble diffusers.

The new screen can be installed in the same influent diverting period or prior to that as well.

## 8.0 COST ESTIMATE

ASTM E2516 – 11 (2019) Standard Classification for Cost Opinion Classification System provides a five- level classification system based on the level of project definition (i.e., percentage of design completion). There are five levels of cost level classification ranging from Class 5 which is an order of magnitude cost opinion to Class 1 which is based upon the actual bid costs for a project. Table 8.1 shows the assumed level of accuracy for each of these levels.

**Table 8.1 – Range for Cost Opinions**

Class	Purpose of Costing Exercise	% of Project Definition	Cost Opinion Range	
			Low	High
<b>Class 5</b>	Screening or Feasibility	0% to 2%	-30%	50%
<b>Class 4</b>	Concept Study or Feasibility	1% to 15%	-20%	40%
<b>Class 3</b>	Preliminary Design	10% to 40%	-20%	30%
<b>Class 2</b>	Detailed Design	30% to 70%	-10%	20%
<b>Class 1</b>	Final Design/Tender	70% to 100%	-5%	10%

The cost estimation provided in this report is Class 3.

The total cost estimate was prepared based on the following assumptions:

- 2022 dollars based on the date this report is written;
- Building estimates are approximated based on size and type of construction using per meter squared costs;
- No costs are provided for land acquisition if this is required;
- Equipment estimates are based on vender quotations obtained during the design stage and/or historical data. Allowance percentages were added for installation based on equipment cost;
- Costs for process piping, electrical, and HVAC completed based on the preliminary design layouts and may vary during the detailed design stage;
- Contractor mark-up of 15% was added based on projects recently completed by RVA;
- Construction Contingency Allowance is 10% of the estimated total construction cost;
- Estimating contingency allowance within the range of low and high, (i.e. -20% and + 30% of the sub-total); and
- Concrete unit prices used based on current market conditions and may vary with the price of metal.

The following items are excluded from the cost estimate:

- Applicable Taxes and HST;
- Applicable Approvals including building permits and Environmental Certificate of Approval;
- Removal of hazardous waste including asbestos, paint containing lead, and any unidentified buried structures; and

- Additional costs for construction approaches including accelerated construction, multiple construction contracts, equipment pre-selection, and contractor pre-selection.

Table 8.2 gives a summary of capital cost breakdown for upgrading the existing Rodney WPCP as stated earlier in this report.

**Table 8.2 – Rodney WPCP Upgrades Cost Estimation**

<b>ITEM</b>	<b>COST</b>
Division 1 – General	28,000
Division 2 – Site Works	158,000
Division 3 – Concrete	20,000
Division 5 – Metals	63,000
Division 9 – Finishes	8,000
Division 11 – Process Equipment	972,000
Division 13 – Control and Instrumentation	180,000
Division 15 – Mechanical	250,000
Division 16 – Electrical	195,000
<b>SUB-TOTAL -1</b>	<b>1,874,000</b>
Bonds and Insurance	50,000
Mobilization & Demobilization	20,000
Contractor Mark-Up (15%)	291,600
Construction Contingency	150,000
<b>SUB-TOTAL -2</b>	<b>2,393,500</b>
<b>Estimating Contingency Class 4 (Low -20%)</b>	<b>1,914,800</b>
<b>Estimating Contingency Class 4 (High +40%)</b>	<b>3,350,900</b>
Engineering cost (13% of Sub-Total -2)	311,155
<b>TOTAL PROJECT COST (LOW)</b>	<b>1,914,800</b>
<b>TOTAL PROJECT COST (HIGH)</b>	<b>3,350,900</b>

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**APPENDIX A**  
**Rodney WPCP Upgrades**  
**Cost Estimate**

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Rodney WPCP Upgrades			
May 4, 2022			
Cost Estimate			
ITEM No.	DESCRIPTION	UNIT	ESTIMATED AMOUNT
SUMMARY PART 1.0 - GENERAL ITEMS			
1.1	Insurance & Bonding	L.S.	\$ 50,000.00
1.2	Mobilization & De-Mobilization	L.S.	\$ 20,000.00
1.3	Fencing, Signage, and Traffic Control	L.S.	\$ 8,000.00
1.4	Temporary Facilities	L.S.	\$ 20,000.00
Total for Part 1.0 - General Requirements			\$ 98,000.00
SUMMARY PART 2.0 – SITE WORKS			
2.1 Removal & Demolition			
a)	Screen Room equipment, Bar Screens, Conveyor, and associated Equipment	L.S.	\$ 8,000.00
b)	Seconary Clarifier Mechanism	L.S.	\$ 12,000.00
c)	10000L Alum Tank	L.S.	\$ 10,000.00
d)	Mechanical Surface Aerators	L.S.	\$ 8,000.00
2.2 Site Preparation			
a)	Clearing & Grubbing	L.S.	\$ 5,000.00
b)	Stripping & Stockpiling Topsoil	L.S.	\$ 5,000.00
2.3 Excavation & Backfilling			
c)	Yard Piping - Pipes	L.S.	\$ 65,000.00
b)	Yard Piping - Electrical Vaults	L.S.	\$ 15,000.00
c)	Restoration	L.S.	\$ 30,000.00
Total for Part 2.0 - Site Works			\$ 158,000.00
SUMMARY PART 3.0 – CONCRETE			
3.1	Alum Tank Enclosure	L.S.	\$ 20,000.00
Total for Part 3.0 - Concrete			\$ 20,000.00
SUMMARY PART 4.0 – MASONRY			
Total for Part 4.0 - Masonry			\$ -
SUMMARY PART 5.0 – METALS			
5.1	Structural Steel (Lintels, scum troughs, etc)	L.S.	\$ 35,000.00
5.2	Grating	L.S.	\$ 20,000.00
5.3	Guardrails, Ladders, Aluminum Stairs	L.S.	\$ 8,000.00
Total for Part 5.0 - Metals			\$ 63,000.00
SUMMARY PART 9.0 – FINISHES			
9.2	Blower Room	L.S.	\$ 8,000.00
Total for Part 9.0 - Finishes			\$ 8,000.00

SUMMARY PART 11.0 – PROCESS EQUIPMENT			
11.1	Spiral Screens, Conveyor, and Control Panel	L.S.	\$ 250,000.00
11.5	Decant Wet Well Pump (1)	L.S.	\$ 50,000.00
11.6	Centrigual Blowers (3)	L.S.	\$ 90,000.00
11.7	Aeration Diffusers (2 tanks)	L.S.	\$ 27,000.00
11.8	Circular Clarifier Mechanism	L.S.	\$ 440,000.00
11.14	Alum Tank	L.S.	\$ 15,000.00
11.20	Installation and Labour	L.S.	\$ 100,000.00
Total for Part 11.0 - Process Equipment			\$ 972,000.00
SUMMARY PART 13.0 – CONTROL AND INSTRUMENTATION			
13.1	Integration Allowance	L.S.	\$ 35,000.00
13.7	Pressure Transmitters	L.S.	\$ 75,000.00
13.9	Gas Monitoring System	L.S.	\$ 35,000.00
13.12	DO & Sensor Transmitters	L.S.	\$ 35,000.00
Total for Part 13.0 - Control and Instrumentation			\$ 180,000.00
SUMMARY PART 15.0 – MECHANICAL			
15.2	Chemical Building Ventilation	L.S.	\$ 50,000.00
15.3	Mechanical Piping	L.S.	\$ 100,000.00
15.4	Process Valves	L.S.	\$ 50,000.00
15.7	Piping Hangers and Supports	L.S.	\$ 25,000.00
15.8	Pipe Insulation	L.S.	\$ 25,000.00
Total for Part 15.0 - Mechanical			\$ 250,000.00
SUMMARY PART 16.0 – ELECTRICAL			
16.1	Duct Banks and Electrical Manholes	L.S.	\$ 75,000.00
16.2	Conduits and Feeder Cables	L.S.	\$ 60,000.00
16.3	Control & Instrumentation Wires	L.S.	\$ 60,000.00
Total for Part 16.0 - Electrical			\$ 195,000.00
Total Construction Costs			\$1,944,000
Capital Cost Estimate Summary			
A	Construction Cost	L.S.	\$ 1,944,000
B	Construction Contingency	L.S.	\$ 150,000
Sub-Total			\$ 2,094,000
		Sub-Total	\$ 2,094,000
		Estimating Contingency (20%)	\$ 388,800
Total Capital Costs (Rounded)			\$2,500,000

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## **APPENDIX B-1**

### **Secondary Clarifier Mechanism**

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# Rodney WWTP

Ontario

## Representative

Tonia Van Dyk  
C & M Environmental Technologies  
Mississauga, Ontario  
(705) 725-9377  
tvandyk@cmeti.com

## Contact

Matt Williams  
mwilliams@westech-inc.com  
  
Matt Pearson  
mpearson@westech-inc.com



Proposal Number: 2160552  
Wednesday, April 27, 2022



# Table of Contents

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## **Technical Proposal**

Item A – Clarifier Mechanism Model CLC18G

## **Clarifications and Exceptions**

## **Commercial Proposal**

Bidder's Contact Information

Pricing

Payment Terms

Schedule

Freight

## **Warranty**

## **Terms & Conditions**

# Technical Proposal

## Item A – Clarifier Mechanism Model CLC18G

General Scope of Supply		
Item	Unit	Value/Description
Number of Mechanisms	Each	1
Application	-	Activated Sludge Secondary
Tank Diameter	m	9.75 (32')
Tank Side Wall Depth	m	4.27 (14') **
Tank Side Water Depth	m	3.66 (12')
Tank Bottom Slope	-	0.25:12**
Design Flow Rate	ML/D	1.32 (0.35 MGD) **
Peak Flow Rate	ML/D	2.88 (0.76 MGD) **
Influent MLSS Concentration	mg/L	3000**
SVI	mL/g	130**

\*\*Assumed Values

Detailed Scope of Supply - Each Mechanism Includes the Following			
Item	Qty	Size/Description	Material
Walkway Bridge	1	914 mm (36") wd. Beam Bridge	304 SS
Walkway Handrail	-	2 Rail Component Handrail, Pop Rivet	Aluminum
Walkway Flooring	-	32 mm (1.25") Grating	Aluminum
Drive Platform	1	610 mm (24") Minimum Drive Clearance	304 SS
Platform Handrail	-	2 Rail Component Handrail, Pop Rivet	Aluminum
Platform Flooring	-	6.4 mm (0.25") Checker Plate	Aluminum
Center Column	1	610 mm (24") dia. x 6.4 mm (0.25") thick	304 SS
Center Cage	1	0.914 m (3') Square	304 SS
Dual Gate EDI	1	1.83 m (6') dia. x 0.762 m (2.5') dp. x 4.8 mm 0.1875" pl.	304 SS
Feedwell	1	3.05 m (10') dia. x 1.52 m (5') dp. x 4.8 mm (0.1875") pl.	304 SS
Suction Header	1	Rectangular Tapered Cross-Section	304 SS
Suction Header Support Arms	2	Box Truss Header Supports, 0.914 m (3') wide	304 SS
Opposite Arm	1	0.914 (3') wide	304 SS
Rotating Suction Manifold	1	2.13 m (7') dia. x 6.4 mm (0.25") thick	304 SS
Skimmer Blade & Supports	2	Extends from feedwell to hinged skimmer	304 SS
Hinged Skimmer Assembly	2	With neoprene wipers	HDG/304 SS/Alum
Scum Box & Supports	1	0.914 m (3') Scum Box	304 SS
Scum Flushing Valve	1	Skimmer Actuated	Polymer/SS
Effluent Weir	1	229 mm (9") dp. x 6.4 mm (0.25") thick	FRP
Scum Baffle & Supports	1	305 mm (12") dp. x 6.4 mm (0.25") thick	FRP
Electrical Control Panel	1	NEMA 4X	304 SS
Drive Unit	1	See Drive Unit Table for description	
Anchor Bolts & Fasteners	-	-	304 SS



Drive Unit		
Description	Unit	Value/Description
Drive Type	C31	Cage Drive w/ Precision Bearing
Housing Material	-	Fabricated Steel
Continuous Rated Torque	ft·lbs	6,000
Momentary Peak Torque	ft·lbs	12,000
Rake Tip Speed	ft/min	10
Motor Size	HP	1
Motor Voltage/Frequency/Phase	V / Hz / Phase	460 / 60 / 3
Torque Control Settings	Alarm: ft·lbs	100%: 6,000
	Motor Cutout: ft·lbs	120%: 7,200
Main Gear and Pinion Lubrication	-	Oil
Main Bearing and Reducer Lubrication	-	Grease

Surface Preparation and Coating		
Application Surfaces	Surface Preparation	Finish
Stainless Steel	Cleaning Grade "C"	See Below for Details
Drive Unit	SSPC-SP6	One (1) coat Tnemec N140F-1255 Epoxy, 4-6 mils DFT, and one (1) coat Tnemec 1074U-B5712 Polyurethane, 3-5 mils DFT

## Stainless Steel Finish

### CLEANING GRADE "C"

1. PRE-CLEAN ALL SURFACES IN ACCORDANCE WITH THE WESTECH WORKMANSHIP STANDARD (QR-00-063) SECTIONS 12 & 13, TO ENSURE THAT ALL SHARP EDGES, BURRS, WELD SPATTER, WELD SLAG ARE REMOVED.
2. A MINIMUM AMOUNT OF FREE IRON MAY REMAIN ON SURFACES. THESE LOCATIONS SHALL BE LIMITED TO SMALL PIN-POINT AREAS 1/16" (1mm) IN DIAMETER OR LESS, SCATTERED IN A RANDOM PATTERN, AND SHALL BE LESS THAN 1% OF THE TOTAL SURFACE AREA.
3. ALL SURFACES SHALL BE FREE FROM:
  - a. HEAT TINT (REGARDLESS OF HEAT SOURCE; WELDING, THERMAL CUTTING, OR GRINDING).
  - b. OXIDES AND TARNISH (FROM THERMAL CUTTING, AND TIGHTLY ADHERENT BROWN OR BLACK TARNISH FORMED ALONG THE TOE OF A WELD).
4. THIS REQUIRED CLEANING APPLIES TO INTERNAL AND EXTERNAL SURFACES SUBJECT TO CORROSIVE MEDIA ATTACK; SUCH AS INTERNAL SURFACES OF PIPING.



CLEANING GRADE "C"

### Approximate Weights

Item	Weight	Unit
Center Column	1400	lbs
Cage, Suction Header, Header Support Arm, Opposite Rake Arm, Sludge Manifold	3450	lbs
EDI, Feedwell, Feedwell Supports	2750	lbs
Standard Skimmer, Standard Scum Box	1000	lbs
Bridge & Platform	1000	lbs
Drive Unit	2200	lbs
Heaviest Single Item (Drive Unit)	2200	lbs

### Additional Services and Equipment

WesTech has included on-site technical assistance for inspection, observation of torque testing, startup, and instruction of plant personnel. Additional on-site services may be purchased at standard WesTech daily rates plus travel and living expenses.

### On-Site Technical Service

Item	Quantity
Total Number of Trips	1
Total Number of Days	1

### Items Not Included in WesTech's Base Scope of Supply (unless specifically noted)

- Concrete/Grout
- Concrete and Anchor Reinforcement
- Conduits and Wiring
- Erection or Assembly
- Lubricants
- Piping, Valves, or Fittings
- Unloading or Storage

### Optional Items

#### Equipment Options

No.	Item	Description	Material
A-1	316 SS Adder	Use 316 SS fabrication in lieu of 304 SS	316 SS

# Clarifications and Exceptions

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## General Clarifications

**Terms & Conditions:** This proposal, including all terms and conditions contained herein, shall become part of any resulting contract or purchase order. Changes to any terms and conditions, including but not limited to submittal and shipment days, payment terms, and escalation clause shall be negotiated at order placement, otherwise the proposal terms and conditions contained herein shall apply.

**Paint:** If your equipment has paint included in the price, please take note to the following. Primer paints are designed to provide only a minimal protection from the time of application (usually for a period not to exceed 30 days). Therefore, it is imperative that the finish coat be applied within 30 days of shipment on all shop primed surfaces. Without the protection of the final coatings, primer degradation may occur after this period, which in turn may require renewed surface preparation and coating. If it is impractical or impossible to coat primed surfaces within the suggested time frame, WesTech strongly recommends the supply of bare metal, with surface preparation and coating performed in the field. All field surface preparation, field paint, touch-up, and repair to shop painted surfaces are not by WesTech.

**Escalation:** If between the proposal date and actual procurement and through no fault of the Seller, the relevant cost of labor, material, freight, tariffs, and other Seller costs combined relating to the contract, increase by greater than 2.5% of the overall contract price, then the contract price shall be subject to escalation and increased. Such increase shall be verified by documentation and the amount of contract price escalation shall be calculated as either the actual increased cost to the Seller or, if agreed by the Parties, the equivalent increase of a relevant industry recognized third-party index, and in both cases without any additional profit or margin being added.

**USA Tariffs and Current Trade Laws:** All prices are based on current USA and North America tariffs and trade laws/agreements at time of bid. Any changes in costs due to USA Tariffs and trade laws/agreements will be passed through to the purchaser at cost.

# Commercial Proposal

Proposal Name: Rodney WWTP

Proposal Number: 2160552

Wednesday, April 27, 2022

## 1. Bidder's Contact Information

Company Name	WesTech Engineering, LLC
Primary Contact Name	Matt Williams
Phone	801.265.1000
Email	mwilliams@westech-inc.com
Address: Number/Street	3665 S West Temple
Address: City, State, Zip	Salt Lake City, UT 84115

## 2. Budget Pricing

Currency: CAN Dollars

### Scope of Supply

A	(1) 32' Diameter Clarifier Mechanism Model CLC18G	\$383,000
A-1	316 SS Adder	\$73,000
Taxes (sales, use, VAT, IVA, IGV, duties, import fees, etc.)		Not Included

Prices are valid for a period not to exceed 30 days from date of proposal.

