Ingleside WWTP Upgrades

Fine Screening Equipment: 46 43 00
Process Equipment Pre-Selection

EVB Engineering
EVB Ref: RFP N° 14 – 2020
Bidding Document for System No. 1 – Fine Screening Equipment
Township of South Stormont, ON
Claro Ref: 17089-Q-01

Claro Environmental Technologies
3065 Peugeot, Suite 100, Laval, QC H7L 5C4 Canada

(Bookmarked PDF)

Ingleside WWTP Upgrades
Fine Screening Equipment: 46 43 00
System No. 1

Request for Proposal
Process Equipment Pre-Selection

Contents

1. Proposal Introduction/System Overview Including Executive Summary & Supplier Experience

A. Proposal Introduction & System Overview including Executive Summary
i. Introduction
ii. Executive Summary – Ingleside, ON

B. Corporate Experience
i. Information Regarding Claro's Staff
ii. Corporate Profiles & Personnel
• Claro Environmental Technologies – Brief Introduction
• Mellegård & Naij AB (M&N) – Brief Introduction
iii. ISO 9001, ISO 14001, & CSA certificates – Mechanical & Controls

2. Form of Proposal (System No. 1: Fine Screens & Compactor – Section 46 43 00)

A. General Proponent Information

B. System #1 Submission Forms – Fine Screens and Compactor
1. Form of Proposal
1.1 Financial Details
1.2 Technical Details
.1 Fine Screens Description
.2 Fine Screen Components Included
.3 Screenings Conveyor Description
.4 Screening Washer Compactor Description
.5 Claro Contact References including Project Information, Thumbnail Drawings & Installation Photographs
.1 Hawkesbury, ON (2012)
.2 Mascouche – Lachenaie, QC (2010)
.3 Mississippi Mills, ON (2012)
.4A Vauxhall PCP, ON (2011)
.4B City of London – Adelaide Pump Station, ON (2018)
.5 Campbell River, BC (2016)

.6 Quinte West, ON (2016)
.7 Squamish, BC (2017)
.8 Fort St. John, BC (2018)
.9 Northern Rockies Regional Municipality – Fort Nelson WWTP, BC (2017)

C. Additional Installation Photographs (Included & selected to demonstrate capabilities & different layouts, apertures, location, age of installation, in-channel & in-tank configurations, municipal influent & septage applications – Contact references provided on request)

1. Alliston, ON (2014)
2. Caledonia, ON (2016)
3. Epping, NH (2019)
4. Ste. Marianne, QC (2015)
5. St. Zotique, QC (2014)
6. Uxbridge, MA (2019)
7. Le Gardeur, QC (2012)
8. Prevost, QC (2011)
9. Kamloops, BC (2013)
10. Repentigny, QC (2018)
11. Sherbrooke, QC (2013-2014)
12. Chalk River, ON (2018)
13. St. Félix de Valois, QC (2019)
14. Asbestos, QC (2010)
15. Bristol, RI (2015)
16. Fruitvale, BC (2019)
17. Pottersburg PCP (London), ON (2018)
18. St. Eustache, QC (2013)
19. St. Placide, QC (2014)
20. Arbutus Ridge, BC (2019)
21. Dorchester, ON (2020)
22. Angus, ON (2020)
23. Wellesley, ON (2020)
24. Petawawa, ON (2020)
25. Edmonton, AB (2012)
26. Ravensview, ON (2019) – Septage
27. Charlie Lake, BC (2016) – Septage
28. Templeton, MA (2013) – Septage
29. Saskatoon, SK (2019) – Septage
30. Régie de Gestion des Matières – Septage Résiduelles de la Maurice, QC (2018)
31. Penetanguishene, ON (2017)
32. Other long-distance discharge tube installations (selected compilation)

D. Expanded Claro Contact Reference List – Municipal Influent Screening Systems

E. Design and Supply Schedule Summary + Sample Warranty Statement

3. Technical Proposal

A. Scope, Layout & General Mechanical & Controls Arrangement Drawings, Sample Control Narrative & Sample HMI Screens
   i. Detailed Scope of Supply, Materials of Construction & Weights
   ii. Price / Listing for 10+ Years of Operation (Conservative PM Basis)
   iii. Plans, Sections & General Arrangement Drawings
      .1 General Layout & Implantation Drawing – Ingleside, ON
      .2 General Layout & Implantation Drawing – Ingleside, ON (11 x 17" format)
      .3 Fine Step Screen – Typical Components Drawing (Exploded 3D View)
      .4 Fine Screen Linkage Drive System (Sleeve Bushings Illustration)
      .5 Wash Press – Components 3-D Drawing (Typical)
      .6 Screening System Control Panel & Local HOA Stations Sample Drawings & Dimensions
   iv. Control Panel – Sample HMI Touch Screens (Samples from Hawkesbury WWTP, ON)
   v. Sample Control Narrative – Ingleside WWTP, ON (Preliminary): Two (2) Fine Step Screens + One (1) Common Wash Press
   vi. Deviation Listing (Separate Listing As Specified)

B. System Performance: Separation Efficiency, Maintenance History and Reliability, & Ease of Use/Hygienic Work Environment Advantages of Claro Fine Step Screening Equipment
   i. Separation Efficiency
      Part A: Introduction
      Part B: Long-term, Proven Performance & Operator Experience / Testimonials
      Part C: Step Screen Capture Rate Efficiency & the UKWir / ThompsonRPM Report
   ii. Listing of the a) Separation Efficiency, b) Mechanical / Maintenance record, & c) Ease of Use / Hygienic Work Environment Advantages of Claro Fine Step Screening Equipment
   iii. Claro Fine Step Screen (3rd Generation Design) – Brief Summary of Distinguishing Design Features / Advantages Compared to Earlier Generation Step Screen Designs
   iv. Operation & Maintenance Requirements
   v. Operation Costs Overview – Electrical & Spares
   vi. Claro Screening Films Website – Ingleside, ON

C. Materials of Construction
   .1 Step Screen
   .2 Wash Press

D. Work (Install & Supply) to Be Completed by the Installing Contractor
   .1 Installation of Mechanical Equipment – Outline
   .2 Power Supply & Control Wiring Summary
   .3 Service Water Supply Requirements Summary

E. Fine Screening System Training Agenda – Ingleside WWTP, ON (Duration: approx. 2.5 hours)

F. Brochures / Catalog Cuts: Fine Step Screen, Wash Press Compactor & Auxiliary Equipment
   .1 Fine Step Screen Brochure
   .2 Wash Press Compactor Brochure
   .3 Hygienic Bagger Brochure
   .4 Level Probe(s) & Transmitter – Endress + Hauser
   .5 Y-strainer – (IFC), if required
   .6 Ball Valves (Full Port; AISI 316) for Wash Press Washing & Flushing Connections + Isolation of Pressure Gauge
   .7 Solenoid Valves (Full Port; AISI 304) for Wash Press Washing & Flushing Connections

G. O&M Manuals – Fine Step Screen & Wash Press Compactor
   i. Fine Step Screen Manual (Sample)
   ii. Wash Press Manual (Sample)

1. Proposal Introduction/System Overview, including Executive Summary & Supplier Experience

Ingleside WWTP Upgrades

Screening Equipment: 46 43 00
Process Equipment Pre-Selection

EVB Engineering
EVB Ref: RFP N° 14 - 2020
Township of South Stormont, ON
Claro Ref: 17089-Q-01

Claro™

claroglobal.com

Project:	Ingleside WWTP Upgrades, ON	**14 September 2020**
Municipal Authority:	Township of South Stormont, ON	**Ref#: Ingleside, NS; 17089-Q-01**
RFP Contact:	EVB Engineering Attention: Jamie Baker, P.Eng., 800 Second St. W., Cornwall, ON K6J 1H6; T.: 613.935.3775 (220); Questions relating to T&C or Technical specifications: jamie.baker@evbengineering.com Closing: 15 September 2020, at 2:00 p.m. local (EST)	
Claro Representative: (Ontario)	Scott Lenhardt, P.Eng., Pro Aqua, Inc., 264 Bronte Street South, Unit #7, Milton, ON L9T 5A3; T.: 905.864.9311 (228); C.: 905.330.9244; scott@proaquasales.com.	
Subject:	Supply & Delivery of Screening Equipment Section 46 43 00; Request for Proposals; Township of South Stormont, Ingleside WWTP Process Equipment Pre-Selection, RFP No. 14 - 2020, ON; EVB Engineering. Including all addenda.	

A. Proposal Introduction / System Overview including Executive Summary

i. Introduction

Claro has the pleasure of offering a design & preselection costs proposal for the subject fine screening equipment for the Ingleside WWTP. We are proposing two (2) x 3rd-generation 3mm aperture fine step screens, a custom-length wash press compactor with 2 matching inlets and a plug-&-play control panel with an intuitively-designed graphic interface based on the project drawings. The fine screens, wash press compactor and control panel fully conform to the separation performance, quality, features & warranty requirements outlined in the RFP specifications. Indeed, the Claro system is provided with a **5-year warranty and is offered at special pre-selection costing**.

The proposed 2-step screen & common wash press equipment configuration does not require an intermediary transfer conveyor. This common wash press arrangement has been successfully implemented in a variety of municipal facilities across Canada including: Hawkesbury (ON; 2012), Mississippi Mills (ON; 2012), Alliston (ON; 2014), Caledonia (ON; 2016), St. Zotique (QC; 2014), Ste. Marianne (QC; 2015), Fort Nelson (BC; 2017), Kitimat (BC; 2018), Fort St. John (BC; 2018), Mill Bay (BC; 2020) and other wastewater treatment plants. The systems at Hawkesbury (3mm) & Mississippi Mills (6mm), for example, have delivered a high level of separation without the requirement of spare parts or maintenance since start-up in 2012. The 3mm step screens at Hawkesbury have successfully safeguarded sensitive downstream unit processes including IFAS treatment basins incorporating honeycomb media and cylindrical drains that have functioned without maintenance or tank drainage.

The separation efficiency of the proposed technology has proven itself over the long-term in applications such as Hawkesbury, Mascouche-Lachenaie (Anox Kaldnes MBBR since 2010), and Ste-Marianne (Suez Meteor MBBR since 2015). The separation efficiency of a properly-sized & controlled 3mm Claro step screen is equal or better than the 6mm perforated plate screen alternative defined in the RFP specifications and is commensurate to the protection of all the unit processes outlined in the facility flow sheet. The proposed step screens will deliver a separation efficiency of >75% as specified for their entire service life without being compromised by a worn brush or bottom frame seal.

Claro provides 3 different types of perforated plate screens for influent works applications among other genres of wastewater screening & grit removal technologies. We believe, however, that the Claro fine step screen will deliver the best results in all respects, including separation efficiency, competitive cost, hygienic & ergonomic operation and exceptionally few maintenance costs across the extended service life of the equipment.

Claro step screens have been preselected over perforated plate designs in multiple applications across Canada. The City of Calgary is retiring an Escalator screen installed in 2008 in favour of preselected 3mm step screens. The advantages documented in this proposal have been proven by treatment plant operator experience. In addition to installation contact references, we provide a review of expected performance, operator testimonials and a review of testing methodologies in Section 3, Part B. This section includes a brief overview of the UKWir/ThompsonRPM study that competitor perforated plate manufacturers have cited in an attempt to cast doubt on the performance of Claro step screening systems.

In outline, the proposed 3 mm step screening system is suggested because it will provide:

a) consistent, high quality separation proven suitable for sensitive treatment systems such as MBBRs;
b) significantly larger peak capacity and better head loss performance, which provides for lower runtimes (typically between 15 & 30 minutes per 24 hours), better separation and less mechanical wear-&-tear;
c) an ergonomic, low-elevation design that pivots fully out of channel that eliminates closed-space entry into the channel, the need for channel isolation/drainage, and the need for access platforms or ladders – also, no disassembly of chutes or movement of downstream equipment is required;
d) a superior ability to pick-up screenings and remove instantaneous volumes of debris such as Spring rain collection-system leaf loads due to the larger holding capacity of its steps when compared to the shallow articulated ledges or curved panels found on perpendicular-to-flow perforated plate units; also, no rotating elements such as a brush or chains that can be wrapped/fouled with wet wipes;
e) a hygienic working environment with an enclosed, odour-vented system enclosure – no high rpm brushes distributing material within the enclosure and gentle handling of screenings without maceration, which also avoids pushing screenings fibres through the filter media;
f) a significantly simpler system with fewer motors and mechanical parts that, in combination with better capacities & lower runtimes, means very little maintenance requirements or parts costs as proven by the maintenance history of our over 150 installations in Canada.

• Please see following page →

In Canada, our step screening system has been preselected by over 30 municipalities representing both large & small wastewater treatment plant facilities:

1. Hawkesbury (ON)
2. Mississippi Mills (ON)
3. Ravensview (ON)
4. Trenton (ON)
5. Adelaide (London, ON)
6. Pottersburg (London, ON)
7. Sault Ste. Marie (ON)
8. Chatham (ON)
9. Petawawa (ON)
10. Port Weller (Region of Niagara, ON)
11. Chatham (Chatham-Kent, ON)
12. Bracebridge (Muskoka, ON)
13. Vermilion (AB)
14. St. Paul (AB)
15. Fish Creek WWTP (City of Calgary, AB)
16. Kamloops (BC)
17. Campbell River (BC)
18. Charlie Lake (BC)
19. Kitimat (BC)
20. Fort Nelson (BC)
21. Fort St. John (BC)
22. Dawson Creek (BC)
23. Armstrong (BC)
24. Arbutus Ridge (BC)
25. Twin Cedars (BC)
26. Mill Springs (BC)
27. Salmo (BC)
28. Squamish (BC)
29. Fruitvale (BC)
30. Tofino (BC)

The Claro system has also been hard-specified at Wallaceburg (ON), Vauxhall (London, ON), Alliston (ON), Caledonia (ON) and other applications based on technical review and competitive costing. (Please see Section 1, Part B. Corporate Experience, Project Personnel & ISO/CSA Certificates and Section 2 Part B Item 1.2.5 & Part C: References + Installation Photographs for additional information regarding installation experience & the proposed staffing for the Ingleside applications).

The Claro unit is designed by the originator of the step screen and incorporates features that reflect over 35 years of continuous design and in-field applications experience. In Section 3, Part B, Item iii, we provide a listing of features & advantages and a summary of how the Claro step screen is differentiated from other earlier generation step screen designs that can still be found in the marketplace. This review of earlier generation units is important since the Claro unit incorporates key innovations that have yielded a mature and reliable technology. The patented bottom deflector plate configuration is crucial to protect the unit from grit deposition, jamming and mechanical distortion. The linkage drive system is designed according to principles that focus mechanical force in a manner that protects against breakage while eliminating the use of maintenance-prone sprockets, chains & chain tensioners. The all-stainless steel discharge eliminates the material wrapping that can be experienced with plastic end-shoe discharges. The curved 1:1 ratio step ensures against material fall-back. Earlier designs, and in particular copies of these screens built in Italy, Korea and other jurisdictions, that do not conform strictly to the RFP specification requirements are not equivalent and can present operational issues that can be difficult to resolve depending on the facility context. Claro would be keen to review the development history and function of all aspects of step screen design in a virtual Microsoft Teams meeting if this preferred or helpful. All Claro screens in Canada incorporate the key features for long-term reliable operation.

A films website (login information provided below) provides a visual overview of the mechanical construction & operational philosophy of the proposed technology.

We invite the evaluation committee to vet our installation references, visit installations (Claro would be happy to help organize virtual site tours), and welcome the opportunity to provide a virual presentation in your offices.

ii. Executive Summary – Ingleside, ON

The following is a point form summary of features & selected advantages of the screening system proposed for the Ingleside facility:

- Separation Efficiency: Claro is proposing a fine step screening system that has a perforation size of 3 mm plus a 'screenings filter mat' (described/illustrated below including films access). This bar rack aperture size & the implementation of a filter mat operational philosophy where a layer of screenings debris caught on the screen functions as an augmented filter, results in exceptionally fine separation. Our 6 mm aperture systems have solved many issues related to poor screening – eliminated pump clogging, aerator fouling, floatables, and accumulation of material in tanks such as digesters, SBRs and aerated lagoons. 3 mm aperture units have been used successfully to protect sensitive downstream treatment equipment such as MBBR & IFAS aeration media systems & their cylindrical drains including Anox Kaldnes & Meteor. 2mm systems are used to protect 2mm flat sheet MBRs.

'Screenings Filter Mat' augments separation & removes hair, plastics & rags / wet-wipes

Equally importantly, this high level of separation performance is maintained throughout the life & operation of the system as it does not depend on the maintenance of the screen's cleaning system or side or bottom seals to sustain its filtration efficiency. The proposed step screen design eliminates the risk of screenings carryover to the downstream side of the channel since it does not depend on the proper adjustment / maintenance of a wearable rotating brush and does not employ a filter belt that re-enters the downstream flow. Its design also does not require a rubber seal or brush to seal the area between the screen's bottom frame & its filter media. Instead, the Claro unit uses a patented stainless steel deflector plate that does not wear, require replacement or enable material to circumvent the specified aperture of the screen for the life of the system.

The effects of this level of separation at the Ingleside facility will be palpable for the service life of the fine screen that can be counted in decades – certainly longer than 30 years in light of the unit's low runtimes (15 - 30 minutes per day) and elegant design – with very minimal PM and spare parts.

We invite a review of installation contact references regarding the level of screening efficiency, its positive effects on downstream treatment systems and the reduction of regular operator maintenance of equipment such as pumps, aerators and sensitive unit processes.

- Warranty: **Claro five (5) year warranty**.
- Low operation times / low mechanical wear-&-tear: Exceptionally low runtimes (on average between 10 & 30 minutes per 24 hour cycle) delivering exceptional energy efficiency, low wash water usage at the wash press (Note: The screen does not use wash water), and long wearable parts life. This low runtime record is due to the 'screenings filter mat' operational philosophy that aims at operational restraint, the superior capacity & head loss performance of the screen, and the sophistication and flexibility of our proposed control system. Our controls report real-time operational information and incorporate a flexibility that enables set-point optimization of every aspect of the screen's control sequence.
- Minimal maintenance or spare parts requirements: Almost no spare parts use & minimal maintenance requirements as further described in Section 3, Part B, Item iv – Operation and

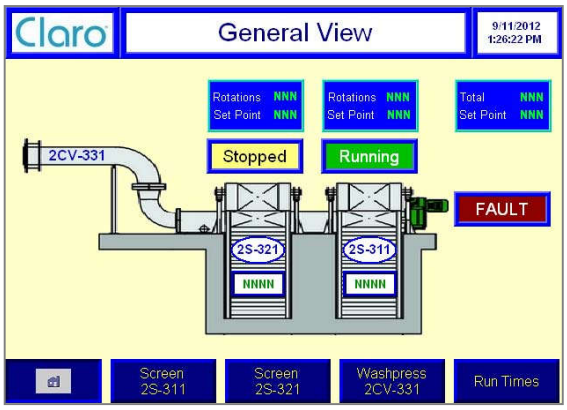
Maintenance Requirements. The system avoids maintenance-prone elements such as brushes, chains, belts, tensioners, scrapers, scraper springs, bottom and side seals, perforated plate panel 'elements' with limited structural strength and lower bearings that are exposed to unscreened influent and grit.

- Fully-enclosed, hygienic operation & standard odour control connections: the Claro step screen is fully enclosed, has a standard odour-control connection that enables the removal of odour from the channel and through the screen before it enters into the operations working area. Also, since the screen handles the captured screening material gently and cleans its filter media without water jets and without the use of a high RPM brush, there is no opportunity for screenings to be dispersed/spattered even within the screen enclosure. Since the step screen does not use chains, there is also no opportunity for material to be pulled up over the top of the channel slab – thus, with the most basic housekeeping, our systems look like an industrial kitchen for their entire service life with no debris litter within or around the screen's enclosure.

Low profile, compact footprint, enclosed, hygienic & odour vented


Robust linkage drive system with no chains, sprockets, or tensioners. Also, self-lubricating (no greasing required)

- Robust, low maintenance drive system: Linkage drive system that does not use maintenance-prone chains, sprockets or tensioners. Self-lubricating high-load PTFE (Teflon fibre weave) slide bushings on the linkage drive system that is located on the clean/screened side of the fine screen's neoprene rubber side channel seals and that are elevated off the channel bottom. Please see "Claro Fine Step Screen Overview Film" available on the provided films website for an illustration of the linkage drive system design & operation. The Claro unit offers the most advanced drive system with typically no maintenance attention required for 5 or more years.
- Capacity responsiveness: The ability of the screens to deliver exceptional separation across the specified flow and to quickly respond to and accommodate extreme flash flows & debris loads due to the large carrying volume of its curved steps & due to the morphic character of the screenings filter media – the screen can move an exceptional volume and large-sized material while being able to clean its filter media to 50% open for 3 mm units. The Claro controls design enables the operator to restrain operation of the screen in order to achieve the highest separation performance and lowest runtimes while providing quick response to above-specification flows & debris loads. The screen has a minimum of 30% additional flow-through capacity and can thus accommodate extreme operational conditions with ease.
- Effective with especially greasy influents: 1 mm step screens have been implemented in bacon processing plants with a grease content of 2365 mg/litre & suspended solids of 4950 mg/litre without the use of hot or cold water addition due to the self-cleaning effect of the step screen movable lamellae rack where the lamellae positively engage the screen aperture rather than depending on water jets, scrapers or brushes that can foul with greasy influents. Please see Claro bacon processing plant screen film "E – High Grease Bacon Screen – 1mm Aperture" available on the provided Claro films website.



- Easy-to-use intuitively-designed controls that enable optimization & fail-safe back-up routines: An elegant and intuitive control design that enables the highest level of flexibility, monitoring & optimization + a series of subroutines that protect against high flows and faults (e.g. for instance, the panel will switch the screens into timer mode if the level sensors experience a fault or loss of echo and then switch back to normal operation once the fault is no longer active). HMI visualization screens included as part of the 12" Allen-Bradley touch screen are based on the specific application's project drawings and represent the installed configuration rather than a standard arrangement. Sample HMI screens are provided for review for a 2 screens & 1 common wash press system arrangement. Our control panels are custom-designed to reflect the application & client preferences. We can integrate client-desired features on request and, since we bring a control technician to the start-up in order to fully re-test the system after installation, these additions or additional integration features can even be made at start-up if required/desired.
- Compact footprint: The step screen design has a low vertical profile footprint and pivots out of channel for ease of access & maintenance inspection without ladders or platforms or the movement / disassembly of downstream equipment. No closed-space entry required. Pivot is effected in minutes. Indeed, the Claro fine screen support design incorporates a forward arm that enables the unit's discharge to rise instead of pinching downstream equipment elements/inlet chutes for quick and straight-forward unit pivot.
- Mature & proven design: 3rd-generation design step screen & wash press by the inventor of the step screen with features informed by over 35 years of applications and equipment design experience – the most advanced step screen available with patented quality and performance guarantee features. A proven history of installation success: 150+ screens in operation in Canada since 2006 & over 5000 units of the same design in operation worldwide. We invite the contact of references and provide photos of similarly-configured systems below.
- Aggressive delivery schedule: We can provide the technical submittal within 2-4 weeks or better. Delivery to site is within 12-20 or better. Further expedited return of submittal & production can be discussed if required/preferred.
- Experienced Canadian design & operations support: Claro has extensive experience in the implementation of the proposed system, is committed to the best value engineering solution at the design phase and conscientious follow-up on an on-going, periodic basis after start-up. Claro's offices & spare parts warehouse is 1 hour & 20 minutes drive from Ingleside, ON. Additionally, Claro has a 24-hour hotline for operations & maintenance advice. The line is typically staffed by Claro General Manager, Peter Lipert. We welcome questions & comments.
- Experienced local Ontario based support: Pro Aqua offers professional local process equipment & maintenance support based in Milton, ON in addition to Claro's parts warehouse, support hotline, and technician availability.

Design/operation philosophy at a glance:

Claro fine step screens and septage receiving stations for municipal influent and septage screening are typically designed with 6 mm or 3 mm bar spacings. Their screenings separation capabilities, however, are comparable to a screen with significantly finer aperture filter media. The use of a 'screenings filter mat', where screenings are allowed to accumulate on the screen, enables the extraction of fine debris such as hair and grit. This quality of separation offers a very high level of protection for downstream equipment.

The control mechanism and fail-safe sizing of the screen for more than peak flow conditions protects against channel overflow or by-pass. The entire system is built to deliver exceptional screening performance—separation, washing of organics, and dewatering compaction—, enclosed hygienic operation, mechanical resilience, and a minimization of maintenance.

Thank you for reviewing our proposal materials. If you have comments or questions, please feel free to contact us or Scott Lenhardt of Pro Aqua, our Ontario manufacturer's representative. We will be happy to provide additional technical information, provide a virtual presentation, and/or make modifications to this proposal that reflect your project application needs.

Thank you & regards,

Peter Lipert Jr.
General Manager
3065 rue Peugeot, Suite 100
Laval, QC H7L 5C4 Cell.: 514.562.4575 pjr@claroglobal.com

www.claroglobal.com

B. Corporate Experience

i. Information Regarding Claro's Staff

- The following personnel would be most directly involved in the design & implementation of the Ingleside screening application:

1) Lead Designer (& Author of this Proposal): Peter Lipert Jr. (General Manager, Claro): Fourteen (14) years experience with the proposed screening system including controls design & operator training. Peter also has started-up nearly all of the systems currently operating in Ontario & Canada.
2) Design Review & Support: Daniel De Carufel, P.Eng. (Senior Project Engineer, Claro): 30 years experience in the wastewater treatment field including screening & conveyor systems.
3) Control Panel Design & Programming: Claude Samson (Franklin Empire Inc): Mr. Samson has designed & programmed all of our control panels for the past 15 years. 20+ years experience in the field. Mr. Samson works at a custom control panel builder nested inside Franklin Empire, a Siemens distributor. Franklin Empire builds the control panel equipment. Mr. Samson accompanies the Claro commissioning technician for start-up to ensure that the start-up/SCADA integration unfolds smoothly. There are 3 additional programmers with knowledge & experience of Claro panels & start-up procedures: Jean-François Beland, Laurie Myriam Lavigne, & Sébastien Ouellet (all of Franklin Empire).

- Below, the key office personnel who would be supporting the project:

4) Design Review & Support: Peter Lipert Sr. (Technical Director, Claro): Fourteen (14) years experience with the proposed screening systems. 35 years experience as a designer/inventor in the field of wastewater treatment. 30 years experience with shaftless spiral conveyor design.
5) Additional Project Management: Teva Forgue (Project Manager, Claro): Twenty (20) years experience in project management & applications design for municipal wastewater and industrial applications.
6) Mellegard & Naij AB, Sweden – brief profile below.

ii. Corporate Profiles & Personnel

This section includes a brief description of the corporate profile of the supplier firm including Canadian representatives and years in the Canadian market. The following is identified: staff and their location, and who will be available for servicing and maintenance assistance after the commissioning of the process equipment is complete.

- Claro Environmental Technologies – Brief Introduction

Claro is a Canadian designer, manufacturer and distributor of OEM wastewater treatment equipment systems. We have been the exclusive distributor of Mellegard & Naij AB (M&N) screening equipment in Canada since 2006. By the Summer of 2020, Claro will have implemented approx. 150+ screens & their auxiliary equipment including shaftless spiral screenings conveyors, screenings wash press compactors & control panels.

Claro is responsible for overall screening system design, commissioning, & aftersales support, including controls, installation supervision, system optimization & operator training. Claro-M&N screening systems have delivered excellent process performance results and have exceptional maintenance histories.

In addition to the staff dedicated to this project cited above, Claro has extensive

experience in the implementation of the proposed systems, is committed to the best value engineering solution at the design phase and conscientious follow-up on an on-going, periodic basis after start-up. Claro has worked with Cities on over twenty-five (25) preselections in Canada. Additionally, Claro has a 24-hour hotline for operations & maintenance advice. The line is typically staffed by Claro General Manager, Peter Lipert. We welcome questions & comments. Claro is 1 hour & 20 minutes drive from Ingleside.

Experienced local Ontario-based support: Providing treatment solutions and process equipment for the water and wastewater industries for 30 years, Pro Aqua is Claro's Ontario representative. Pro Aqua offers professional local process equipment support & a certified full-service maintenance department based in Milton, ON – approx. 4 hours & 20 minutes from Ingleside, ON.

Contact Information:

Claro (Exclusive Canadian Distributor & Designer) is located in Laval, Quebec (10 minutes outside Montreal); 24-hour tel.: 514.562.4575.

Pro Aqua, Inc.: Claro manufacturer's representative is located at: 264 Bronte Street South, Unit #7, Milton, ON, L9T 5A3; T.: 905.864.9311; https://proaquasales.com

The maintenance requirements for the screens, screenings conveyors & wash presses are minimal. Spare parts requirements have also proven to be exceptionally low. Once required, however, Claro has the resources to support operators & a full complement of spares for every screen that it implements.

Photo of ISO 9001 stainless only shop from Admin/design office's observation window

In addition to screening systems, Claro designs and manufactures grit removal, shaftless spiral conveyor, anaerobic digestion, and heat exchanger & heat recovery equipment (for more information, please see: www.claroglobal.com). Claro has demonstrated its design & project management proficiency by implementing these OEM designs for clients such the City of Edmonton, Gold Bar WWTP (main plant; 6 x 110 ft. dia. digesters + 11 heat exchangers & 2 x 33 m. long aerated grit tank retrofits), Metro Toronto (7 x 110 ft. dia. digesters), Thunder Bay (4 x 70 ft. dia. digesters), London (1 x heat recovery heat exchanger for incinerator ash slurry), City of Laval (2 x aerated grit tank retrofits), Cornwall (2 x automated conveyor sludge outloading system) and other projects. As a technology company, our senior engineering staff offers a flexibility of approach that balances existing methods with a proven track record of innovation and project-specific solutions.

Claro is partnered with an ISO 9001-certified stainless steel-only fabrication shop located in Montreal that fabricates all of our OEM equipment and can address all elements of fabrication on an expedited schedule.

Claro is represented in Canada by:

- Sansom (http://sansom.ca): New Brunswick, Nova Scotia, Newfoundland & Labrador, & Prince Edward Island.
- Brault Maxtech (http://www.braultmaxtech.com/en/index.asp): Québec
- Pro Aqua (http://www.proaquasales.com): Ontario
- Mequipco (http://www.mequipco.com/index.html): Manitoba, Saskatchewan, Alberta, British Colombia & NWT.

Claro is a privately-held, family company that is federally incorporated in Canada. It was founded in 2005 & incorporated in 2006.

• Mellegard & Naij AB (M&N) – Brief Introduction

Claro is the exclusive Canadian distributor for Mellegård & Naij AB, an OEM design company that focuses exclusively on developing and manufacturing wastewater and water treatment screening technologies (Address: Kåsatorpsvägen 7, SE-541 34 Skövde, Sweden; www.mellegard.se).

M&N production shop.

The M&N fine step screen and wash press proposed for Ingleside WWTP is the product of over 35 years of development. Per Mellegård, M&N Technical Director and Co-founder, has been designing step screens since their inception in the early 1980s. He was part of the two-person design team that originated this screening concept and is the principal designer of the antecedent to M&N screening equipment. This second generation fine step screen has over 5000 installations; the wash press has over 3000 worldwide.

M&N AB was founded in 2000 in order to promote Mellegård's third-generation design fine step screen and wash press that are distinguished from earlier generation units as follows:

- fully articulated linkage system based on high load SKF sleeve bushing (no chains, sprockets, tensioners, or belts)
- curved 1:1 ratio step for better retention and conveyance of screening towards discharge with no roll-back
- patented deflector plate at base of screen to eliminate end-shoes and to help deflect grit onto screenings filter mat
- All stainless steel discharge that eliminates plastic end shoes

The design advantages of these features are described in this preselection package and illustrated in the Claro films website prepared for Ingleside & EVB. M&N has over 5000 installations worldwide.