### Additional Field Service

Daily Rate (Applicable Only to Field Service Not Included in Scope)	\$1,600
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Pricing does not include field service unless noted in scope of supply, but is available at the daily rate plus expenses. The greater of a two week notice or visa procurement time is required prior to departure date. Our field service policy can be provided upon request for more details.

## 3. Payment Terms

Purchase Order Acceptance and Contract Execution	10%
Submittals Provided by WesTech	15%
Release for Fabrication	35%
Notification of Ready to Ship	40%

All payments are net 30 days. Partial shipments are allowed. An approved Letter of Credit is required if Incoterms CIF, CFR, DAP, CIP, or CPT are applicable. Payment is required in full for all other Incoterms prior to international shipment. Other terms per WesTech proforma invoice. Please note that the advising bank must be named as: Wells Fargo Bank, International Department, 9000 Flair Drive, 3rd Floor, El Monte, California 91731, USA.

## 4. Schedule

Submittals, after Purchase Order Acceptance and Contract Execution	6 to 8 weeks
Ready to Ship, after Receipt of Final Submittal Approval	18 to 20 weeks
<b>Estimated Weeks to Ready to Ship</b>	<b>24 to 28 weeks*</b>

\*Customer submittal approval is typically required to proceed with equipment fabrication and is not accounted for in the schedule above. Project schedule will be extended to account for time associated with receipt of customer submittal approval.

## 5. Freight

Domestic	FOB Shipping Point - Full Freight Allowed to Jobsite (FSP-FFA)	
<b>From</b>	<b>Final Destination</b>	<b>Number of Trucks or Containers</b>
WesTech Shops	Ontario	TBD

# One-Year Warranty

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WesTech is meeting a global need for clean water through technology treatment solutions. We are proud that the equipment and systems we design, build, maintain, and operate are making the world a better place and creating a more sustainable environment for future generations.

Equipment manufactured or sold by WesTech Engineering, LLC, once paid for in full, is backed by the following warranty:

Subject to the terms below, WesTech warrants all new equipment manufactured or sold by WesTech Engineering, LLC to be unencumbered and free from defects in material and workmanship, and WesTech will replace or repair, F.O.B. its factories or other location it chooses, any part or parts returned to WesTech which WesTech's examination and analysis determine have failed within the warranty period because of defects in material and workmanship. The warranty period is either, one calendar year immediately following start-up, or eighteen (18) months from when WesTech sent its ready-to-ship notification to the purchaser, whichever expires sooner. All repair or replacement parts qualifying under this warranty shall be free of charge. Purchaser will provide timely written notice to WesTech of any defects it believes should be repaired or replaced under this warranty. WesTech will reject as untimely any warranty defect claim that purchaser submits more than thirty (30) days after the possible warranty defect first occurred. Unless specifically stated otherwise, this warranty does not cover normal wear or consumables. This warranty is not transferable.

This warranty shall be void and shall not apply where the equipment or any part thereof

- a) has been dismantled, modified, repaired or connected to other equipment, outside of a WesTech factory, or without WesTech's written approval, or
- b) has not been installed in complete adherence to all WesTech's or parts manufacturer's requirements, recommendations, and procedures, or
- c) has been subject to misuse, abuse, neglect, or accident, or has not at all times been operated and maintained in strict compliance with all of WesTech's requirements and recommendations therefor, including, but not limited to, the relevant WesTech Operations & Maintenance Manual and any other of WesTech's specified guidelines & procedures, or
- d) has been subject to force majeure events; use of chemicals not approved in writing by WesTech; electrical surges; overloading; significant power, water or feed supply fluctuations; or non-compliance with agreed feedwater or chemical volumes, specifications or procedures.

In any case where a part or component of equipment under this warranty is or may be faulty and the component or part is also covered under the warranty of a third party then the purchaser shall provide reasonable assistance to first pursue a claim under the third party warranty before making a claim under this warranty from WesTech. WesTech Engineering, LLC gives no warranty with respect to parts, accessories, or components purchased other than through WesTech. The warranties which apply to such items are those offered by the respective manufacturers.

This warranty is expressly given by WesTech and accepted by purchaser in lieu of all other warranties whether written, oral, express, implied, statutory or otherwise, including without limitation, warranties of merchantability and fitness for particular purpose. WesTech neither accepts nor authorizes any other person to assume for it any other liability with respect to its equipment. WesTech shall not be liable for normal wear and tear, corrosion, or any contingent, incidental, or consequential damage or expense due to partial or complete inoperability of its equipment for any reason whatsoever. The purchaser's exclusive and only remedy for breach of this warranty shall be the repair and or replacement of the defective part or parts within a reasonable time of WesTech's accepting the validity of a warranty claim made by the purchaser.



# Terms & Conditions

Terms and Conditions appearing in any order based on this proposal which are inconsistent herewith shall not be binding on WesTech Engineering, LLC. The sale and purchase of equipment described herein shall be governed exclusively by the foregoing proposal and the following provisions:

**1. SPECIFICATIONS:** WesTech Engineering, LLC is furnishing its standard equipment as outlined in the proposal and as will be covered by final approved drawings. The equipment may not be in strict compliance with the Engineer's/Owner's plans, specifications, or addenda as there may be deviations. The equipment will, however, meet the general intention of the mechanical specifications of these documents.

**2. ITEMS INCLUDED:** This proposal includes only the equipment specified herein and does not include erection, installation, accessories, nor associated materials such as controls, piping, etc., unless specifically listed.

**3. PARTIES TO CONTRACT:** WesTech Engineering, LLC is not a party to or bound by the terms of any contract between WesTech Engineering, LLC's customer and any other party. WesTech Engineering, LLC's undertakings are limited to those defined in the contract between WesTech Engineering, LLC and its direct customers.

**4. PRICE AND DELIVERY:** All selling prices quoted are subject to change without notice after 30 days from the date of this proposal unless specified otherwise. Unless otherwise stated, all prices are F.O.B. WesTech Engineering, LLC or its supplier's shipping points. All claims for damage, delay or shortage arising from such equipment shall be made by Purchaser directly against the carrier. When shipments are quoted F.O.B. job site or other designation, Purchaser shall inspect the equipment shipped, notifying WesTech Engineering, LLC of any damage or shortage within forty-eight hours of receipt, and failure to so notify WesTech Engineering, LLC shall constitute acceptance by Purchaser, relieving WesTech Engineering, LLC of any liability for shipping damages or shortages.

**5. PAYMENTS:** All invoices are net 30 days. Delinquencies are subject to a 1.5 percent service charge per month or the maximum permitted by law, whichever is less on all past due accounts. Pro rata payments are due as shipments are made. If shipments are delayed by the Purchaser, invoices shall be sent on the date when WesTech Engineering, LLC is prepared to make shipment and payment shall become due under standard invoicing terms. If the work to be performed hereunder is delayed by the Purchaser, payments shall be based on the purchase price and percentage of completion. Products held for the Purchaser shall be at the risk and expense of the Purchaser. Unless specifically stated otherwise, prices quoted are for equipment only. These terms are independent of and not contingent upon the time and manner in which the Purchaser receives payment from the owner.

**6. PAYMENT TERMS:** Credit is subject to acceptance by WesTech Engineering, LLC's Credit Department. If the financial condition of the Purchaser at any time is such as to give WesTech Engineering, LLC, in its judgment, doubt concerning the Purchaser's ability to pay, WesTech Engineering, LLC may require full or partial payment in advance or may suspend any further deliveries or continuance of the work to be performed by the WesTech Engineering, LLC until such payment has been received.

**7. ESCALATION:** If between the proposal date and actual procurement and through no fault of the Seller, the relevant cost of labor, material, freight, tariffs, and other Seller costs combined relating to the contract, increase by greater than 2.5% of the overall contract price, then the contract price shall be subject to escalation and increased. Such increase shall be verified by documentation and the amount of contract price escalation shall be calculated as either the actual increased cost to the Seller or, if agreed by the Parties, the equivalent increase of a relevant industry recognized third-

party index, and in both cases without any additional profit or margin being added.

**8. APPROVAL:** If approval of equipment submittals by Purchaser or others is required, a condition precedent to WesTech Engineering, LLC supplying any equipment shall be such complete approval.

**9. INSTALLATION SUPERVISION:** Prices quoted for equipment do not include installation supervision. WesTech Engineering, LLC recommends and will, upon request, make available, at WesTech Engineering, LLC's then current rate, an experienced installation supervisor to act as the Purchaser's employee and agent to supervise installation of the equipment. Purchaser shall at its sole expense furnish all necessary labor equipment, and materials needed for installation.

Responsibility for proper operation of equipment, if not installed by WesTech Engineering, LLC or installed in accordance with WesTech Engineering, LLC's instructions, and inspected and accepted in writing by WesTech Engineering, LLC, rests entirely with Purchaser; and any work performed by WesTech Engineering, LLC personnel in making adjustment or changes must be paid for at WesTech Engineering, LLC's then current per diem rates plus living and traveling expenses.

WesTech Engineering, LLC will supply the safety devices described in this proposal or shown in WesTech Engineering, LLC's drawings furnished as part of this order but excepting these, WesTech Engineering, LLC shall not be required to supply or install any safety devices whether required by law or otherwise. The Purchaser hereby agrees to indemnify and hold harmless WesTech Engineering, LLC from any claims or losses arising due to alleged or actual insufficiency or inadequacy of the safety devices offered or supplied hereunder, whether specified by WesTech Engineering, LLC or Purchaser, and from any damage resulting from the use of the equipment supplied hereunder.

**10. ACCEPTANCE OF PRODUCTS:** Products will be deemed accepted without any claim by Purchaser unless written notice of non-acceptance is received by WesTech Engineering, LLC within 30 days of delivery if shipped F.O.B. point of shipment, or 48 hours of delivery if shipped F.O.B. point of destination. Such written notice shall not be considered received by WesTech Engineering, LLC unless it is accompanied by all freight bills for said shipment, with Purchaser's notations as to damages, shortages and conditions of equipment, containers, and seals. Non-accepted products are subject to the return policy stated below.

**11. TAXES:** Any federal, state, or local sales, use or other taxes applicable to this transaction, unless specifically included in the price, shall be for Purchaser's account.

**12. TITLE:** The equipment specified herein, and any replacements or substitutes therefore shall, regardless of the manner in which affixed to or used in connection with realty, remain the sole and personal property of WesTech Engineering, LLC until the full purchase price has been paid. Purchaser agrees to do all things necessary to protect and maintain WesTech Engineering, LLC's title and interest in and to such equipment; and upon Purchaser's default, WesTech Engineering, LLC may retain as liquidated damages any and all partial payments made and shall be free to enter the premises where such equipment is located and remove the same as its property without prejudice to any further claims on account of damages or loss which WesTech Engineering, LLC may suffer from any cause.

**13. INSURANCE:** From date of shipment until the invoice is paid in full, Purchaser agrees to provide and maintain at its expense, but for WesTech Engineering, LLC's benefit, adequate insurance including, but not limited

to, builders risk insurance on the equipment against any loss of any nature whatsoever.

**14. SHIPMENTS:** Any shipment of delivery dates recited represent WesTech Engineering, LLC's best estimate but no liability, direct or indirect, is assumed by WesTech Engineering, LLC for failure to ship or deliver on such dates.

WesTech Engineering, LLC shall have the right to make partial shipments; and invoices covering the same shall be due and payable by Purchaser in accordance with the payment terms thereof. If Purchaser defaults in any payment when due hereunder, WesTech Engineering, LLC may, without incurring any liability therefore to Purchaser or Purchaser's customers, declare all payments immediately due and payable with maximum legal interest thereon from due date of said payment, and at its option, stop all further work and shipments until all past due payments have been made, and/or require that any further deliveries be paid for prior to shipment.

If Purchaser requests postponements of shipments, the purchase price shall be due and payable upon notice from WesTech Engineering, LLC that the equipment is ready for shipment; and thereafter any storage or other charge WesTech Engineering, LLC incurs on account of the equipment shall be for the Purchaser's account.

If delivery is specified at a point other than WesTech Engineering, LLC or its supplier's shipping points, and delivery is postponed or prevented by strike, accident, embargo, or other cause beyond WesTech Engineering, LLC's reasonable control and occurring at a location other than WesTech Engineering, LLC or its supplier's shipping points, WesTech Engineering, LLC assumes no liability in delivery delay. If Purchaser refuses such delivery, WesTech Engineering, LLC may store the equipment at Purchaser's expense. For all purposes of this agreement such tender of delivery or storage shall constitute delivery.

**15. WARRANTY:** WesTech Engineering LLC warrants equipment it supplies only in accordance with the attached WesTech Warranty. This warranty is expressly given by WesTech and accepted by purchaser in lieu of all other warranties whether written, oral, express, implied, statutory or otherwise, including without limitation, warranties of merchantability and fitness for particular purpose. WesTech neither accepts nor authorizes any other person to assume for it any other liability with respect to its equipment. WesTech shall not be liable for normal wear and tear, corrosion, or any contingent, incidental, or consequential damage or expense due to partial or complete inoperability of its equipment for any reason whatsoever. The purchaser's exclusive and only remedy for breach of this warranty shall be the repair and or replacement of the defective part or parts within a reasonable time of WesTech's accepting the validity of a warranty claim made by the purchaser.

**16. PATENTS:** WesTech Engineering, LLC agrees that it will, at its own expense, defend all suits or proceedings instituted against Purchaser and pay any award of damages assessed against it in such suits or proceedings, so far as the same are based on any claim that the said equipment or any part thereof constitutes an infringement of any apparatus patent of the United States issued at the date of this Agreement, provided WesTech Engineering, LLC is given prompt notice in writing of the institution or threatened institution of any suit or proceeding and is given full control of the defense, settlement, or compromise of any such action; and Purchaser agrees to give WesTech Engineering, LLC needed information, assistance, and authority to enable WesTech Engineering, LLC so to do. In the event said equipment is held or conceded to infringe such a patent, WesTech Engineering, LLC shall have the right at its sole option and expense to a) modify the equipment to be non-infringing, b) obtain for Purchaser the license to continue using said equipment, or c) accept return of the equipment and refund to the Purchaser the purchase price thereof less a reasonable charge for the use thereof. WesTech Engineering, LLC will reimburse Purchaser for actual out-of-pocket expenses, exclusive of legal fees, incurred in preparing such information and rendering such assistance

at WesTech Engineering, LLC's request. The foregoing states the entire liability of WesTech Engineering, LLC, with respect to patent infringement; and except as otherwise agreed to in writing, WesTech Engineering, LLC assumes no responsibility for process patent infringement.

**17. SURFACE PREPARATION AND PAINTING:** If furnished, shop primer paint is intended to serve only as minimal protective finish. WesTech Engineering, LLC will not be responsible for the condition of primed or finish painted surfaces after equipment leaves its shops. Purchasers are invited to inspect paint in shops for proper preparation and application prior to shipment. WesTech Engineering, LLC assumes no responsibility for field surface preparation or touch-up of shipping damage to paint. Painting of fasteners and other touch-up to painted surfaces will be by Purchaser's painting contractor after mechanism installation.

Motors, gear motors, and other components not manufactured by WesTech Engineering, LLC will be painted with that manufacturer's standard paint system. It is WesTech Engineering, LLC's intention to ship major steel components as soon as fabricated, often before drive, motors, and other manufactured components. Unless Purchaser can ensure that shop primed steel shall be field painted within thirty (30) days after arrival at the job site, WesTech Engineering, LLC encourages the Purchaser to order these components without primer.

WesTech Engineering, LLC's prices are based on paints and surface preparations as outlined in the main body of this proposal. In the event that an alternate paint system is selected, WesTech Engineering, LLC requests that Purchaser's order advise of the paint selection. WesTech Engineering, LLC will then either adjust the price as may be necessary to comply or ship the material unpainted if compliance is not possible due to application problems or environmental controls.

**18. CANCELLATION, SUSPENSION, OR DELAY:** After acceptance by WesTech Engineering, LLC, this proposal, or Purchaser's order based on this proposal, shall be a firm agreement and is not subject to cancellation, suspension, or delay except upon payment by Purchaser of appropriate charges which shall include all costs incurred by WesTech Engineering, LLC to date of cancellation, suspension, or delay plus a reasonable profit. Additionally, all charges related to storage and/or resumption of work, at WesTech Engineering, LLC's plant or elsewhere, shall be for Purchaser's sole account; and all risks incidental to storage shall be assumed by Purchaser.

**19. FORCE MAJEURE:** Neither party hereto shall be liable to the other for default or delay in delivery caused by extreme weather or other act of God, strike or other labor shortage or disturbance, fire, accident, war or civil disturbance, act of government, pandemic, delay of carriers, failure of normal sources of supply, complete or partial shutdown of plant by reason of inability to attain sufficient raw materials or power, and/or other similar contingency beyond the reasonable control of the respective parties. The time for delivery specified herein shall be extended during the continuance of such conditions, or any other cause beyond such party's reasonable control. Escalation resulting from a Force Majeure event shall be equitably adjusted per the escalation policy stated above.

**20. RETURN OF PRODUCTS:** No products may be returned to WesTech Engineering, LLC without WesTech Engineering, LLC's prior written permission. Said permission may be withheld by WesTech Engineering, LLC at its sole discretion.

**21. BACKCHARGES:** WesTech Engineering LLC will not approve or accept backcharges for labor, materials, or other costs incurred by Purchaser or others in modification, adjustment, service, or repair of WesTech Engineering LLC furnished materials unless such back charge has been authorized in advance in writing by a WesTech Engineering LLC purchase order, or work requisition signed by WesTech Engineering LLC.

**22. INDEMNIFICATION:** Purchaser agrees to indemnify WesTech Engineering, LLC from all costs incurred, including but not limited to court costs and reasonable attorney fees, from enforcing any provisions of this contract, including but not limited to breach of contract or costs incurred in collecting monies owed on this contract.

**23. ENTIRE AGREEMENT:** This proposal expresses the entire agreement between the parties hereto superseding any prior understandings and is not subject to modification except by a writing signed by an authorized officer of each party.

**24. MOTORS AND MOTOR DRIVES:** In order to avoid shipment delays of WesTech Engineering, LLC equipment, the motor drives may be sent directly to the job site for installation by the equipment installer. Minor fit-up may be required.