- Please see ISO 9001, ISO 14001, & CSA certificates reproduced in the following pages.

iii. ISO 9001, ISO 14001, & CSA certificates – Mechanical & Controls

.1 ISO 9001:2015 (Mechanical Equipment)

CERTIFICATE

Certificate
No. 6901-04

Inspecta Sertifiointi Oy has granted this certificate as proof that the quality system of

Mellegård & Naij AB
Skövde

complies with the requirements of the standard

ISO 9001:2015

Certification covers

Development, production and sales of equipment for water treatment.

The certificate is issued on 2019-01-02
(first issue 2013-01-11).
The certificate is valid until 2022-01-11.

Mikko Törmänen, Managing Director

The certificate is valid on condition that the quality system of the organization remains in compliance with the aforementioned standard and the General Regulations ABC 200.
The validity of the certificate can be verified on the Internet at www.inspecta.fi

Inspecta Sertifiointi Oy
P.O. Box 1000,
Sörnäistenkatu 2
FI-00581 Helsinki,
Finland
Tel. + 358 10 521 600

IQNet MEMBER

kiwa certified ISO 9001 Inspecta Sertifiointi Oy

FINAS Finnish Accreditation Service S002 (EN ISO/IEC 17021-1)

.2 ISO 14001:2015 (Mechanical Equipment)

CERTIFICATE

Certificate
No. 6902-04

Inspecta Sertifiointi Oy has granted this certificate as proof that
the environmental management system of

Mellegård & Naij AB
Skövde

complies with the requirements of the standard

ISO 14001:2015

Certification covers

Development, production and sales of equipment for water treatment.

The certificate is issued on 2019-01-02
(first issue 2013-01-11).
The certificate is valid until 2022-01-11.

Mikko Törmänen, Managing Director

The certificate is valid on condition that the environmental management system of the organization remains in compliance with the aforementioned standard and the General Regulations ABC 200.
The validity of the certificate can be verified on the Internet at www.inspecta.fi

Inspecta Sertifiointi Oy
P.O. Box 1000,
Sömäistenkatu 2
FI-00581 Helsinki,
Finland
Tel. +358 10 521 600

IQNet MEMBER

kiwa certified ISO 14001 Inspecta Sertifiointi Oy

FINAS Finnish Accreditation Service S002 (EN ISO/IEC 17021-1)

Claro

.3 ISO 9001:2015 (Control Panel Equipment)

intertek
Total Quality. Assured.

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Franklin Empire Inc.

Main Site: 8421, Darnley Road,
Ville Mont-Royal, Quebec, H4T 2B2, Canada

See appendix for additional sites and additional site scopes

has been registered by Intertek as conforming to the requirements of:

ISO 9001:2015

The management system is applicable to:

Sales and distribution of electrical products. Design, sales and manufacturing of custom designed automation systems, control panels, power factor correction panels and industrial heaters.

Certificate Number:
2515

Initial Certification Date:
21 March 1997

Date of Certification Decision:
04 June 2019

Issuing Date:
25 June 2019

Valid Until:
20 June 2022

Intertek

Calin Moldovean
President, Business Assurance

Intertek Testing Services NA, Inc.,
900 Chelmsford Street,
Lowell, MA 01851.
USA.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone. The certificate remains the property of Intertek, to whom it must be returned upon request.

Page 1 of 9

Claro

.4 CSA Certification Fabrication (Control Panel Equipment)

GROUPE CSA

Certificat de Conformité

Certificat: 1805588 **Contrat Principal:** 151015

Projet: 80015825 **Date d'émission:** 2019-09-25

Émis à: **Franklin Empire Inc. Electro-Mecanik Playford Division**
215 rue Fortin
Québec, Quebec, G1M 3M2
Canada

Les produits énumérés ci-dessous peuvent porter la marque CSA tel qu'illustré

Émis par: *Khalil Ouldchama*
Khalil Ouldchama, ing.

PRODUITS

[X] CLASSE 3211 09 - APPAREILLAGE INDUSTRIEL DE COMMANDE - Assemblages spéciaux de contrôle industriel (sur commande)

[ ] CLASSE 3211 89 - APPAREILLAGE INDUSTRIEL DE COMMANDE - Assemblages spéciaux de contrôle industriel (sur commande) - Certifié selon les normes des États-Unis

Ensemble de commande spécial, de type ouvert ou fermé, comprenant des composants certifiés et/ou listés, notamment des boîtiers de type 1, 3, 3R, 4, 4X ou 12, fusibles, interrupteurs, disjoncteurs, démarreurs, contacteurs, variateurs de vitesses ca/cc, automates programmables, transformateurs, relais de contrôle, minuteries et autres dispositifs auxiliaires à usage industriel et/ou les applications suivantes:

- Appareillage de branchement (Canada seulement)
- Dispositifs de commande de chauffage électrique
- Contrôleurs de compresseur
- Utilisation de barrières à sécurité intrinsèque
- Relais/Automates Programmables

DQD 507 Rev. 2019-04-30 Page 1

GROUPE CSA

Caractéristiques électriques nominales :
Entrée - 600 Vca/cc maximum, 1/3 phase, 50/60 Hz, 2000 A maximum.
Sortie - 600 Vca/cc maximum, 1/3 phase, 50/60 Hz, 2000 A maximum, 800 HP maximum.

Conditions d'acceptabilité :

Ces panneaux industriels de commande font l'objet d'une évaluation visant uniquement à détecter les feux d'origine électrique et les risques d'électrocution. L'évaluation sur les panneaux industriels de commande n'inclut pas l'évaluation sur le caractère de fonctionnement adéquat des dispositifs de contrôle et de protection destinés à superviser le fonctionnement de l'équipement contrôlé.

Un panneau industriel de commande n'inclut pas les charges à contrôler, y compris les moteurs, les luminaires, les appareils de chauffage ou les équipements d'utilisation.

Les équipements de type ouvert sont certifiés seulement comme composants sujets à réévaluation dans l'application finale pour une utilisation dans un ensemble complet où la pertinence de la combinaison doit être déterminée par l'autorité compétente.

[ ] Les équipements couverts par la section de contrôleurs de brûleurs à mazout / gaz ne doivent pas inclure de panneaux de commande destinés à la supervision de la sécurité des flammes, au contrôle ou au séquencement des équipements de type à combustible. Les panneaux ne doivent comporter aucune conduite de gaz ou d'eau.

[X] Cet équipement est conçu pour être installé et utilisé dans des endroits ordinaires, conformément à la *partie I du Code canadien de l'électricité,* à une température ambiante comprise entre 0 °C et 40 °C. L'appareillage qui doit être utilisé à une température ambiante supérieure ou inférieure à cette plage devra faire l'objet d'une évaluation supplémentaire.

[X] Cet équipement est conçu pour être installé et utilisé dans des endroits ordinaires, conformément à la *partie I du Code canadien de l'électricité*, à une température ambiante comprise entre 0 °C et 40 °C.

[ ] Cet équipement est destiné à être installé dans des endroits ordinaires, conformément au *code national de l'électricité, ANSI/NFPA 70*, où la température ambiante ne dépasse pas 40 °C (104 °F).

[ ] Cet équipement est conçu pour être installé dans des endroits ordinaires, conformément à la *partie I du Code canadien de l'électricité*, à une température ambiante comprise entre 0 °C et 40 °C et/ou au *Code national de l'électricité, ANSI/NFPA 70*, où la température ambiante ne dépasse pas 40 °C (104 °F).

EXIGENCES PERTINENTES

[X] CAN/CSA-C22.2 No. 0-10	-	Exigences générales-Code canadien de l'électricité, Deuxième partie
[ ] CSA C22.2 No. 14-18	-	Industrial Control Equipment
[X] CSA C22.2 No. 286-17	-	Panneaux et ensembles industriels de commande
[ ] ANSI/UL 508A, 3rd Edition	-	Industrial Control Panels
[ ] ANSI/UL 698A, 4th Edition	-	Standard for Industrial Control Panels Relating to Hazardous (Classified)

GROUPE CSA

Supplément au Certificat de Conformité

Certificat: 1805588 **Contrat Principal:** 151015

Les produits énumérés ci-après, y compris les plus récentes révisions, peuvent porter un marquage conformément au certificat indiqué.

Historique de la certification du produit

Projet	Date	Description
80015825	2019-09-25	Mise à jour du rapport afin de couvrir l'ajout d'un composant non –certifié, condensateurs à protection interne, modèles MKP de la série MKP à la liste des composants non certifiés. Conformément à la norme CSA C22.2 N ° 286-17 / CSA Class 3211-09.
70217590	2019-03-29	Mise à jour du rapport selon l'avis de certification "Industriel de commande No. 59" en date de 10 mai 2018, concernant la norme CSA-C22.2 No. 286-17, à savoir le remplacement de C22.2 No. 14 par C22.2 No. 286 comme norme d'évaluation principale pour les panneaux de contrôle CAN.
70075034	2017-05-31	Évaluation d'une nouvelle configuration d'assemblage de commande industriel et mise à jour du rapport CSA 151015-1805588.
70068954	2016-10-14	Mise à jour du rapport 151015_1805588: Augmentation de la capacité à 800hp et ajout d'option de commande de compresseur, document CPC- 12.
2719388	2014-05-16	Ajout d'options: appareillage de branchement (CPC-2) pour installation extérieur seulement, commande de chauffage (CPC-6), ensemble de commande spéciale type ouvert (sans coffret), et composant accepté.
2562468	2012-09-25	Ajout des personnes ressource responsable de l'exploitation du programme CSA.
2068480	2008-10-17	Qualification pour panneaux avec barrières pour circuits à sécurité intrinsèque (SI) pour le programme d'ensemble de panneau de contrôle industriel.
1956435	2007-10-23	Mise à jour du Rapport 151015-1805588 pour ajout et qualification de personne-ressource de l'entreprise au programme spécial de commande industriel; évaluation prévue à la semaine du 15 octobre 2007.
1805588	2006-09-20	Mise à jour selon l'Avis de Certification réf N04-125: Assemblages de commande industriels spéciaux (faits sur demande); consolidation du rapport LR 34590-1 avec les rapports -2, -5, -7 et 250001366 (excluant commande de facteur de puissance).

2. Form of Proposal

Ingleside WWTP Upgrades

Screening Equipment: 46 43 00
Process Equipment Pre-Selection

EVB Engineering
EVB Ref: RFP N° 14 - 2020
Township of South Stormont, ON
Claro Ref: 17089-Q-01

A. General Proponent Information

APPENDIX C – SUBMISSION FORM

A. General Proponent Information

The undersigned hereby acknowledges that he/she, as an officer of the stated corporation, has read and understands the specifications, requirements, and proposed agreement regarding the **Equipment Preselection** for the Ingleside WWTP, Township of South Stormont. He/she further acknowledges that the seller's proposed product, equipment, materials, and services fully meet or exceed those as specified in the Township's RFP. Additionally, the Proponent agrees that all its technical and financial documents and responses to the aforementioned RFP will, at the option of the Township, become a legally binding and essential portion of the final contract agreement between the successful Proponent and the Township following execution of the contract agreement.

The following information must be completed to ensure tender acceptance.

*ADDENDA No. 1 to 4 INCLUSIVE WERE CAREFULLY EXAMINED.

DATED THIS 14th DAY OF September, 2020.

PROPONENT'S COMPANY NAME: Claro Environmental Technologies, Inc. (4382510 Canada Inc.)

ADDRESS: 3065 Rue Peugeot
Suite 100

CITY/PROVINCE: Laval / QC POSTAL CODE: H7L 5C4

PHONE NO.: +1 514-562-4575 FAX NO.: (E-mail is preferred for speed of reply.)

EMAIL ADDRESS: pjr@claroglobal.com

WEBSITE: www.claroglobal.com

CONTACT NAME (please print): Peter Lipert, Jr.

TITLE (please print): General Manager PHONE NO.: +1 514-562-4575

AUTHORIZED SIGNATURE:

HST REGISTRATION NO: 840776520 RT 0001

WSIB COVERAGE: YES NO (Claro is, however, covered by the Québec equivalent, CNESST and all other required insurances.)

If required, however, we will attain WSIB coverage.

addenda received during the period and shall take them into consideration when preparing their bid submission. A signed copy of each Addendum must be included with the bid submission. Failure to comply may be cause for rejection of bid submission.

If required, however, we will attain WSIB coverage if required. We are usually are except with CNESST.

RFP (Consecutive Negotiations) – Equipment Preselection
Ingleside WWTP Upgrades

Page 22 of 38

2. Acknowledgment of Non-Binding Procurement Process

The proponent acknowledges that the RFP process will be governed by the terms and conditions of the RFP, and that, among other things, such terms and conditions confirm that this procurement process does not constitute a formal, legally binding bidding process (and for greater certainty, does not give rise to a Contract A bidding process contract), and that no legal relationship or obligation regarding the procurement of any good or service will be created between the Township and the proponent unless and until the Township and the proponent execute a written agreement for the Deliverables.

3. Ability to Provide Deliverables

The proponent has carefully examined the RFP documents and has a clear and comprehensive knowledge of the Deliverables required. The proponent represents and warrants its ability to provide the Deliverables in accordance with the requirements of the RFP for the rates set out in its proposal.

4. Non-Binding Pricing

The proponent has submitted its pricing in accordance with the instructions in the RFP. The proponent confirms that the pricing information provided is accurate. The proponent acknowledges that any inaccurate, misleading, or incomplete information, including withdrawn or altered pricing, could adversely impact the acceptance of its proposal or its eligibility for future work.

5. Addenda

The proponent is deemed to have read and taken into account all addenda issued by the Township prior to the Deadline for Issuing Addenda.

6. Communication with Competitors

For the purposes of this RFP, the word "competitor" includes any individual or organization, other than the proponent, whether or not related to or affiliated with the proponent, who could potentially submit a response to this RFP.

Unless specifically disclosed below under Disclosure of Communications with Competitors, the proponent declares that:

(a) it has prepared its proposal independently from, and without consultation, communication, agreement or arrangement with any competitor, including, but not limited to, consultation, communication, agreement or arrangement regarding:

(i) prices;

(ii) methods, factors or formulas used to calculate prices;

(iii) the quality, quantity, specifications or delivery particulars of the Deliverables;

(iv) the intention or decision to submit, or not to submit, a proposal; or

(v) the submission of a proposal which does not meet the mandatory technical requirements or specifications of the RFP; and

(b) it has not disclosed details of its proposal to any competitor and it will not disclose details of its proposal to any competitor prior to the notification of the outcome of the procurement process.

Disclosure of Communications with Competitors

If the proponent has communicated or intends to communicate with one or more competitors about this RFP or its proposal, the proponent discloses below the names of those competitors and the nature of, and reasons for, such communications:

Not Applicable.

7. No Prohibited Conduct

The proponent declares that it has not engaged in any conduct prohibited by this RFP.

8. Conflict of Interest

The proponent must declare all potential Conflicts of Interest, as defined in section 3.4.1 of the RFP. This includes disclosing the names and all pertinent details of all individuals (employees, advisers, or individuals acting in any other capacity) who (a) participated in the preparation of the proposal; **AND** (b) were employees of the Township within twelve (12) months prior to the Submission Deadline.

If the box below is left blank, the proponent will be deemed to declare that (a) there was no Conflict of Interest in preparing its proposal; and (b) there is no foreseeable Conflict of Interest in performing the contractual obligations contemplated in the RFP.

Otherwise, if the statement below applies, check the box.

☐ The proponent declares that there is an actual or potential Conflict of Interest relating to the preparation of its proposal, and/or the proponent foresees an actual or potential Conflict of Interest in performing the contractual obligations contemplated in the RFP.

If the proponent declares an actual or potential Conflict of Interest by marking the box above, the proponent must set out below details of the actual or potential Conflict of Interest:

_____

_____

_____

9. Disclosure of Information

The proponent hereby agrees that any information provided in this proposal, even if it is identified as being supplied in confidence, may be disclosed where required by law or by order of a court or tribunal. The proponent hereby consents to the disclosure, on a confidential basis, of this proposal by the Township to the advisers retained by the Township to advise or assist with the RFP process, including with respect to the evaluation of this proposal.

Signature of Proponent Representative

Peter Lipert, Jr.
Name of Proponent Representative

General Manager
Title of Proponent Representative

September 14th, 2020
Date

I have the authority to bind the proponent.

B. System #1 Submission Forms – Fine Screens and Compactor

PART 1 FORM OF PROPOSAL

(See Clause 24 in General Terms and Conditions for Instructions)

BY: Claro Environmental Technologies, Inc. (4382510 Canada Inc.)
Suite 100 - 3065 Rue Peugeot
Laval, QC H7L 5C4

TO: The Corporation of the Township of South Stormont

c/o Jamie Baker
Project Manager
EVB Engineering
800 Second Street West
Cornwall, ON K6J 1H6

FOR:

Pre-Selection of System #1: Supply, delivery and commissioning of the Fine Screens, Screening Conveyor and Screening Compactor for the Ingleside WWTP, Township of South Stormont.

P1.0 We, the above-named Equipment Supplier, having carefully examined the quotation documents issued by the Engineer, including the General Terms and Conditions, Specifications and other related documents if any, herewith submit in duplicate and in accordance with the Terms and Conditions set out in the aforementioned documents our quotation for the equipment listed hereinafter.

P2.0 We agree that, in case of any conflict between any of the terms and conditions set out in the documents which we submit, together with this Form of Quotation & Schedule and the Terms and Conditions set out in the quotation documents issued by the Engineer, the provisions of the latter documents shall take precedence and shall govern.

P3.0 We agree to the following requirements as noted in the Owners General Terms and Conditions For Preselected Equipment.

.1 Validity period of this Quotation shall be **240 days** from closing date for quotations.

.2 Manuals and Parts Lists are to be supplied as listed in the specifications.

.3 Shop drawings are to be supplied as listed in the specifications.

.4 Services required at site: The Supplier shall be responsible for verifying site conditions including accessibility and minimum clearances for sizing of equipment as well as assistance in commissioning the equipment.

P4.0 The proposal documents include the Submission Form, the Form of Proposal, including all Financial and Technical Details, Schedule, reference sheet from Supplier's recent installation, the General Terms and Conditions, the Request for Proposal documentation and the Technical Specifications.

Claro Environmental Technologies, Inc.
4382510 Canada Inc.
Name of Supplier

Signature of Authorized Officer

Sebastian Lemus F.
Witness (Name & Signature)
Sebastian Lemus Fonseca
Projects Engineer-In-Training
Claro Environmental Technologies

September 14th, 2020
Date

(Please see below & left for company seal)
Company Seal

Claro Environmental Technologies 4382510 Canada Inc.

1.1 FINANCIAL DETAILS

1. Supply and delivery of the Fine Screens, Screening Conveyor and Screening Compactor and the associated equipment complete as specified. 1a. Fine Screens 1b. Screening Conveyor 1c. Screening Washer/Compactor Note: [1d. Control panel represents the following value included within the costs cited at above right; this line item is not on the Form of Proposal, however, we are following the addition of this line item by Addendum 4 for the grit Financial Details form]: Control panel is valued at: 81,000 (already included in values cited above right)	[redacted]
2. Preparation and delivery of Shop Drawings.	[redacted]
3. Services at site, including all expenses, as specified in the Technical Specification (46 43 00, 3.4) and Clause 15.0 (Category 2) Commissioning of the Installation for the Fine Screen Systems.	[redacted]
Total Quoted Price (1+2+3)	[redacted]
Per diem rate for additional field work not included in the above	[redacted]
Total Price Valid For	240 Days
Delivery of Shop Drawings	2 – 4 Weeks (or better as required)
Delivery of Equipment (after approved shop drawings)	12 – 20 Weeks (or better as required)
*Amount of Currency Exchange USD/CAD	[redacted]
*Additional Amount of Duty Paid (if applicable)	
Percent of Imported Components (if greater than 10%)	[redacted]

*****[Option]: Deduct of 30,000 CAD if the screening (46 43 00) & grit removal systems (46 53 00) are purchased/shipped together & the start-up days/tasks are considered in common (both systems are typically started & inspected at the same time since they function in tandem). We will not request additional days to complete the start-up requirements in order to preserve the deduce offered.**

*Actual cost in dollars carried in bid must be placed in the spaces provided.
*Proponents wishing to submit multiple designs shall complete this form for each submission.
*Pricing to be quoted in Canadian Funds:

Note: **Claro will not request any currency fluctuation adders. The stated prices are firm for the required validity period without exception.

1.2 TECHNICAL DETAILS

.1 Fine Screens Description

Parameter	Description
Manufacturer of Screens	Mellegård & Naij, AB
Make of Screens	Claro/Mellegård & Naij Step Screen
Model of Screens	Step Screen 1900-500-3 mm
# of Screens	Two (2)
Screen Type (bar, perforated, step, etc.)	Step Screen
Screening Opening Size	3 mm + Screenings Filter Mat
Installation Angle	50 degrees
Effective Flow Rate	2,000 m^3/d to 20,800 m^3/d @ 35% blockage (20,800 m3/hour reflects 0.24 L/sec as its basis for the peak daily instantaneous flow); The system will accommodate an additional 30% capacity at lower blockage levels if flows are above specification. We assume that there will always be some screenings in the flow thus we leave the final 5% of 35% as a precautionary margin when calculating max flow-through capacity.
Required Channel Dimensions	Width 650 mm Total Depth 1500 mm Water Level @ ADF 510 mm (ADF: 5,400 m3/day) Water Level @ PF 1246 mm with the specified downstream level of 1100 mm & 146 mm of head loss (Addendum No. 2 Answer to Question 26: Downstream level Elev. 82.40 - invert @ 81.30 = 1.1 m downstream level). Note: This downstream level appears to be unnecessarily high if an appropriate Parshall is be used. If this downstream level is desired, we can install an appropriately-designed open-bottom (to avoid grit deposition) Sutro weir plate downstream of the screens for exact proportional downstream level control and flow reporting. Instead, however, we suggest a 9” throat Parshall flume downstream of the proposed Claro 360 grit forced vortex system that delivers a lower downstream level that nonetheless works perfectly with both the proposed fine step screens & 360 Claro vortex. When two screens are installed, they are

	programmed to oscillate (one screen actuates while the other is suppressed and vice versa) in response to the common upstream level in order to diminish run times & equalize any hydraulic imbalances between the 2 channels (note: the oscillation routine releases above an adjustable upstream high level). In the Ingleside scenario, the 2 screens would have the following levels with a 9" Parshall providing proportional downstream level control: 727/595 mm upstream/downstream with a head loss of 133 mm, which is ideal. The proposed design will provide very low runtimes and a very high level of separation. If alternate hydraulics and/or Parshall flume sizes are preferred, we would be happy to discuss approaches.
Headloss	@ Peak Flow & Clean Screen 18 mm @ Peak Flow & 50% Obstructed 273 mm @ Peak Flow & 70% Obstructed 441 mm* *Note: The Claro step screen is designed to withstand 100% head loss (i.e. completely full channel upstream and empty channel downstream without risk of structural damage unlike perforated plate elements).

.2 Fine Screen components included:

Component	Description/Material
Structural Frame • Frame Thickness • Front Cover Thickness • Back Housing Thickness • Discharge Chute	5 mm 1.5 mm Not applicable mm Note: All structural elements are 5mm thick and can withstand 100% head loss (i.e. completely full channel upstream & empty channel downstream without risk of structural damage)

Component	**Description/Material**
Thickness • Type of Pivot	1.5 mm Complete pivot of screen out of channel to workbench level. No ladders or access platforms required. Disassembly of discharge chute or movement of wash press not required.
Screening Removal Mechanism • Quantity of Elements	Not applicable for Claro step screen technology; The step screen will have 41 stationary lamellae bars and 43 moveable lamellae bars that constitute its filter media (total of 84).
• Element Thickness	Not applicable mm Lamellae bars are 3mm thick x 75 mm deep as specified
Chain Driving System • Chain Type	Linkage Drive System; AISI 316L & high load PTFE (Teflon) fibre-weave sleeve bushings (PM for sleeve bushings is 5 – 6 years or longer). The Claro step screen incorporates no maintenance-prone chains, sprockets or tensioners or bottom bearings exposed to unscreened flow or sedimented grit.
• Breaking Load	Not applicable kN Note: The Claro step screen is designed to withstand 100% head loss (i.e. completely full channel upstream & empty channel downstream without risk of structural damage.)
Wash Water System	The Claro step screen does not require service wash water. Please see technical proposal below & Claro films website for a description/demonstration of how the proposed unit is a self-cleaning unit that does not require water jets/spray bars and how the unit accommodates high DS & high grease influents such as septage & food processing wastes/grease such as at bacon processing facilities.
• Wash Water Flow Rate	Not applicable L/s
• Min. Water Pressure	Not applicable kPa
• Connection Size	Not applicable mm
Drive Unit	
• Main Power Supply	575 V 3 Phase 60 Hz
• Element Drive Motor	0.75 kW Movable bar rack drive system; approx. 10 - 30 minutes of operation time per 24 hours.
• Brush Drive Motor	Not applicable kW Claro step screen does not employ a brush.
• Motor Enclosure Type	TEFC; Class 1 Div. I

• Motor Service Factor	1.15
• Reducer Service Factor	1.4 or greater (AGMA II)
Materials of Construction	
• Structural Frame	AISI 316L stainless steel
• Housing Sheets	AISI 316L stainless steel
• Discharge Chute	AISI 316L stainless steel
• Elements	Lamellae bars (as opposed to elements) in AISI 316L stainless steel
• Chain Links	Linkage drive system (rather than chain links) in AISI 316L stainless steel
• Bushings	High-load PTFE (Teflon fibre weave)
• Chain Pins	Not applicable
• Sprockets	Not applicable
• Element Slides	Not applicable
• Bottom Revolving	

Component	**Description/Material**
Element Guide	Not applicable
• Spray Wash Manifold	Not applicable
• Spray Nozzles	Not applicable
Describe Screens (including inclination and special features)	The Claro step screen is fully enclosed, has a standard odour-control connection, and handles the captured screening material gently & cleans its filter media without dispersion/spattering of screenings (not even within its enclosure). At an inclination of 50°, the step screen design has a low vertical profile footprint and pivots out of channel for ease of access & maintenance inspection without ladders, platforms, closed-space entry or disassembly/removal of discharge chute or movement of wash press unit. Patented bottom deflector plate, full linkage drive system, all stainless steel discharge, no plastic end shoes, curved 3mm thick steps – features that are in full conformity with the quality features of the RFP specifications. Please see broader proposal document for installation photographs, films, drawings, operator testimonials and other supporting information.
Describe the Screen Drive System	The linkage drive system eliminates chain/belt, sprocket and tensioner drive systems that require chain maintenance and risk major screen damage if a chain breaks or skips a cog. The Claro linkage drive system eliminates this risk by using a mechanism of structurally heavy-duty links that are connected to the drive unit and the moveable lamellae rack, resulting in a robust design that avoids exposure to grit abrasion or sedimentation or entanglement

	of long fibers in rotating elements (please see drawings section & Claro Films website for further illustration). The linkage drive system is located on the clean side of the screening process and elevated above the channel floor. Thus, unlike chain, sprocket & filter belt systems, the Claro drive system is not exposed to screenings or to the grit that sediments at the base of the screen in the region of the bottom sprockets, chain and bearings. The system rides on high load PTFE (Teflon) sleeve bushings that do not require lubrication, tensioning. PM replacement is typically in excess of 5 -6 years and takes approx. 1 day to complete either by plant staff or a Claro technician. Cost for complete set of bushings is nominal (please see spare parts costing listing). The step screen does not incorporate a filter belt brush or its drive system.
Describe Cleaning Operation	The Claro step screen has a moveable bar rack that rotates through a stationary lamellae bar rack. This rotation enables the positive and full engagement of the apertures by the stainless steel lamellae that further allows the screening system to effectively address high DS & greasy debris such as septage and slaughterhouse & food processing greases (e.g. even @ 1mm aperture at bacon processing facility with no hot water addition; please see Claro films website for septage & bacon processing screen films). This ability to handle high DS & high grease material is not shared by brush systems, which would quickly foul. Each moveable bar rack rotation moves the screenings filter mat one step closer to the discharge – thus, the cleaning mechanism is also the screenings transit mechanism. The step screen has an all stainless steel discharge constituted of stainless steel 'fingers' that are attached to the ends of the stationary lamellae bars. This design enables a clean removal & discharge of the captured screenings without binding or hang-up (Please see Claro films website for illustration). Since the step screen's cleaning system does not incorporate a rotating brush, there is no risk of wrapping of wet wipes or stringy materials. Indeed, this type of fibrous material helps to constitute the screenings filter mat. The Claro design ensures that separation performance is maintained throughout the life & operation of the system as it does not depend on the maintenance of the screen's cleaning system or side or bottom seals to sustain its filtration efficiency. The proposed step screen design eliminates the risk of screenings carryover to the downstream side of the channel since it does not depend on the proper adjustment / maintenance of a wearable rotating brush and does not employ a filter belt that re-enters the downstream flow. Its design also does not require a rubber seal or brush to seal the area between the screen's bottom frame & its filter media. The lamellae are 316L stainless steel, 3 mm thick, 1:1 height-to-depth ratio and incorporate a curved step profile, which enables the screen to better cradle larger debris towards its discharge (the unit can pick-up a 2-litre Coca-Cola bottle and large volume Spring leaf deluges with ease). This design is very effective in preventing rollback of screenings towards the bottom of the influent channel, a common event in earlier step screen designs.

.3 Screening Conveyor Description

Parameter	**Description**
Manufacturer of Screening Conveyor	Our system does not require a screenings transfer conveyor. A common wash press washes, dewaters and compacts the screenings and then discharges this treated material into a hygienic bagging system and into the screenings bin via a wash press compaction tube. Please see our technical proposal for more information on this common wash press configuration including drawings & references. This configuration has been implemented in facilities across Canada including systems in the Ingleside area such as Hawkesbury WWTP & Mississippi Mills WWTP.
Make of Screening Conveyor	Not applicable/not required
Model of Screening Conveyor	Not applicable/not required
# of Screening Conveyors	Not applicable/not required
# of Inlets per Conveyor	Not applicable/not required
# of Outlets per Conveyor	Not applicable/not required
Wet Screening Maximum Unit Capacity	N/A m^3/hr
Type of Screw	Shaftless or Shafted (Circle one) Not applicable
Conveyor Length	N/A mm
Parameter	**Description**
Transport Mode	Push or Pull (Circle one) Not applicable
Dimensions • Overall Length • Conveyor Length • Conveyor Diameter • Screw External Diameter	 N/A mm (including motor) N/A mm N/A mm N/A mm
Drive Units • Motor Power • Motor • Motor Classification • Motor Service Factor Min. • Reducer Service Factor Min.	 N/A V N/A Phase N/A Hz N/A kW Not applicable Not Applicable Not Applicable

Materials of Construction	
• Structural Components	Not applicable
• Spiral Screw	Not applicable
• Drive Shaft	Not applicable
• Wear Liner	Not applicable
• Fasteners & Hardware	Not applicable

.4 Screening Washer Compactor Description

Parameter	**Description**
Manufacturer of Screening Washer Compactor	Mellegård & Naij, AB
Make of Screening Washer / Compactor	Claro/ Mellegård & Naij Wash Press
Model of Screening Washer / Compactor	TP 200 – 1900
# of Screening Washer Compactors	One (1), common to both step screens
Wet Screening Maximum Unit Capacity	1 m^3/hr (optimal inlet capacity for low run times; maximum actual capacity is greater)
Solids Reduction	50 - 70 % (by Volume) General Note: Reduction percentage depends in part on the characteristics of the material entering the wash press – the more organics & water present, the larger the relative percentage reduction (i.e. before vs after treatment). The Claro wash press yields the highest possible reductions due to its ability to exert maximum pressure on the screenings material & effect thorough washing. The degree of the unit's ability to pressurize / squeeze the screenings can be inferred by the length of the discharge tubes that we have been able to implement – e.g, up to 8 meters long at facilities such as Penetanguishene WWTP, ON. The flexibility of the controls also enables the wash press to increase the residence time of the debris within the washing zone by implementing pauses (with pauses mode) or multiple passes (reverse/forward cycle mode) for screenings especially high in unmacerated organics (i.e. straight from toilet to facility as is sometimes the case).

Parameter	**Description**
Solids Reduction	50 - 70 % (by Volume) General Note: Reduction percentage depends in part on the characteristics of the material entering the wash press – the more organics &

	water present, the larger the relative percentage reduction (i.e. before vs after treatment). The Claro wash press yields the highest possible reductions due to its ability to exert maximum pressure on the screenings material & effect thorough washing. The degree of the unit's ability to pressurize / squeeze the screenings can be inferred by the length of the discharge tubes that we have been able to implement – e.g, up to 8 meters long at facilities such as Penetanguishene WWTP, ON. The flexibility of the controls also enables the wash press to increase the residence time of the debris within the washing zone by implementing pauses (with pauses mode) or multiple passes (reverse/forward cycle mode) for screenings especially high in unmacerated organics (i.e. straight from toilet to facility as is sometimes the case).
Output Dryness	45 – 60 % Note: Dryness will also vary based on the degree of fibre contained within the screenings – the more fibre, the higher the friction and back-pressure exerted on the washed screenings. Dryness is also impacted by the degree of organics removal since humidity inheres in organic material. The Claro wash press will produce the driest possible screenings with no standing water in the bin or hygienic bag even after long storage due to its ability to thoroughly wash and then compress the screenings as outlined above.
Organics Removal	75 – 90 % Note: The degree of relative organics removal (i.e. organics before vs after treatment) also depends on initial screenings material characteristics. The Claro wash press, however, will achieve the highest removal due to the thoroughness of its washing and ability to compress the screens + the flexibility of its controls – for instance, the controls will enable the wash press to increase the residence time of the debris within the wash zone by implementing pauses or multiple passes (reverse/forward cycles) for screenings especially high in unmacerated organics (i.e. straight from toilet to facility as is sometimes the case).
Drive Units • Motor Power • Motor • Motor Classification • Motor Service Factor Min. • Reducer Service Factor Min.	 575 V 3 Phase 60 Hz 1.5 kW TEFC; Class 1 Div. I 1.15 1.4 or greater (AGMA II)

Dimensions	
• Inlet Length	1900 mm with covers & inlet chutes to match each fine screen discharge with 90 degree inlet chute side walls
• Conveyor Diameter	200 mm
• Installation Angle	0 degrees
• Discharge Angle	30 – 90 degrees (discharge tube will be configured to best suit the application)
• Discharge Height	1520 mm (or as best suits layout requirements & final bin dimensions)
• Spiral Screw External Diameter	280 mm
• Perforation Size	4 mm (perforations on compaction zone cylinder that enables the exit of soft pudding-like organics & grease & soluble contaminants. The wash press drain can be directed back to the upstream side of the screens, however, this is not required for the maintenance of excellent separation.
• Drain Diameter	76 mm
Wash Water System	
• Wash Water Flow Rate	Approx. 0.7 L/s
• Min. Water Pressure	276 - 379 kPa (40 – 55 psig)
• Connection Size	2 x 13 mm
	Note: Intermittent operation; wash press operates only when sufficient material volume accumulates within the inlet (based on screen bar rotations/discharge volume; never runs empty)
Material of Construction	
• Structural Components	AISI 316L stainless steel
• Screw Flights	AISI 316L stainless steel (Or special micro alloy abrasion-resistant steel, 220 Brinell Hardness as preferred)
• Screw Shaft	AISI 316 stainless steel
• Roller Bearing Housing	AISI 316; The thrust bearing is located within the wash press bearing housing and supported on a shoulder shaft as a means of protecting the gear drive from the forces that issue from screenings compression. This arrangement makes the wash press more space efficient as well as reliable.

Parameter	**Description**

• Screw Housing	AISI 316L stainless steel
• Collecting Trough	AISI 316L stainless steel
• Spray Wash Manifold	AISI 316L stainless steel
• Spray Nozzles	Stainless steel & plastic 360 rotating jets
• Fasteners & Hardware	AISI 316L stainless steel

.1 A detailed list of spare parts and parts cost estimate is enclosed. Yes / No (circle one)

.2 Provide weight of screens and screening conveyor/washer/compactor. Yes / No (circle one)

.3 Proposed drive locations, drive weight and supporting information has been provided. Yes / No (circle one)

.4 All drawings, technical data and supporting documentation that fully describe and demonstrate that this quotation meets the required specifications are attached. Yes / No (circle one)

.5 Deviations and/or alternatives are separately noted. Yes / No (circle one)

.6 Provide a detailed estimate of the annual operation and maintenance costs of running the equipment. Yes / No (circle one)

.7 Provide a list of all ancillary components required for a complete operating system which are not supplied with this quotation. State the required design capacity and any pertinent design characteristics for any equipment that must be supplied by the Owner. Yes / No (circle one)

.8 Provide a list of a minimum of five (5) previous installations, noting the closest installation to the Owner, that have been in operation for a minimum of five (5) years, with design conditions similar to those required herein, where possible. Provide the following information for each installation:

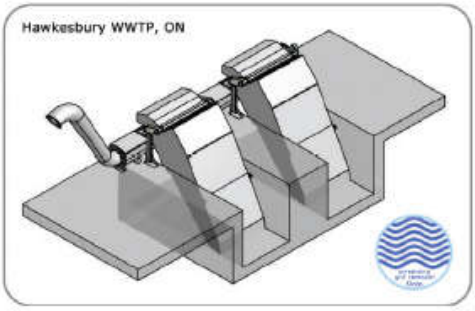
.1 Owner
.2 Owner contact information
.3 Contract contact information
.4 Brief description of the equipment provided
.5 Capacity of equipment
.6 Year the equipment was put into operation
.7 Value of supply contract

Note: In order to suggest capabilities & separation efficiency & the proposed equipment configuration, we have provided nine (9) references including additional project information & installation photographs. Please see following pages.

END OF SECTION

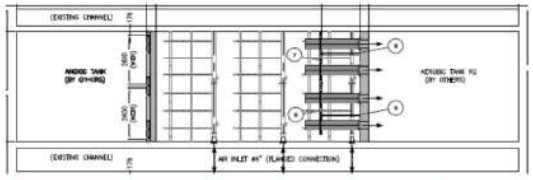
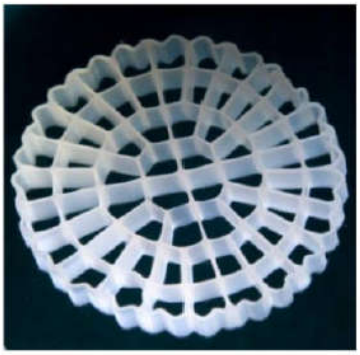
.5 Claro Contact References including Project Information, Thumbnail Drawings & Installation Photographs

.1 Hawkesbury, ON (2012)

Item No.	Project Information
1	**Owner & Facility:**
	Hawkesbury, ON -- Facility: Hawkesbury WWTP
	Owner Representative:
	Martin Perron, Superintendent, Environmental Services, Hawkesbury, 815 Main St E., Hawkesbury, ON K6A 1B5; Cell: (613) 678-0464; mperron@hawkesbury.ca
	Brief Description and Model #s (Provide project cut sheet or describe below):
	Overview Description & Project Context: Two (2) fine step screens, 2 x model 1900-1050-3mm; one (1) common wash press, model TP250-3300 with discharge/compaction tube & hygienic bagger; and plug-&-play controls. Capacity of each screen: 42 MLD (1750 m3/hour) each. Wash press capacity 2.5 m3/hour; New greenfield facility; Preselected. Commissioned in 2012, the Hawkesbury 3mm screens have been successfully protecting a Veolia IFAS system, which includes MBBR media & sieves identical to the Mascouche system for eight (8) years (Please see publically available photos of the IFAS tanks below in the notes section). Also, the screens have have not yet had their linkage syatem sleeve bushings changed since start-up. Wash press spiral and wear bars are also still in very good condition (last inspected in August 2020). 
	Date of Substantial Completion:
	Start-Up: 2012
	Approximate Contract Value: $ 295,000 CAD - Preselected
	Capacity (MLD):
	42 MLD each
	General Contractor Contact Info:
	Jason Assaly, Vice President – Construction, Asco Construction, 52 Antares Drive, Unit #11, Ottawa, Ontario K2E 7Z1; Tel: 613.229-1243; jason.assaly@ascoconstruction.com

- **Please also see reference letter included in Section 3, Part B: System Performance, Item i.**

- **Continued following page →**

1	**Notes:** Commissioned in 2012, the Hawkesbury 3mm screens have been successfully protecting a Veolia IFAS system, which includes MBBR media identical to the Mascouche system, for eight (8) years (Please see publically available photos of the IFAS tanks below). **Hawkesbury- IFAS Basin**  **Hawkesbury - Sieves and Aeration grid**  

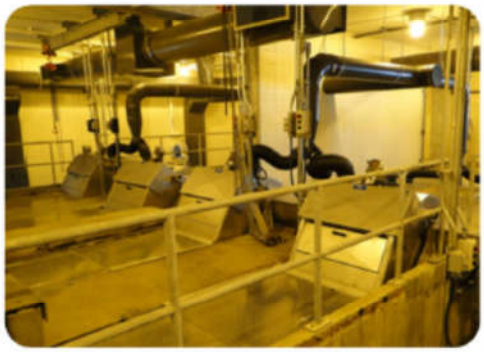
Hawkesbury, ON (2012) – Project Photographs

Hawkesbury, ON (2012)

- 2 x fine step screens (3mm)
- 1 x wash press
- 1 x hygienic bagger
- controls

- **Fine Screen Capacity: 1900-1050-3mm (1750 m3/h; 11 MGD each screen); Preselected**

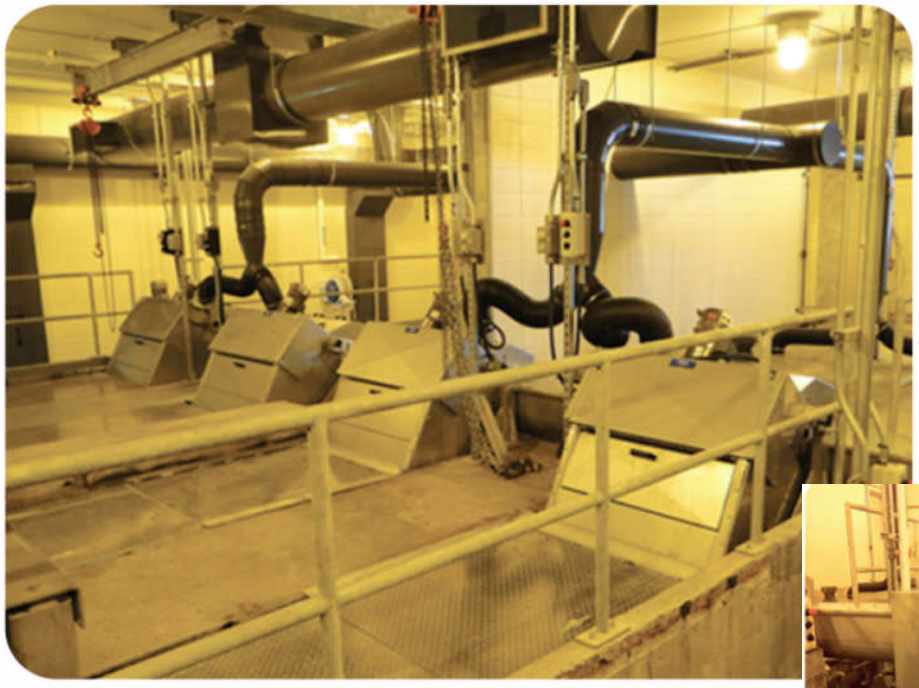
.2 Mascouche – Lachenaie, QC (2010)

Item No.	Project Information
2	**Owner & Facility:** Mascouche / Lachenaie, QC -- Facility: Mascouche / Lachenaie WWTP **Owner Representative:** David Wisdom, Project Manager/Gestionnaire de projet en traitement des eaux, SIMO, 199 chemin de la Cabane Ronde, Mascouche, QC J7K 3C1; 514-796-9136; dwisdom@simo.qc.ca [English-Speaking Reference] Yvon Plante, Tech. B.A.A., Operations Director/Directeur exploitation, SIMO, 514.281.6525 ext. 2291) ; cell : 514.942.0681; yvon.plante@simo.qc.ca [French-only speaking reference]; Mr. Wisdom can speak to the efficiacy of the facility as lead operator/manager. Mr. Yvon Plante also runs St-Eustache WWTP, QC, which is equipped with 2 x 3mm step screens & TP200 wash press units. Mr. Wisdom worked as an operator at St-Eustache for several months before being transferred to Mascouche. SIMO is an operations company. **Brief Description and Model #s (Provide project cut sheet or describe below):** Overview Description & Project Context: Four (4) fine step screens, 2 x model 1400-1050-3mm (new channels) & 2 x 1400-900-3mm (existing channels); one (1) common screenings conveyor, model U-320-7000; one (1) wash press, model TP250-500 with discharge/compaction tube & hygienic bagger; and plug-&-play controls. Capacity of each screen: 48 MLD each (2 x model 1400-1050-3mm) & 41 MLD each (2 x model 1400-900-3mm); 100% redundancy for 89 MLD. Wash press capacity: 2.5 m3/hour; Retrofit & expansion application; Hard-specified. Commissioned in 2010, the Mascouche 3mm screens have been successfully protecting a Veolia Anox Kaldnes MBBR system for ten (10) years (Please see publically available photos of the MBBR tanks below in the notes section). Also, the screens have had their sleeve bushings changed once (approx. year 7) since start-up.  Mascouche-Lachenaie WWTP, QC **Date of Substantial Completion:** Start-Up: 2010 **Approximate Contract Value: $ 420,000 CAD - Hard-Specified** **Capacity (MLD):** 48 MLD each (2 x model 1400-1050-3mm) & 41 MLD each (2 x model 1400-900-3mm); 100% redundancy application. **General Contractor Contact Info:** Nordmec Construction, 390 rue Siméon local 3, Mont-Tremblant, QC J8E 2R2; T. 819.429.5555

• **Continued following page →**

2	**Notes:** Commissioned in 2010, the Mascouche 3mm screens have been successfully protecting a Veolia Anox Kaldnes MBBR system for ten (10) years and running. Here are publically available photographs of the MBBR tanks that are downstream of the Claro 3mm step screens. The blue arrow (added for illustration) indicates the location of the influent works building, which houses the Claro screening system & the laboratory/office. Mascouche LagoonGuard™ VEOLIA  Mascouche LagoonGuard™ 

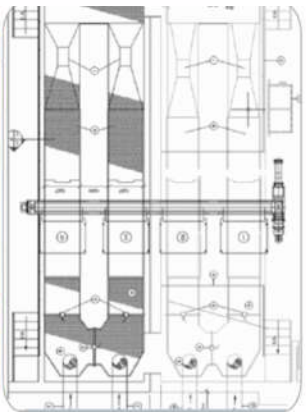
Mascouche – Lachenaie, QC (2010) – Project Photographs



Mascouche, QC (2010)

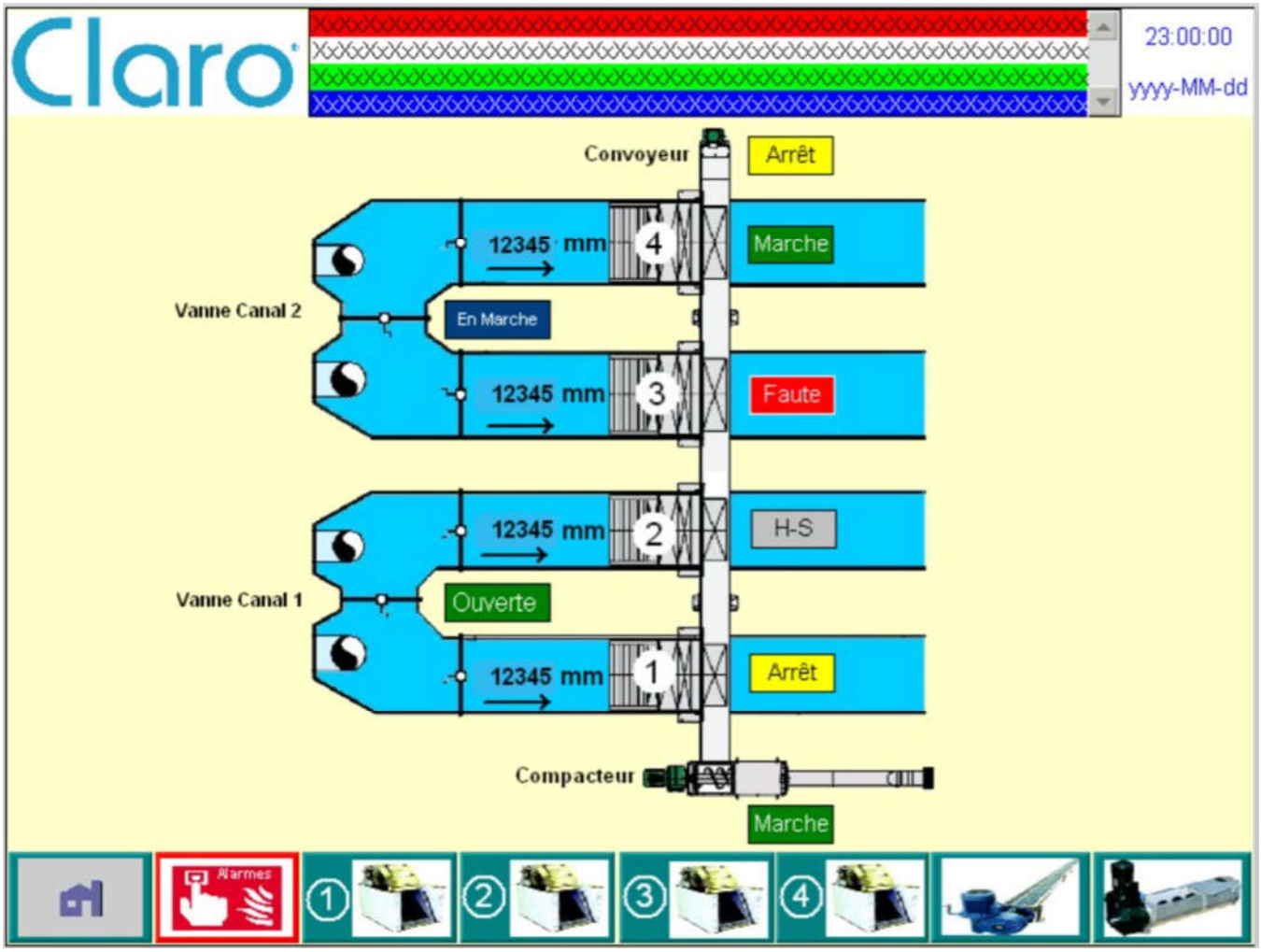
- 4 x fine stair screens (1/8")
- 1 x transfer conveyor
- 1 x wash press
- 1 x hygienic bagger
- controls

- **Fine Screen Capacity: 1400-1050-3mm (1850 m3/h; 11.7 MGD each screen)**



Claro

• HMI Screenshot (12” GE Touchscreen – image extracted from development software)



screening grit removal Claro

• Continued following page →

.3 Mississipi Mills, ON (2012)

Item No.	Project Information
3	**Owner & Facility:** Town of Mississippi Mills, ON -- Facility: Mississippi Mills WWTP **Owner Representative:** Robert (Bob) LeBlanc, Sr. Operations Manager-Capital Projects, Ontario Clean Water Agency (OCWA), Eastern Region Hub; C. 613.253.6933, Tel: 613-257-4990; RLeBlanc@ocwa.com; Mr. Leblanc was the Superintendent of Mississiippi Mills at start-up. He recently assumed the responsibilities of Sr. Operations Manager of this facility and other sister facilities in the OCWA network. Mr. Leblanc is well-placed to speak about the long-term longevity and performance of the step screening system. **Brief Description and Model #s (Provide project cut sheet or describe below):** Overview Description & Project Context: Two (2) fine step screens, 2 x model 1900-750-6mm; one (1) common wash press, model TP250-2400 with discharge/compaction tube & hygienic bagger; and plug-&-play controls. Capacity of each screen: 42 MLD (1200 m3/hour) each. Wash press capacity 2.5 m3/hour; New greenfield facility; Preselected. Commissioned in 2012. The screens have have not yet had their linkage syatem sleeve bushings changed since start-up.  Mississippi Mills WWTP, ON **Date of Substantial Completion:** Start-Up: 2012 **Approximate Contract Value: $ 260,000 CAD - Preselected** **Capacity (MLD):** 42 MLD each (2 x model 1400-750-6mm); 100% redundancy application. **General Contractor Contact Info:** North America Construction (1993) Ltd., NAC Constructors Ltd., 220 Wolf Grove Road, Almonte, ON K0A 1A0; Tel: 613.256.9650 **Notes:** The Mississippi Mills 6mm screens have been functioning effectively without maintenance or spares since start-up in 2012.

• **Continued following page →**

Mississippi Mills, ON (2012) – Project Photographs

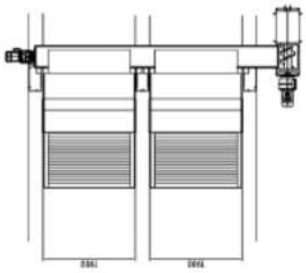
Mississippi Mills, ON (2012)

- 2 x fine stair screens (1/4")
- 1 x wash press
- 1 x hygienic bagger
- controls

- **Fine Screen Capacity: 1900-750-6mm (1200 m3/h; 7.6 MGD each screen); Preselected**

• **Continued following page →**

.4A Vauxhall PCP, ON (2011)

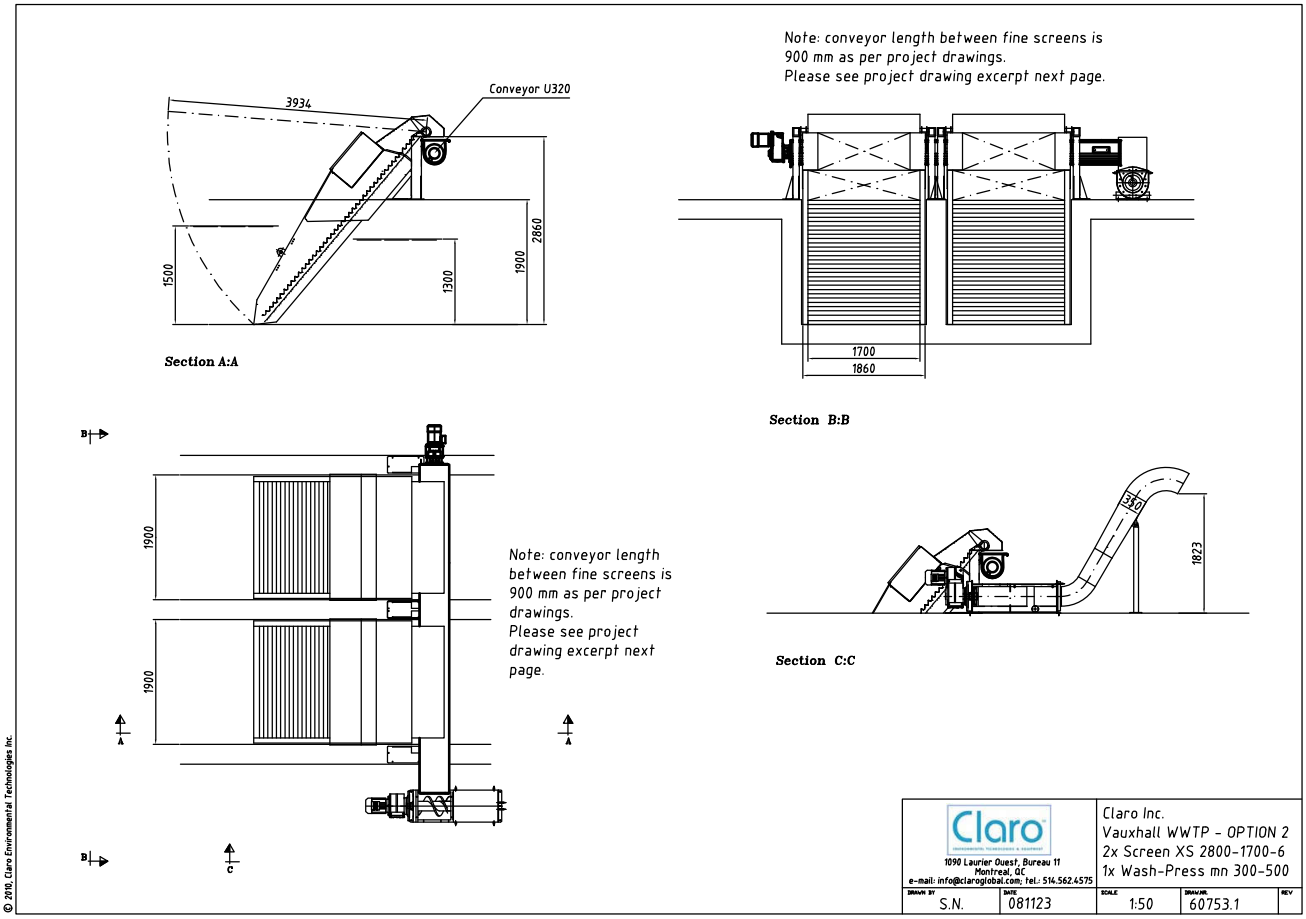
Item No.	Project Information
4A	**Owner & Facility:**
	City of London, ON -- Facility: Vauxhall Pollution Control Plant (PCP)
	Owner Representative:
	Mark Elliott, C.E.T., Senior Engineering Technologist, Wastewater Treatment Operations, City of London, 109 Greenside Avenue, London, ON N6J 2X5; P: 519.963.1366; Cell: 226.927.5287; melliott@london.ca
	Brief Description and Model #s (Provide project cut sheet or describe below):
	Overview Description & Project Context: Two (2) model 2800-1700-6mm, fine step screens, one (1) U-320-5000 shaftless spiral transfer conveyor, & one (1) model 300-500 wash press. Capacity: fine screens 100,000 MLD each; 4167 m3/h; 26.42 MGD each screen); Hard Specified. This application has been in service since 2011 without the change of the system's linkage drive sleeve bushings. Claro note: Operators have reported elimination of grease issues downstream in the facility in addition to protection of downstream equipment from screenings debris. City of London experiences exceptionally high grease loading when compared to other municipalities. 
	Date of Substantial Completion:
	2011
	Approximate Contract Value: $ 450,000 CAD - Hard Specified
	Capacity (MLD):
	Rated for 100 MLD each screen; 100% redundancy design as specified.
	General Contractor Contact Info:
	Bryan O'Hearn, Baseline Constructors Inc., 550 Parkside Dr., Unit A 23, Waterloo, ON N2L 5V4; T.: 519-880-9863, C.: 519-503-0425; bohearn@baselineconstructors.ca
	Notes:
	City of London has Claro fine screening equipment at Adelaide PS, Vauxhall PCP, & Pottersburg PCP. Conveyor & wash press equipment is also installed at Greenway PCP, ON (at both new and old headworks, which are both in service). We are currently working on another facility design (design phase; not released for tender yet). We have also provided reference information for Adelaide PS (follows as reference 4B) since it is a large 3mm screening system and is within the same city system. Mr. Mark Elliott is also the contact for the Adelaide installation & can also provide information about the Pottersburg installation (please see installation photographs in the sample installation photograph section immediately following the references listing).

• **Continued following page →**

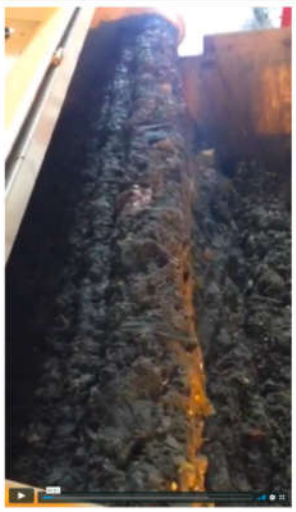
Vauxhall PCP, ON (London, ON; 2011; Hard Specified) – Project Photographs

Vauxhall PCP, ON (2011)

- 2 x fine stair screens (1/4")
- 1 x transfer conveyor
- 1 x wash press
- 1 x hygienic bagger
- **Fine Screen Capacity: 2800-1700-6mm (100 MLD; 4167 m3/h; 26.42 MGD each screen); Hard Specified**



.4B City of London – Adelaide Pump Station, ON (2018)

Item No.	Project Information
4B	**Owner & Facility:** City of London, ON -- Facility: Adelaide Pump Station (PS) **Owner Representative:** Mark Elliott, C.E.T., Senior Engineering Technologist, Wastewater Treatment Operations, City of London, 109 Greenside Avenue, London, ON N6J 2X5; P: 519.963.1366; Cell: 226.927.5287; melliott@london.ca **Brief Description and Model #s (Provide project cut sheet or describe below):** Overview Description & Project Context: Two fine step (2) screens, one (1) conveyor, one (1) wash press, and one (1) conveyor (outloading conveyor with pneumatic gates on outlet chutes for even material distribution in bin). Preselected by the City based on experience with Claro fine step screens at their Vauxhall PCP facility (installed 2011) & wash press equipment installed at Greenway PCP (2009). In addition to addressing the municipal influent flow, the units also screen a weekly deluge of debris that sediments within the facility's 2 pump wells -- this screening procedure occurs weekly during the regular pump station voiding routine. The pump wells are built with a large capacity and in a manner that encourages significant sedimentation of debris that decomposes, becomes septic and exhibits a very sludgy material character. This screenings/sludge is mixed with a signifcant amount of grit. Every week operators run the pumps on maximum to clean out the wells, one well at a time. The two screens are used to separate out this material and thus experience an extreme loading at peak flow on a regular basis. A film showing one screen handling the pump station voiding flow (during Phase 1 of the 2-stage start-up process) is included on the Claro films website (login information provided below). The quality of the separation is such that operators reported to Claro that the discharged volume at the existing downstream grit system was reduced by between 50 - 75% (to be conservative, we can assume approx. 50%, the lower end of this spectrum). The previous screens were Climber-type screens with 1/2" spacing. Here is a screen shot from the pump station voiding routine film available/included with this proposal package (please see image at right).  Adelaide PS, (London, ON) Pump Station Voiding Routine - view of screen discharge). **Date of Substantial Completion:** 2018 **Approximate Contract Value: $ 580,000 CAD - Preselected** **Capacity (MLD):** Rated for 200 MLD each screen; 100% redundancy design as specified. **General Contractor Contact Info:** Dave Goyette, C.E.T, Dielco Industrial Contractors Ltd., 61 Enterprise Drive, London, ON N6N 1A4; T.: 519.685.2224 (30); C.: 519.933.0099 dave@dielco.com; Note: This contract was not novated to the contractor. City of London bid the installation contract but retained equipment supply responsibility. Project management and overview design was by RV Anderson (London, ON Office). **Notes:** City of London has Claro fine screening equipment at Adelaide PS, Vauxhall PCP, & Pottersburg PCP. Conveyor & wash press equipment is also installed at Greenway PCP, ON (at both new and old headworks, which are both in service). We are currently working on another facility design (design phase; not released for tender yet).