**25. EXTENDED STORAGE:** Extended storage instructions will be part of information provided to shipment. If equipment installation and start-up is delayed more than 30 days, the provisions of the storage instructions must be followed to keep WARRANTY in force.

**26. LIABILITY:** Professional liability insurance, including but not limited to, errors and omissions insurance, is not included. In any event, liability for errors and omissions shall be limited to the lesser of \$100,000 USD or the value of the particular piece of equipment (not the value of the entire order) supplied by WesTech Engineering LLC against which a claim is sought.

**27. ARBITRATION NEGOTIATION:** Any controversy or claim arising out of or relating to the performance of any contract resulting from this proposal or

contract issued, or the breach thereof, shall be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator(s) may be entered to any court having jurisdiction.

ACCEPTED BY PURCHASER

Customer Name: \_\_\_\_\_

Customer Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contact Name: \_\_\_\_\_

Contact Phone: \_\_\_\_\_

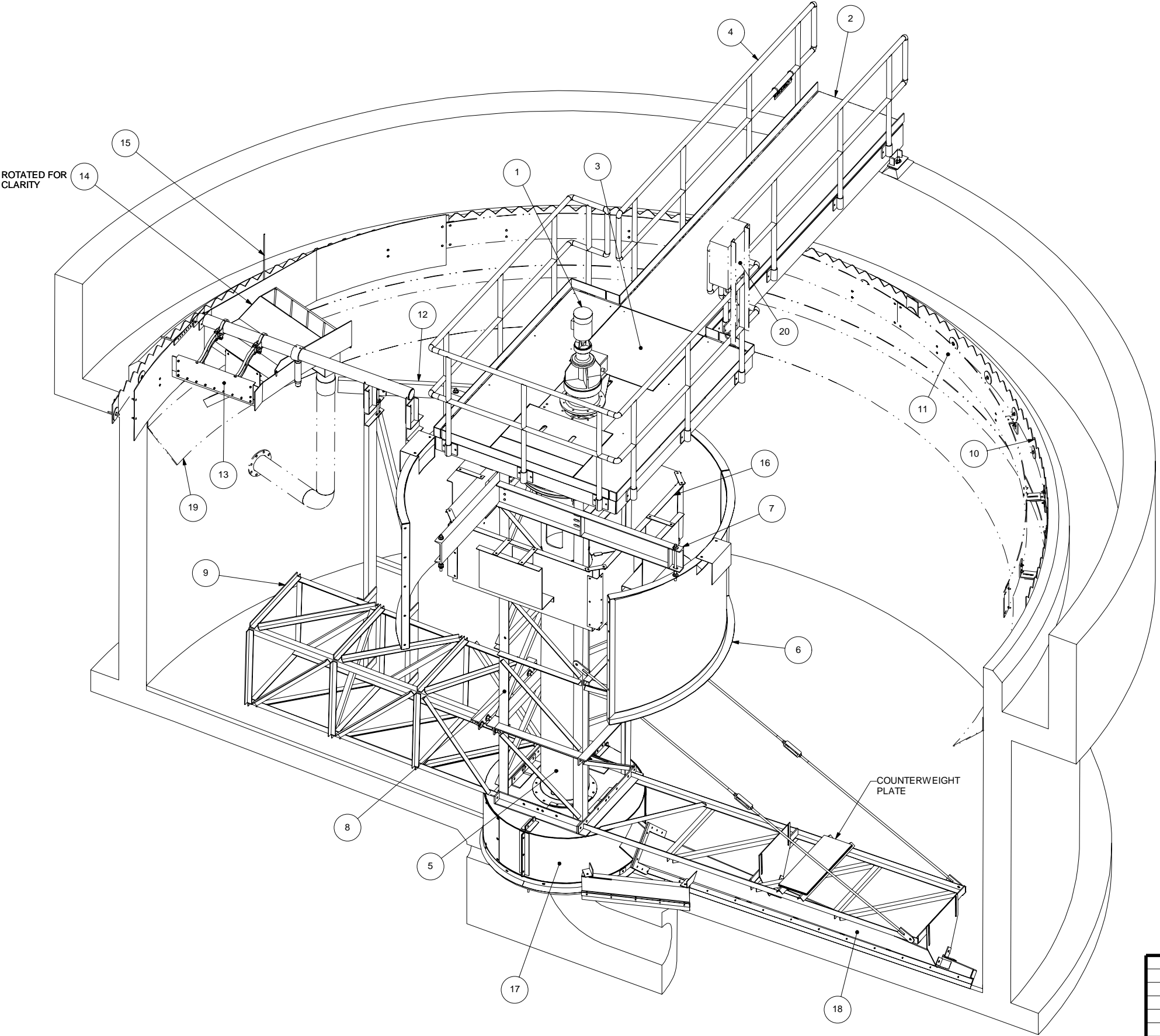
Contact Email: \_\_\_\_\_

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_



EQUIPMENT LIST	
ITEM	DESCRIPTION/REMARKS
1	31" DRIVE UNIT WITH TORQUE CONTROL DEVICE, 6000 FT-LBS CONTINUOUS RUNNING TORQUE.
2	3'-0" WIDE WALKWAY WITH 1 1/4" GRATING.
3	8'-6" LONG x 6'-6" WIDE PLATFORM (WITH MINIMUM 2'-0" CLEARANCE AROUND DRIVE) WITH 1/4" FLOORPLATE.
4	HANDRAIL 1 1/2" NOMINAL DIAMETER x 3'-6" HIGH, 2-RAIL WITH 4 INCH EXTRUDED KICKPLATE.
5	1'-6" OUTSIDE DIAMETER CENTER INFLUENT COLUMN WITH INFLUENT PORTS.
6	10'-0" INSIDE DIAMETER x 5'-0" SIDEDEPTH FEEDWELL WITH BAFFLED SCUM PORTS.
7	FEEDWELL SUPPORTS.
8	3'-0" SQUARE DRIVE CAGE.
9	(1) 3'-0" WIDE x 3'-0" HIGH SUPPORT ARM.
10	WEIR PLATE (OPTIONAL).
11	BAFFLE PLATE (OPTIONAL).
12	(1) SKIMMER BLADE WITH SUPPORT.
13	(1) SCUM SKIMMER ASSEMBLY WITH WIPERS.
14	3'-0" SCUM BOX WITH SUPPORTS AND DISCHARGE PIPE CONNECTION WITH FLEXIBLE COUPLING.
15	SCUM FLUSHING VALVE.
16	6'-0" INSIDE SQUARE x 2'-6" SIDEDEPTH ENERGY DISSIPATING INLET WELL WITH MULTIPLE INLET GATES.
17	5'-0" DIAMETER SLUDGE MANIFOLD.
18	(1) SUCTION HEADER WITH ORIFICES SUPPORTED BY A PLANE TRUSS.
19	DENSITY CURRENT BAFFLE (OPTIONAL).
20	ELECTRICAL CONTROL PANEL (OPTIONAL).

PREPARED FOR:

ENGINEER:

CONTRACTOR:

P.O./CONTRACT  
NUMBER

**Westech**

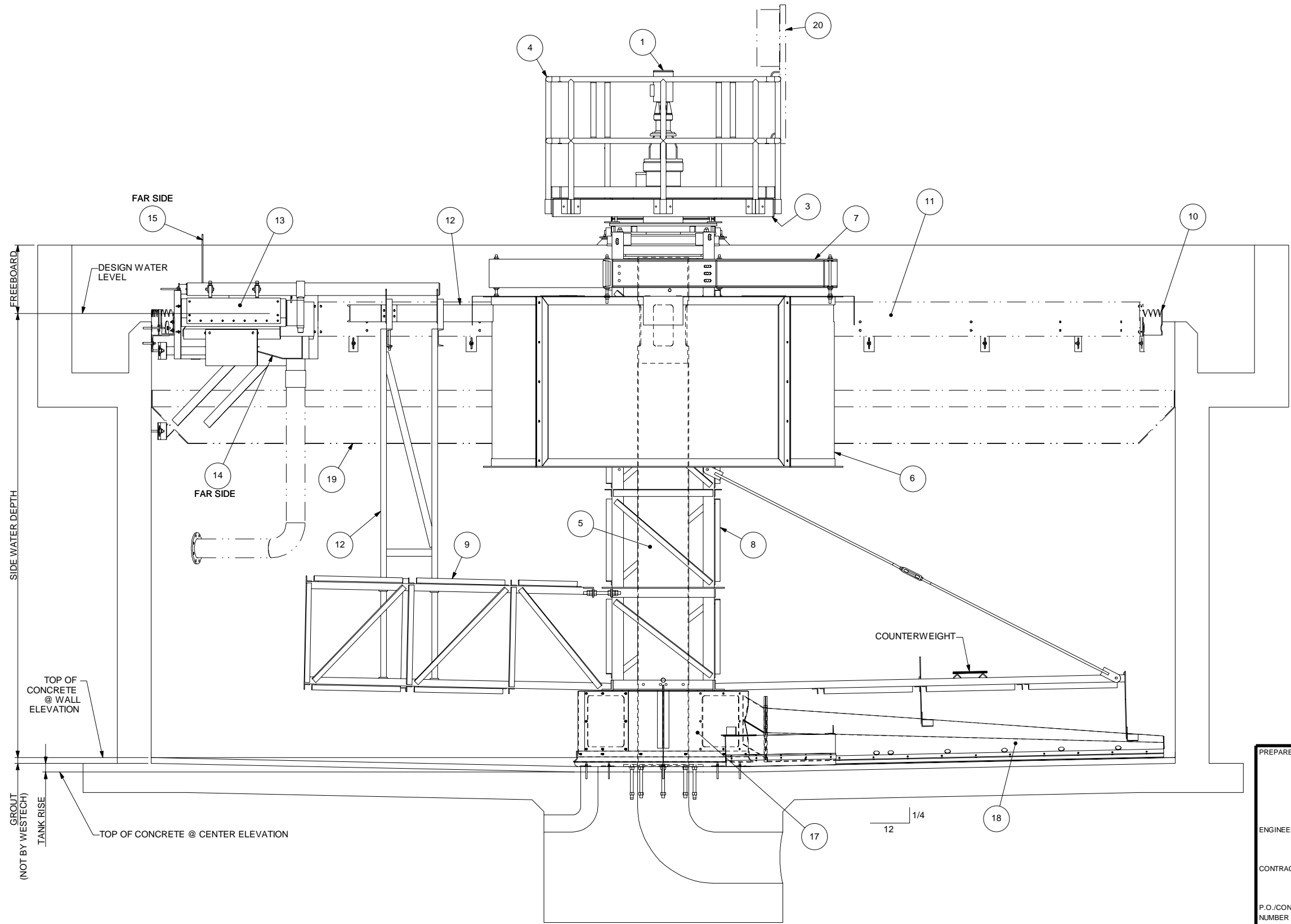
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TITLE: **GENERAL ARRANGEMENT - TANK CUTAWAY VIEW**  
**Ø 30'-40' CLARIFIER**  
**CLC18G**

DESIGNER	CHECKER	APPROVER	DATE	
RI62	LY13		2021-05-17	
DOCUMENT NUMBER			SHEET	REV
PROP123-1001			1 OF 1	-

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE
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REFERENCE DOCUMENTS



PREPARED FOR:

ENGINEER:

CONTRACTOR:

P.O./CONTRACT  
NUMBER

**WestTech**

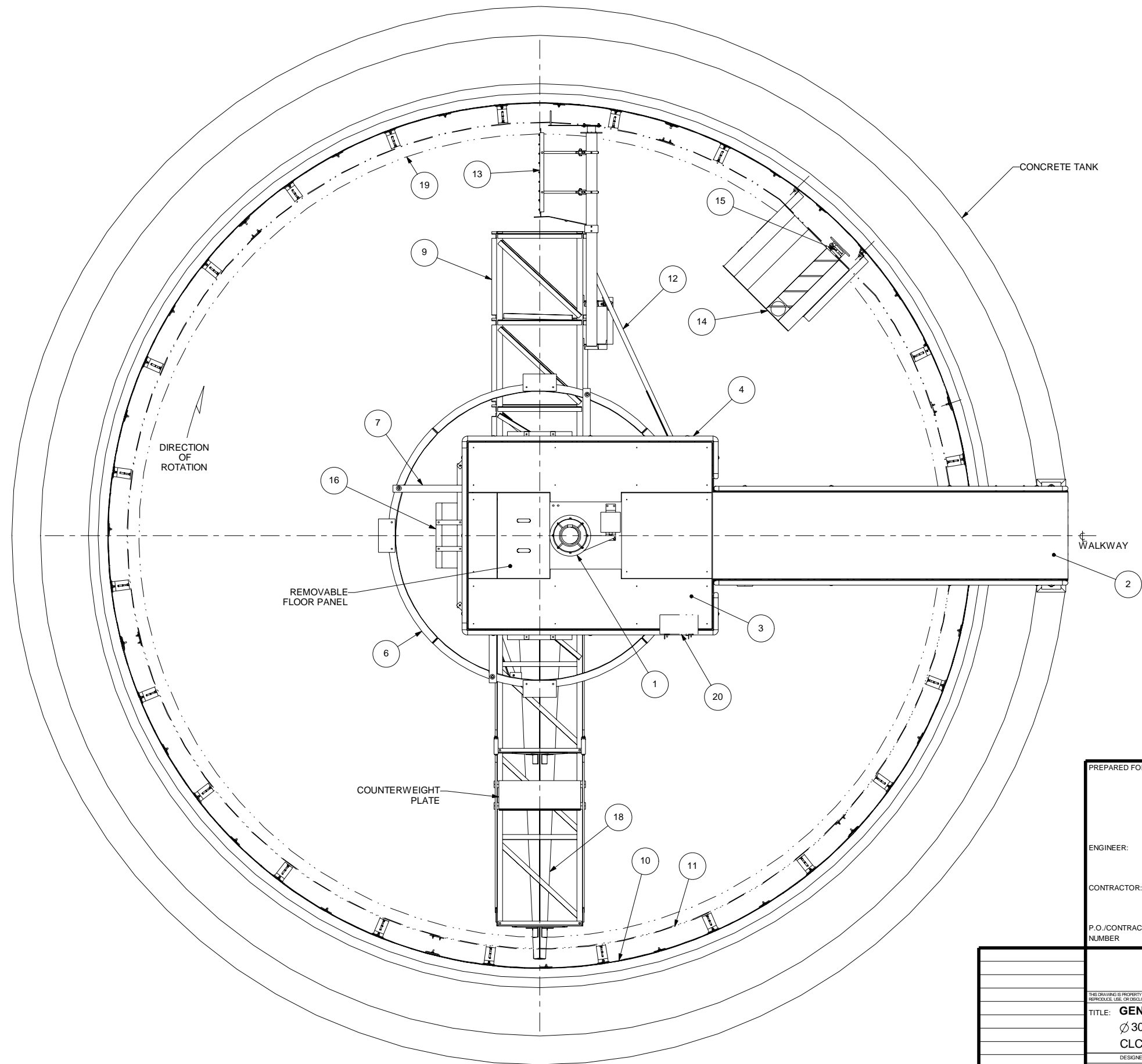
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TITLE: **GENERAL ARRANGEMENT - ELEVATION VIEW**  
**Ø 30'-40' CLARIFIER**  
**CLC18G**

DESIGNER	CHECKER	APPROVER	DATE	
RI62	LY13		10-20-2021	
DOCUMENT NUMBER			SHEET	REV
PROP123-1002			1 OF 1	-

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE
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ENGINEER:			
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TITLE: <b>GENERAL ARRANGEMENT - PLAN VIEW</b>			
Ø 30'-40' CLARIFIER			
CLC18G			
DESIGNER	CHECKER	APPROVER	DATE
RI62	LY13		10-20-2021
DOCUMENT NUMBER			SHEET
PROP123-1003			1 OF 1
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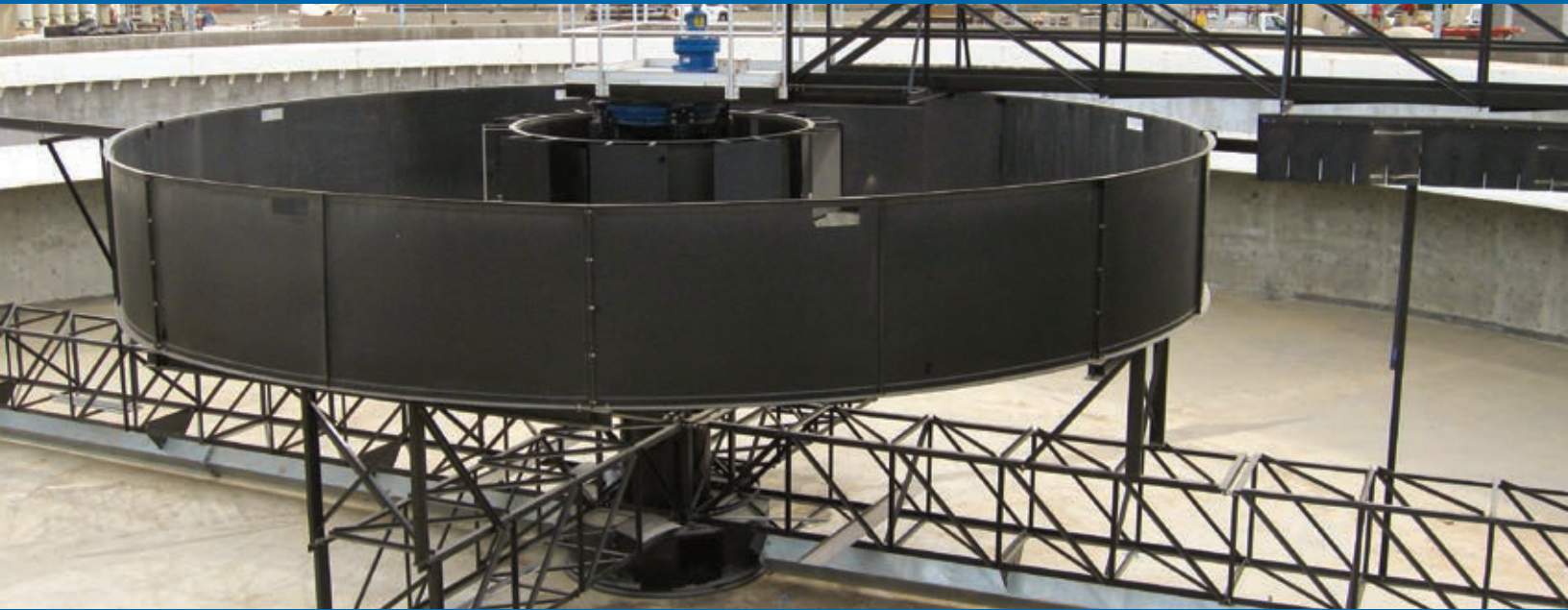
REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE
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REFERENCE DOCUMENTS



# COP™ Suction Header Clarifier

Rapid Solids Removal



**WESTECH®**



# Clarifier Optimization Package



The COP™ Suction Header merges the rapid solids removal of a suction header mechanism with the performance-enhancing components of the WesTech Clarifier Optimization Package (COP). The combination of these features provides high-quality effluent and full-floor sludge removal with every rotation.