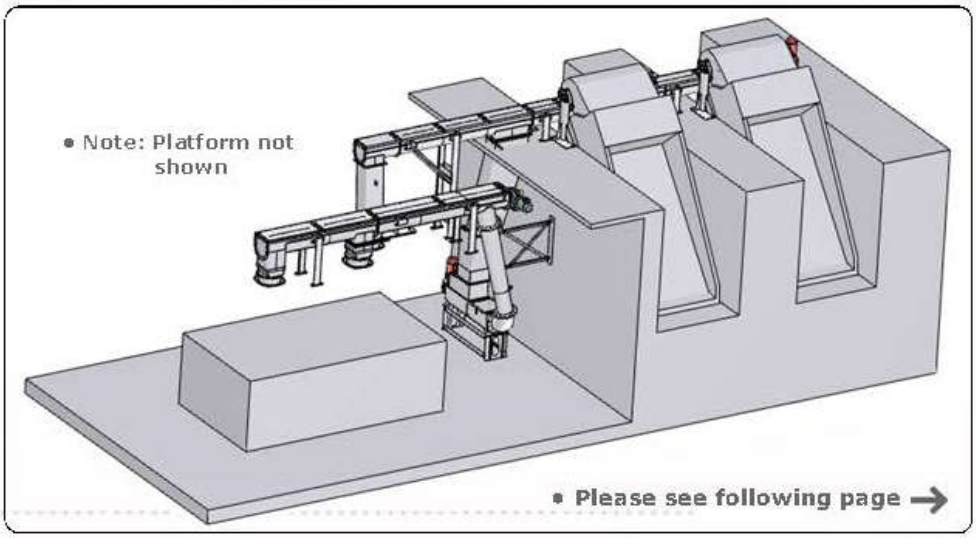
Adelaide PS (London, ON; 2018) – Project Photographs

Claro

Screening Systems – Installation Photos/Drawings

Adelaide, ON - Fine Screening & Outloading System (2018)

- **Fine Screening & Outloading System:** Claro Fine Step Screen (model 3500-1600-3mm), Transfer Conveyor (model U320-8900) with manual gate, precautionary by-pass & hygienic bagger, Wash Press (model 300-700) c/w compaction tube, Outloading Conveyor (model U360-5600) c/w 2 outlets & one pneumatic gate including hygienic baggers. Note: Stop gates stored behind screens.



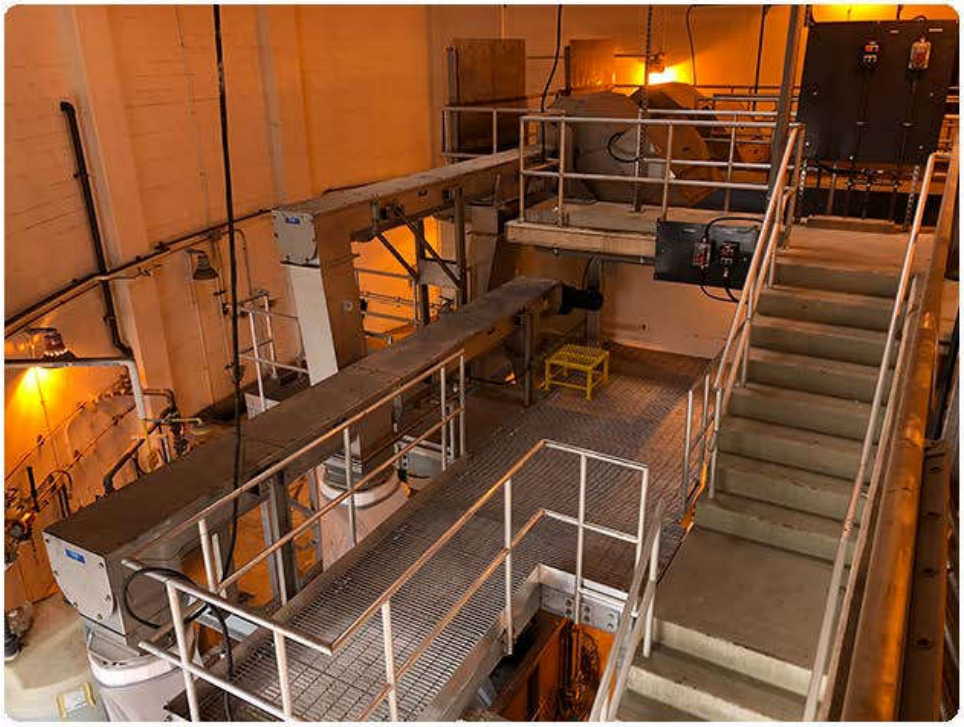
Claro

Claro

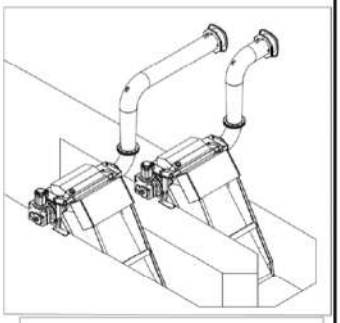
Screening Systems – Installation Photos/Drawings

Adelaide, ON - Fine Screening & Outloading System (2018)

- **Fine Screening & Outloading System:** Claro Fine Step Screen (model 3500-1600-3mm), Transfer Conveyor (model U320-8900) with manual gate, precautionary by-pass & hygienic bagger, Wash Press (model 300-700) c/w compaction tube, Outloading Conveyor (model U360-5600) c/w 2 outlets & one pneumatic gate including hygienic baggers.



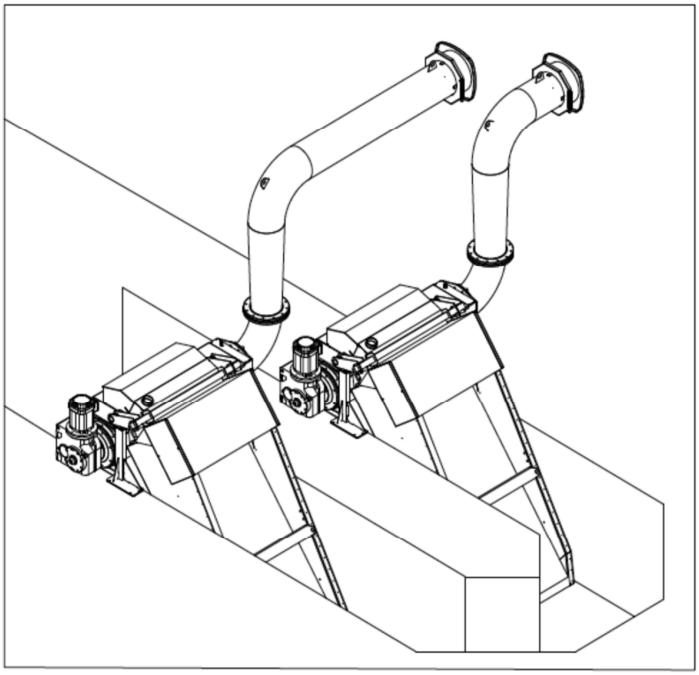
.5 Campbell River, BC (2016)

Item No.	Project Information
5	**Owner & Facility:**
	City of Campbell River, BC -- Facility: Norm Wood Environmental Centre
	Owner Representative:
	Lorne Sandberg, Wastewater Supervisor, Norm Wood Environmental Centre, 4000 N. Island Hwy, Campbell River, BC V9H 0C2; Tel: 250.286.4833, Cell: 250.204.4262; Lorne.Sandberg@CampbellRiver.ca
	Brief Description and Model #s (Provide project cut sheet or describe below):
	Overview Description & Project Context: 2 x Fine Step Screens: Model 2100-1000-3mm (64 MLD; 2664 m3/h; 16.89 MGD each screen) & 2 x Wash Presses c/w discharge tubes & baggers: Model TP300-1000 (3.5 m3/hour); & custom configuration control panel arrangement to fit available footprint & client preferences (PLC panel rated Class 1, Div. 2 without use of air purge system installed in screening room + 18 inch wide separate starters panel in custom AISI 304 enclosure). Retrofit application. We also implemented a downstream sutro weir to provide a proportional downstream level, report instantaneous flow values & logged flows, eliminate a straight weir that was causing downstream grit accumulation issues, and integrated the existing ISCO sampler to sample based on a flow value interval adjustable at our control panel for proportional sampling. AISI 316L construction. Municipal influent & septage discharges. Preselected. N.B. This preselection called for perforated plate units. We proposed 3mm aperture step screens in lieu with excellent results.  Norm Wood Environmental Centre
	Date of Substantial Completion:
	Start-Up: Phase 1: May 2016; Phase 2: June 2016
	Approximate Contract Value: $ 320,000 CAD - Preselected
	Capacity (MLD):
	Rated for 64 MLD each screen; 100% redundancy design as specified.
	General Contractor Contact Info:
	Graham Stewart, Ridgeline Mechanical, 576 Timberlane Rd. Courtenay BC V9N 9K8 Tel: (250) 898-7648 Fax: (250) 334-3493
	Notes:
	This preselection called for perforated plate units. We proposed 3mm aperture step screens in lieu with excellent results. Please see screening separation testimonial letter included in this proposal document.

- **Please also see reference letter included in Section 3, Part B: System Performance, Item i.**

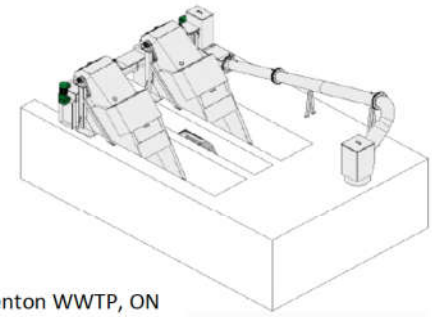
- **Continued following page →**

Campbell River, BC (2016) – Installation Photographs



- **Fine Screen Capacity: 2100-1000-3mm (2664 m^3/h; 16.89 MGD each screen); Preselected**

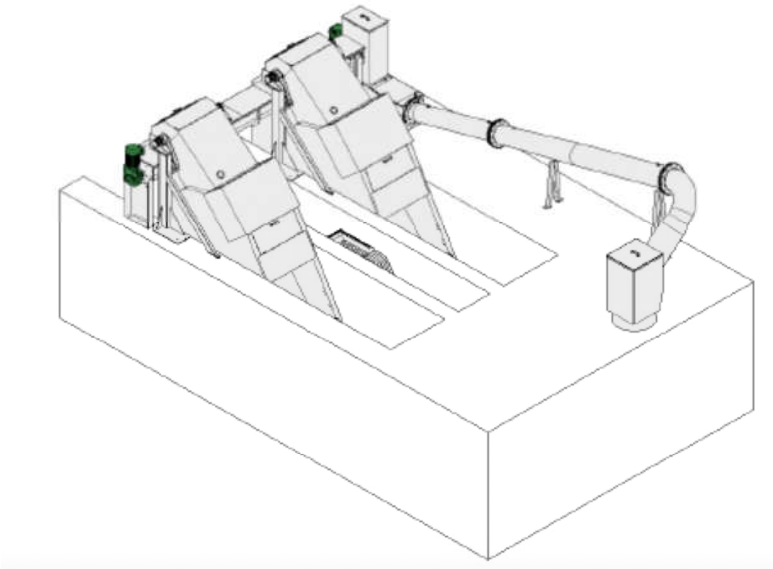
.6 Quinte West (Trenton WWTP), ON (2016)

Item No.	Project Information
6	**Owner & Facility:**
	Quinte West, ON -- Facility: Trenton Wastewater Treatment Plant (WWTP)
	Owner Representative:
	Brad Purchase, Superintendent of Wastewater Treatment, Public Works & Environmental Services City of Quinte West, 613.392.2841 x4491; 343.645.5039 Cell; brad.purchase@quintewest.ca
	Brief Description and Model #s (Provide project cut sheet or describe below):
	Overview Description & Project Context: Two (2) fine step screens, model 3100-800-6mm , one (1) screenings conveyor, model U-320-4200, & one (1) wash press, model TP250-500 with extended discharge & compaction tube + transition box with inspection lid. The extended discharge tube design is provided in order to acheive a pre-existing screenings drop chute in this stacked facility (bin is 2 floors below). Including plug-&-play control panel. A tight footprint retrofit. Capacity of each screen: 1390 l/sec; 2084 m3/hour; Wash press model TP250-500 rated for 2.5 m3/hour; Retrofit application; Preselected.  Trenton WWTP, ON
	Date of Substantial Completion:
	Start-Up: 2016
	Approximate Contract Value: $ 320,000 CAD - Preselected
	Capacity (MLD):
	Rated for 50 MLD each screen for a total of 100 MLD; 50% / 50% design as specified.
	General Contractor Contact Info:
	Theo P. Brunsting, P. Eng., Partner - Civil Projects, Peak Engineering & Construction, 13580 County Road #2, Colborne, ON K0K 1S0; T.: 905.355.1500, F.: 905.355.3238; theob@peakltd.ca
	Notes:
	This preselection called for perforated plate units. We proposed 3mm aperture step screens in lieu with excellent results.

• **Continued following page →**

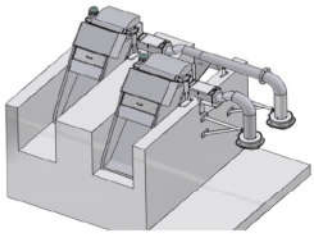
Quinte West (Trenton WWTP), ON (2016) – Installation Photographs



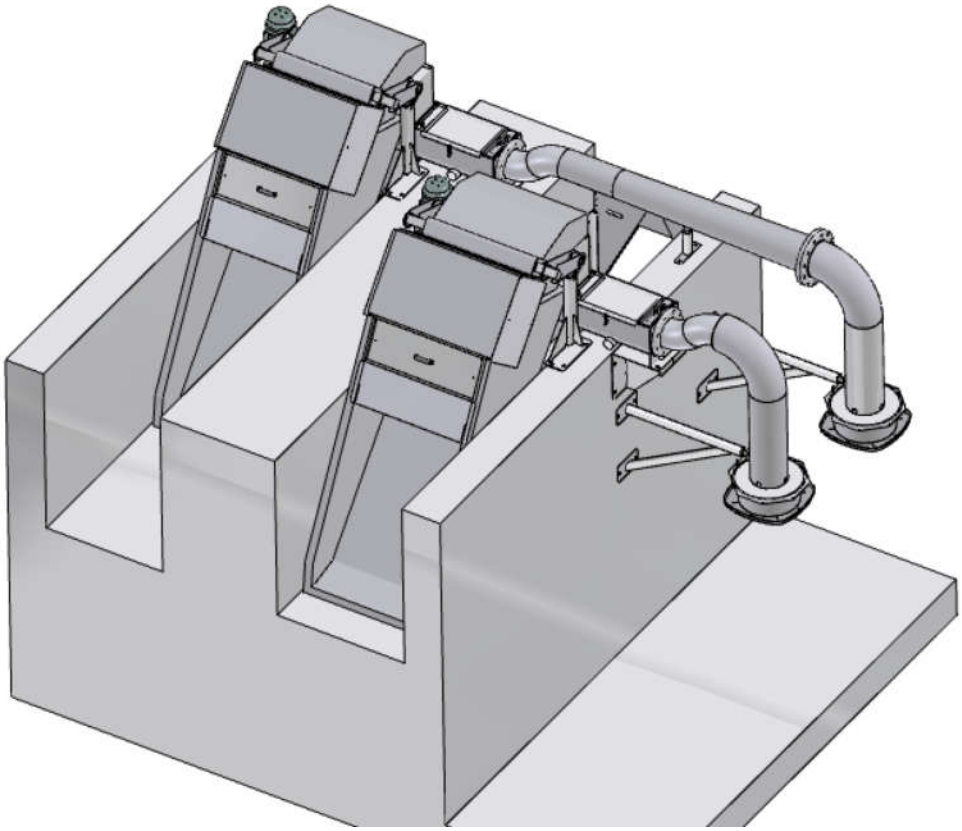
- **Fine Screen Capacity: Each model 3100-800-6mm (2084 m^3/h; 13.2 MGD each screen); Extended discharge tube to enable constrained retrofit application footprint; Preselected**

.7 Squamish, BC (2017)

Item No.	Project Information	
7	**Owner & Facility:**	
	City of Squamish, BC -- Facility: Mamquam Treatment Plant	
	Owner Representative:	
	Scott Macintyre, Chief Operator Mamquam Treatment Plant, District of Squamish, 39907 Government Rd. Squamish, BC V8B 0N7; smacintyre@squamish.ca	
	Brief Description and Model #s (Provide project cut sheet or describe below):	
	Overview Description & Project Context: 2 x Fine Step Screens: 2 x Model 1900-750-3mm (**30 MLD; 1250 m3/h; 7.925 MGD** each screen) & 2 x Wash Presses c/w discharge tubes & baggers: Model TP200-900 (1 m3/hour) & control panel. Preselected. N.B. This preselection called for perforated plate units. We proposed 3mm aperture step screens in lieu with excellent results.	 Squamish WWTP, BC
	Date of Substantial Completion:	
	Start-Up: 2017	
	Approximate Contract Value: $ 320,000 CAD - Preselected	
	Capacity (MLD):	
	Rated for 30 MLD each screen; 100% redundancy design as specified.	
	General Contractor Contact Info:	
	Installed by City technicians.	
	Notes:	
	This preselection called for perforated plate units. We proposed 3mm aperture step screens in lieu with excellent results. Please see screening separation testimonial letter included in this proposal document.	

• **Continued following page →**

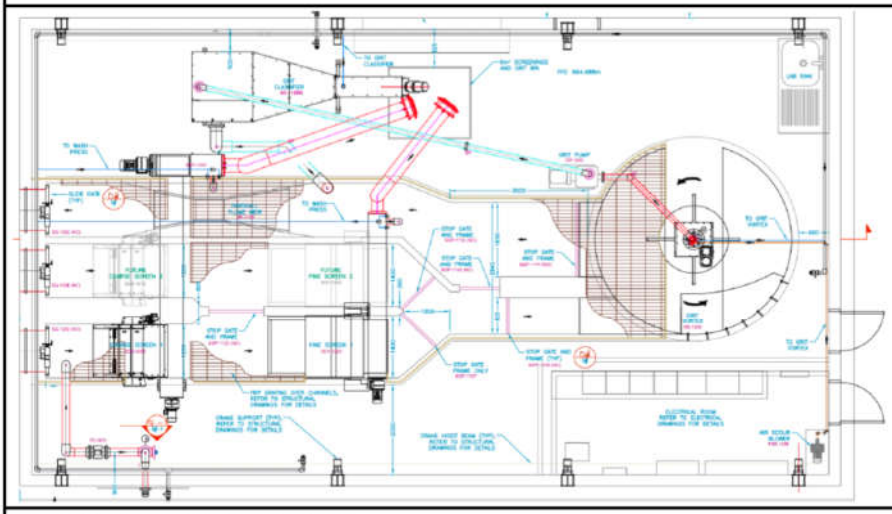
Squamish, BC (2017; Preselected)



Scott Macintyre
Chief Operator Mamquam Treatment Plant
District of Squamish | Hardwired for Adventure
39907 Government Rd. Squamish BC V8B 0N7
PO box 310 V8B 0A3
smacintyre@squamish.ca

• **Continued following page →**

.8 Fort St. John, BC (2018)

Item No.	Project Information
8	**Owner & Facility:**
	City of Fort St. John, BC -- Facility: Fort St. John Wastewater Treatment Plant (WWTP)
	Owner Representative:
	Garland Durnford, Water / Sewer Treatment, City of Fort St John, 10631-100 St., Fort St John, BC V1J 3Z5; T: 250.787.2745; GDurnford@fortstjohn.ca
	Brief Description and Model #s (Provide project cut sheet or describe below):
	Overview Description & Project Context: One Claro coarse mutiple rake screening system followed by a Claro 3mm fine step screening system, which protects a vortex grit removal system and a future MBBR. The coarse screening system includes: one (1) multiple rake screen, model 3000-1000-19mm, one (1) U-360-5500mm screenings transfer conveyor, and one (1) model TP300-700 wash press with level sensor in the inlet & discharge tube & hygienic bagger. Conveyor is prepared for future 2nd multiple rake screen. Fine screening system includes the following: Fine Step Screen: 1 x model 2400-1300-3mm (53.2 MLD; 2217 m3/h; 14.05 MGD each screen - duty & future) & 1 x common Wash Press c/w discharge tube & hygienic bagger: Model TP250-2900 (2.0 m3/hour). Wash press designed to accept a second step screen. Grit System includes: forced vortex unit 4250 mm diameter, Gorman-Rupp self-priming grit pump, CL-320 grit classifier, side channel blower & complete plug-&-play controls. Preselected over a competitor's perforated plate system.
	 Fort St-John WWTP, BC - Plan View Layout
	Date of Substantial Completion:
	Start-Up: Summer 2018
	Approximate Contract Value: $600,000 CAD - Preselected
	Capacity (MLD):
	Rated for 53.2 MLD each screen; 100% redundancy design as specified.
	General Contractor Contact Info:
	Knappett Industries, Northern Branch – Peace Region, Unit C - 10519 – 100th Avenue, Fort St. John, BC V1J 1Z1; 250.785.0123
	Notes:
	This preselection is designed in anticipation of the protection of an MBBR system, which has not been implemented at this juncture. The Claro 3mm step screen was preselected in lieu of a competitor's perforated plate screening system.

Fort St. John, BC (2018; Preselected) – Installation Photographs

Claro

Screening & Grit Removal Systems – Installation Photos/Drawings

Fort St. John, BC - Coarse Pre-Screening, Fine Screening & Grit Removal System (2018)

- **Coarse Screening System:** Claro Multiple Rake (model 3000-1000-19mm), Transfer Conveyor (model U-360-550) & Wash Press (model 300-700) including Discharge Tube & Hygienic Bagger
- **Fine Screening System:** Claro Fine Step Screen (model 2400-1200-3mm), Wash Press (model 250-2900 including Discharge Tube & Hygienic Bagger
- **Grit Removal System:** Claro VortiClar™ Forced Vortex (model 4250-53.2), Grit Pump (Model Gorman-Rupp 4X4 Direct Drive Self-Priming), Grit Classifier (model CL-320) & Side-Channel Blower
- **Control Panel System:** Complete plug-&-play PLC control panel with all components for a fuly-functional system including all starters, VFDs, motor protection, surge protection etc.
- Note: System configured for capacity & redundancy expansion - 2nd multiple rake & step screen

• •

- **Coarse Screening System:** Claro Multiple Rake (model 3000-1000-19mm), Transfer Conveyor (model U-360-550) & Wash Press (model 300-700) including Discharge Tube & Hygienic Bagger

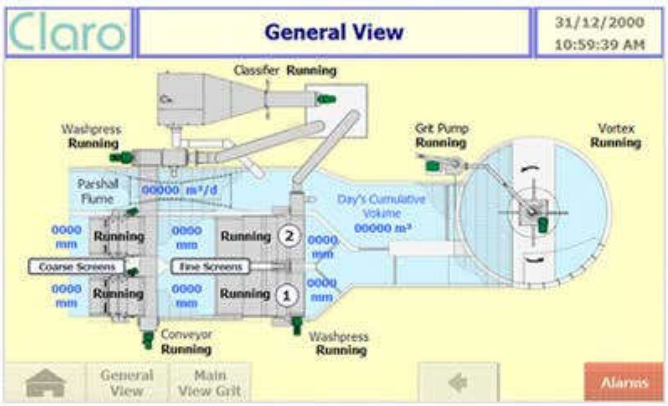
• Please see following page →

Claro

Screening & Grit Removal Systems – Installation Photos/Drawings

Fort St. John, BC - Coarse Pre-Screening, Fine Screening & Grit Removal System (2018)

- **Fine Screening System:** Claro Fine Step Screen (model 2400-1200-3mm), Wash Press (model 250-2900 including Discharge Tube & Hygienic Bagger & Common Plug-&-Play Control Panel



•Please see following page →

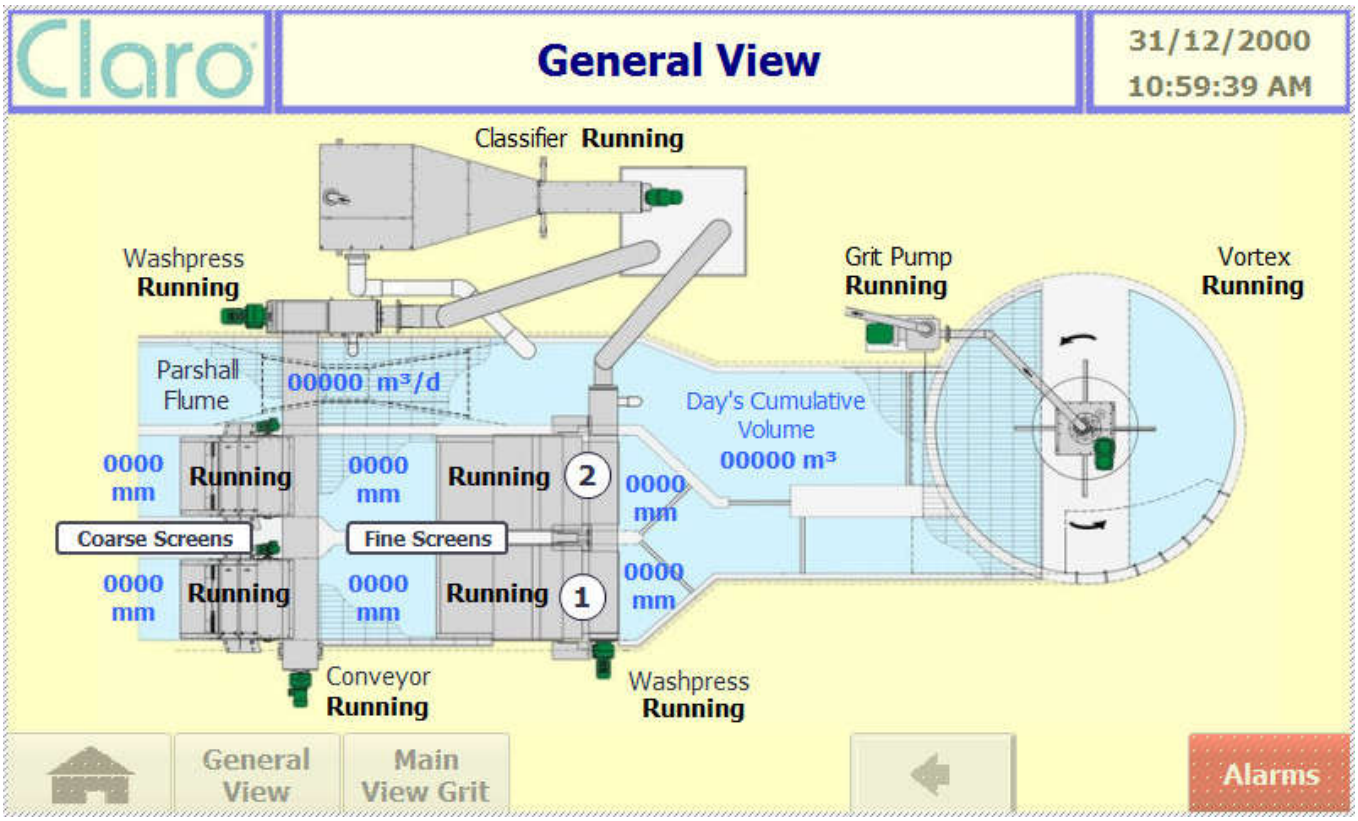
Claro

Screening & Grit Removal Systems – Installation Photos/Drawings

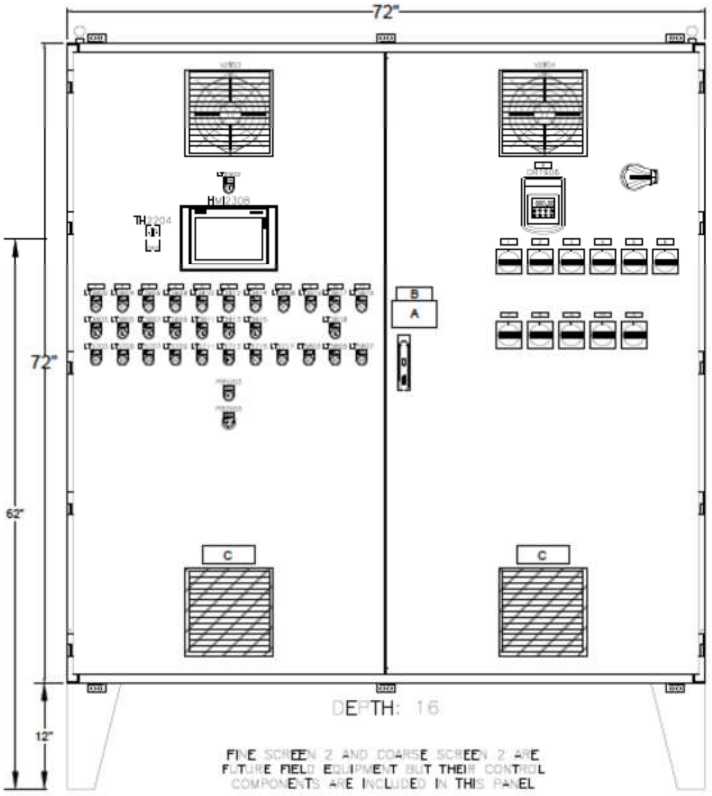
Fort St. John, BC - Coarse Pre-Screening, Fine Screening & Grit Removal System (2018)

- **Grit Removal System:** Claro VortiClar™ Forced Vortex (model 4250-53.2), Grit Pump (Model Gorman-Rupp 4X4 Direct Drive Self-Priming), Grit Classifier (model CL-320) & Side-Channel Blower

Claro



- Common Control Panel for 2 Multiple Rake Screens (19 mm), 1 Conveyor, 1 Wash Press, 2 Fine Step Screens (3mm), 1 Common Wash Press, Vortex, 1 Grit Pump, 1 Classifier & 1 Side Channel Blower



- **Installation Contact Reference:**

Garland Durnford
Water / Sewer Treatment
City of Fort St John
10631-100 St
Fort St John, BC V1J 3Z5
T: 250.787.2745
GDurnford@fortstjohn.ca

screening grit removal Claro

Claro

.9 Northern Rockies Regional Municipality – Fort Nelson WWTP, BC (2017)

Item No.	Project Information
9	**Owner & Facility:**
	Northern Rockies Regional Municipality, BC -- Facility: Fort Nelson WWTP
	Owner Representative:
	Harold de Jong, Utility Supervisor, Northern Rockies Regional Municipality, Town of Fort Nelson; T.: 250-500-1910; hdejong@northernrockies.ca
	Brief Description and Model #s (Provide project cut sheet or describe below):
	• One (1) Fine Step Screen model 2800-400-6mm rated 216 l/sec; 417 m3/h, One (1) Wash Press model TP-200-2000 rated 1.0 m3/h; Wash press designed to accept second future screen for doubling of flow capacity to 20,000 m3/day; forced vortex system (3000 mm dia.) including self-priming Gorman-Rupp grit pump, side channel blower, grit classifier & common screening & grit removal control panel. New application; hard specified. Fort Nelson, BC 
	Date of Substantial Completion:
	Start-Up: 2017
	Approximate Contract Value: $ 295,000 CAD - Preselected
	Capacity (MLD):
	One (1) Fine Step Screen model 2800-400-6 rated 10 MLD for phase 1 screen; 216 l/sec; 417 m3/h, One (1) Wash Press model TP-200-2000 rated 1.0 m3/h; Vortex peak flow: 26,500 m3/day.
	General Contractor Contact Info:
	IDL Project Inc, 1088 Great Street, Prince George, BC, V2N 2K8 ; T: 250.649.0561
	Notes:
	Commissioned in 2017, the Fort Nelson fine screening & grit removal system has not required spare parts or maintenance since start-up and has effectively protected an aerated lagoon and UV system. Here is an example of the grit product from the grit system, which is a reflection of the 6mm screenings capture rate and the efficacy of the grit system. Grit is clean/screenings-free + dry and suitable for hygienic bagging by the provided hygienic bagger without any standing water in the bin. Treated screenings are similarly dry. 

• **Continued following page →**

Fort Nelson, BC (2017) – Common Wash Press Configuration + Vortex Grit Removal System

C. Additional Installation Photographs (Included & selected to demonstrate capabilities & different layouts, apertures, location, age of installation, in-channel & in-tank configurations, municipal influent & septage applications – Contact references provided on request)

.1 Alliston WWTP, ON (2014) – Similar Common Wash Press Configuration

Alliston, ON (2014)

- 2 x fine stair screens (1/4")
- 1 x wash press
- 1 x hygienic bagger
- controls

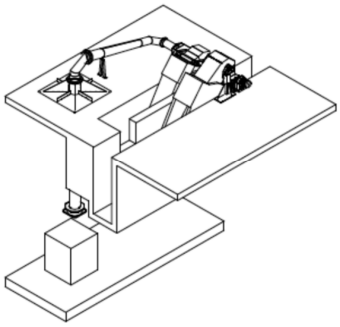
- **Fine Screen Capacity: 1700-450-6mm (592 m3/h; 3.75 MGD each screen); Hard Specified**

.2 Caledonia WWTP, ON (2016) – Similar Common Wash Press Configuration

Caledonia, ON (2016)

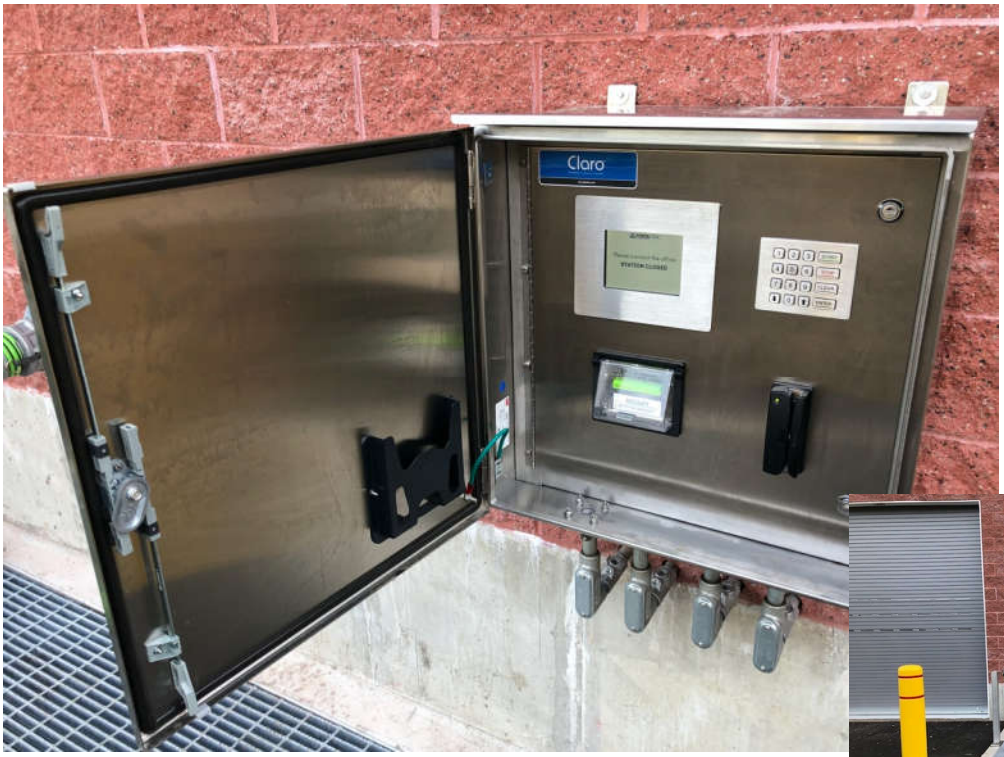
- 2 x fine stair screens (1/4")
- 1 x wash press
- 1 x hygienic bagger
- controls

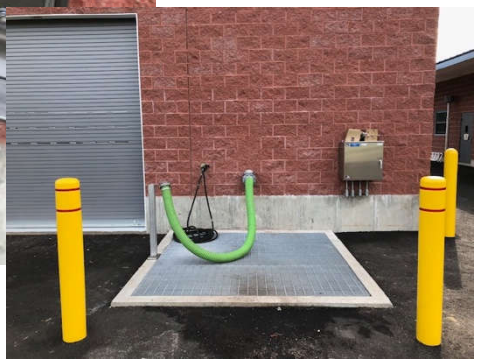
- **Fine Screen Capacity: 2800-500-6mm & 2100-400-6mm (972 m3/h; 6.16 MGD each screen); Hard Specified; Tight Space Retrofit into Existing Channels.**

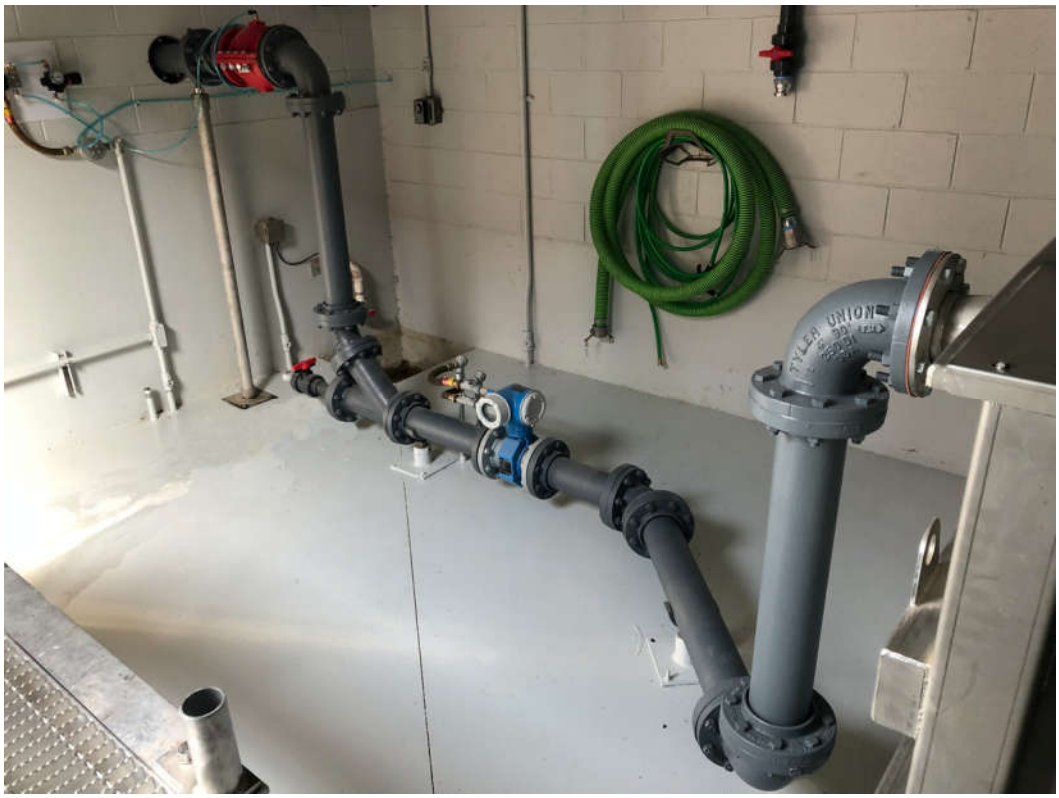


.3 Epping, NH (2019) – 6 mm in-Channel Screen, 2 mm in-Tank Screen for Protection of MBBR & Common Wash Configuration

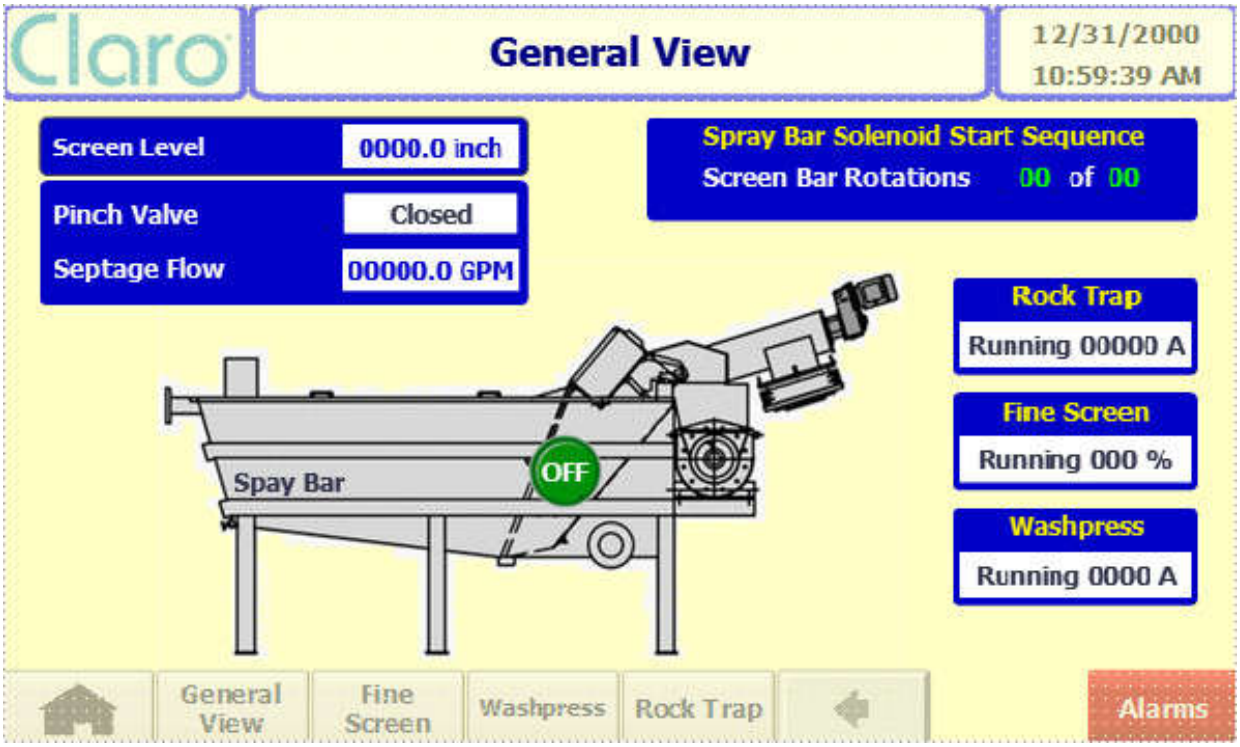
(Cont.) Epping, NH (2019) – Septage Station Including Wash Press, Automated Rock Trap, Hygienic Baggers, Hauler Access/invoicing Station & Control Panel



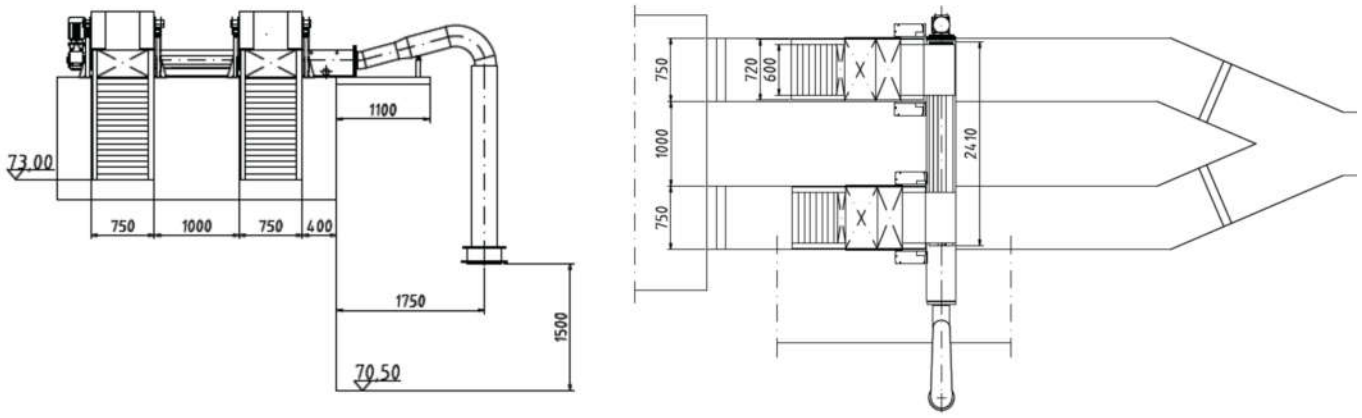




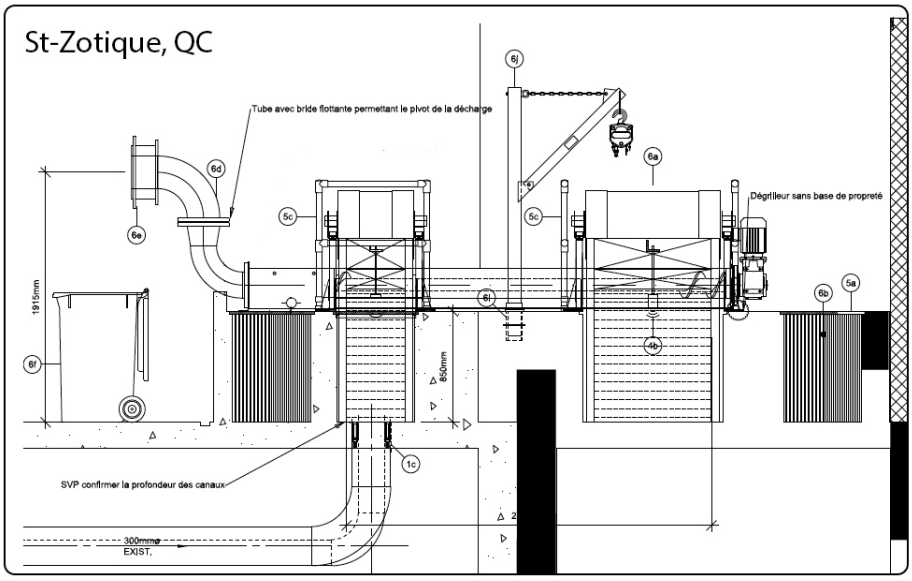
- **Sample HMI Graphic Touch Screen (General View)**



.4 Ste-Marianne WWTP, QC (2015) – Similar Common Wash Press Configuration



.5 St-Zotique, QC (2014) – Similar Common Wash Press Configuration



St-Zotique, ON (2014)

- 2 x fine stair screens (1/4")
- 1 x wash press
- 1 x hygienic bagger
- controls

- **Fine Screen Capacity: 1400 - 450 - 3 mm & 1400 - 900 - 3 mm (210 m^3/h & 630 m^3/h respectively)**
- **Smaller channel was existing; larger channel & manual rake channel added with building**

screening grit removal Claro

Claro

.6 Uxbridge, MA (2019) – Example of Screen Pivot-Out-of-Channel

Claro

Fine Step Screening Systems – Installation Photos

Uxbridge, MA (2019)

- 1 x fine step screen (1/4"; 6mm aperture); capacity 5.6 MGD (883 m3/h)
- 1 x wash press c/w discharge tube & hygienic bagging system; capacity 35 cfh (1 m3/h)
- PLC based 'plug-&-play' controls system including starters & all other components for automatic & manual operation.

- Fine step screen pivots out of channel in minutes for complete inspection access without closed-space channel entry.
  No disassembly or movement of downstream equipment required.

screening grit removal Claro

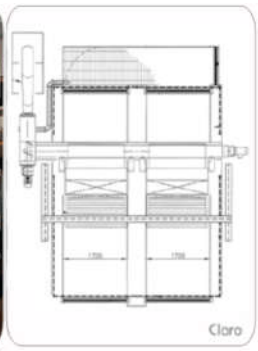
Claro

.7 Le Gardeur WWTP, QC (2012)

Le Gardeur, QC (2012)

- 2 x fine stair screens (1/4")
- 1 x transfer conveyor
- 1 x wash press
- 1 x hygienic bagger
- controls

- **Fine Screen Capacity: 2400-1500-6 mm (1875 m^3/h; 11.88 MGD each screen); Hard Specified.**



.8 Prévost, QC (2011)

Prévost, QC (2011)

- 1 x fine stair screen (1/4")
- 1 x wash press
- 1 x hygienic bagger
- controls

- **Fine Screen Capacity: 1900-600-6mm (650 m^3/h; 4.12 MGD)**

Claro

.9 Kamloops WWTP, BC (2013)

Claro

Fine Stair Screening Systems – Installation Photos

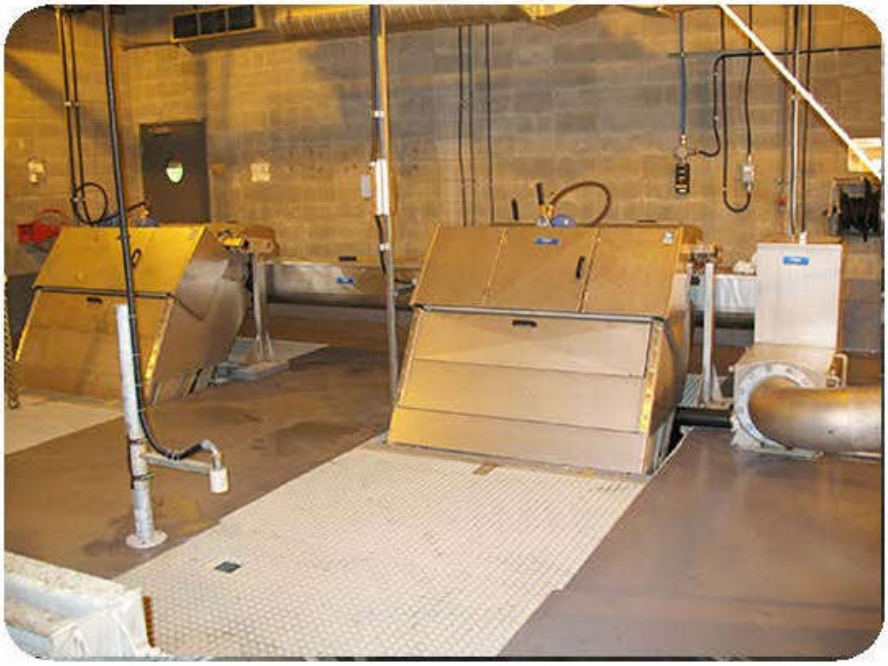
Kamloops, BC (2013)

- 1 x fine stair screen (1/4")
- 1 x wash press
- 1 x hygienic bagger
- Controls

- **Fine Screen Capacity: 2800-1400-6 mm (5004 m3/h; 3.2 MGD); Preselected**

Claro

.10 Repentigny WWTP, QC (2008)



Repentigny, QC (2008)

- 2 x fine stair screens (1/4")
- 1 x transfer conveyor
- 1 x wash press
- 1 x hygienic bagger

- **Fine Screen Capacity: 1900-1400-6 mm (2300 m^3/h; 14.58 MGD each screen); protecting two (2) aerated grit removal tanks with travelling bridge & grit pump systems; retrofit of existing channels**

.11 Sherbrooke WWTP, QC (December 2013 – January 2014)

Claro

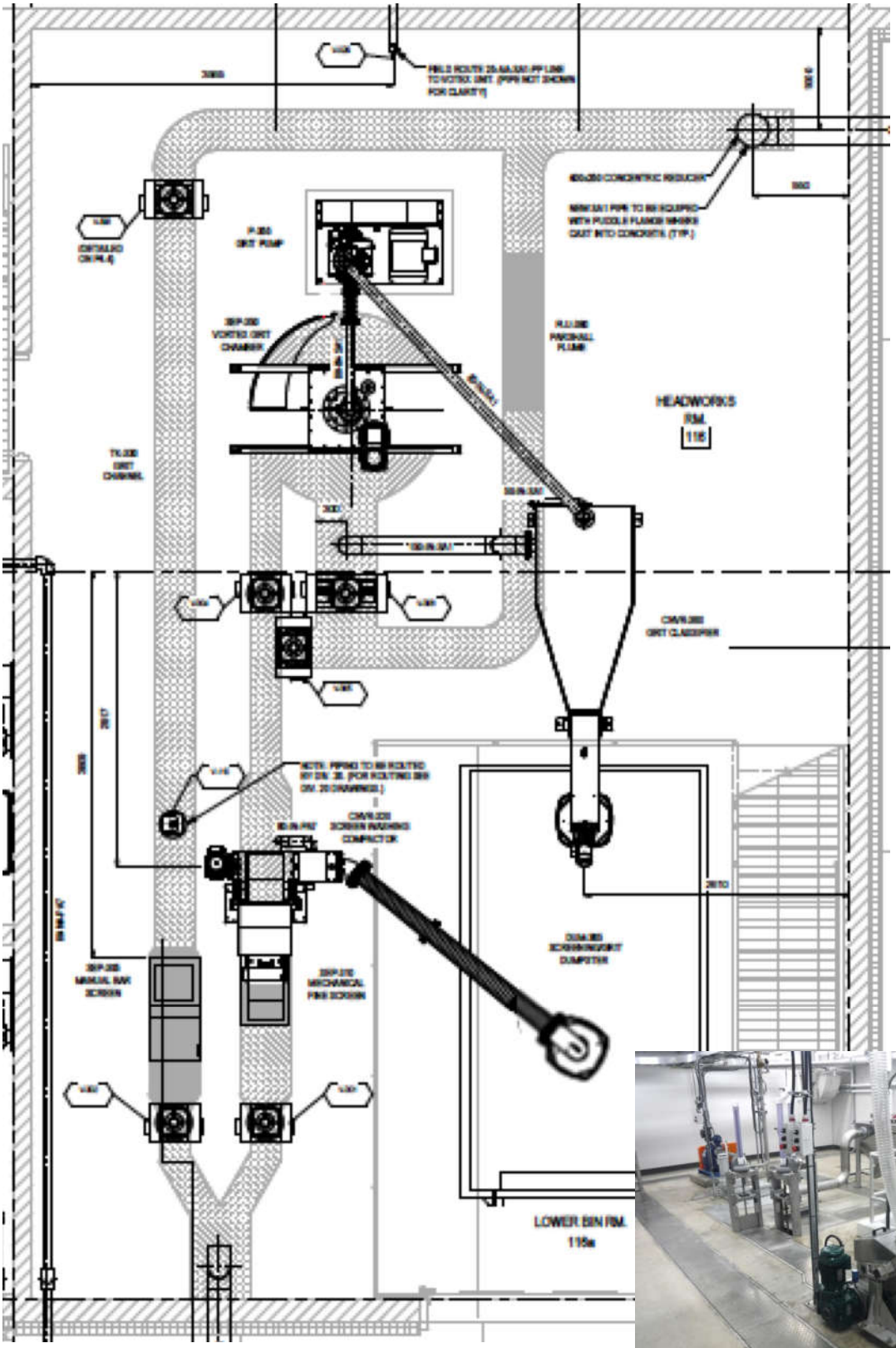
Fine Step Screening Systems – Installation Photos/Drawings

Sherbrooke WWTP, QC (2013-14)

- 4 x Claro Fine Step Screens (model 3100-1000-6)
- 1 x conveyor (model U-320-17000mm)
- 1 x wash press
- Control panel & local stations

- **Fine Screen Capacity: 3100-1000-6 mm (3000 m^3/h; 19.02 MGD each screen); protecting 4 aerated grit tanks with travelling bridge and grit pump systems; retrofit of existing channels; hard specified**

.12 Chalk River WWTP, ON (2018)



13 St. Félix-de-Valois WWTP, QC (2019)

.14 Asbestos WWTP, QC (2010)

Asbestos, QC (2010)

- 1 x fine stair screen (1/4")
- 1 x wash press
- 1 x hygienic bagger
- controls

- **Fine Screen Capacity: 1700-450-6 mm (540 m^3/h); retrofit of existing channel**

• **Continued following page – Asbestos Septage Station →**

(Cont.) Asbestos WWTP, QC (2018) – 1/8" (3 mm) Aperture Septage Station: Including Wash Press, Automated Rock Trap, Hygienic Baggers, Simplified Hauler Access/Discharge Logging Station & Control Panel

.15 Bristol, RI (2015)

.16 Fruitvale, BC (2019)

Claro

Fine Step Screening Systems – Installation Photos

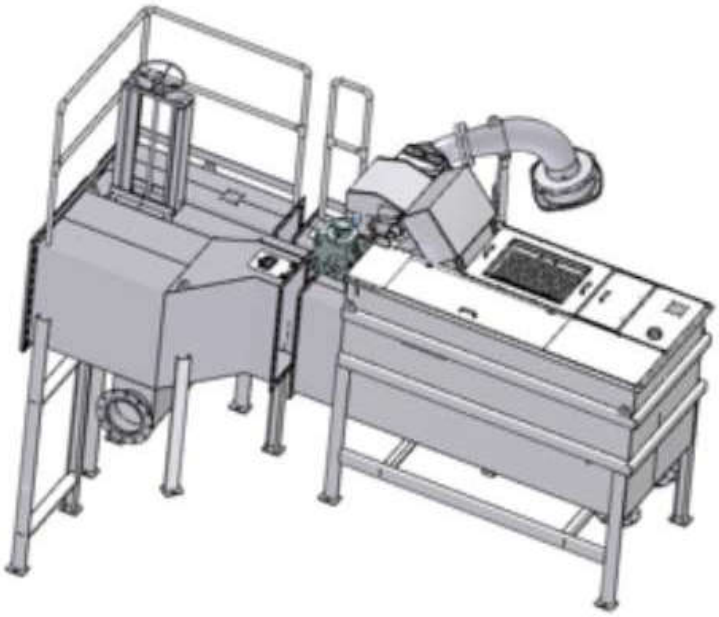
Fruitvale, BC (2019)

- 1 x fine step screen (3mm) in stainless steel tank c/w internal precautionary by-pass weir, pivoting manual screen, stainless steel channels & flow control gate; all prepared for integration of phase 2 Claro vortex, classifier & pump grit removal system
- 1 x wash press c/w discharge tube & hygienic bagging system
- All-24V low voltage components PLC control panel, separate high voltage starters panel & local HOA stations

screening grit removal Claro

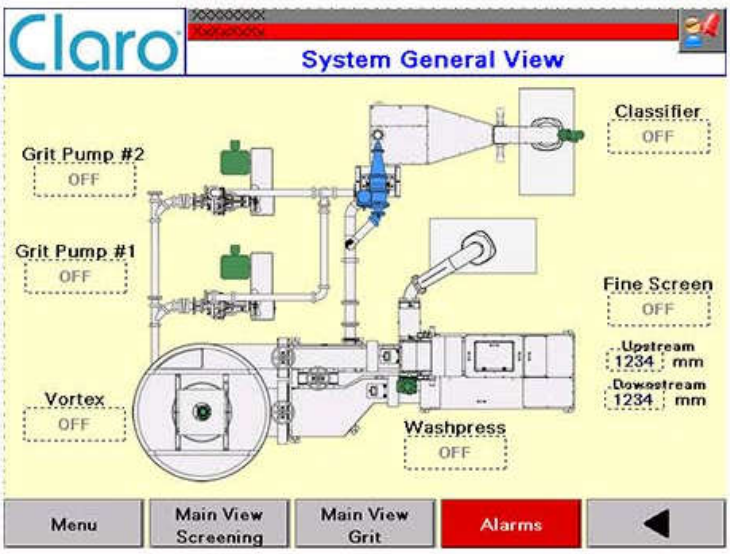
Claro

Fine Step Screening Systems – Installation Photos



Fruitvale, BC (2019)

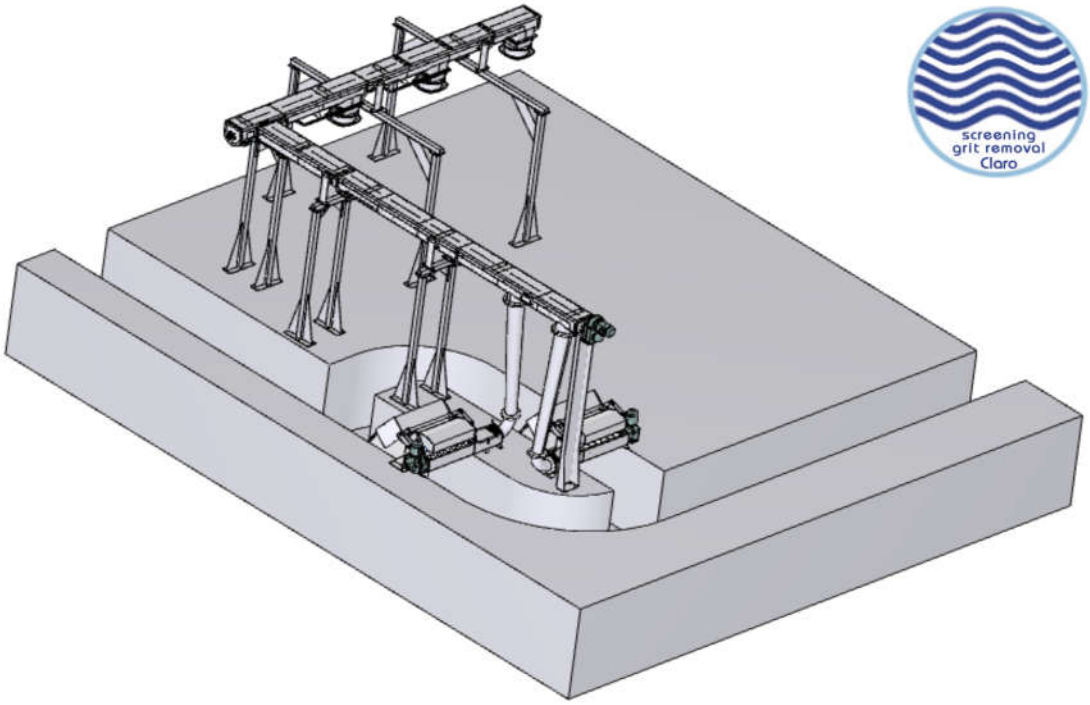
- 1 x fine step screen (3mm) in stainless steel tank c/w internal precautionary by-pass weir, pivoting manual screen, stainless steel channels & flow control gate; all prepared for integration of phase 2 Claro vortex, classifier & pump grit removal system
- 1 x wash press c/w discharge tube & hygienic bagging system
- All-24V low voltage components PLC control panel, separate high voltage starters panel & local HOA stations



- System General View status HMI touch screen showing the final Phase 1 fine screening system & Phase 2 grit removal system layout.