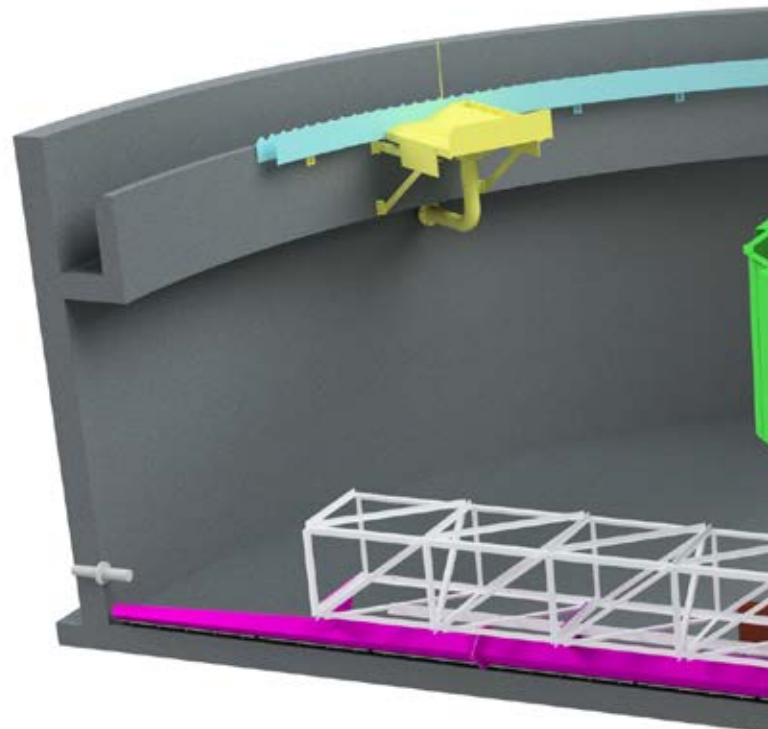
## Why Choose a COP™ Clarifier?

When denitrification or secondary phosphorous release may occur in your secondary clarifier, you need a system that will get the solids to the floor more quickly and remove them more efficiently. Combining COP features like the Dual-Gate™ energy-dissipating inlet (EDI) and flocculating feedwell in conjunction with a suction header mechanism helps remove the solids from the system efficiently. This prevents process upsets and/or effluent violations.

The influent center column is sized and ported to both prevent settling and to systematically reduce incoming velocities. Our unique Dual-Gate EDI nearly eliminates hydraulic energy as the flow enters the feedwell. The flocculating feedwell (FFW) encourages the interaction of the solids as they exit the EDI. This leads to larger floc particles that improve settleability without inducing increased vertical velocities which could scour the sludge blanket. The suction header removes the settled solids from the tank floor with every rotation.

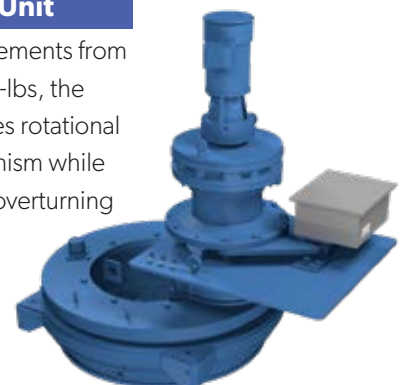
## Rapid Solids Removal Mechanism

- Removes solids quickly from clarifier tanks
- Limits denitrification in the secondary clarifier
- Helps prevent secondary phosphorous release in biological phosphorous removal plants



## Premium Drive Unit

Designed for torque requirements from 1,000 ft-lbs to 6,000,000 ft-lbs, the Premium Drive Unit provides rotational force to the clarifier mechanism while resisting torque loads and overturning moments.



### Density Current Baffle

Eliminates wall currents and prevents short-circuiting. The wall-mounted baffle is low in cost and requires no maintenance.

### Scum Removal

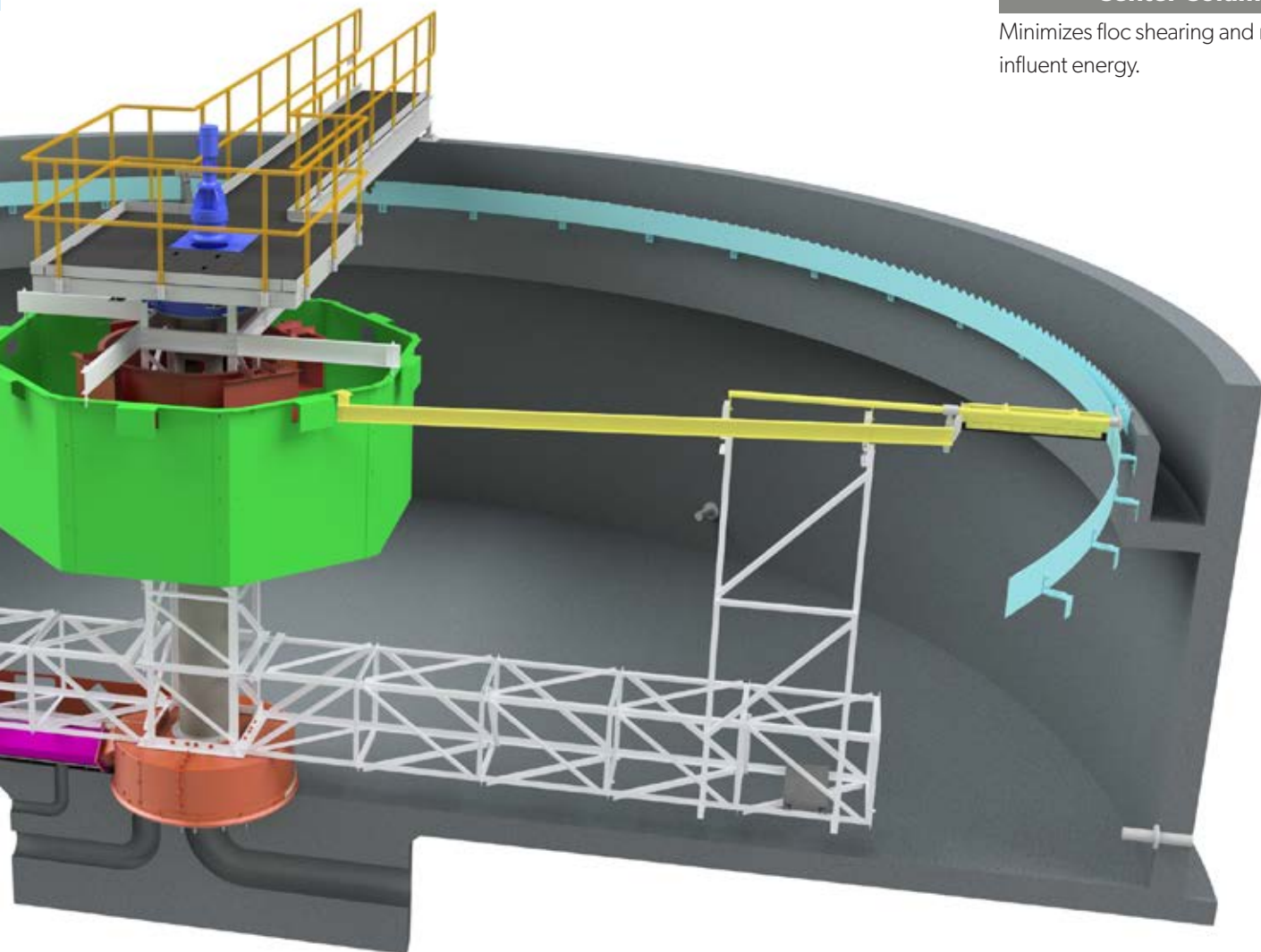
Removes scum build-up from within the feedwell and from the clarifier surface.

### Flocculating Feedwell

Promotes hydraulic flocculation in the inlet area and is designed to eliminate scouring of the sludge blanket.

### Center Column

Minimizes floc shearing and reduces influent energy.



### Sludge Manifold

Transmits hydraulic suction from return activated sludge (RAS) pumps to suction header collector(s).

### Suction Header

Rapid, hydraulically driven sludge removal via engineered orifices in either one or two tapered header duct(s).

### Energy-Dissipating Inlet (EDI)

Reduces the higher energy feed from the center column into a lower velocity flow. The flow is then gently introduced as a tangential flow into the flocculating feedwell to maximize flocculation.



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# Drive Units

for Clarifiers and Thickeners



**WESTECH®**

# Drive Units



Municipal and industrial customers have been coming to WesTech since the 1970s for precision bearing drives, as part of the company's high-quality process equipment offerings for liquid-solids separation. Our drive gives you a flexible design, precision components, and strict quality control. WesTech guarantees a long drive life and the best fit for your process equipment needs. We stand behind our equipment, which has proven to meet the toughest requirements.

## Applications

Clarifier and thickener drive units provide the rotational force necessary to turn the rake arms in a circular basin. The rotating rake arms transport settled solids to the center of the tank for removal. Because drive units are applied in water and wastewater treatment plants, as well as industrial facilities, WesTech has developed a premium drive unit for each application. WesTech drive units can be designed for torque requirements from 1,000 ft-lbs to 6,000,000 ft-lbs.

### Industrial & Minerals

- Contact Clarifiers for Raw Water
- Concentrate and Tailings Thickeners
- Paste Thickeners
- CCD Circuits
- DAF Units for Oily Wastes
- Circular Oil / Water Separators
- General Duty Clarifiers and Thickeners

### Wastewater

- Primary Clarifiers
- Secondary Clarifiers
- Tertiary Contact Clarifiers
- Gravity Sludge Thickeners
- DAF Thickeners

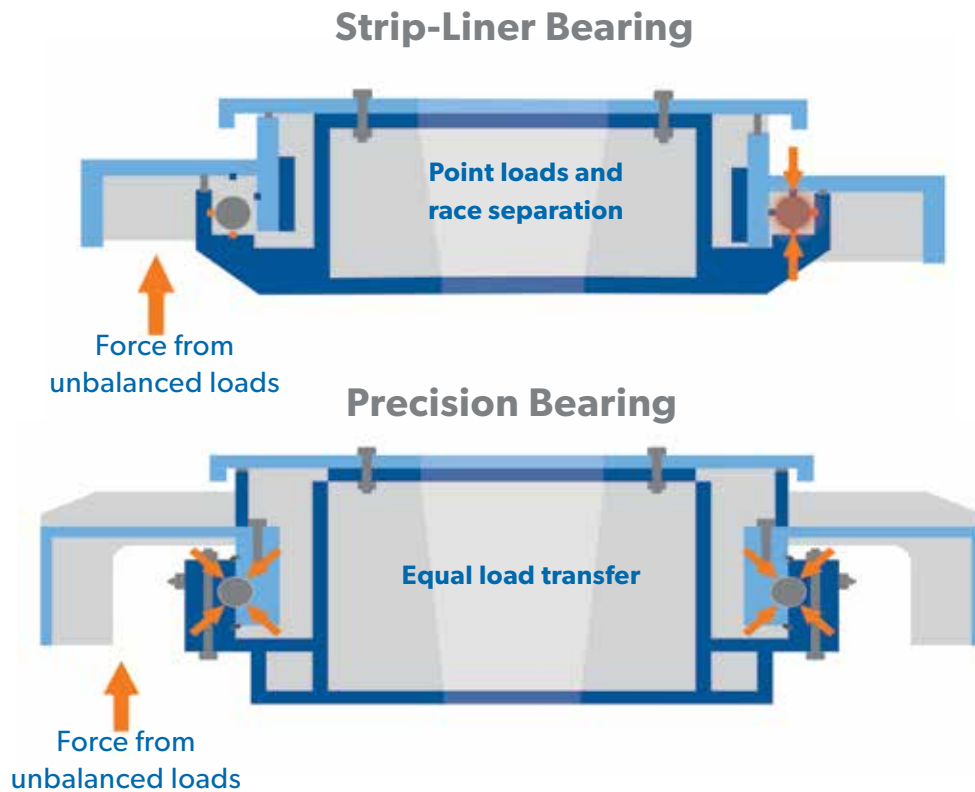
### Water

- Sedimentation Clarifiers
- Contact Clarifiers
- Flocculating Clarifiers
- Gravity Sludge Thickeners
- Filter Backwash Clarifiers



# Precision Bearing Drive

WesTech offers precision bearings in its drive units, a better choice when compared to the primitive strip-liner bearings of other units.



## Precision Manufacturing Tolerances

The precision bearings WesTech uses in its drive units are ideal for high load, high speed applications and are manufactured by recognized bearing companies. The use of these precision bearings is widespread among larger and more heavily-loaded clarifier and thickener mechanisms common to the metallurgical industries, in addition to overhead cranes, gun turrets, and track hoes.

## Exceptional Long Life and Load Capacities

Instead of applying the bearing load in four points on the bearing balls as with the old-style strip-lined bearings, the precision bearing utilizes a full band contact race with hardness equal to that of the strip liners. Calculated bearing life is at least five times that for strip liners of the same ball size and diameter. The need for splitting gears and housings is eliminated because of the superior service life.

## Overturning Load Capacity

Strip-lined bearings have no inherent overturning load capacity and must rely on the mechanism weight alone to hold the bearing race together. This capacity of the precision bearing makes possible tank settling, misalignment, and lack of precision leveling of the drive during installation and operation a far less determining factor in premature bearing failure.

## Even Load Distribution

As the figure shows, the rotating turntable of the strip-liner can easily separate from its stationary base and cause a point load on one or two bearing balls. This separation can occur with the simple action of a skimmer riding over a scum box. The locked ring design of the precision bearing eliminates damaging point loads by equally transferring any unbalanced load to the entire group of bearing balls.

## Main Bearing Protection

WesTech gear housings protect the bearings from dirt and contamination using designed neoprene seals and gaskets, whereas strip-lined bearings typically only use a loose felt seal. WesTech precision gears also allow the bearing to run in a separate, sealed grease cavity, which achieves additional protection from contamination.

# Advantages of the WesTech Drive



## Cycloidal Speed Reducer

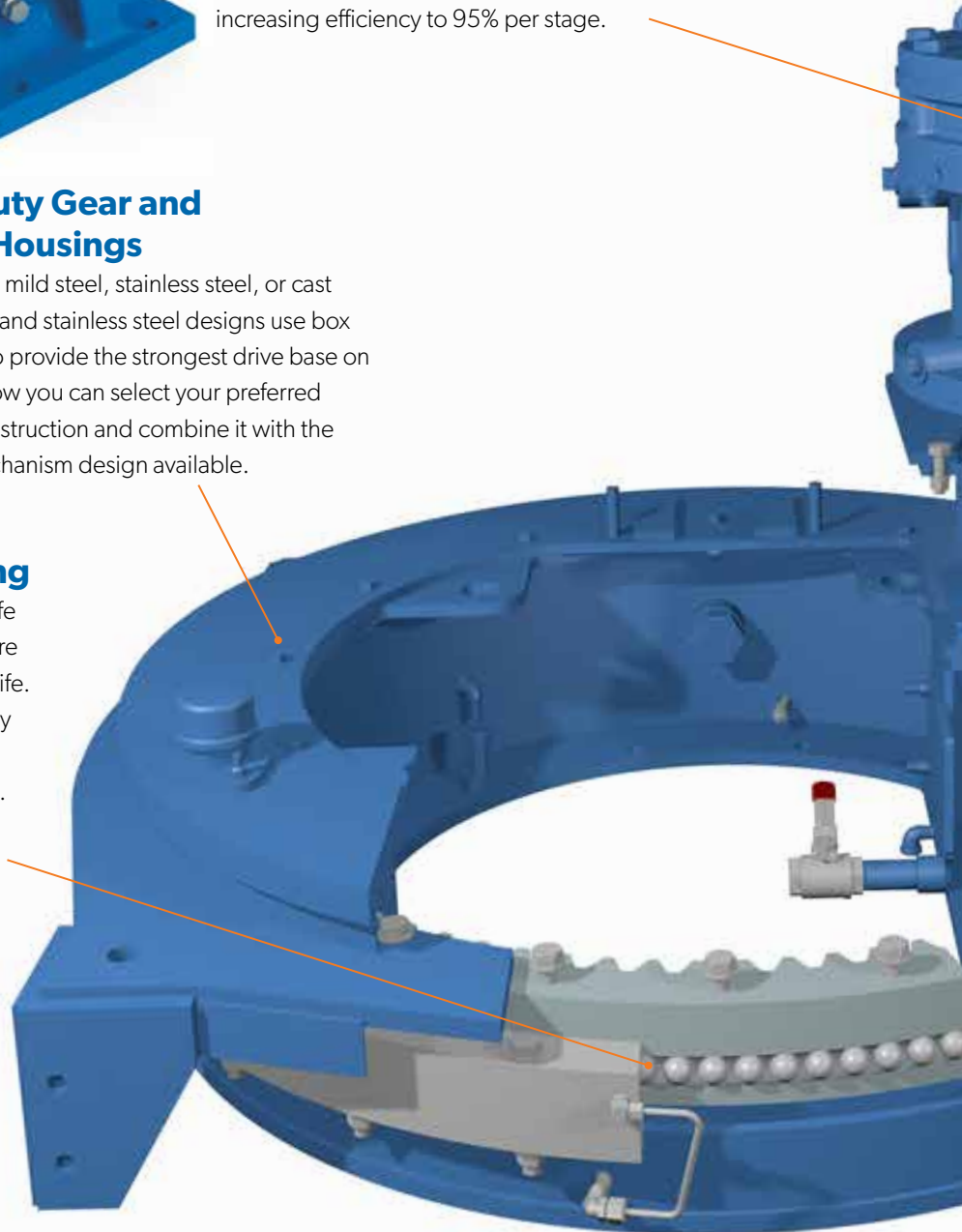
can withstand momentary shock loads exceeding 500% of its rated continuous torque. At least two-thirds of the speed reducer teeth are engaged at any one time. The rolling action of the main lobes and pins reduces heat buildup and wear, while increasing efficiency to 95% per stage.

## Heavy-duty Gear and Bearing Housings

are available in mild steel, stainless steel, or cast iron. The steel and stainless steel designs use box construction to provide the strongest drive base on the market. Now you can select your preferred material of construction and combine it with the best drive mechanism design available.

## Precision Main Gear and Bearing

in a WesTech drive has a calculated L-10 service life exceeding 100 years. The alloy steel gear teeth are hardened to 285-321 BHN for exceptional gear life. A modified-addendum main gear tooth geometry increases load distribution among gear teeth, reduces gear wear, and prevents tooth breakage. The tight bearing tolerances maintain a proper gear-to-pinion alignment.







### Direct Coupling

of motors, speed reducers, and shafts eliminates drive chains, belts, and an oily mess around the drive. This design improves safety, reduces maintenance requirements, and provides a neat and clean space-saving design.

### Torkmatic™ Overload Protection

accurately senses the torque from the pinion shaft and displays it on the torque indicator. On every new drive, the electromechanical switches are factory set for high-torque alarm and high-torque motor cutout to protect the mechanism from damage. These settings can also be confirmed by field tests during start-up. Other options include rake arm lift, remote monitoring, redundant motor cutout, and explosion-proof torque boxes. An electronic load cell type torque protection is also available for use on new and existing drives.

### Pinion Bearings

eliminate overhung loads on the output bearing of the speed reducer. The upper and lower pinion bearings keep the pinion shaft in precise alignment with the main gear.

### Lubrication Options

While oil lubrication has been the standard for many years, WesTech also supplies an all-grease lubricated drive. Grease lubrication eliminates the need for periodic condensate draining and messy oil changes, as well as the threat of potential oil spills. Both systems of lubrication have been successfully used for years and help ensure a long bearing life.

# Design Flexibility

One of the unique advantages of premium WesTech drives is their great flexibility in design. This flexibility allows the engineer to select a drive that best matches the environmental and mechanical requirements. WesTech's thorough design and meticulous component selection yields a strong, reliable, premium-quality drive that will provide a long service life with minimum maintenance. Your drive unit will be delivered to the job site completely assembled, shop tested, and ready to be installed.

## Drive Unit Types

WesTech offers two main drive types: the Shaft Drive and the Cage Drive. The selection of the drive type depends on how the rotating mechanism will be supported in a given application.

### Cage Drive

A cage drive unit rests on a stationary column mounted in the center of the tank. A half or full-span bridge then attaches to the robust housing of the drive unit. This column-mounted drive transmits power to the sludge collection system through a center cage mechanism.

### Shaft Drive

A shaft drive works well in smaller-diameter tanks where the entire mechanism is supported by a full-span bridge. This bridge-mounted drive transmits power to the sludge collection system through a center drive shaft.

## Drive Unit Options

### Concentric Dual Drive

Dual drives are multi-tasking units that provide independent mixing in the feedwell, while the rakes transport settled solids along the floor. Supplied in both shaft and cage designs, dual drives are commonly used in WesTech's Solids CONTACT CLARIFIERS™ and Flocculating Clarifiers. Two distinct motor/reducer assemblies are combined into one unit, which allows for independent speed control of the mixer/flocculator and the rake arms.

Cage Drive



Shaft Drive



Dual Shaft Drive



### Lift Drive

In heavy-duty industrial applications where torque can peak unexpectedly, both shaft and cage drive units can be provided with a lifting device to raise the rake mechanism out of the dense, settled slurry. As the rakes are raised from the slurry, the torque load decreases and operation continues, which gives the operator time to make necessary system adjustments. The operator can then slowly lower the rakes back to their original position and avoid any shutdown time during the process.

### D25 Gearless Shaft Drive

The D25 drive has the motor and speed reducer assembly directly mounted on the precision bearing for low-torque applications. The precision bearing eliminates the need for a submerged bearing that is common with other gearless drives and some strip-liner drives. In these low-torque applications, the main gear-to-pinion reduction is not needed.

### Direct Shaft Drive

For light-duty applications, WesTech provides a drive unit that connects the center drive shaft directly to the output of the cycloidal speed reducer.

### Multiple Pinion Drive

Heavy-duty industrial applications often require more torque than a single pinion can provide. In such cases, multiple pinions are used to drive a single precision bearing, which allows the torque design to double, triple, or quadruple in value.

### Peripheral Drive

Rim drives travel along the periphery of a concrete tank and pivot the sludge collection system around the center support column. For large-diameter tanks, rim drives can provide both mechanical and cost advantages. In minerals applications, heavy-duty traction drives are used for large-diameter units with very high solids throughput requirements. Traction drives are designed to travel along either a smooth or geared rail, depending on site-specific torque requirements.

Shaft Drive  
with Lift



D25 Drive



Multiple  
Pinion Drive





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Salt Lake City, Utah, USA

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Job No.	Year		Location			Qty	Size	Equipment/Model
22200	0	CITY OF LAUREL WWTP IMPROVEMENTS BNR UPGRADE	LAUREL	MT	US	2		CANCELLED CLC18
23163	0	FREDERICTON WWTF SECONDARY CLARIFIER EQUIPMENT	FREDERICTON	NEW BRUNSWICK	CA	1	120 Feet	Secondary Clarifier CLC18G
23829	0	CENTRAL WWTP EXPANSION	PFLUGERVILLE	TX	US	2	115' DIA	Secondary Clarifiers Phase 2 CLC18G
24632	0	WESTVILLE PHASE 2 IMPROVEMENTS	INDIANAPOLIS	IN	US	1	45' DIA x 14' SWD SECONDARY	CLARIFIER CLC18G
3427	1984	PINOLE, CA WWTP/KAWEAH CONSTR.	PINOLE	CA	US	2	45' DIA.	CLARIFIERS SUCTION CLC18
3502	1985	ODELL, OR WWTP/COPENHAGEN UTILITIES	ODELL	OR	US	1	45' DIA.	CLARIFIER CLC18
3506	1985	LEWISTOWN, MT WWTP/MORGAN OSWOOD CONSTR.	LEWISTOWN	MT	US	2	70' DIA.	CLARIFIERS CLC18
3587	1986	BEATRICE MEATS/WALLACE, NC	WALLACE	NC	US	1	45' DIA.	CLARIFIER CLC18
3609	1986	KILGORE, TX WTP	KILGORE	TX	US	2	70'	CLARIFIERS SUCTION CLC18
3628	1986	IBM/FISHKILL, NY	HOPE JUNCTION	NY	US	2	45' DIA.	CLARIFIERS CLC18
3563	1986	LONGMONT, CO WWTP	LONGMONT	CO	US	2	120' DIA.	CLARIFIERS SUCTION HEADER CLC18
3724	1987	HARVEY, LA STP	HARVEY	LA	US	1	70' DIA.	CLARIFIER CLC18
3723	1988	SUNNYSIDE, WA WWTP	SUNNYSIDE	WA	US	1	85' DIA.	CLARIFIER CLC18
3748	1988	FALLBROOK, CA WWTP	FALLBROOK	CA	US	1	75' DIA.	CLARIFIER CLC18
3737	1988	SILOAM SPRINGS, AR WWTP	SILOAM SPRINGS	AR	US	2	84' DIA.	CLARIFIERS CLC18

Job No.	Year	Location				Qty	Size	Equipment/Model
3778	1988	MERIDIAN, ID WWTP	MERIDIAN	ID	US	1	80' DIA.	CLARIFIER CLC18
3707	1988	GROVER STREET WWTP/PRITCHARD, AL	PRICHARD	AL	US	1	105' DIA.	CLARIFIER CLC18
3835	1989	GROVER STREET WWTP/PRITCHARD, AL	PRICHARD	AL	US	1	85' DIA.	CLARIFIER CLC18
3996	1990	EMPIRE, MN	FARMINGTON	MN	US	1	80' DIA.	SUCTION HEADER CLARIFIER CLC18
3996	1990	EMPIRE	FARMINGTON	MN	US	1	90' DIA.	CLARIFIER CLC18
4065	1991	HARDEEVILLE, SC WWTP	HARDEEVILLE	SC	US	1	60' DIA.	CLARIFIER SUCTION CLC18
4225	1992	MANTECA, CA WWTP/KAWEAH CONSTR.	MANTECA CENTER	CA	US	1	85' DIA.	CLARIFIER CLC18
4225	1992	MANTECA, CA WWTP/KAWEAH CONSTR.	MANTECA CENTER	CA	US	2	85' DIA.	CLARIFIERS RETROFIT CLC18
4273	1993	RIVER ROAD WRP/AMARILLO, TX	AMARILLO	TX	US	1	85' DIA.	CLARIFIER CLC18
4273	1993	RIVER ROAD WRP/AMARILLO, TX	AMARILLO	TX	US	1	70' DIA.	CLARIFIER CLC18
4541	1994	TOLUCA	TOLUCA	MX	MX	3	45 METER	CLARIFIERS SUCTION HEADER CLC18
4454	1994	MAUMEE RIVER WWTP/LUCAS COUNTY, OH	Waterville	OH	US	1	105' DIA.	CLARIFIER CLC18
4643	1995	HAGERSTOWN, MD/SBCCS CONSTRUCTORS	HAGERSTOW N	MD	US	2	75' DIA.	SC CLARIFIERS CLC18
4672	1995	VERNON, TX WWTP/CAJUN CONTRACTORS	VERNON	TX	US	1	65' DIA.	CLARIFIER SECONDARY CLC18
4875	1997	STURGIS, MI WWTP/ALLIED MECHANICAL	STURGIS	MI	US	1	60' DIA	CLARIFIER CLC18

Job No.	Year	Location				Qty	Size	Equipment/Model
4878	1997	TZ OSBORNE WWTP/GREENSBOR O, NC/UNITARY SYSTEMS	MC LEANSVILLE	NC	US	2	130' DIA.	CLARIFIERS HEADER CLC18
4914	1997	LARGO WWRF CLEARWATER, FL	CLEARWATER	FL	US	1	80' DIA.	CLARIFIER SUCTION CLC18
18041	1998	CARGILL HIGH RIVER, AB, CAN	HIGH RIVER	AB	CA	1	60' DIA.	CLARIFIER CLC18
5123	1998	BASF GEISMAR, LA	GEISMAR	LA	US	1	82' DIA	CLARIFIER CLC18
18141	1999	LINDEN, MI WWTP/GENESEE COUNTY	Linden	MI	US	1	70' DIA	CLARIFIER CLC18
18310	1999	ELLIJAY	ELLIJAY	GA	US	2	90' DIA	CLARIFIERS FLAT FLOOR CLC18
18341	2000	HOWELL, MI WWTP/JOHN E GREEN CO.	HOWELL	MI	US	1	55' DIA	CLARIFIER FLAT FLOOR CLC18
18852	2002	TRACY, CA	TRACY	CA	US	1	100' DIA	CLARIFIER FLAT FLOOR CLC18
18938	2002	ASHLAND, OH	ASHLAND	OH	US	2	80' DIA	CLARIFIER RETROFITS FLAT FLOOR CLC18
19285	2004	LONGMONT WWTP	LONGMONT	CO	US	2	120' DIA	CLARIFIER RETROFITS CLC18
19265	2004	DISCOVERY BAY	DISCOVERY BAY	CA	US	1	50' DIA	CLARIFIER CLC18
19267	2004	OTSEGO, MN WWTF/RICE LAKE CONSTR.	OTSEGO	MN	US	2	40' DIA	CLARIFIERS CLC18
19434	2004	LEWISTOWN	LEWISTOWN	MT	US	2	70' DIA	CLARIFIER RETROFITS CLC18
19413	2004	SLIDELL TERRACE AVENUE	SLIDELL	LA	US	2	85' DIA	CLARIFIER RETROFITS CLC18G
19489	2005	EVELETH, MN WWTP/RICE LAKE CONSTR.	EVELETH	MN	US	1	52.5' DIA	CLARIFIER CLC18



Job No.	Year	Location				Qty	Size	Equipment/Model
19622	2005	OTSEGO EAST	OTSEGO	MN	US	2	65' DIA	CLARIFIERS CLC18
19682	2005	BP WHITING, IN	HAMMOND	IN	US	1	150' DIA	CLARIFIER CLC18
19807	2006	LITITZ	LITITZ	PA	US	1	70' DIA	CLARIFIER RETROFIT COMPONENTS CLC18
19768	2006	OAKS WWTP	OAKS	PA	US	2	110' DIA	CLARIFIERS CLC18
19925	2007	EUGENE- SPRINGFIELD WPCF	EUGENE	OR	US	2	130' DIA	CLARIFIERS CLC18G
19855	2007	WHITE WATER CREEK WPCF/FAYETTEVILL E, GA/REYNOLDS	FAYETTEVILL E	GA	US	4	50' DIA	CLARIFIERS CLC18
19938	2007	LARGO	CLEARWATER	FL	US	2	80' DIA	CLARIFIERS CLC18
19837	2007	ELLIS CREEK	PETALUMA	CA	US	2	125' DIA	CLARIFIERS CLC18
19925	2007	EUGENE- SPRINGFIELD WPCF	EUGENE	OR	US	8	130' DIA	CLARIFIERS CLC18G
20410	2008	VALERO CORPUS CHRISTI, TX	CORPUS CHRISTI	TX	US	2	85' DIA	CLARIFIERS CLC18
20627	2009	LEXINGTON	LEXINGTON	OH	US	2	34' DIA	CLARIFIERS CLC18
20635	2009	FOSTER POULTRY FARMS	LIVINGSTON	CA	US	2	115' DIA	CLARIFIERS CLC18
20657	2009	LARGO WWRF	CLEARWATER	FL	US	3	80' DIA	CLARIFIERS CLC18
20672	2009	CHELSEA WWTP	CHELSEA	MI	US	2	50' DIA	CLARIFIERS CLC18G
20770	2009	BOZEMAN, MT WWTP	BOZEMAN	MT	US	2	85' DIA	CLARIFIER CLC18G
20931	2010	ZUAZUA-CLYCSA	ZUAZUA		MX	2	65' DIA	CLARIFIERS CLC18
20850	2010	NORESTE	MONTERREY		MX	1	48 M	SUCTION HEADER CLARIFIER CLC18
20850	2010	NORESTE	MONTERREY		MX	1	48 M	SUCTION HEADER CLARIFIER CLC18

Job No.	Year	Location				Qty	Size	Equipment/Model
20881	2010	ELI LILLY	CAROLINA	PR	PR	1	40' DIA X 17'9"	SUCTION HEADER CLARIFIER CLC18
20941	2010	MAUMEE RIVER STP	WATERVILLE	OH	US	2	105' DIA	CLARIFIERS FLAT FLOOR CLC18
21216	2011	PESQUERIA	DE LOS LERMAS GUADALUPE N L		MX	1	70' DIA	CLARIFIER CLC18
21032	2011	SPRING CREEK, IL/ WWTP/PLOCHER CONSTRUCTION	SPRINGFIELD	IL	US	6	140' DIA	SECONDARY CLARIFIERS CLC18G
21178	2011	LEPRINO FOODS WAVERLY, NY	WAVERLY	NY	US	2	33 FT	SUCTION HEADER CLARIFIERS CLC18
21284	2011	ENTERPRISE WWTF IMPROVEMENTS	ENTERPRISE	AL	US	2	90' DIA	SUCTION HEADER CLARIFIERS CLC18G
21452	2012	LEWISTOWN WWTF	LEWISTOWN	PA	US	3	60' DIA	SECONDARY CLARIFIER CLC18
21466	2012	MOUNT MORRIS, IL WWTF/WILLIAMS BROS CONSTR.	MOUNT MORRIS	IL	US	2	55' DIA	FINAL CLARIFIERS CLC18G
21683	2012	CERRALVO WWTP	Cerralvo	Nuevo Leon	MX	1	32.8' DIA	CLARIFIER CLC18
21687	2013	BURLINGTON, WI WWTF/STAAB CONSTRUCTION CORP.	BURLINGTON	WI	US	2	85' DIA	SUCTION HEADER CLARIFIERS CLC18G
21615	2013	ALEXANDRIA WWTP	ALEXANDRIA	LA	US	2	105' DIA	COP CLARIFIERS CLC18G
21698	2013	CRESTON WWTP	CRESTON	BC	CA	2	50' DIA	SUCTION HEADER CLARIFIERS CLC18G
21894	2013	MADISON TWP, OH WWTP/AP OHORO CO.	MADISON	OH	US	2	104' DIA	SUCTION HEADER CLARIFIERS CLC18
21882	2013	ST PAUL PARK ADRIEN, MN/MARATHON	ADRIEN	MN	US	2	55'	CLARIFIERS CLC18