17. Pottersburg PCP (London, ON; Preselected; 2018)

- Two (2) Fine Step Screens, Two (2) Wash Presses, Two (2) Shaftless Spiral Conveyors Including Pneumatically-Actuated Slide Gates



.18 St-Eustache WWTP, QC (2013)

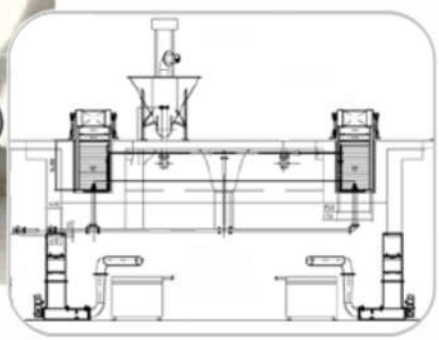
Claro

Fine Stair Screening Systems – Installation Photos

St-Eustache, QC (2013)

- 2 x fine stair screens (1/8")
- 2 x transfer conveyors reused in this retrofit design
- 2 x wash press c/w stainless steel chutes & precautionary diberter plates
- 2 x hygienic baggers
- Local controls
- All other infrastructure preserved/reused

- **Fine Screen Capacity: 1900-850-3mm (2500 m^3/h each screen); retrofit of existing channels**



Claro

.19 St-Placide WWTP, QC (2014)

Claro

Fine Step Screening Systems – Installation Photos

St-Placide, QC (2014)

- 1 x fine step screen (6mm) in stainless steel tank c/w internal precautionary by-pass weir
- 1 x wash press c/w discharge tube & hygienic bagging system
- Control panel & local HOA & disconnect stations

Claro

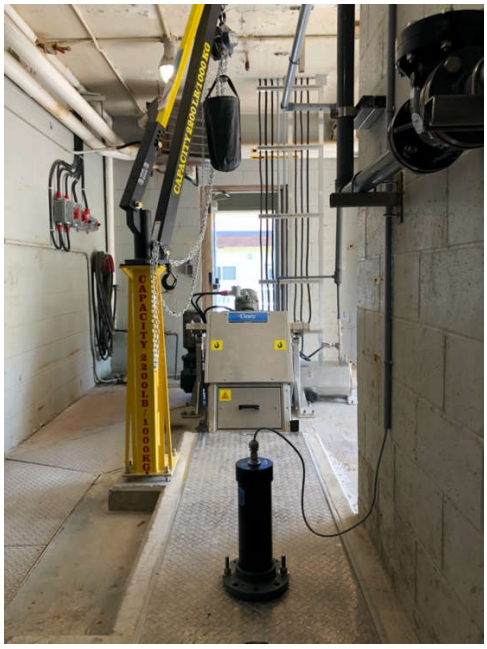
20. Arbutus Ridge, BC (2 mm c/w Vancouver Island Heating Package; 2019)

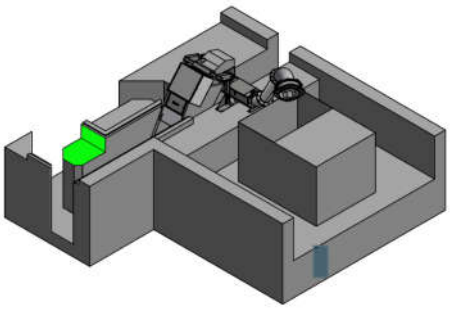
.21 Dorchester WWTP, ON (2020)

.22 Angus WWTP, ON (2020)

.23 Wellesley WWTP, ON (2020; Start-up Pending)

.24 Petawawa WWTP, ON (2020)





.25 Edmonton, AB (2012) - Gold Bar WWTP (Main Plant)

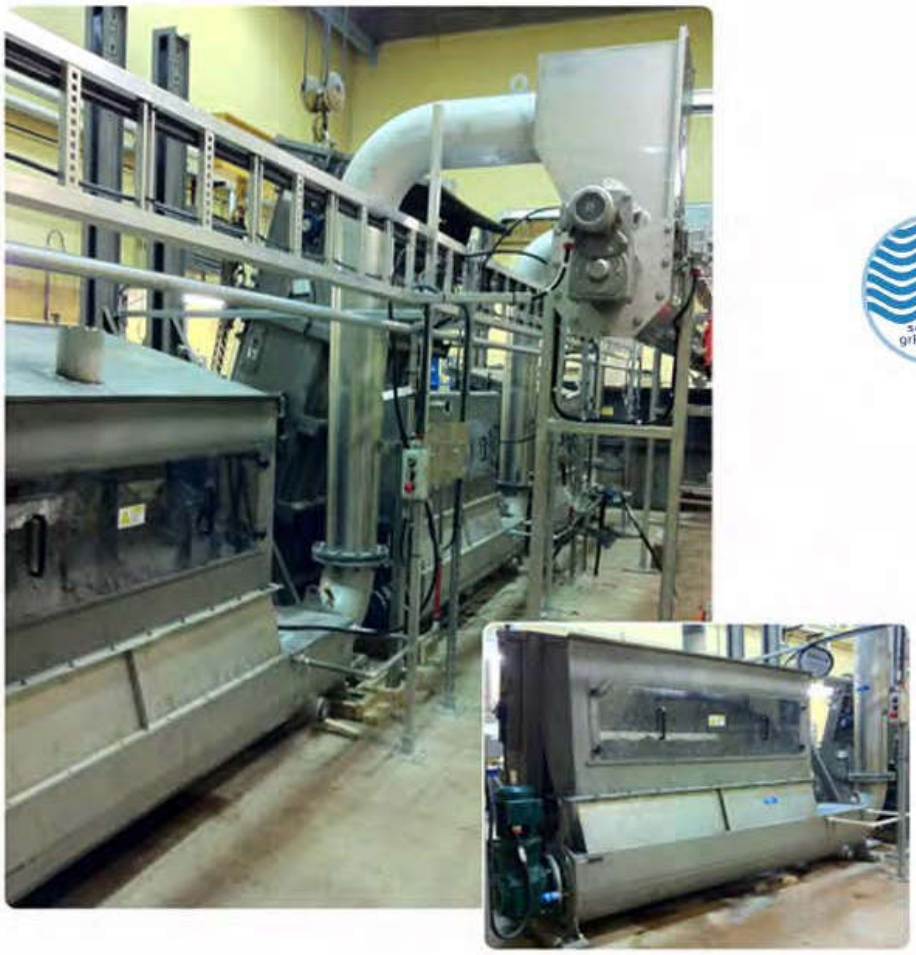
Claro

Fine Stair Screening Systems – Installation Photos/Drawings

Gold Bar WWTP, Edmonton Main Plant (2012)

- 3 x wash presses (model 300-2000mm)
- 1 x conveyor (model U-420-9400mm)
- 2 x hygienic baggers
- 3 dedicated control panels

- Three (3) dedicated wash presses with 2000mm wide custom inlets accept screenings from 3 screens. Two (2) wash presses discharge via vertical discharge/compaction tubes into a U-420 screenings conveyor. Diverter chutes enable a diversion of treated screenings to temporary bins if conveyor is out of service. The third wash press discharges directly into the screenings bin. This configuration provides for redundancy & 2 discharge points into the screenings bin for proper distribution of material.

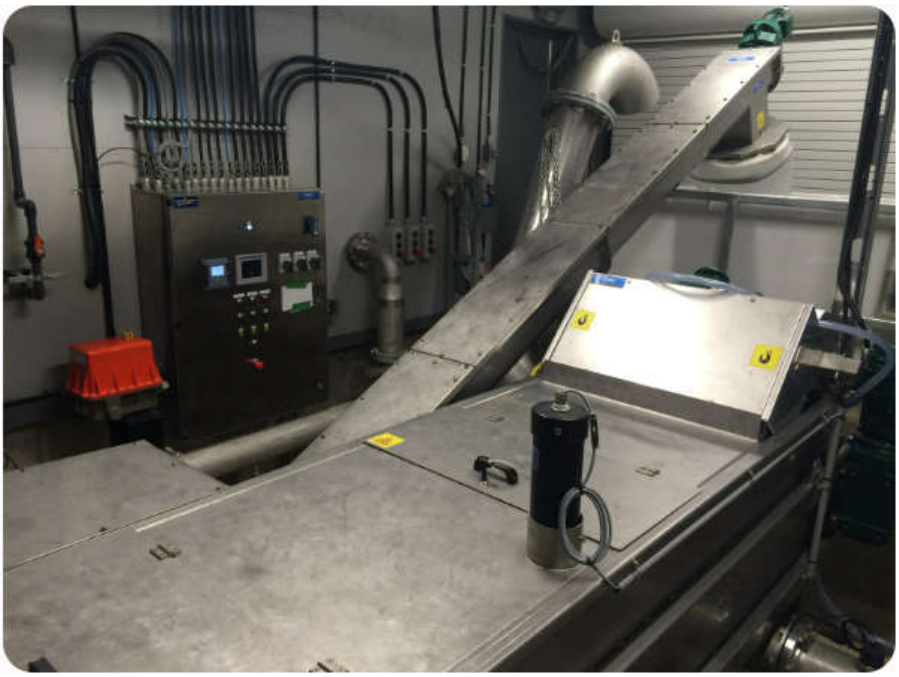


.26 Ravensview WWTP, ON (2019) – Dual Input Septage Station Including Wash Press, Automated Rock Trap, Hygienic Baggers & Control Panel

• Split Voltage Controls – PLC & Starters Control Panel

• Two-truck Input Area

.27 Charlie Lake, BC (2016) – Septage Station Including Wash Press, Automated Rock Trap, Hygienic Baggers, Hauler Access/invoicing Station & Control Panel



.28 Templeton, MA (2013) – Septage Station c/w Control Panel

.29 Marquis WWTP (Saskatoon, SK; 2019) – Two (2) Complete Mirrored Septage Stations Including Wash Press, Automated Rock Trap, & Hygienic Baggers + Pinch Valves & Hazardous Gas Detectors

.30 Régie de gestion des matières résiduelles de la Mauricie (RGMRM; 2018)

Dedicated Septage Receiving Facility – Septage Station Including Wash Press, Automated Rock Trap, Hygienic Baggers, Hauler Access/invoicing Station & Control Panel (Accepts High DS Juggler-Type Hauler Trucks that Pre-Decant)

.31 Penetanguishene WWTP, ON – Extended Discharge Tube Config (7 m. + Drop Chute)

.32 Other Long-Distance Discharge Tube Installation Photographs (Selected Compilation)

Greenway PCC (London, ON; 2008); 5 m

Gold Bar WWTP, AB (Edmonton Main Plant; 2009); 5.5 m.

2 Sample Facilities in Sweden with Extended Wash Press Pipe Systems

D. Expanded Claro Contact Reference List – Municipal Influent Screening Systems

Name of Project	Prov.	Start Up Year	No. of Screens	No of Septage Stations	Aperture (mm)	No. Screenings Conveyors	No of Wash Presses	Owner
Grand Falls	NL	2020 (in Submittal)	2			1	1	Grand Falls, NL
Sanford	ME	2020 (in submittal)		1	6	1	1	Sanford Sanitary District
Beauharnois	QC	2020 (in Submittal)	1		6		1	Beauharnois, QC
Baie-St-Paul	QC	2020 (in Submittal)	1		6		1	Baie-St-Paul, QC
Fermont	QC	2020 (in Submittal)		1	6	1	1	Fermont, QC
Lévis (St Romuald)	QC	2020 (in Submittal)	1		6		1	Lévis, QC
Port Weller	ON	2020 (in Construction)	2		6		2	Port Weller, ON
Thornbury	ON	2020 (in Construction)	1		6		1	Thornbury, ON
Mill Springs / Mill Bay	BC	2020	1		2		1	Mill Bay, BC
Bracebridge (Muskoka)	ON	2020 (in Construction)	2		3		2	Bracebridge (Muskoka), ON
Chatham-Kent	ON	2020	2		6	1		Chatham, ON
St-Jean-Baptiste	QC	2020	1		6		1	St-Jean-Baptiste, QC
Baie Comeau Mingan	QC	2020	1		6		1	Baie Comeau, QC
Plessisville	QC	2020	1		3		1	Plessisville, QC
Fish Creek	AB	2020 (in Construction)	2		3		2	Calgary, AB
Twin Cedar	BC	2020	1		2		1	Cobble Hill, BC
Ste Madeleine	QC	2019	1		6		1	Ste-Madeleine, QC
Kingsville - Lakeshore WPCP	ON	2020	1		6		1	Kingsville, ON
Petawawa	ON	2020 (in Construction)	1		3		1	Petawawa, ON
St-Paul	AB	2020 (in Construction)	1		6		1	St-Paul, AB
Sherbrooke Rock-Forest	QC	2019	1		6		1	Sherbrooke, QC
Asbestos	QC	2019		1	6	1	1	Asbestos, QC
Baie Comeau Marquette	QC	2019	1		6		1	Baie Comeau, QC
L.E.T St-Étienne (RGMRM)	QC	2019		1	6	1	1	St Etienne des Grès, QC
Olymel (Atrahan - Yamachiche)	QC	2019	1		6		1	Olymel, QC
Coast Envrionmental	BC	2019	1		6			Coast Environmental Inc.
Sault Ste Marie	ON	2020 (in Construction)	2		6	1	2	Sault Ste Marie, ON
Wellesley	ON	2020	1		3		1	Wellesley, ON
Dorchester	ON	2020	1		3	1		Dorchester, ON
Salmo	BC	2019	1		3		1	Salmo, BC

Ste Catherine de la Jacques Cartier	QC	2019	1		6		1	Ste-Catherine-de-la-Jacques-Cartier, QC
Vermillion	AB	2020	1		6		1	Vermillion, AB
Arbustus Ridge	BC	2019	1		2		1	Arbustus Ridge, BC
Epping	NH	2019		1	6		1	Epping, NH
Epping	NH	2019	2		6 & 2		1	Epping, NH
Saguenay - La Baie	QC	2018	2		6		1	Saguenay, QC
Squamish	BC	2018	2		3		2	Squamish, BC
Pottersburg	ON	2018	2		6	2	2	London, ON
Adelaide	ON	2018	2		3	2	1	London, ON
Uxbridge	MA	2019	1		6		1	Uxbridge, MA
Marquis	SK	2019		2	6			Saskatoon, SK
Ste-Angèle-de-Monnoir	QC	2018	1		6		1	Ste-Angèle-de-Monnoir, QC
Armstrong	BC	2018	1		3		1	Armstrong, BC
Verchères	QC	2018	1		6		1	Verchères, QC
Victoriaville	QC	2018	2		3		1	Victoriaville, QC
Angus	ON	2017	1		6		1	Essa, ON
Kitimat	BC	2017	2		3		1	Kitimat, BC
Rockland	MA	2017			N/A		1	Rockland, MA
Fort Nelson	BC	2017	1		6		1	Fort Nelson, BC
Fort St-John	BC	2018	1		3		1	Fort St-John, BC
Fruitvale	BC	2019	1		3		1	Fruitvale, BC
Dawson Creek	BC	2018		1	6		1	Dawson Creek, BC
St-Félix-de-Valois	QC	2019	2		3		2	St-Félix-de-Valois, QC
Lévis (St-Étienne)	QC	2017	1		6		1	St-Étienne-de Lévis, QC
EBI (Dépôt Rive Nord)	QC	2017		1	6			EBI Inc.
Coaticook STEU	QC	2018		1	6			Régie Intermunicipale de gestion des déchets de la Région de la Coaticook (RIGDSC), QC
Ravensview WWTP (Utilities Kingston)	ON	2019		1	6		1	Utilities Kingston, ON
St-Canut STEU	QC	2016	2		3		1	Mirabel, QC
Les Coteaux STEU	QC	2019	1		3		1	Régie d'assainissement Des Coteaux, QC
Rougemont / St Césaire	QC	2016	1		6		1	Régie intermunicipale d'assainissement des eaux usées
Chalk River WWTP	ON	2018	1		3		1	Chalk River, ON
Rockwood WWTP	ON	2016	1		6		1	Rockwood, ON
Wiarton WWTP	ON	2016	1		3		1	Wiarton, ON
Caledonia WWTP	ON	2016	2		6		1	Haldimand County, ON
Saanich WWTP	BC	2015			N/A		1	Capiral Region District (CRD), BC
Coast Environmental WWTP	BC	2016	1				1	Coast Environmental Inc.
Windsor WWTP	NS	2016			N/A	1	1	Windsor, NS

Campbell River WWTP	BC	2016	2		3		2	Campbell River, BC
La Prairie STEU	QC	2016-2017	3		3	1	2	Régie d'Assainissement des Eaux du Bassin La Prairie (RAEBL), QC
CTBM (Ste-Pie) WWTP	QC	2015		1	6		1	CTBM, QC
Trenton WWTP	ON	2017	2		6	1	1	Trenton, ON
Deseronto WWTP	ON	2015	1		6		1	Deseronto, ON
Bristol WWTP	RI	2015	2		6		2	Bristol, RI
Charlie Lake WWTP	BC	2015		1	6		1	Charlie Lake, BC
New Tottenham WWTP	ON	2015	2		6		2	New Tecumseth, ON
Alliston WPCP	ON	2015	2		6		1	New Tecumseth, ON
St-Roch-de-l'Achigan STEU	QC	2015	1		2		1	St-Roch-de-l'Achigan, QC
St-Cyrille-de-Wendover STEU	QC	2015	1	1	6		2	St-Cyrille-de-Wendover, QC
St-Zotique STEU	QC	2015	2		3		1	St-Zotique, QC
Vallée du Richelieu (RAEVR) STEU	QC	2017		1	6		1	Régie d'Assainissement des Eaux de la Vallée du Richelieu (RAEVR), QC
Vallée du Richelieu (RAEVR) STEU	QC	2016	2		6		1	Régie d'Assainissement des Eaux de la Vallée du Richelieu (RAEVR), QC
St-Benoît-du-Lac STEU	QC	2015	1		3			St-Benoit-du-Lac, QC
St-Placide STEU	QC	2014	1		6		1	St-Placide, QC
Ste-Julienne STEU	QC	2014	1		6		1	Ste-Julienne, QC
Magog STEU	QC	2014	2		6		1	Magog, QC
Valleyfield STEU	QC	2014		1	6		1	Salaberry-de-Vallleyfield, QC
Natashquan STEU	QC	2014	1		6		1	Natashquan, QC
Sherbrooke STEU	QC	2014		1	6		1	Sherbrooke, QC
Sherbrooke STEU	QC	2014	4		6	1	1	Sherbrooke, QC
Templeton WWTP	MA	2013		1	6			Templeton, MA
Ste-Marianne STEU, QC	QC	2015	2		3		1	Mirabel, QC
Philip H. Jones WPCP	ON	2016	2			1	1	Penetanguishene, ON
Marieville STEU	QC	2013	1		6		1	Marieville, QC
Kamloops Sewage Treatment Centre	BC	2013	1		6		1	Kamloops, BC
St-Eustache STEU	QC	2013	2		3		2	St-Eustache, QC
Charles River Pollution Control District (Medway) WWTP	MA	2012			N/A		2	Medway, MA
Le Gardeur STEU	QC	2012	2		6	1	1	Repentigny, QC
Hawkesbury WWTP	ON	2012	2		3		1	Hawkesbury, ON
Lassonde, Rougemont, QC	QC	2012	2		1 & 2			A. Lassonde, inc.

Gold Bar WWTP, AB (Main Plant Edmonton)	AB	2012			N/A	1	3	EPCOR Water Services (Edmonton, AB)
Wallaceburg PCC	ON	2011	1		6		1	Chatham-Kent, ON
Vauxhall PCP	ON	2011	2		6	1	1	London, ON
Ste-Sophie STEU	QC	2011	1		6		1	Ste-Sophie, QC
Prévost STEU	QC	2011	1		6		1	Prévost, QC
Mississippi Mills WWTP	ON	2011	2		6		1	Mississippi Mills, ON
L'Epiphanie STEU	QC	2011	1		6		1	L'Epiphanie, QC
Willow Creek WWTP	CA	2011	1				1	Lake Arrowhead (LACSD), CA
Mascouche-Terrebonne STEU	QC	2010	4		3	1	1	Régie d'assainissement des eaux Terrebonne / Mascouche
Asbestos STEU	QC	2010	1		6		1	Asbestos, QC
Greenway PCC	ON	2009			N/A	1	1	London, ON
Gold Bar WWTP (Main Plant Edmonton)	AB	2010			N/A		1	EPCOR Water Services (Edmonton, AB)
Repentigny STEU	QC	2008	2		6	1	1	Repentigny, QC
Gold Bar WWTP (Main Plant Edmonton)	AB	2009			N/A		1	EPCOR Water Services (Edmonton, AB)
L'Assomption STEU	QC	2006	2		6	1	1	L'Assomption, QC

Plus over 5000 Additional References Worldwide

E. Design & Supply Schedule Summary + Sample Warranty Statement

i. Technical Submittal: Technical submittal after notice to proceed within 2-3 weeks or better.

ii. Delivery after Final: Submittal Approval: 12-20 working weeks (to be coordinated with installing contractor & client) or better.

iii. Terms of Delivery: FOB Ingleside, ON; each piece of equipment in a crate (or) on a specially-built wooden pallet. Delivered in a marine container on a conventional transport truck or in a closed dry van.

iv. Warranty: **5 years** normal running time after start-up & substantial completion.

v. Payment Terms: As specified in Section GT.20 – Payment of the General Terms and Conditions for Preselected Equipment of RFP N° 14 - 2020.

vi. Proposal Validity: 240 days after the closing date for submission of quotation as specified. Extension of validity on request.

• Note: RFP specifications terms to take precedence over the proposal stated terms if they conflict.

Sample Warranty Text excerpt:

vii. **Warranty:** All equipment or parts covered by this quotation are guaranteed to be free from defective material and workmanship, under normal use and service, for a period of five (5) years. Unless otherwise indicated in the quotation, this guarantee does not cover wear of normal wearing parts unless wear of such part has resulted from defective material and workmanship. In the event of any defects developing within the stated period, under normal and proper use, Claro is to be notified promptly in writing, and upon receipt of our written consent, the parts are to be returned promptly to Claro at Claro's shipping expense. If Claro's inspection indicates defective material or workmanship, the parts will, at Claro's option, either be repaired or replaced without charge and shipped back to Ingleside at Claro's expense. Note: Corrective or other work, or expenditures of any kind must be authorized by Claro in writing prior to the commencement of such work or prior to committing to such expenditures, without exception.

3. Technical Proposal

Ingleside WWTP Upgrades

Screening Equipment: 46 43 00
Process Equipment Pre-Selection

EVB Engineering
EVB Ref: RFP N° 14 - 2020
Township of South Stormont, ON
Claro Ref: 17089-Q-01

3. Technical Proposal

A. Scope, Layout & General Mechanical & Controls Arrangement Drawings, Sample Control Narrative & Sample HMI Screens: Showing dimensions, weights, materials of construction and general details for each piece of process & controls equipment. Drawings aim to be provided in sufficient detail to demonstrate conformance with the specification requirements and allow evaluation and comparison of the proposed equipment.

• •

i. Detailed Scope of Supply, Materials of Construction & Weights

Item 1: Two (2) Claro Fine Step Screens – Model 1900-500-3 mm

- Quantity: Two (2)
- Discharge height: 1945 mm
- Effective width: 500 mm
- Screen frame width (without channel seals): 600 mm
- Screen frame width (with channel seals): 650 mm
- Channel dims. (Width x Depth): 650 mm x 1500 mm
- Aperture between bars: 3 mm
- Lamella bar thickness: 3 mm
- Frame components: 5 mm
- Installation angle: 50 degrees
- Frame & covers material: AISI 316L Stainless Steel
- Bars material: AISI 316L Stainless Steel
- Drive unit: SEW c/w NEMA adapter
- Electric motor: Baldor – 0.75 kW (1 HP), CSA 600V, 3 phase, 60Hz; Class 1, Div. I; equipped with integral, externally wired electrical brake also Class 1, Div. I; Note: Control panel includes all elements including starters & amperage protection.
- Drive unit is painted according to SEW standard OS2, in RAL 6005.
- Home position (proximity sensor) switch by Turck: Class 1, Div. I, compliant c/w intrinsic barrier in panel.
- Electrical torque guard, Emotron M20 included (pre-installed in control panel).
- Patented bottom step, no plastic end bar spacers required at the bottom of the screen.
- All stainless steel linkage drive system (no chains, sprockets, or tensioners).
- All stainless steel discharge without plastic end bar spacers and without screenings cutter, scrapers, or brushes – screenings discharge with no wrapping or plugging.
- Easy/quick pivot of out of channel with linkage system; no disassembly of screen, inlet chute or movement of downstream equipment required.
- Lifting lugs for pivoting of screen out of channel; also, additional lifting lugs inside motor compartment for four-point lifting of screen into channel during installation.
- Standard odour control connection in AISI 316L stainless steel (4” dia.) on screen for direct negative venting of channel & screening equipment.
- Screen total weight: 3 mm approx. 850 kg.

• Capacities & levels summary:

➢ Peak Flow: 240 L/s each screen; 20,800m3/day (100% redundancy).
3 mm aperture unit – upstream/downstream levels: 1246/1100 mm @ 35% screen blockage; Headloss: 146 mm; Freeboard: 1500-1246=254 mm; Note: Downstream level based on Preliminary Hydraulic Profile provided in the RFP specifications / addenda. Addendum No. 2 Answer to Question 26: Downstream level Elev. 82.40 - invert @ 81.30 = 1.1 m downstream level). Note: This downstream level appears to be unnecessarily high if an appropriate Parshall is be used. If this downstream level is desired, we can install an appropriately-designed open-bottom (to avoid grit deposition) Sutro weir plate downstream of the screens for exact proportional downstream level control and flow reporting. Instead, however, we suggest a 9" throat Parshall flume downstream of the proposed Claro 360 grit forced vortex system that delivers a lower downstream level that nonetheless works perfectly with both the proposed fine step screens & 360 Claro vortex. When two screens are installed, they are programmed to oscillate (one screen actuates while the other is suppressed and vice versa) in response to the common upstream level in order to diminish run times & equalize any hydraulic imbalances between the 2 channels (note: the oscillation routine releases above an adjustable upstream high level). In the Ingleside scenario, the 2 screens would have the following levels with a 9" Parshall providing proportional downstream level control: 727/595 mm upstream/downstream with a head loss of 133 mm, which is ideal. The proposed design will provide very low runtimes and a very high level of separation. If alternate hydraulics and/or Parshall flume sizes are preferred, we would be happy to discuss approaches.

• Fine step screen built under ISO 9001 & ISO 14001 certification.

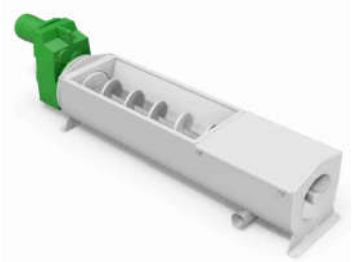
Note: A lifting system (e.g.: davit crane, overhead I-beam with trolley, or portable A-frame gantry) is required in order to pivot the screen out of channel for maintenance inspection purposes (closed-space entry into the channel is not required). Claro can advise and/or provide a quotation for the preferred approach on request.

Item 1a: Spare parts for Claro Fine Step Screen – Model 1900-500-3 mm (As Specified)

• One (1) complete set of high load sleeve bushings.
• One (1) set of bottom stub shafts (total of 4).
• Six (6) deflector plate mounting kits
• One hundred (150) UHMW inter-spacers.
• One (1) screen motor.
• Note i: All the above spare parts supplied as specified.
• Note ii: All spare parts (except motor) delivered within labeled toolboxes for ease of storage & identification. Please see Item ii below for detailed pricing.

Item 2: One (1) Common Claro Wash Press – Model TP 200-1900

• Press diameter, Ø 200 mm
• Inlet: L x W x H = 1900 mm x 280 mm x 340 mm
• Connection, flange: DN200, PN10
• Material of construction: AISI 316L, spiral in AISI 316L stainless steel or special abrasion-resistant Swedish micro alloy as preferred; Hardox plate on last flight for elevated abrasion resistance; last flight double thickness for increased strength.



Wear bars in Hardox – 400 Brinell hardness. Example of service life: The wear bars at Hawkesbury have been in service for 8 years. The wear thus far is only 1 mm and thus promises significantly longer service life. The spiral is also is very good condition and exhibits almost no palpable wear.

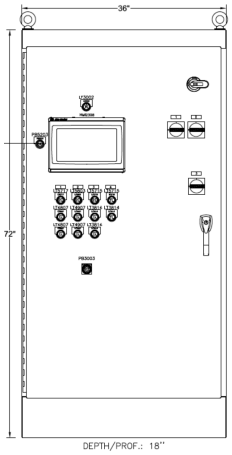
- Drive unit, SEW helical bevel for reduced footprint c/w NEMA adapter, AGMA II.
- Electric motor, Baldor – 1.5 kW (2 HP), CSA 600V, 3 Phase, 60Hz; Class 1, Div. I; helical bevel arrangement for reduced footprint.
- Drive unit painted according to SEW standard OS2, in RAL 6005.
- Water connections, 2 x ½"; including two (2) x Class 1, Div. I, AISI 316 stainless full port solenoid valves & two (2) x full port ball valves in 316 stainless steel; one (1) x 40 mm dia. stainless steel pressure gauge & ¼" dia. AISI 316 isolating ball valve; additional ½" dia. stainless steel Y-strainer provided if service water is not potable (e.g. well water or final effluent (FE)).
- Service water requirements: approx. 0.7 L/s @ 276-379 kPa (40 – 55 psig; higher pressures also acceptable up to approx. 95 psig); operation of service water is intermittent and only when there is sufficient screenings material accumulated within the wash press inlet to justify a treatment cycle, mechanical movement and electrical / wash water resource use. The wash press never runs empty.
- Capacity for optimal washing, compaction & dewatering: input of wet screenings: 1.0 m^3/h.
- Reject water outlet, Ø 3" (76 mm O.D.); Fernco rubber sleeve c/w 2 stainless steel gear clamps & 3" dia. PVC piping to channel downstream or upstream of screen by installing contractor.
- Lifting lugs on each end of the wash press for two-point lifting of wash press during installation, allowing for ease of placement & handing.
- Wash press built under ISO 9001 & ISO 14001 certification.

Item 2a: Spare parts for Claro Common Wash Press – Model TP 200-1900 (As-Specified)

- One (1) Bolt-On Nylon Brush as per the proposed wash press design (Note: Claro would be happy to provide a spare brush if this item forms part of the recommended design. Typically, our wash press does not require this wearable part due to the superior tolerances of the design).
- One (1) complete set of anti-directional wear bars and required mounting hardware (Hardox 400 Brinell hardness).
- One (1) complete thrust bearing sealing kit.
- One (1) common conveyor/compactor motor.
- Automatic greasers for use within the 24-month warranty period.
- Note i: No special proprietary tools required.
- Note ii: All spare parts delivered within labeled toolboxes for ease of storage & identification. Please see Item ii below for detailed pricing.

- Continued following page →

Item 3: One (1) Screening & Wash Press Control Panel & Local HOA Stations (As Specified)



- General Overview: Control panel provides for the automatic and manual control of the fine screening systems + common wash press including intuitively designed graphic touch screen interface based on project drawings and including animated, real-time liquid level & other values. Graphic interface provides a real-time overview of the system's operation: e.g. stage of operational sequence (mode), all set-points, real-time values as the system approaches current timer set points, real-time influent levels & start-level set points, real-time motor amperage readings, solenoid on/off status, record of alarm conditions etc. Control panel all as specified.