Job No.	Year		Location			Qty	Size	Equipment/Model
22103	2014	BROOKINGS MUNICIPAL UTILITIES	BROOKINGS	SD	US	3	94' DIA	CLARIFIER CLC18
22222	2014	ISSASA SADM	GUADALUPE	NL	MX	2	65 Feet	Drives CLC18
22007	2014	ABINGTON REGIONAL WA WWTP	CHINCHILLA	PA	US	2	80' DIA	CLARIFIER CLC18G
22197	2014	FRUITLAND WWTP PACKAGE 2	FRUITLAND	ID	US	2	70' DIA	SECONDARY CLARIFIERS CLC18
22202	2014	CHAMBERS CREEK WWTP MECH 319	UNIVERSITY PLACE	WA		1	150' DIA	SECONDARY CLARIFIER CLC18
22307	2015	DISCOVERY BAY, CA WWTP/ANDERSON PACIFIC ENG.	DISCOVERY BAY	CA	US	1	50' DIA	SUCTION HEADER SECOND. CLARIF. CLC18
22233	2015	NORTHWEST LANGLEY WWTP PHASE 1 UPGRADE	LANGLEY	BRITISH COLUMBIA	CA	3	27.5 M	SECONDARY CLARIFIER CLC18G
22393	2015	RM CLAYTON WRF	ATLANTA	GA	US	1	150' DIA	CLARIFIER RETROFIT EQUIPMENT CLC18
22410	2015	HOWELL WWTP	Howell	MI	US	1	55' DIA	CLARIFIER CLC18
22423	2015	ADA WWTP EXPANSION	ADA	OH	US	3	60' DIA	SECONDARY CLARIFIERS CLC18G
22514	2015	LOGANSPOUT WWTP	LOGANSPOUT	IN	US	2	75' DIA	Secondary CLARIFIER CLC18G
22588	2016	LONGMONT WWTP AMMONIA TREATMENT AND BIOSOLIDS	LONGMONT	CO	US	1	120' DIA	Secondary Dual Suction Header CLC18
22781	2016	CHERRY POINT, NC MARINE CORP WWTP/CLEARWATER	CHERRY POINT	NC	US	2	75' DIA	Clarifier Repl. Components CLC18
22459	2016	BACK RIVER WWTP BALTIMORE, MD	BALTIMORE	MD	US	12	120' DIA	CLARIFIERS CLC18G
22653	2016	EDGERTON WWTF	EDGERTON	WI	US	2	50' DIA	Secondary Clarifiers CLC18

Job No.	Year	Location	Qty	Size	Equipment/Model
22723	2016	LOUISVILLE, CO WWTP	LOUISVILLE CO US 3	60' DIA	Secondary Clarifiers CLC18
22657	2016	PTAR AGUASCALIENTES MEXICO	CIUDAD DE MÉXICO MEXICO MX 4	46m dia	CLARIFIER CLC18
22859	2016	MONROE, WA WWTP	MONROE WA US 1	42' DIA	SS Secondary Clarifier CLC18
22854	2016	WEST BAY COUNTY WWTP SECONDARY CLARIFIER	BAY CITY MI US 1	85' DIA	Secondary Clarifier CLC18G
22834	2017	FY'16 HAIKEY CREEK WWTP CAPITAL EQUIP REPLACEMENT	BROKEN ARROW OK US 2	110' DIA	Final Clarifiers CLC18G
22588	2017	LONGMONT WWTP AMMONIA TREATMENT AND BIOSOLIDS	LONGMONT CO US 2	120' DIA	Secondary Retrofit Header CLC18
23043	2017	CONAGRA	RICHLAND WA US 1	71.3'	CLARIFIER CLC18
23111	2017	SHELL CHEMICAL COMPANY	NORCO LA US 1	158' dia	CLARIFIER CLC18
22957	2017	FT. MADISON, IA WWTP/LEANDER CONSTRUCTION	FORT MADISON IA US 2	100' DIA	Final Clarifiers CLC18G
23033	2017	CONOCOCHEAGUE WWTP WASHINGTON COUNTY, MD	WILLIAMSPOR T MD US 1	90' DIA	Final Clarifier No. 3 CLC18
22827	2017	SAN MATEO WWTP	SAN MATEO CA US 4	75' DIA	316SS Secondary Clarifiers CLC18G
23033	2017	CONOCOCHEAGUE WWTP WASHINGTON COUNTY, MD	WILLIAMSPOR T MD US 2	90' DIA	Final Clarifier No. 1&2 Rehab CLC18
23156	2017	CHESTERTON WWTP CLARIFIER RENOVATION PHASE 3	PORTER IN US 1	65' DIA	Secondary Clarifier Retrofit CLC18

Job No.	Year		Location			Qty	Size	Equipment/Model
23163	2017	FREDERICTON WWTF SECONDARY CLARIFIER EQUIPMENT	FREDERICTON	NEW BRUNSWICK	CA	1	120' Dia	Secondary Clarifiers CLC18G
23153	2017	BILLINGS WRF	Billings	MT	US	3	140' DIA	Secondary Clarifiers CLC18
23086	2018	EL MORRO	LAREDO	TX	US	2	42M DIA	CLARIFIER CLC18
22814	2018	ORANGE COUNTY SOUTH WRF PHASE V IMPROVEMENTS	ORLANDO	FL	US	1	165' DIA	SECONDARY CLARIFIER MECHANISM CLC18G
23145	2018	COEUR D'ALENE TERTIARY TREATMENT PHASE 2	COEUR D'ALENE	ID	US	1	75' DIA	Secondary Clarifier CLC18G
23344	2018	CABIN CREEK WRRF IMPROVEMENTS	GRIFFIN	GA	US	2	50' DIA.	Secondary Clarifiers CLC18
23338	2018	SOUTHEAST WWTP IMPROVEMENTS	ALTUS	OK	US	1	90' DIA.	Secondary Clarifier CLC18G
22971	2018	AKRON, OH WRF STEP FEED PHASE 2	AKRON	OH	US	18	100' DIA	Final Clarifiers CLC18G
23260	2018	WATERLOO WWTP SECONDARY CLARIFIERS #1 & #2	WATERLOO	ONTARIO	CA	2	120' DIA.	SS Secondary Clarifiers CLC18G
23362	2018	NEWTON COUNTY RWSD IMPROVEMENTS CONTRACT B	FAIR OAKS	IN	US	2	45' DIA.	Secondary Clarifiers CLC18G
23459	2018	WEST BAY COUNTY WWTP SECONDARY CLARIFIER EQUIPMENT	BAY CITY	MI	US	1	85' DIA	Secondary Clarifier CLC18G
23524	2018	MUSTANG WWTP IMPROVEMENTS PHASE IIC & IID	MUSTANG	OK	US	2	70' DIA	Secondary Clarifier Mechanisms CLC18G
23578	2019	SOUTH BELOIT WWTP IMPROVEMENTS	SOUTH BELOIT	IL	US	2	80' Dia.	Secondary Clarifiers CLC18G
23647	2019	FAIRBURY CSO LONG TERM CONTROL PLAN	FAIRBURY	IL	US	2	50' Dia.	Secondary Clarifiers CLC18G

Job No.	Year		Location			Qty	Size	Equipment/Model
23775	2019	LEBANON WWTP EXPANSION	LEBANON	IN	US	1	90' DIA	Secondary Clarifier Mechanism CLC18G
23547	2019	DURHAM AWWTF PHASE 5 SECONDARY TREATMENT SYSTEM	TIGARD	OR	US	1	151' DIA	Secondary Clarifier CLC18G
23812	2019	CARTERSVILLE WPCP NUTRIENT REMOVAL UPGRADE	CARTERSVILLE	GA	US	1	135' DIA	CLARIFIER CLC18G
23691	2020	SOUTH SAN FRANCISCO WQCP	S SAN FRANCISCO	CA	US	1	110' DIA	Secondary Clarifier CLC18G
23772	2020	LARGO WWRF BIOLOGICAL TREATMENT IMPROVEMENTS	CLEARWATER	FL	US	1	80' DIA	CLARIFIER CLC18
23812	2020	CARTERSVILLE WPCP NUTRIENT REMOVAL UPGRADE	CARTERSVILLE	GA	US	2	135' DIA	CLARIFIER CLC18G
23855	2020	KRAFT-HEINZ ORE-IDA PLANT	ONTARIO	OR	US	1	140' x 20'	CLARIFIER CLC18G
24021	2020	PALO ALTO PUBLIC WORKS DEPARTMENT CLARIFIERS 4 & 6	PALO ALTO	CA	US	1	120' DIA	CLARIFIER CLC18G
23829	2020	CENTRAL WWTP EXPANSION	PFLUGERVILLE	TX	US	1	115' DIA	Secondary Clarifier Phase 1 CLC18G
24117	2020	SHERIDAN WASTEWATER SYSTEM PEAK FLOW IMPROVEMENTS	SHERIDAN	IN	US	1	65' DIA	Secondary Clarifier CLC18
24145	2021	GREENWOOD STP CLARIFIER UPGRADES	Kingston	NOVA SCOTIA	CA	2	50' DIA	SS Secondary Clarifiers CLC18G
24170	2021	ALUM CREEK WRF SECONDARY CLARIFIER UPGRADE	LEWIS CENTER	OH	US	4	135' DIA	304SS Secondary Clarifiers CLC18G
24183	2021	GUAYAMA, PUERTO RICO	ROCKFORD	IL	PR	2	120'	CLARIFIER CLC18G

Job No.	Year		Location			Qty	Size	Equipment/Model
24147	2021	FOREST GROVE WWTF SECONDARY CLARIFIER IMPROVEMENTS	FOREST GROVE	OR	US	1	120' DIA	Secondary Clarifier CLC18G
24198	2021	HAIFA	SOUTH INDUSTRIAL PARK	ACRE	IL	4	45m	CLARIFIER CLC18G
24256	2021	HOWELL WWTP IMPROVEMENTS	HOWELL	MI	US	1	55' DIA	Secondary Clarifier Mechanism CLC18G
23934	2021	PONTIAC, IL WWTP IMPROVEMENTS	PONTIAC	IL	US	1	60' DIA	CLARIFIER CLC18G
24090	2021	MCCAIN FOODS OTHELLO	OTHELLO	WA	US	1	100' x 19'	CLARIFIER CLC18G
24362	2021	HENDRICKS COUNTY WWTP PHASE VI EXPANSION	AVON	IN	US	1	60' DIA.	Secondary Clarifier Mechanism CLC18G
24420	2021	THOMASTON USDA SEWER SYSTEM IMPROVEMENTS	THOMASTON	GA	US	1	100' DIA.	Secondary Clarifier Mechanism CLC18G
24372	2021	BROOKFIELD WRF IMPROVEMENTS	MASURY	OH	US	2	50' DIA	304SS Secondary Clarifier Mech CLC18G
24533	2022	JAMES WWTP CLARIFIER COMPONENT REPLACEMENT	ABBOTSFORD	BC	CA	1	100' DIA	CLARIFIER CLC18G
24379	2023	ALCOSAN NORTH END PLANT EXPANSION	PITTSBURGH	PA	US	2	141' DIA.	PA SS Secondary Clarifiers CLC18
Total Qty =						<b>272</b>		

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## **APPENDIX B-2**

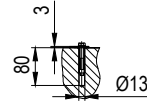
### **Aeration System**

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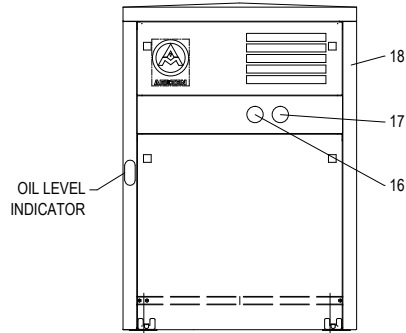


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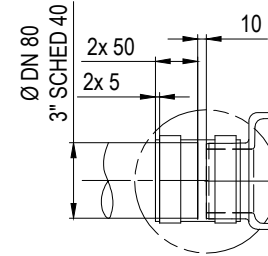
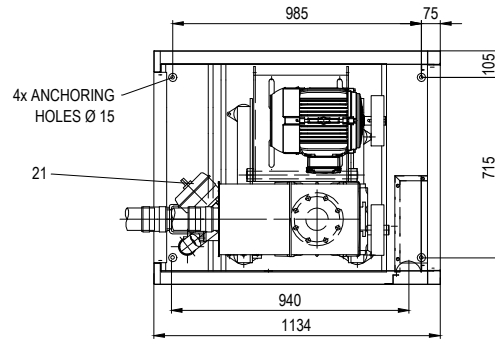
for straddling dowels A/B 12/15 - Liebig - dowel  
( not included in Aerzen's scope of supply )



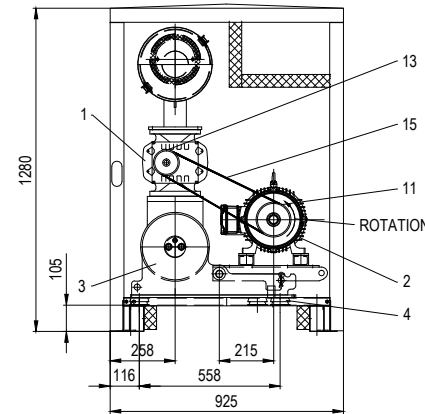
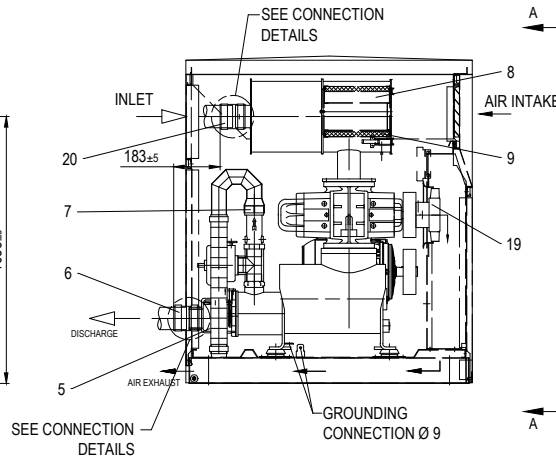
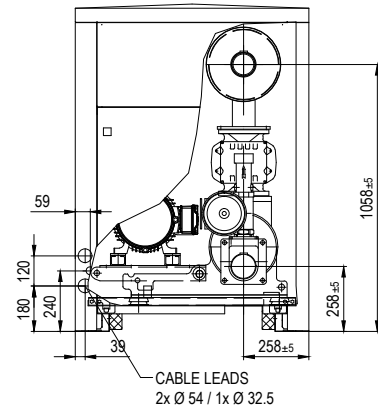
ANCHORING BY OTHERS  
ANCHORING DETAILS



VIEW 'A-A' - FRONT OF UNIT




CONNECTION  
DETAILS



NOTE	QTY.	POS	DESCRIPTION
	1	1	BLOWER - GM 7L - 80 KG
D	1	2	ELECTRIC MOTOR - WEG 210T REPRESENTED
	1	3	BASEFRAME / DISCHARGE SILENCER - DN 80
	4	4	VIBRATION ISOLATORS - DN 80
	1	5	CONNECTION HOUSING WITH CHECK VALVE - DN 80
	1	6	DISCHARGE FLEXIBLE SLEEVE - DN 80 / 3" SCHED 40
	1	7	PRESSURE RELIEF VALVE - DN 50 - SET TO 750 mbar
	1	8	INLET FILTER / SILENCER - DN 80
	1	9	INLET FILTER ELEMENT - G5 DN 80
	1	10	BELT GUARD - DN 50
	1	11	DRIVER SHEAVE
E	1	12	DRIVER BUSHING
	1	13	DRIVEN SHEAVE
E	1	14	DRIVEN BUSHING
	1	15	V-BELT SET
	1	16	FILTER MAINTENANCE INDICATOR - MANN
	1	17	DISHARGE PRESSURE GAUGE WITH BALL VALVE - WIKA
	1	18	ACOUSTIC ENCLOSURE - G5 DN 80 - INDOOR INSTALLATION
	1	19	MECHANICAL FAN - MOUNTED ON BLOWER SHAFT - GM 4S/7L
G	1	20	INLET FLEXIBLE SLEEVE - DN 80 / 3" SCHED 40
G	1	21	UNLOADING VALVE

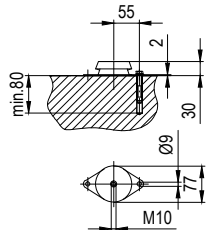
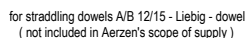
#### NOTES:

- UNIT ASSEMBLY WEIGHT WITHOUT MOTOR: 320 KG
- PAINT: AERZEN STANDARD BLUE
- 1M CLEARANCE IS RECOMMENDED AT THE FRONT OF THE UNIT FOR MAINTENANCE ACCESS
- MOTOR: WEG 210T REPRESENTED
- NOT SHOWN ON DRAWING
- FOR VARIABLE SPEED APPLICATIONS, CONSTANT TORQUE VFD ARE REQUIRED
- OPTIONAL

 AERZEN AERZEN CANADA 1995 MONTÉE LABOISSIÈRE, VAUDREUIL QC J1V 8P2 (450) 424-3866 FAX (450) 424-3865 FAX	TITLE DELTA - GM 7L DN 80 - PRESSURE	
	DWG NO. ZG-00799	
	DRAWN BY	REVIEWED BY
	DATE	REV
THIRD ANGLE PROJECTION		B
SCALE: NONE		SHEET: 1 OF 1

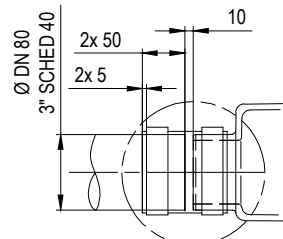
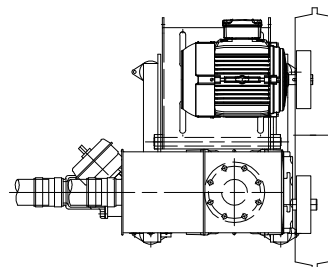
REVISION DETAILS					
REV	DRAWN BY	DATE	REVIEWED	DATE	DETAILS
B	-	18-10-12	-	18-10-12	UPDATE ON GENERAL ARRANGEMENT DRAWING
A	-	08/05/11	-	08/05/11	RELEASE

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## ANCHORING BY OTHERS

### ANCHORING DETAILS

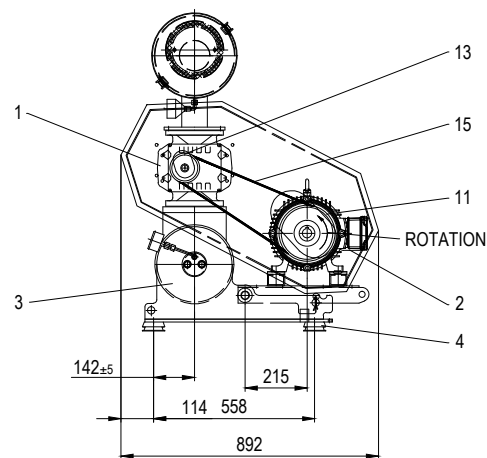
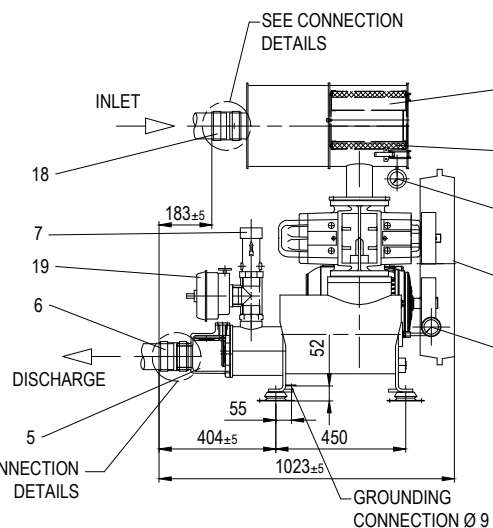
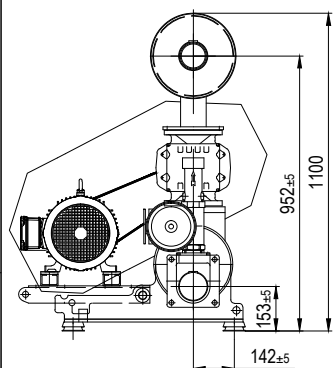


## CONNECTION DETAILS

NOTE	QTY.	POS	DESCRIPTION
	1	1	BLOWER - GM 7L - 80 KG
D	1	2	ELECTRIC MOTOR - WEG 210T REPRESENTED
	1	3	BASEFRAME / DISCHARGE SILENCER - DN 80
	4	4	VIBRATION ISOLATORS - DN 80
	1	5	CONNECTION HOUSING WITH CHECK VALVE - DN 80
	1	6	DISCHARGE FLEXIBLE SLEEVE - DN 80 / 3" SCHED 40
	1	7	PRESSURE RELIEF VALVE - DN 50 - SET TO 750 mbar
	1	8	INLET FILTER / SILENCER - DN 80
	1	9	INLET FILTER ELEMENT - G5 DN 80
	1	10	BELT GUARD - DN 50
	1	11	DRIVER SHEAVE
E	1	12	DRIVER BUSHING
	1	13	DRIVEN SHEAVE
E	1	14	DRIVEN BUSHING
	1	15	V-BELT SET
	1	16	FILTER MAINTENANCE INDICATOR - MANN
	1	17	DISCHARGE PRESSURE GAUGE WITH BALL VALVE - WIKA
G	1	18	INLET FLEXIBLE SLEEVE - DN 80 / 3" SCHED 40
G	1	19	UNLOADING VALVE

**NOTES:**

- A. UNIT ASSEMBLY WEIGHT WITHOUT MOTOR: 208 KG
- B. PAINT: AERZEN STANDARD BLUE
- C. 1M CLEARANCE IS RECOMMENDED AT THE FRONT OF THE UNIT FOR MAINTENANCE ACCESS
- D. MOTOR: WEG 210T REPRESENTED
- E. NOT SHOWN ON DRAWING
- F. FOR VARIABLE SPEED APPLICATIONS, CONSTANT TORQUE VFD ARE REQUIRED
- G. OPTIONAL



REVISION DETAILS						
REV	DRAWN BY	DATE	REVIEWED	DATE	DETAILS	APPROVED BY
B	-	18-10-12	-	18-10-12	UPDATE ON GENERAL ARRANGMENT DRAWING	
A	-	08/03/11	-	08/03/11	RELEASE	



### THIRD ANGLE PROJECTION



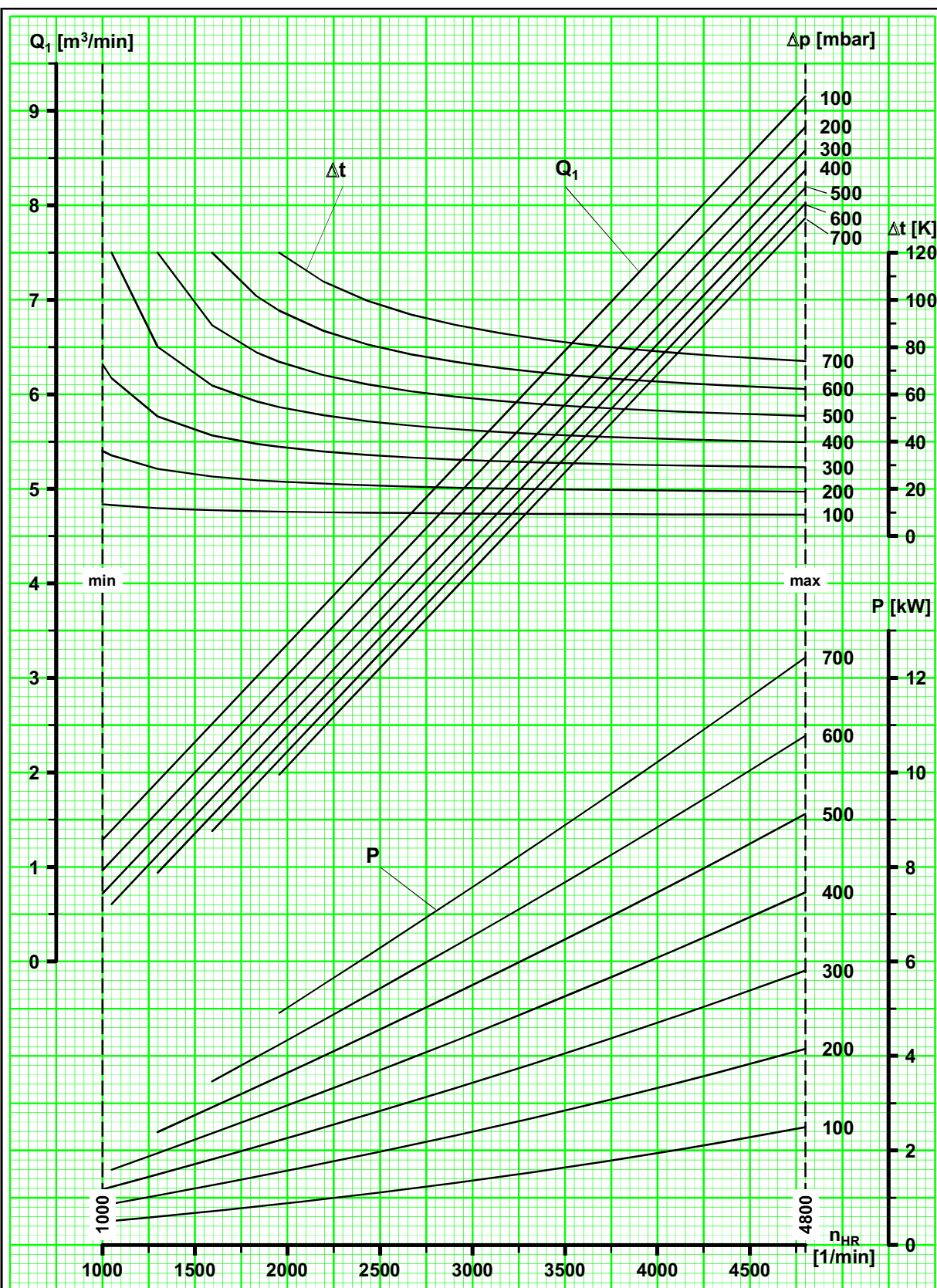
TITLE DELTA - GM 7L  
DN 80 - PRESSURE

DWG NO.	ZG-00825
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DRAWN BY	REVIEWED BY
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DATE	FEBRUARY 08, 2011
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SCALE: NONE	SIZE: A	SHEET: 1 OF 1
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$Q_1$  : Ansaugvolumenstrom (Luft)  
bei  $p_1 = 1,0$  bar und  $t_1 = 20^\circ\text{C}$

$n_{HR}$  : Hauptrotordrehzahl

$n_V$  : Antriebswellendrehzahl

$P$  : Leistungsbedarf an der Kupplung

$t$  : Temperaturerhöhung

$p$  : Druckerhöhung

intake volume flow (air)  
at  $p_1 = 1,0$  bar and  $t_1 = 20^\circ\text{C}$

main rotor speed

drive shaft speed

power required at the coupling

temperature rise

pressure difference

débit aspiré (air)  
pour  $p_1 = 1,0$  bar et  $t_1 = 20^\circ\text{C}$

vitesse du rotor principal

vitesse de l'arbre d'entraînement

puissance absorbée à l'accouplement

élévation de température

pression différentielle

Leistungsdiagramm - Überdruck - für Drehkolbengebläsestufe

performance diagram - overpressure - for stage of rotary piston blower

courbes de fonctionnement - fonctionnement en pression - pour étage de surpresseur à pistons rotatifs

**GM 7 L**

$n_V / n_{HR} = 1$

04/2016  
TRD - Halleemann

G2 - 406 - XL  
SAP - 4000323895 - 00

Customer Reference: Rodney WWTP Upgrade, P# 215817  
Aerzen Reference: SQ-21-214024a

Submitted by: Nikita Assilamehoo  
[nikita.assilamehoo@aerzen.com](mailto:nikita.assilamehoo@aerzen.com)

### **SCOPE OF SUPPLY**

#### **3 Aerzen Generation 5 Blower Package - GM 7L DN 80 - Pressure - including:**

Aerzen GM 7L Blower  
Drive Motor: 15hp, 1800rpm, TEFC, 575V/60Hz  
  
Base with integrated reactive type discharge silencer  
Intake filter silencer  
Hinged motor support as automatic belt tensioning device  
Set of vibration isolation mounts  
Narrow v-belt drive with guard - 1 set  
Spring loaded relief valve  
Discharge manifold with externally accessible integrated check valve  
Flexible connector with clamps for schedule 40 pipe, discharge

#### **Instruments**

Pressure gauge c/w isolation ball valve (3x)  
Dirty filter indicator (3x)

#### **Optional Accessories**

Acoustic Enclosure - Indoor/Outdoor  
Inlet flexible sleeve - DN 80 (3")  
Motor Protection - 1 Thermistor/Ph

#### **Optional Instruments**

Temperature switch c/w thermowell 120V (3x)  
Pressure switch 120V (3x)  
15Hp - 575V VFD - NEMA 12 - Constant Torque c/w Disconnect (Shipped Loose) (3x)

#### **Optional Spare Parts**

1 Year Maintenance Kit (1 x V-Belt Set, 1 x Intake Filter)  
2 Year Maintenance Kit (1 x V-Belt Set, 1 x Oil Change (Delta Lube), 2 x Air Filter)

#### **Connection Points:**

Intake Connection: Local  
Discharge Connection: DN 80 - 3"

Exclusions: See page 2

Customer Reference: Rodney WWTP Upgrade, P# 215817  
Aerzen Reference: SQ-21-214024a

## **PERFORMANCE DATA**

### **Aerzen Blower Package - GM 7L DN 80 - Pressure**

#### **Configuration:**

**G5**

**Min F**

<b>Conditions:</b>	<b>Sm³/min</b>	<b>332</b>	<b>71</b>		
Flow at inlet conditions	m³/min	6.24	1.34		
	lcfm	221	47		
Inlet pressure ( abs. )	bar	0.988	0.988		
	Psi	14.33	14.33		
Pressure differential	mbar(g)	483	483		
	<b>Psig</b>	<b>7.0</b>	<b>7.0</b>		
Inlet temperature	°C	40	40		
Discharge temperature	°C	96	142		
Blower speed	RPM	3905	1520		
Blower maximum speed	RPM	4800	4800		
% of maximum blower speed		81%	32%		
Power required at shaft (with accessories) **	kW	7.3	2.7		
	HP	9.7	3.6		
Total Power (Wire to Air):	HP	10.8	4.0		
Motor rating	<b>HP</b>	<b>15.0</b>			
Motor speed	RPM	1765	687		
Motor frequency	Hz	60	23		

Noise level without acoustic hood

dB(A) 90

Noise level with acoustic hood

dB(A) 73

#### **Tolerances as per EN 10204, in accordance with standard ISO 1217:**

Flow at inlet conditions / Power required at shaft +/- 5%

#### **Blower package noise level:**

Free field measurement at 1m from the complete blower package ( tolerance +/- 2 dB(A) )

#### **Tests and measurements:**

Blower stage: 1.5 hour flow test at the factory ( Germany ) on a calibrated test bed, at maximum operating conditions and according to DIN 1945. acceptance tolerance: +/- 5%.  
A complete test report is available upon request.

#### **On Site Commissioning**

Available upon request, charges to be advised.

- Any commissioning activity is subject to two weeks prior notice and completion of commissioning checklist.
- Any on-site activity outside the time indicated will be billed according to the Aerzen Standard Rate Sheet

#### **Exclusions**

Control Panels, Motor Starters, Piping and Electrical Connections

\* Unloading valves are required for reduced voltage starters

#### **Warranty**

Blowers including accessories are warranted for a period of 12mo / max 18mo after delivery and after provisional acceptance of the work against defects in workmanship and design. This warranty does not cover wearing parts unless such parts are defective during shipping / commissioning. As per Aerzen standard warranty terms.

\*\* Power at shaft excludes drive motor and belt drive

Customer Reference: Rodney WWTP Upgrade, P# 215817  
Aerzen Reference: SQ-21-214024a

#### **PRICING**

	<b><u>Unit Cost</u></b>	<b><u>Extended Cost</u></b>	
<b>Pressure Package - GM 7L DN 80</b>	11,720.00 \$	35,160.00 \$	3 Units
<b><u>OPTIONS</u></b>			
Acoustic Enclosure - Indoor/Outdoor	2,880.00 \$	8,640.00 \$	3 Units
Inlet flexible sleeve	120.00 \$	360.00 \$	3 Units
Motor Protection - 1 Thermistor/Ph	260.00 \$	780.00 \$	3 Units
<b><u>Optional Instruments</u></b>			
Temperature Switches	490.00 \$	1,470.00 \$	3 Units
Pressure Switches	460.00 \$	1,380.00 \$	3 Units
VFD with its stand	4,400.00 \$	13,200.00 \$	3 Units
<b><u>Optional Spare Parts</u></b>			
1 Year Maintenance Kit	200.00 \$	600.00 \$	3 Units
2 Year Maintenance Kit	380.00 \$	1,140.00 \$	3 Units

#### **TERMS AND CONDITIONS**

<b>INCOTERMS:</b>	EXW - Aerzen Canada
<b>Delivery:</b>	Collect
<b>Start-up Assistance / Operator Training:</b>	As noted - page 2
<b>Funds:</b>	CAD
<b>Payment terms:</b>	See schedule below Subject to credit approval and final destination of goods
<b>Payment Schedule:</b>	15% on submittal of approval drawings 85% on readiness to ship - Aerzen Canada
<b>Taxes:</b>	G.S.T. extra, P.S.T. charged in Quebec only
<b>Prices firm until:</b>	5/21/2022
<b>Packing:</b>	Heavy duty wooden skid with polyethylene wrapping included * Skeleton Frame * Special packing can be quoted upon request.
<b>Warranty:</b>	12mo / max 18mo after delivery
<b>Estimated Delivery:</b>	10-12 Weeks

- to avoid warranty conflicts, we recommend that our start-up services be ordered and the inspection and operation procedures in our manual be respected.
- The goods remain the property of Aerzen Canada until full payment. Extended payment delays may void the warranty.
- Past due invoice amounts carry an interest charge calculated at 24% apr.
- Aerzen Canada reserves the right to change product specifications without prior notice.
- Aerzen can hold ready units free of charge for up to 3 weeks past agreed due date, after which storage fees will apply.

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**APPENDIX B-3**  
**Spiral Screen and FRP Enclosure**

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claroglobal.com

Project: Rodney WPCP **19 January 2022**  
Municipal Authority: West Elgin, ON **Ref#: Rodney, ON; 21221-Q-00**  
Consultant Contact Tariq Abou Jarboua, Project Designer, R.V. Anderson Associates Ltd., 557 Southdale Road East, Suit 200, London, On N6E 1A2; T.: 519.681.9916 x5023; C.: 519.697.8201; [TAbouJarboua@rvanderson.com](mailto:TAbouJarboua@rvanderson.com)  
Claro Representative: Scott Lenhardt, P.Eng., Pro Aqua, Inc., 264 Bronte Street South, Unit #7, Milton (Ontario) ON L9T 5A3; T.: 905.864.9311 (228); C.: 905.330.9244; [scott@proaquasales.com](mailto:scott@proaquasales.com)  
Subject: Budgetary costs proposal for one (1) spiral screen system: one (1) in-channel configuration spiral screen c/w continuous automatic hygienic bagger, control panel, davit crane, & custom FRP enclosure.

### [Part C]: Budgetary Costs – Village of Rodney, ON

- Item 1: One (1) Claro Shaftless Spiral Conveyor Screen – Model SS 300-2800-6mm
- Item 2: One (1) Control Panel (Outdoor Installation) Incl. Ultrasonic Level Sensor & Float Switch + Local E-Stop Station
- Item 3: One (1) Custom FRP Enclosure
- Item 4: One (1) Davit Crane System
- Item 5: Claro Technical Submittal, Installation Instructions & Commissioning Services, and O&M Manuals
- Item 6: Shipping, Brokerage & Insurance to Village of Rodney, ON project site included
- Costs for Items 1 – 6 .....174,800 CAD  
(Applicable Taxes Extra)

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### [Part D]: Terms of Delivery

- Terms of Delivery: DDP Village of Rodney project site, ON; each piece of equipment in a crate (or) on a specially-built wooden pallet and in a marine container delivered on a chassis truck or within a conventional transport truck; contractor responsible for providing appropriate on-site off-loading equipment.
- Delivery Time: Submittal within 4 weeks or better if required.  
Delivery on site 16-22 weeks or better if required.
- Warranty: **1 year** normal running time. Warranty resets upon repair.
- Terms of payment: 90% on delivery (30 days net)  
10% on start-up (30 days following successful start-up)
- This proposal is valid 1 month from 19 January 2022. Extensions of validity on request.