  Control panel including the following general features:
  - Allen-Bradley CompactLogix 5370 L3, 2 Mbyte, Dual Ethernet, 1GB SD Card PLC.
    - Discrete (I/O) cards, 120 VAC/24 VDC, (10% spare, minimum two (2) points).
    - Analog (4-20 mA, T/C, RTD) cards, (10% spare, minimum one (1) point).
    - Power supply (Bulletin 1769, as specified).
  - Allen-Bradley PanelView Plus 7 12-inch colour HMI; intuitively-designed graphic touch screen interface based on project drawings and including animated, real-time liquid level & other values.
  - Allen-Bradley I/O ready cables (factory wired card RTB; cable with free connectors).
  - Industrial Type Managed Ethernet Switch (Hirschmann RS20, as specified).
  - Industrial Type Patch Panel.
  - Industrial Type Ethernet Patch Cables.
  - NEMA 4-12 epoxy-painted steel enclosure for installation outside of explosion-proof requirement area (Dimensions: approx. 72" x 36" x 18").
  - Includes Endress + Hauser Prosonic S ultrasonic level detection upstream & downstream of each screen; four (4) x level detectors c/w 15m (49 ft.) of sealed Class 1, Div. 1 cable + two (2) din-rail-mounted transmitters installed inside control panel – all set points adjusted via HMI; including four (4) sensor PVC mounting tubes adapted to chosen checker plate or channel grating.
  - Two (2) high water level HWL float switches (NEMA-7) w/ mounting bracket & 10 m of factor-sealed cable; one for each screen (Flygt ENM-10, Class 1, Div. I).
  - Starters for fine screen (2, reversible), wash press (1, reversible), included in control panel. Note: VFDs not required due to significant reserve capacity & solids transit loading capabilities. VFDs are not a typical feature required for the proper operation of Claro step screens.
  - Surge protector for protection of PLC.
  - Loss-of-phase detector to further protect all motors.
  - Emotron M20 torque sensors for motor amperage reading for fine screens (x 2) and current transformer (CT) for amperage reading of the wash press (x 1).
  - Uninterruptible Power Supply (UPS): Transfer unit (UPS), main battery and additional batteries, true, double conversion, online design, input 120 VAC plus or minus 20 percent, output 120 VAC, automatic voltage regulation and battery management, lightning and surge protection, overload indicator, replace battery indicator, user replaceable, hot swap sealed batteries, as manufactured by Powerware 9130; 1000

VA. Sized to ensure the control panel continues to perform communications, data manipulation, calculations, monitoring and process data archiving for a minimum of 20 minutes following the loss of supply power. UPS installed in a control panel. The UPS does not block access to any panel mounted equipment.
- Ethernet/SCADA connectivity, data exchange table & control panel & HMI programming included. HMI graphics provided to SCADA integrator on request.
- Control panel ready for integration of local motor disconnect stations that are provided by others, as per Addendum 1.
- Panel door c/w main disconnect switch (lockable), motor lock-out switches and thermal resets, main push button E-Stop, alarm reset push button, white power on LED, red LED pilot lights for all motors "Fault" conditions, green LED pilot lights for all motors "Forward" and "Reverse" conditions, and yellow LED pilot lights indicating the operation of the wash press compactor solenoids, as specified.
- Three (3) combination local Man/Off/Auto + Forward/Reverse selector switch c/w spring loaded return from “REVERSE” to “OFF” position + E-Stop switches, in Class 1, Div. I cast aluminum enclosures (screen x 2, wash press x 1).
- Buttons & selectors to be NEMA 4X, 30 mm dia. Class 1, Div. I as specified.
- Final copies of the PLC & HMI program on a USB key and a user license granted to the Owner provided, as specified. Fully documented ladder logic in print form provide as specified.

- Control panel built under CSA & ISO 9001 certification.

Item 3a: Spare parts for Claro Screening & Wash Press Control Panel (As Specified)

- Two (2) fuses of each type and ratings used in control circuitry.
- Two (2) pilot light lenses and two bulbs.
- Two (2) control relays of each type and rating used in control circuitry.
- 100% spare fuses c/w a spare fuse holder mounted inside the panel provided.
- 20% spare Input and Output modules and corresponding I/O rack space.

Item 4: Claro Technical Submittal, Installation Instructions & Commissioning Field Services, and O&M Manuals

- Complete technical submittal including AutoCAD layout drawings as specified.
- Operation & maintenance manuals (electronic copy in bookmarked PDF format & 4 print copies, bound in three ring, hard cover, type binders, as specified).
- Installation supervision, commissioning, and operator training instructions for fine screening system by experienced Claro technician with references for at least ten (10) other installations (as specified). To present at site or classroom designated by Owner, for minimum 8-hour on-site person days listed below, travel time excluded:
    - 2 person days for installation assistance and inspection; 2 trips.
    - 5 person days for functional and performance testing and completion of Manufacturer’s Certificate of Proper Installation; 2 trips.
    - 2 person days for pre-start-up classroom or site training; 2 trips.
    - 2 person days for facility start-up and post start-up training of Owner’s personal; 2 trips. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Owner and Contract Administrator.

Item 5: Shipping, Brokerage & Insurance to Ingleside, ON

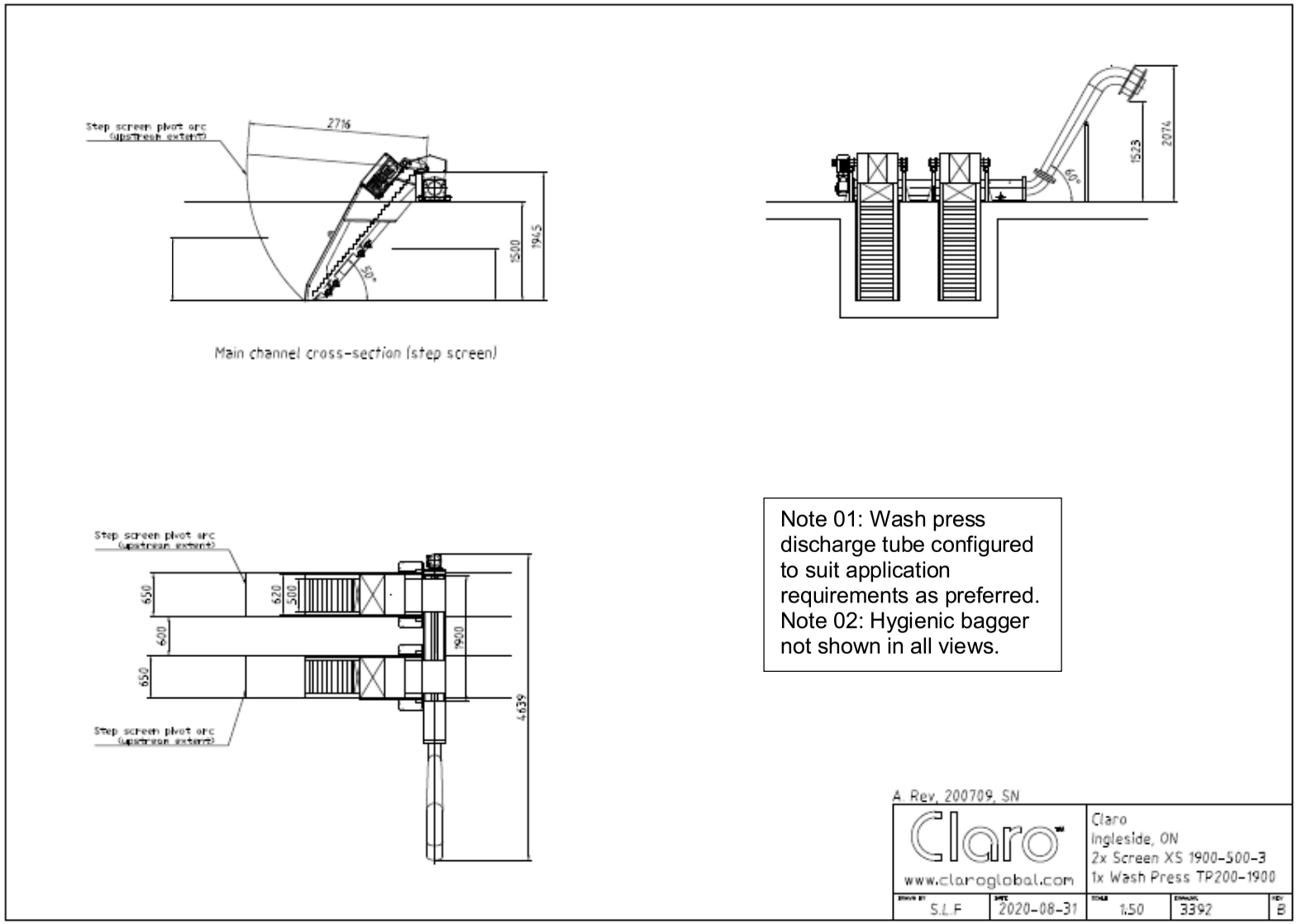
ii. Price / Listing for 10+ Years of Operation (Conservative PM Basis). Typically no spare parts required for the first 5 years – please see below:

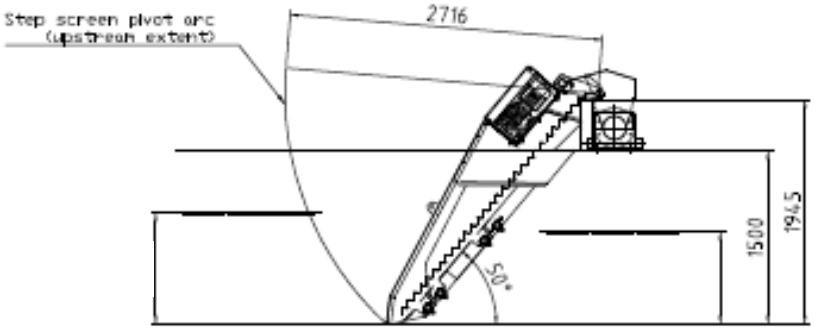
- Fine Screen: One (1) set of bushings for fine screen, as specified. This quantity allows for one preventative maintenance change of the bushings after minimum of 5 years.
- Fine Screen: Six (6) set of springs for the fine screen's bottom deflector plate to be changed when the bushings are changed on a preventative maintenance basis.
- Fine Screen: UHMW interspacers – perhaps 150 pairs on a precautionary stock basis (we will include these with the order).
- Fine Screen: One (1) set of bottom stub shafts (4 stubs in total), as specified, possibly for use of 2 within a 10 year period with 2 more for precautionary stock.
- Fine Screen Motor: One (1) screen motor, as specified.
- Wash Press: Spare parts for one preventative maintenance change on a 6-12 year interval. Thus, one (1) set of wear bars for wash press including retaining bolts & one (1) wash press seal & thrust bearings set. In this application, we estimate that the wear bars will last approx. 6 to 9 years & the spiral will last between 8 & 15 years. For example, Hawkesbury WWTP has been running on the same spiral & wear bars since 2012. A recent inspection showed 1 mm of wear on the 5 mm thick Hardox wear bars and no palpable wear on the special micro alloy steel spiral. This long wearable parts life is due to material of construction, system design & operational control philosophy.
- Wash Press: One (1) extra automatic greaser cartridge (1 required per year; greasers should be purchased only 2 years ahead since shelf life of greasers is approx. 2 years due to the presence of a battery within the cartridge).
- Wash Press: One (1) Bolt-on Nylon brush, as specified.
- Wash Press: One (1) compactor motor, as specified.
- Note: Based on our experience of other installations, it is unlikely that the fine screen bushings or the wash press spiral will be required every 5 years. If providing a precautionary preventative maintenance listing for 10 years, however, it is best to lean towards the conservative. We have implemented very few spare parts over the last fifteen years e.g. change of bushings on 5 systems thus far & change of 2 wash press spirals thus far on over 150 systems implemented in Canada.

Spare Parts for Fine Step Screen Model 1900 – 500 – 3 mm		
One (1) Set of Bushings for Model 1900-500-3 mm	[redacted]	CAD
Six (6) Set of Mounting Parts for Deflector Plate (hinge pin, springs, retaining washer and cotter pin)		CAD
Fine Screen UHMW Interspacers (3 mm) – 150 pairs		CAD
One (1) Set of Bottom Stub Shafts (4 stubs total)		CAD
One (1) Screen Motor (with electrical brake)		CAD
Spare Parts for Wash Press/Compactor Model TP200 – 1900		
One (1) Bolt-On Nylon Brush	[redacted]	CAD
Wash Press - Wear Bars Including Retaining Bolts & Washers		CAD
Wash Press - Thrust Bearing Box Sealing Kit		CAD
One (1) Common Conveyor/Compactor Motor (to be quoted by motor manufacturer)		CAD
Automatic Greaser		CAD
Shipping Included / Delivered with Screening System		CAD

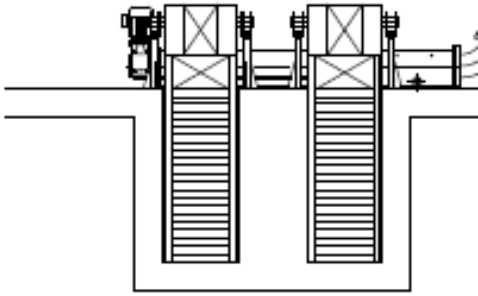
iii. Plans, Sections & General Arrangement Drawings

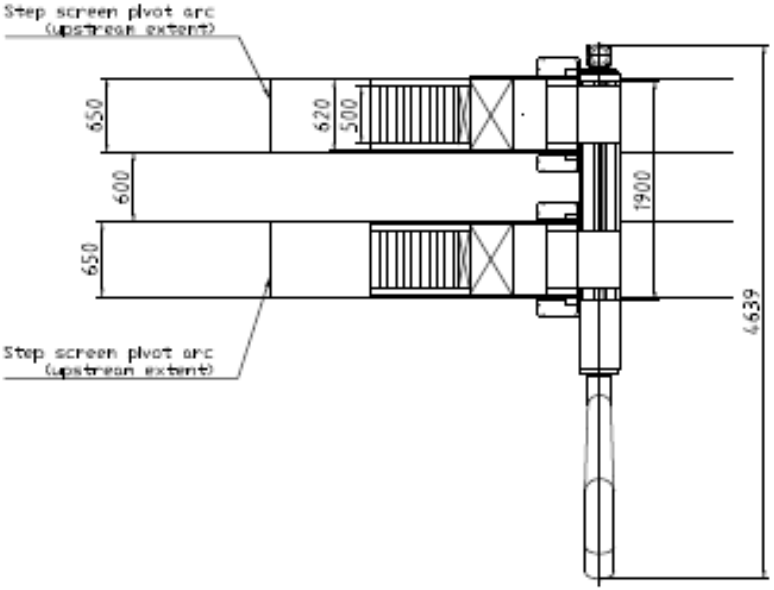
.1 General Layout & Implantation Drawing – Ingleside, ON





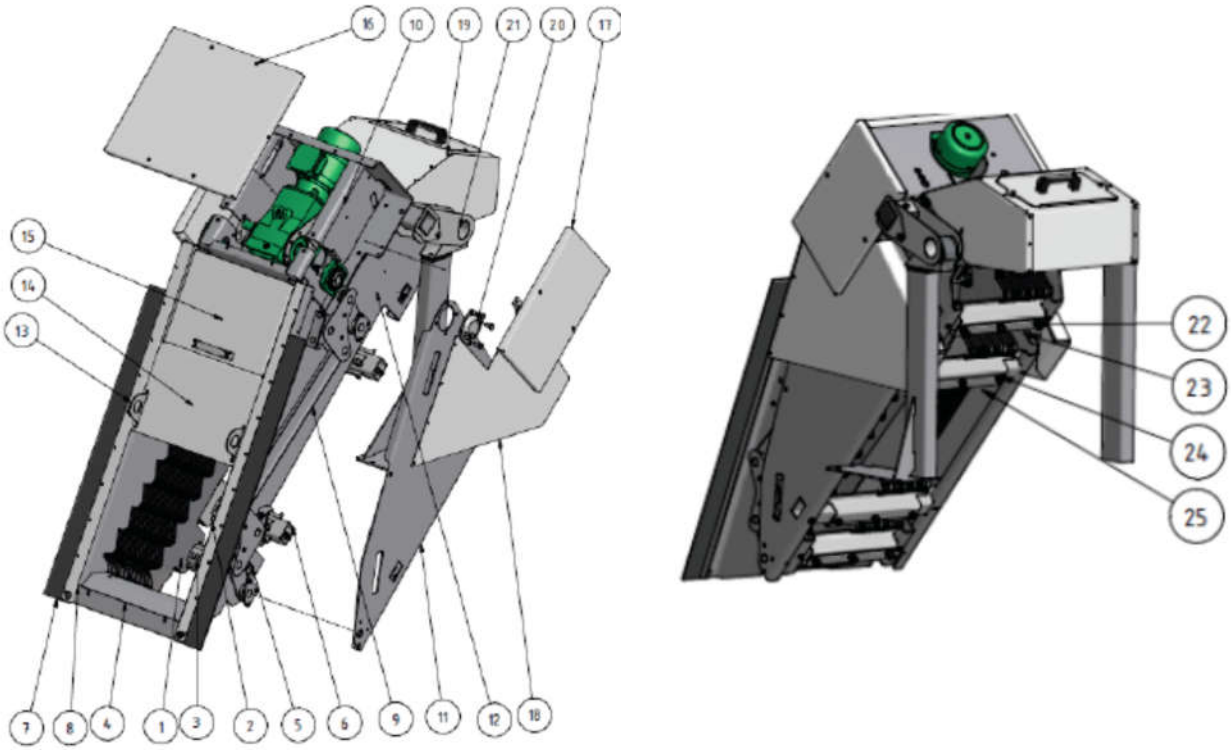
Main channel cross-section (step screen)





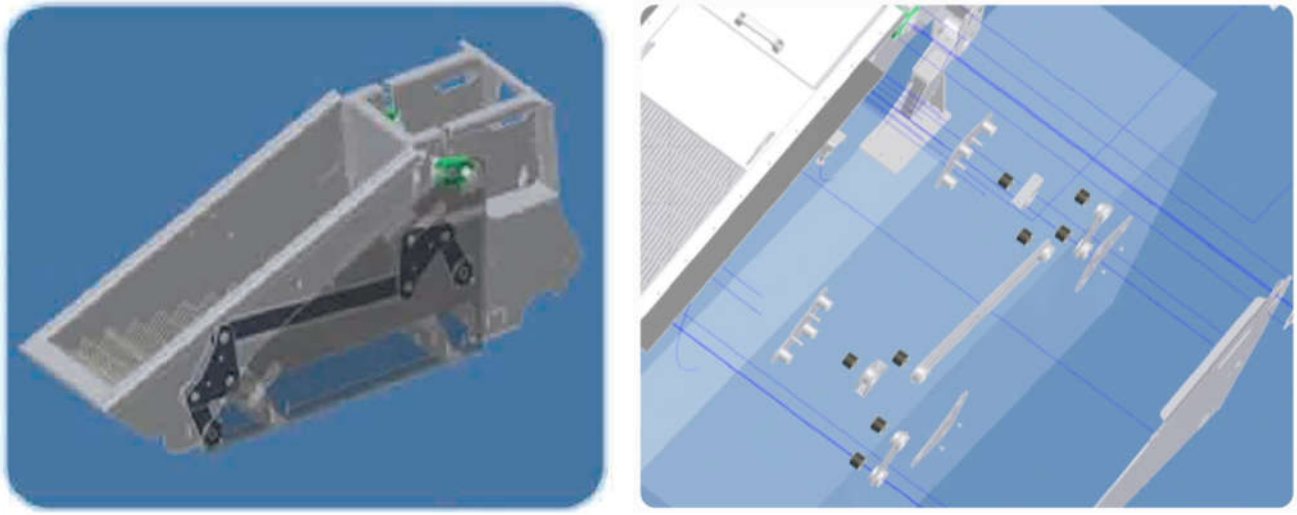
Note 01
discharg
suit appl
as prefe
Note 02
shown i

.3 Fine Step Screen – Typical Components Drawing (Exploded 3D View)



Item	Quantity	Name
1	Varies	Fixed bar with discharge detail
2	Varies	Movable bar
3	4	Positioning spacer depending on spacing
4	1	Bottom flap
5	2	Fixed cross member
6	2	Movable crossmember
7	2	Rubber - seal
8	2	Rubber clamp
9	2	Linkage system
10	1	Power train housing
11	2	Connecting plate
12	2	Side plate
13	2	Lifting lugs
14	1	Cover
15	1	Inspection lid
16	1	Gearbox cover
17	2	Gearbox cover
18	2	Cover
19	1	Discharge acess cover
20	2	Cover - bearing
21	2	Linkage system for supports
22	2	Inner bar fixing channel - fixed
23	2	Outer bar fixing channel - fixed
24	2	Inner bar fixing channel - movable
25	2	Outer bar fixing channel – movable

.4 Fine Screen Linkage Drive System (Sleeve Bushings Illustration)

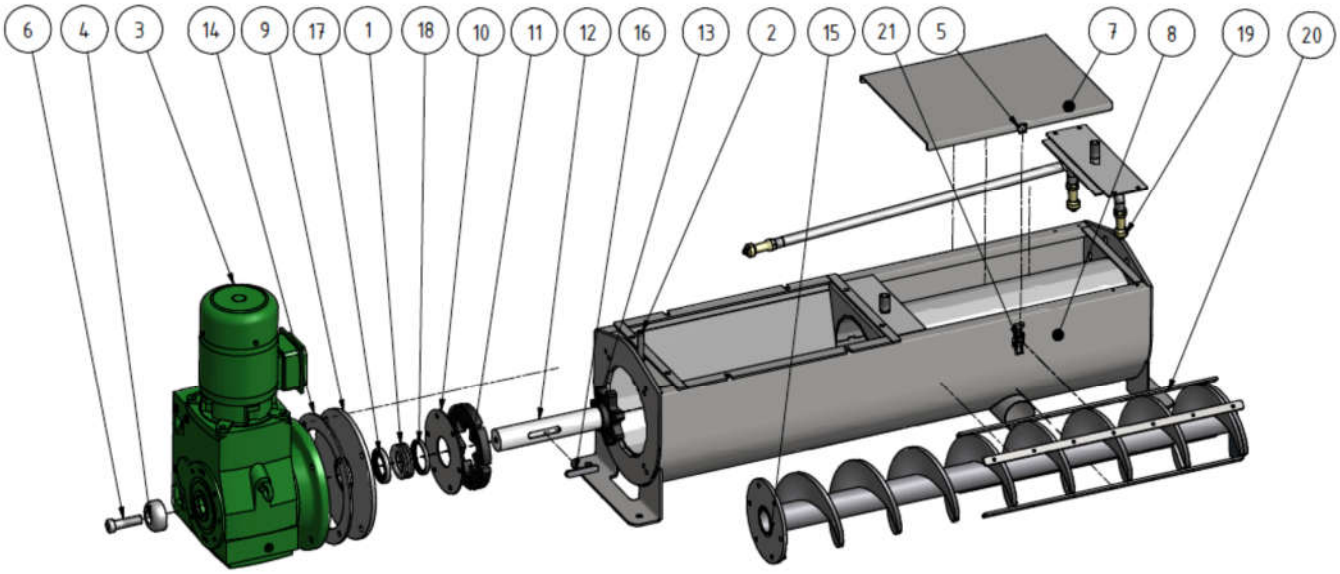


Fine screen linkage system & exploded view 3D drawing
(excerpt from maintenance training film)

Please see Claro films website for animation of linkage system movement included in fine screening system overview film (login information provided below)

.5 Wash Press Compactor– Components 3-D Drawing (Model TP150 or TP200)

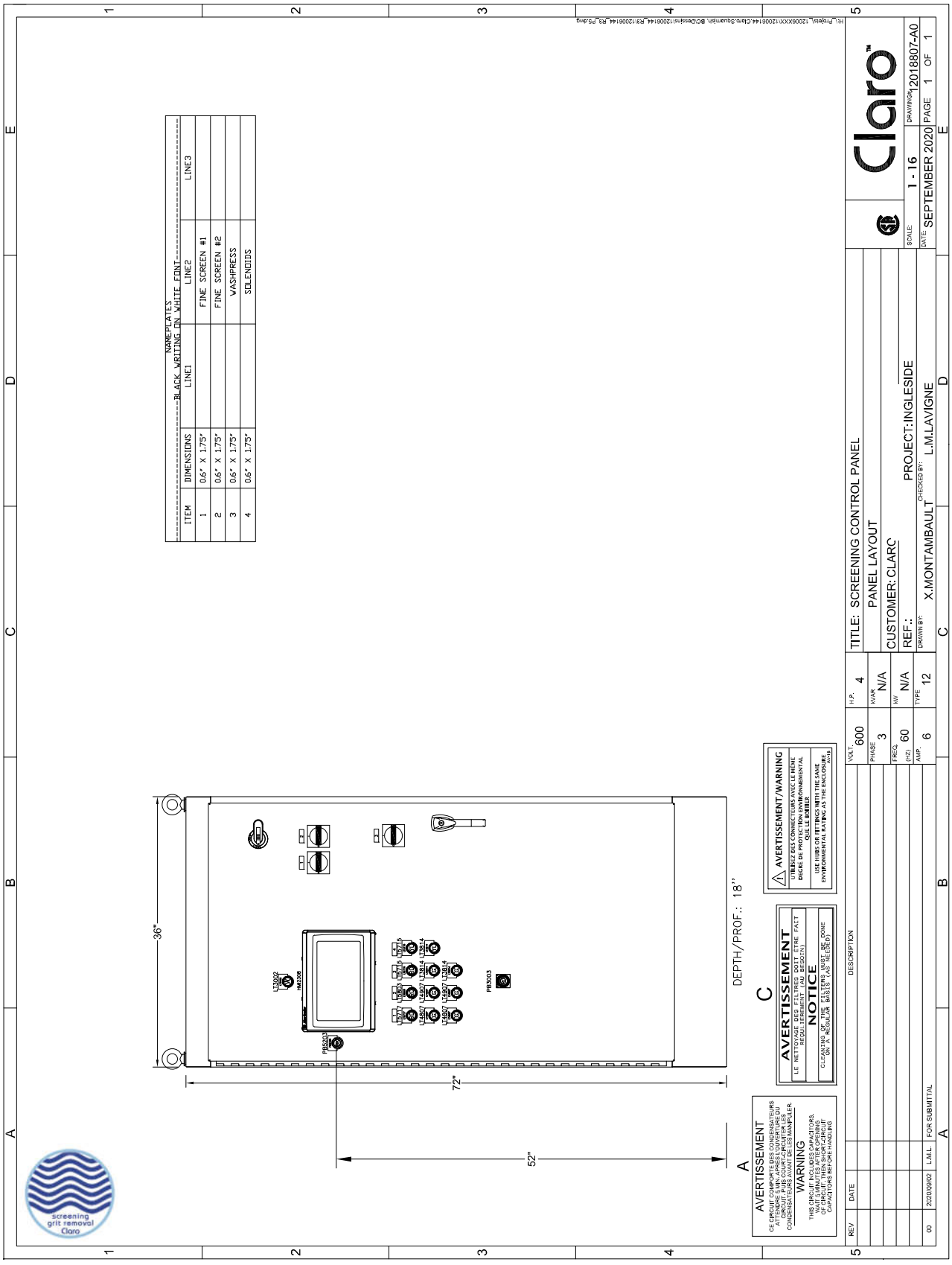
Claro Wash Press – Model TP 150 or TP200
Components Drawing

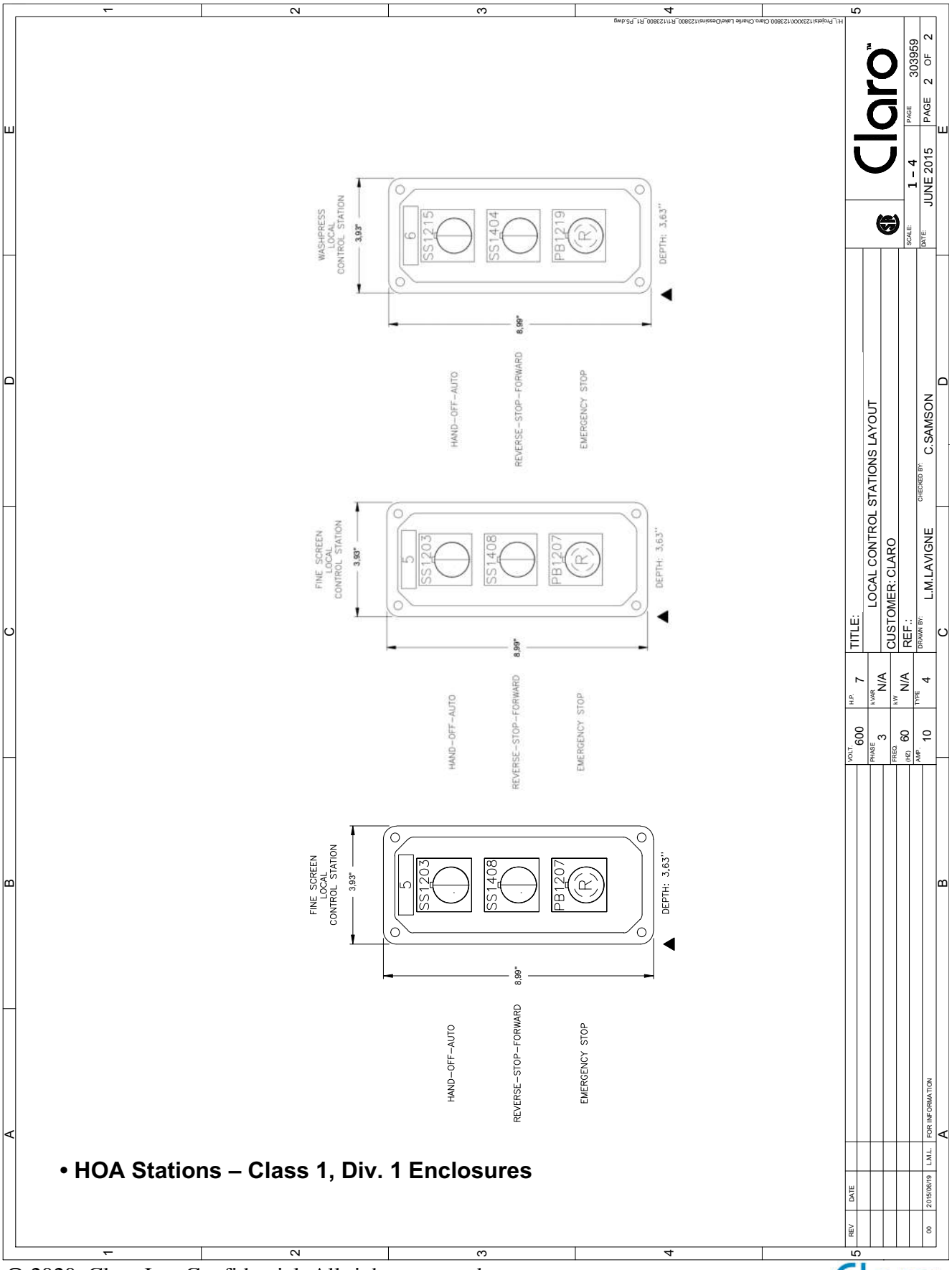


21	1	Lock
20	1	Wear liner
19	1	Spray nozzle
18	1	Sealing
17	1	Sealing
16	1	Key
15	1	Spiral
14	1	Distance
13	1	Sleeve
12	1	Shaft assembly
11	1	Carrier

10	1	Bracket
9	1	Drive unit flange
8	1	Press house
7	1	Cover
6	1	Screw
5	2	Lockplate
4	1	Sleeve
3	1	Drive unit
2	1	Pipe
1	1	Bearing