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**APPENDIX B-4**  
**Alum Tank**

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Hello Tariq,

Thank you for your recent request for quote. We are pleased to be of service to you and your team. As per your request, I have prepared the quote below and attached drawing(s) for your reference.

**ACO model: CT-2455, HDPE (1.9s.g.) Closed Top Tank; \$ 10,532.00 EA/net**

Dimensions: 90"Ø x 132" tall

Capacity: 2,450 IG / 2,940 USG / 11,000 L

Complete with:

- 1, 24" HDPE bolted lid with gasket
- 1, 8" PVC Spool Flange with Donker Bolts
- 1, Steel Mixer mount bridge with Donker Bolts finished in white powder coat (Max. mixer weight of 250 lbs) with 12" diameter hole in top of tank
- 3, 1-1/2" FNPT PVC Tank Adapter
- 1, 2" FNPT PVC Tank Adapter
- 4, Steel lifting lug assembly with Donker bolts
- 1, Stainless Steel engraved ID Tag with HDPE mounting bracket (4" x 6")

Gaskets: EPDM

Delivery: Approx. 9-11 weeks

Lead time is subject to change. Lead time is to be confirmed once drawings are approved, if applicable.

All sales are final. Applicable taxes are extra. FOB ACO in Pickering, ON. Quote is valid for thirty (30) days only.

*(Please note that all quotes containing steel products are only valid for 7 days)*

All funds are CAD.

**From:** Tariq Abou Jarboua <[TAbouJarboua@rvanderson.com](mailto:TAbouJarboua@rvanderson.com)>

**Sent:** December 13, 2021 2:20 PM

**To:** Bill Murray <[william@acotainers.com](mailto:william@acotainers.com)>

**Subject:** Rodney WPCP Upgrade Project # 215817, Alum Storage Tank

Dear William

You are kindly requested to quote for one Alum Storage Tank to replace the existing FRP 30,000 Tank.

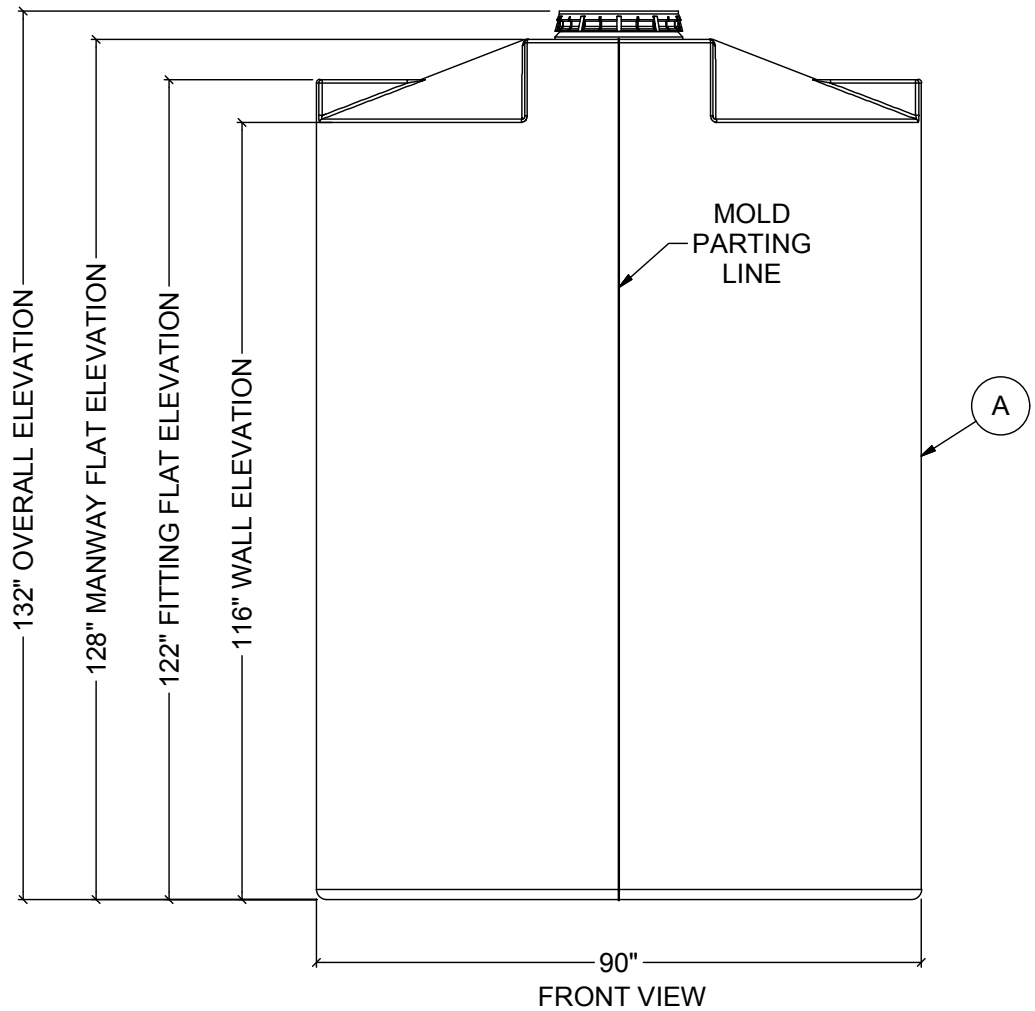
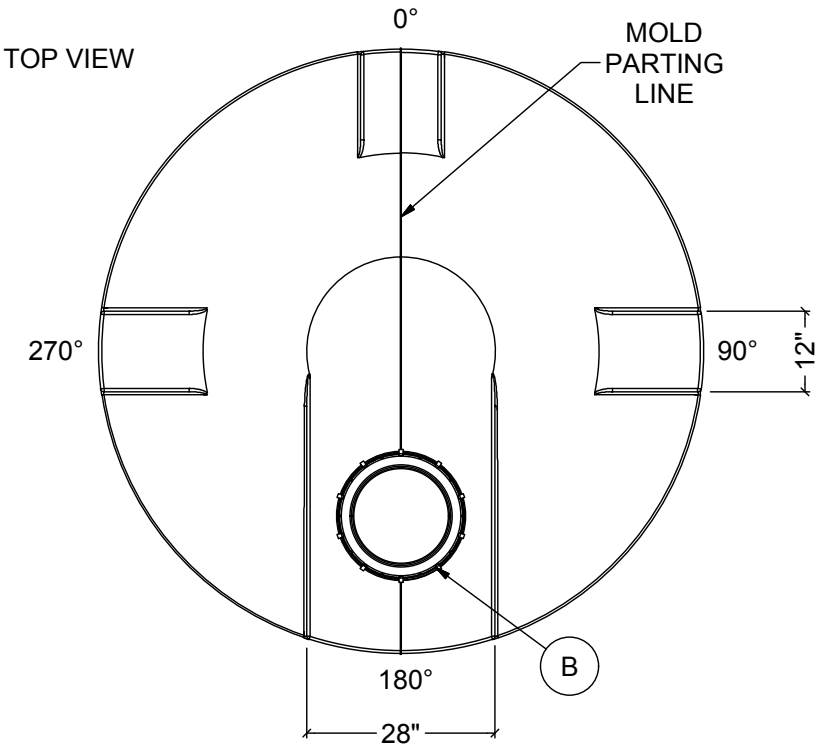
Requested Specs:

One PE (ACO Container Sys.), Volume: 10,000 L, Vertical Tank to store Alum solution.

The tank to be completely self-supporting without the need for ribs of stiffeners.

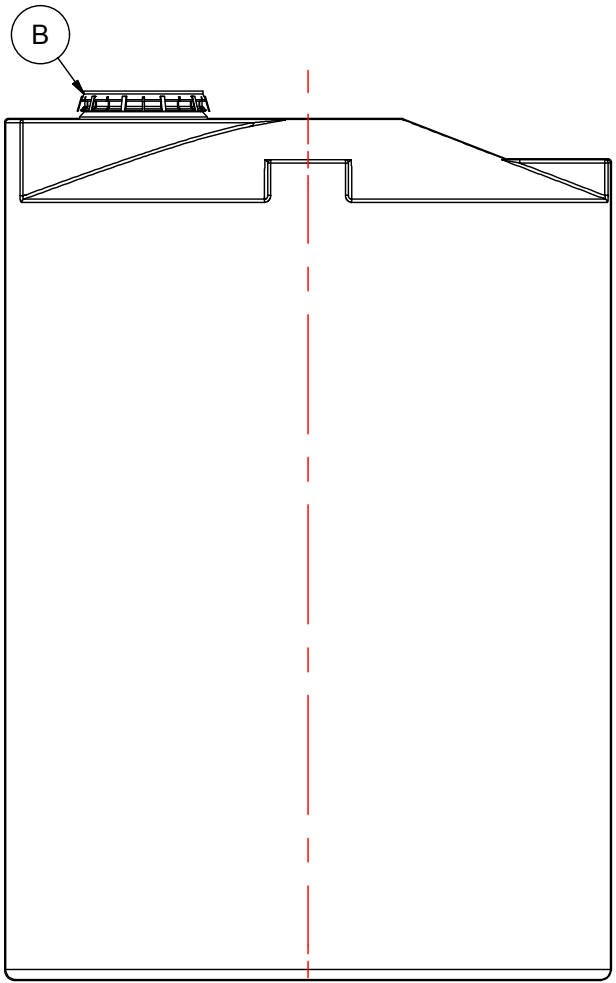
Tank Fittings:

- Min 610 mm dia Access Lid with handles for easy removal
- Min 200 mm dia level sensor nozzle (flanged)
- Min 300 mm dia opening for a portable mixer c/w reinforced bracket for a mixer to be clamped or bolted on.
- 40 mm dia nipple for make-up water connection
- 40 mm dia nipple for suction header connections
- 50 mm dia vent nipple
- 40 mm dia drain valve and plug
- Gasket's material to be compatible with product to be stored
- Lifting lugs
- Label and Tag

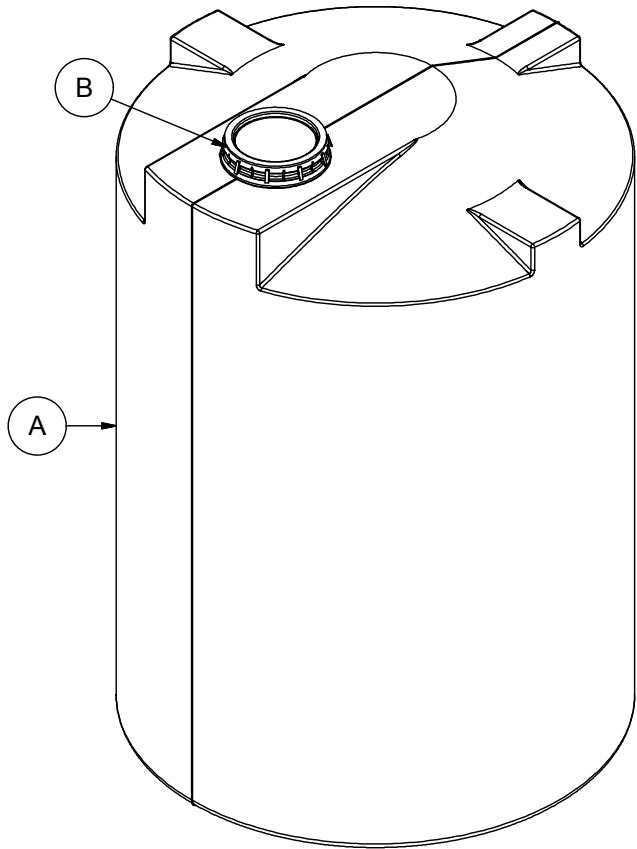



NOTES:

1. TANK IS MANUFACTURED FROM HDPE OR XLPE. (1.5 OR 1.9 OR 2.2 SG)
2. TANK IS MANUFACTURED TO ASTM-D-1998 STANDARD.
3. ALL TANK DIMENSIONS ARE SUBJECT TO A +/-3% DIMENSIONAL TOLERANCE.
4. FLEXIBLE COUPLINGS ARE REQUIRED FOR ALL EXTERNAL PIPING.
5. ALL FITTING GASKETS ARE EPDM OR VITON.
6. ACO RECOMMENDS ALL FLANGE GASKETS TO BE MIN. 1/4" THICK.
7. ON LARGER TANKS SOME MECHANICAL FITTINGS MAY NEED TO BE REMOVED IN ORDER TO AVOID WIDE OR OVERSIZED LOADS DURING TRANSPORT.
8. HDPE ALIGNMENT WEDGES MAY BE INSTALLED BY ACO ON SOME TOP FITTINGS TO KEEP THEM PERPENDICULAR TO THE GROUND.



MATERIALS LIST		
ITEMS	DESCRIPTION	NOTES
A	CT-2455 CLOSED TOP TANK	
B	16" LID WITH LOCKING STRAP	



1	NOV-01-18	ADDED PARTING LINE	WM		
REV	DATE	DESCRIPTION	BY	APPD	REVD
REVISIONS					
CUSTOMER					
TITLE		ACO JOB NO:			
2,450 IG CLOSED TOP TANK		PURCHASE ORDER NO:			
		PURCHASER'S EQUIP. NO:			
THIS DRAWING IS THE PROPERTY OF ROTOPLAST INC. AND SHALL NOT BE COPIED OR TRANSFERRED WITHOUT THE WRITTEN CONSENT OF ROTOPLAST INC.		<div><div>CONTAINER SYSTEMS</div><div>A division of Rotoplast Inc.</div></div>			
ENGINEERS SEAL	ACO CONTAINER SYSTEMS DIVISION OF ROTOPLAST INC. 794 McKay Road Pickering, Ontario, Canada Tel: 905-683-8222 Web: ACOTAINERS.COM		DESIGNED		
			DRAWN	WM	
			CHECKED		
			APPROVED		
			SCALE	N.T.S.	
			DATE		02-03-2016
DWG No				REV	
CT-2455				1	

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**APPENDIX C**  
**Rodney WPCP Upgrades Desktop**  
**Analysis and BioWin Modeling**

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# Rodney WPCP Desktop Analysis and BioWin Modeling

Parameter	Unit	Current Operation Avg	Current Operation Avg	Current Operation Max	Current Operation Max	Rated Capacity Avg Month	Rated Capacity Avg Month	Rated Capacity Max Month	Rated Capacity Max Month
		Value	Value	Value	Value	Value	Value	Value	Value
Average day flow (ADF)	m <sup>3</sup> /d	360	360	360	360	590	590	590	590
Peak day flow (PDF)	m <sup>3</sup> /d	1,972	1,972	1,972	1,972	2,333	2,333	2,333	2,333
Peak hourly flow (PHF)	m <sup>3</sup> /d	2,333	2,333	2,333	2,333	2,333	2,333	2,333	2,333
cBOD <sub>5</sub>	mg/L	110	110	235	235	110	110	235	235
TSS	mg/L	120	120	263	263	120	120	263	263
VSS	mg/L	110	110	210	210	110	110	210	210
TKN	mg/L	30	30	43	43	30	30	43	43
TP	mg/L	3.1	3.1	4.7	4.7	3.1	3.1	4.7	4.7
Temperature	°C	12	21	12	21	12	21	12	21
<b>Extended Aeration Tanks</b>									
Aeration tank volume in operation	m <sup>3</sup>	410	410	410	410	410	410	820	820
Aeration tank depth	m	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Aeration tank surface area	m <sup>2</sup>	137	137	137	137	137	137	273	273
Aeration tank HRT	h	27	27	27	27	17	17	33	33
SRT	d	15	15	15	15	15	15	15	15
Average DO	mg/L	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
MLSS	mg/L	1370	1320	3752	3654	2024	1945	2429	2347
Aeration Capacity	m <sup>3</sup> /h	167	175	315	332	292	305	509	534
Current / required air supply rate	m <sup>3</sup> /h								
Mixing air demand @0.61L/m <sup>2</sup> -sec	m <sup>3</sup> /h	301	301	301	301	300	300	600	600
<b>Secondary Clarifiers</b>									
Clarifier surface area	m <sup>2</sup>	74	74	74	74	74	74	74	74
RAS ratio	%	100	100	100	100	100	100	100	100
RAS flow rate	m <sup>3</sup> /d	360	360	360	360	590	590	590	590
RAS MLSS	mg/L	2684	2589	7359	7167	4000	3843	4742	4582
Surface overflow rate at ADF	m <sup>3</sup> /m <sup>2</sup> -d	5	5	5	5	8	8	8	8
Surface overflow rate at PHF	m <sup>3</sup> /m <sup>2</sup> -d	32	32	32	32	32	32	32	32
Solids loading rate at ADF	kg/m <sup>2</sup> -d	13	13	37	36	32	31	39	37
Solids loading rate at PDF	kg/m <sup>2</sup> -d	43	42	118	115	80	77	96	93
<b>Effluent quality</b>									
cBOD <sub>5</sub>	mg/L	1.39	1.32	1.61	1.52	1.67	1.56	1.84	1.72
TSS	mg/L	1.66	1.66	1.79	1.78	2.91	2.9	2.88	2.87
TAN	mg/L	0.55	0.27	1.24	0.6	0.53	0.27	0.59	0.29
TP	mg/L	0.11	0.12	0.04	0.05	0.16	0.31	0.08	0.09
<b>Sludge Quality</b>									
Sludge TSS	kg/d	37	35	102	99	54	52	131	127
Sludge VSS	kg/d	21	19	44	41	33	31	71	67
Flow	m <sup>3</sup> /d	13.67	13.67	13.85	13.85	13.42	13.40	27.65	27.64
TSS	%	0.3	0.3	0.7	0.7	0.4	0.4	0.5	0.5