.6 Control Panel & Local HOA Stations Sample Drawings & Dimensions

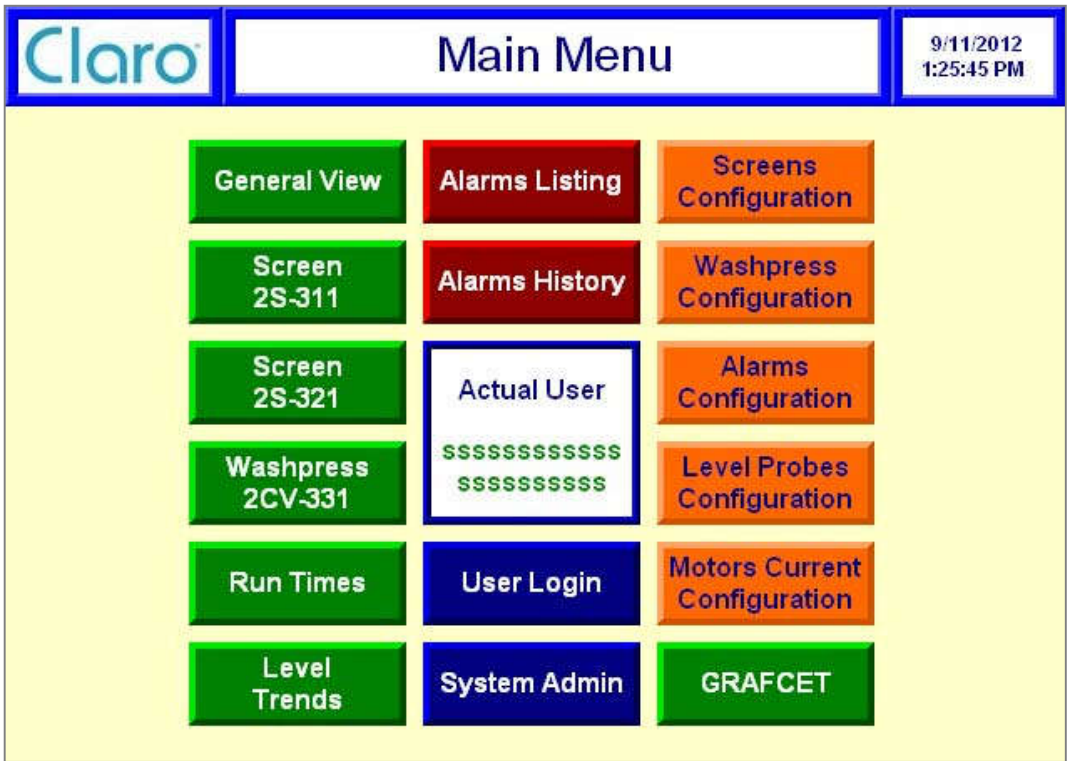


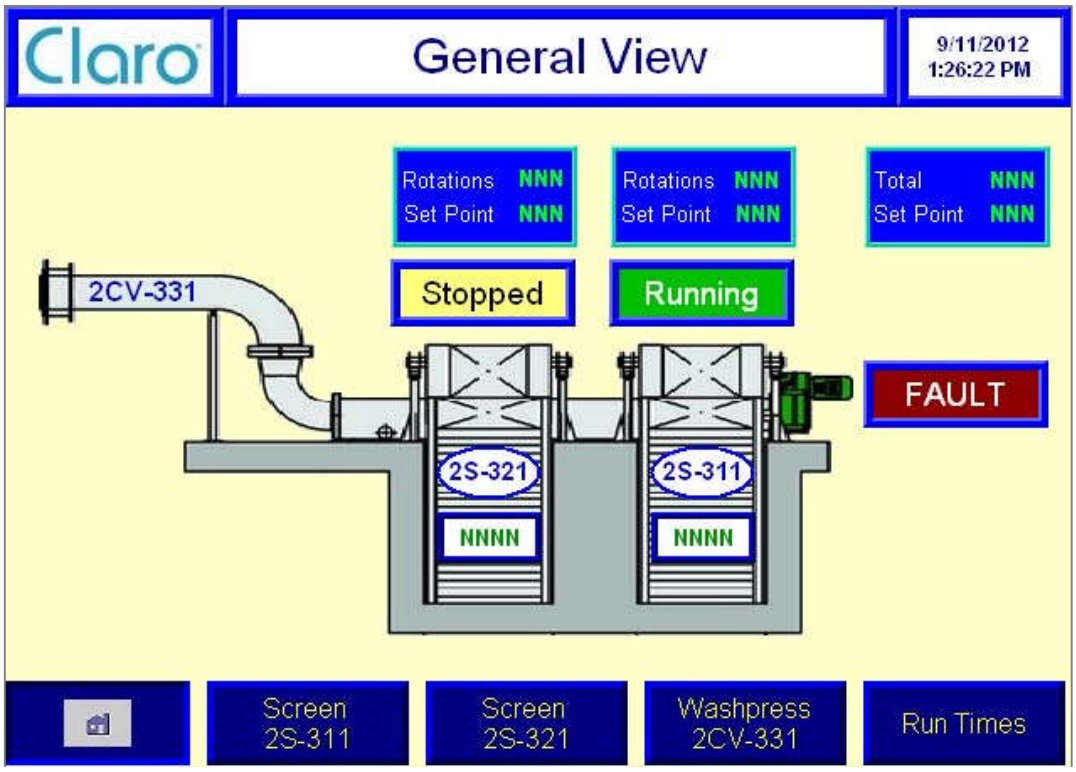


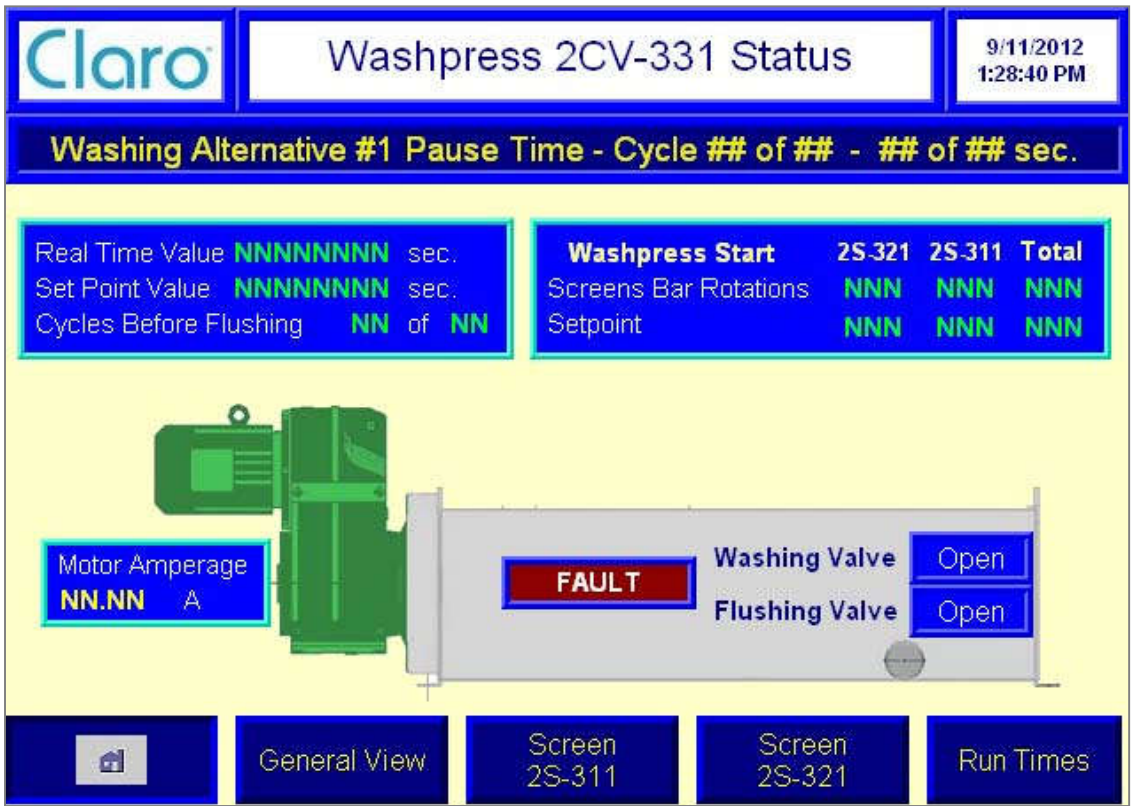
- **HOA Stations – Class 1, Div. 1 Enclosures**

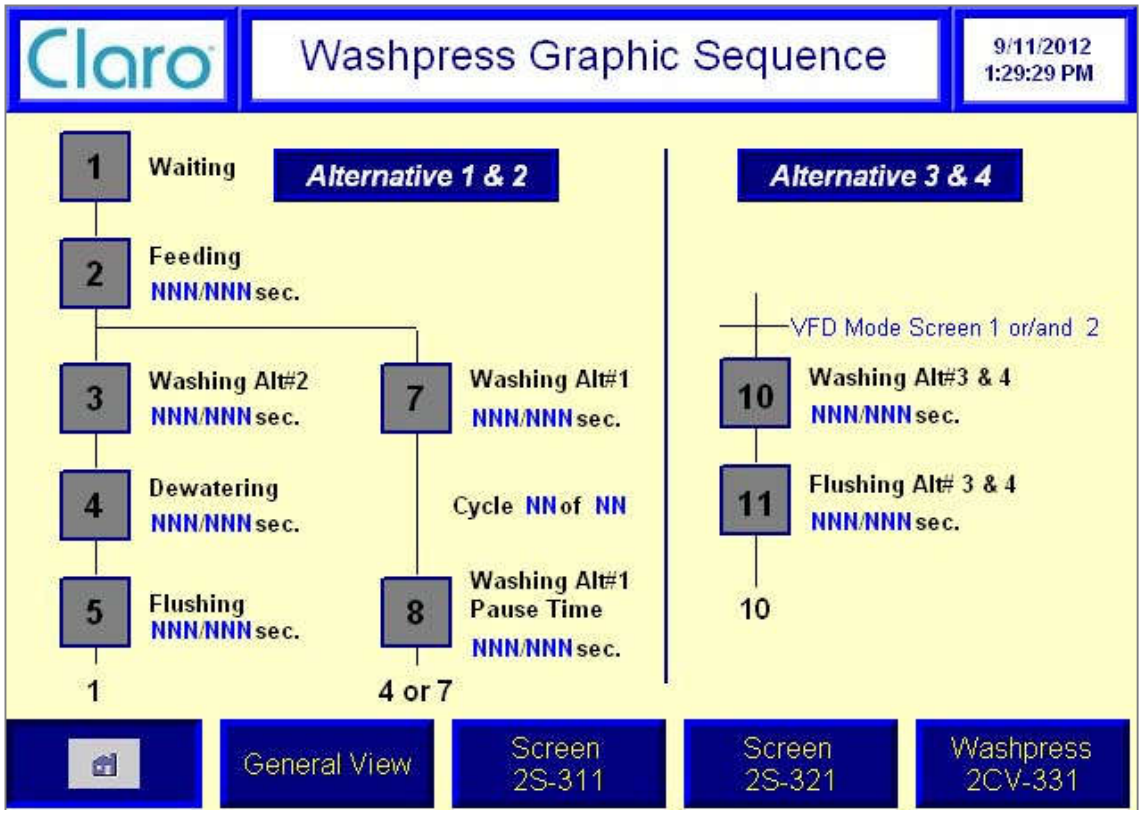
iv. Control Panel – Sample HMI Touch Screens (Samples from Hawkesbury WWTP, ON)

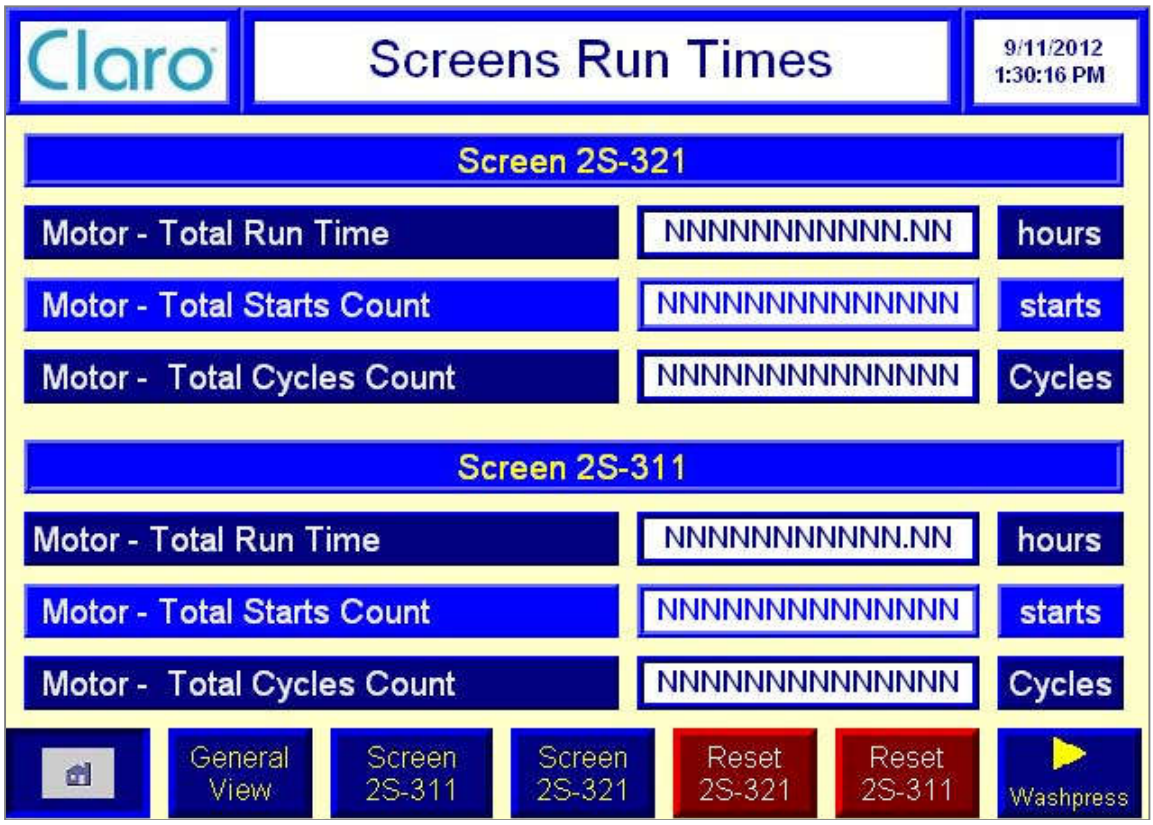
- Note: Sample HMI Touch Screens for 2 Fine Screens & 1 Common Wash Press (In-Channel Configuration)

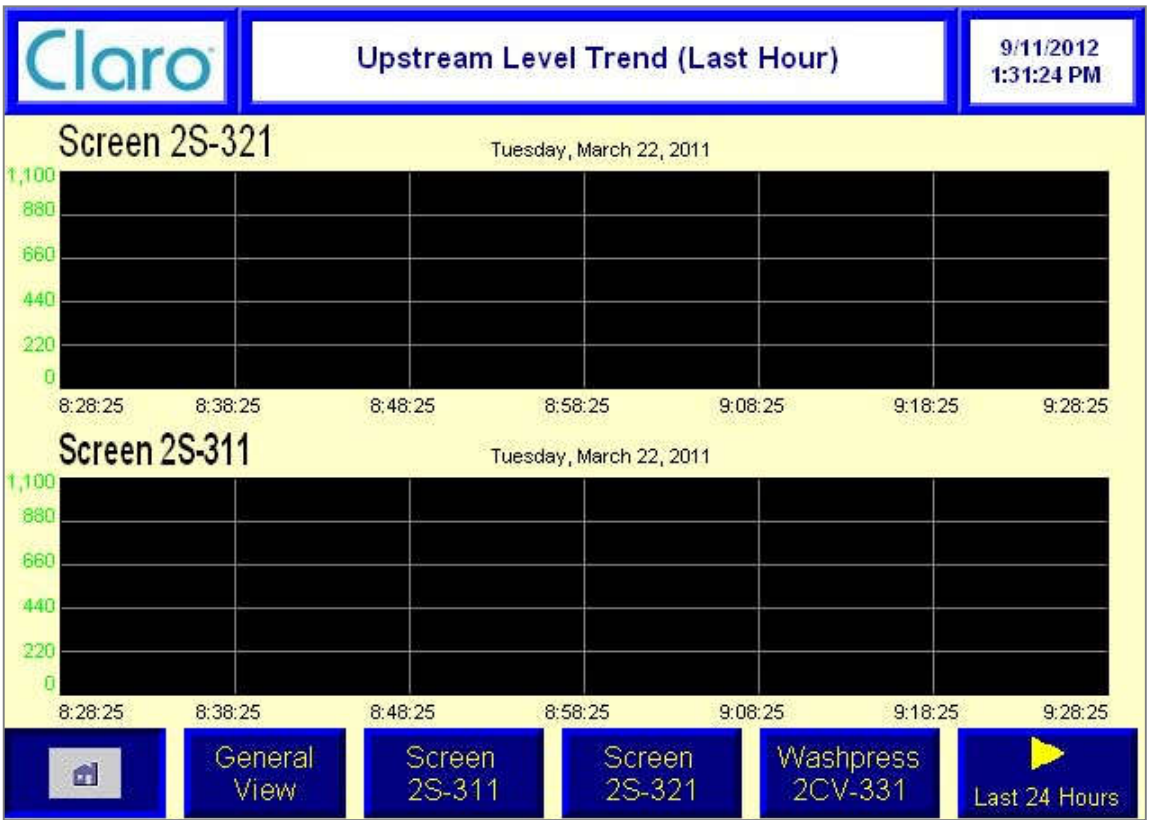


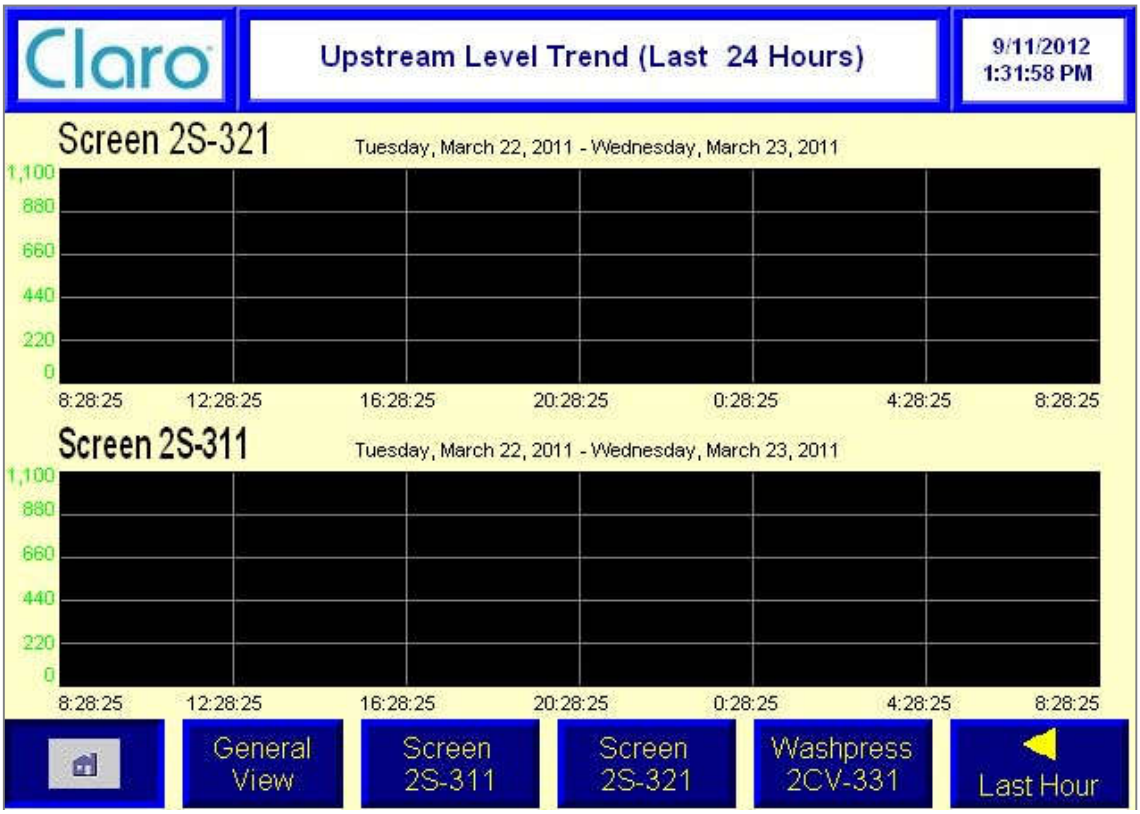


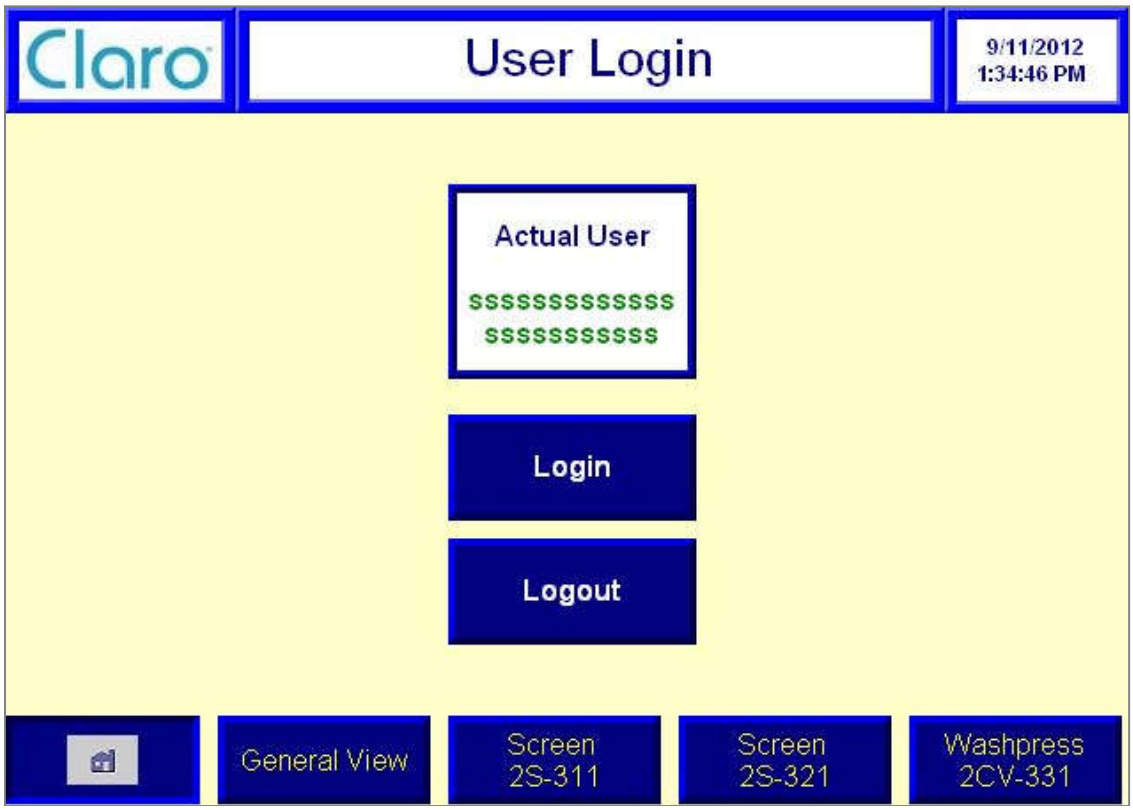


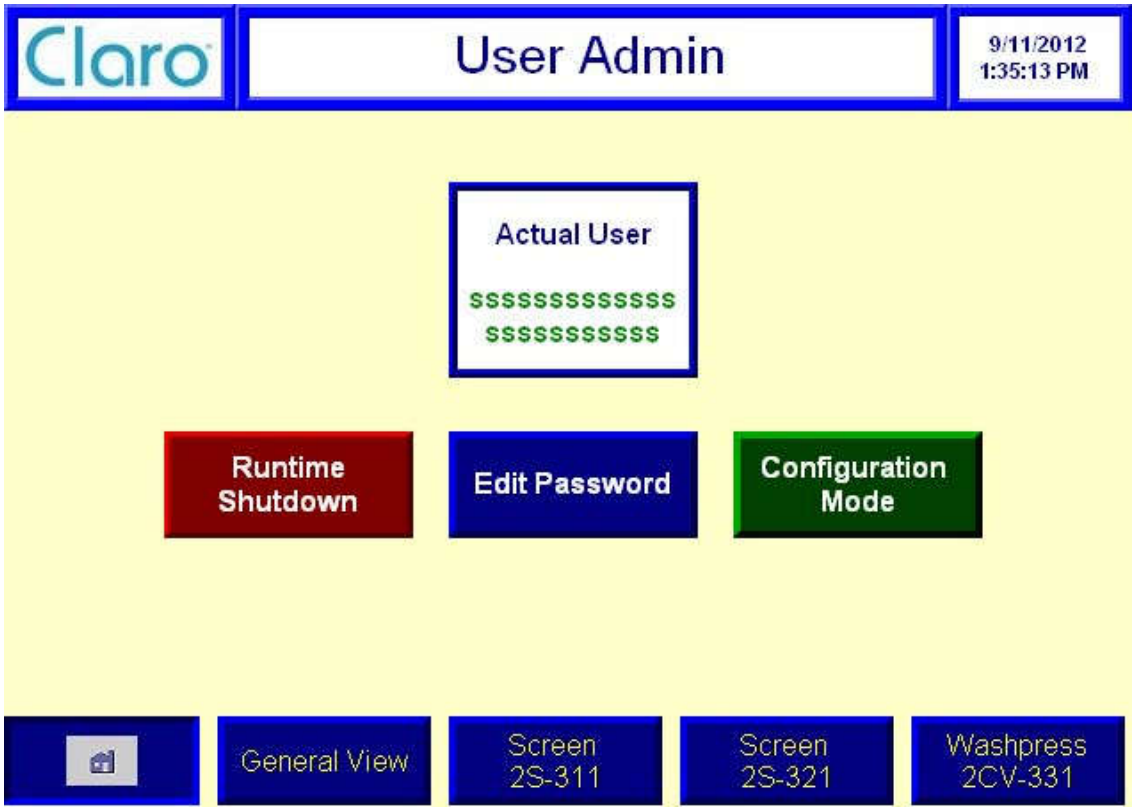


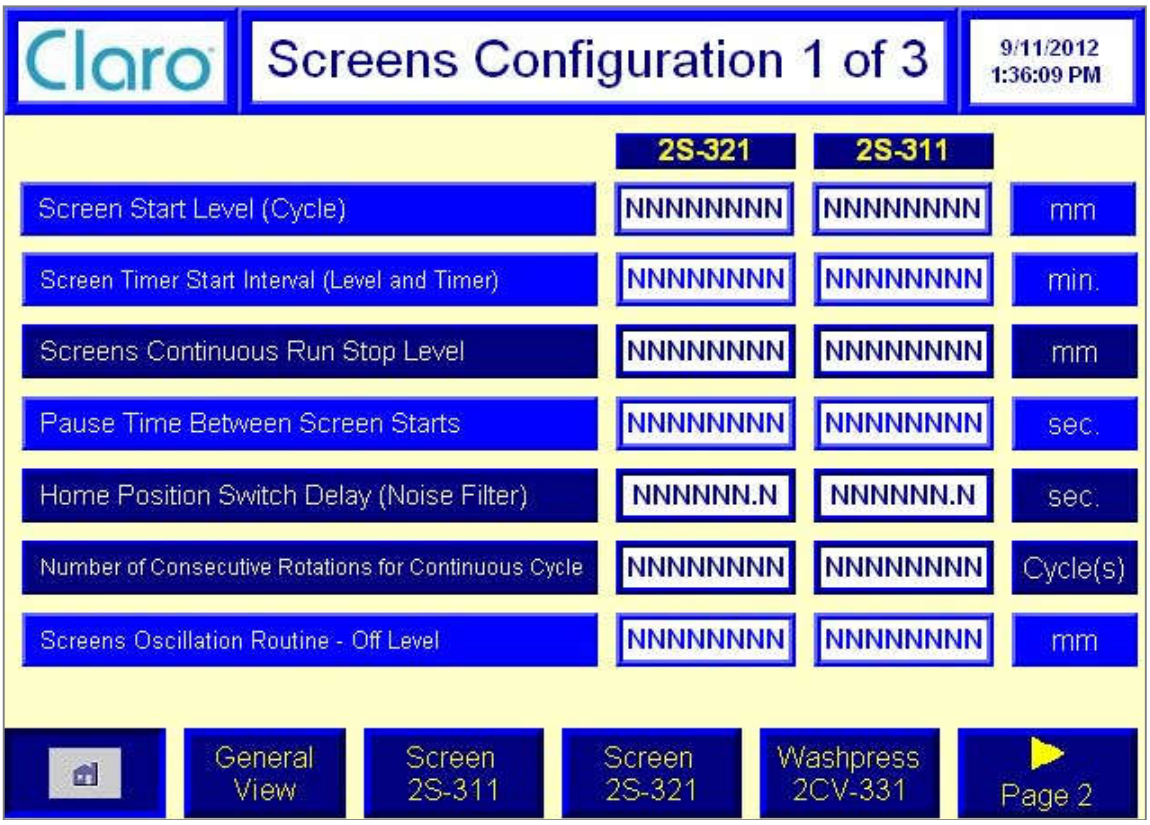


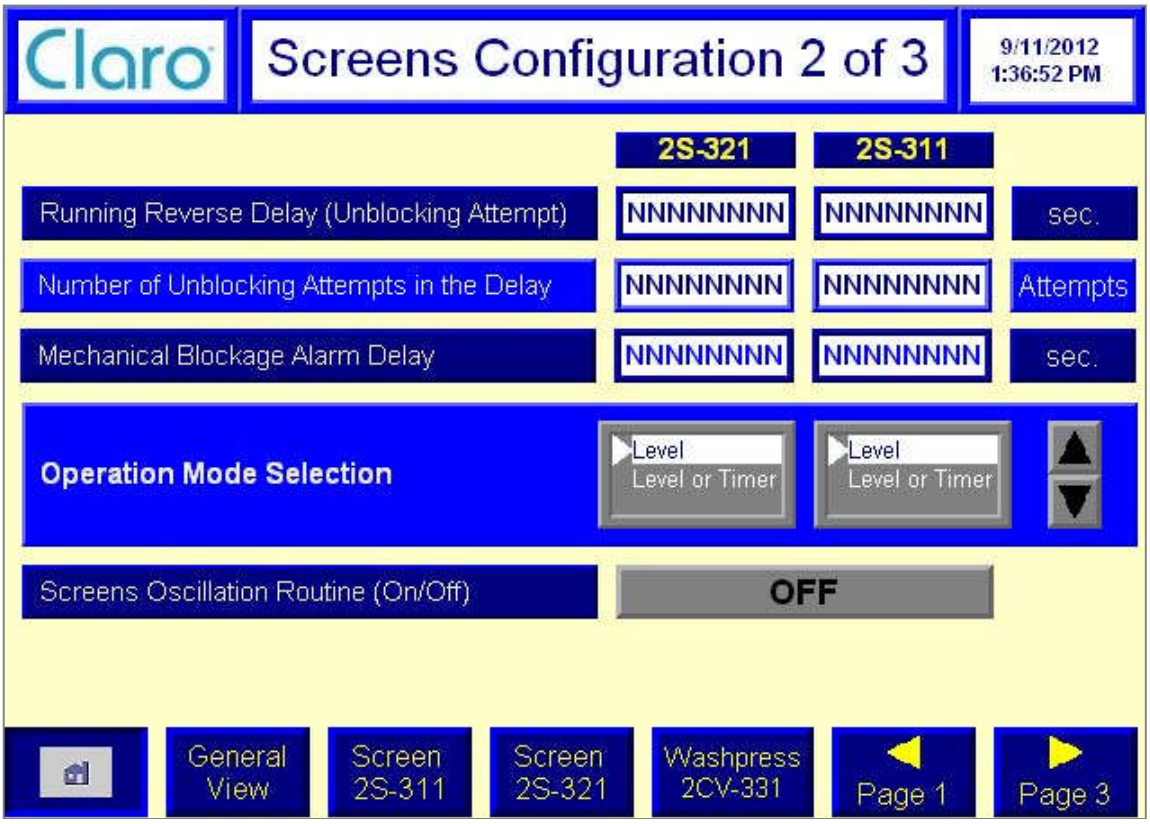


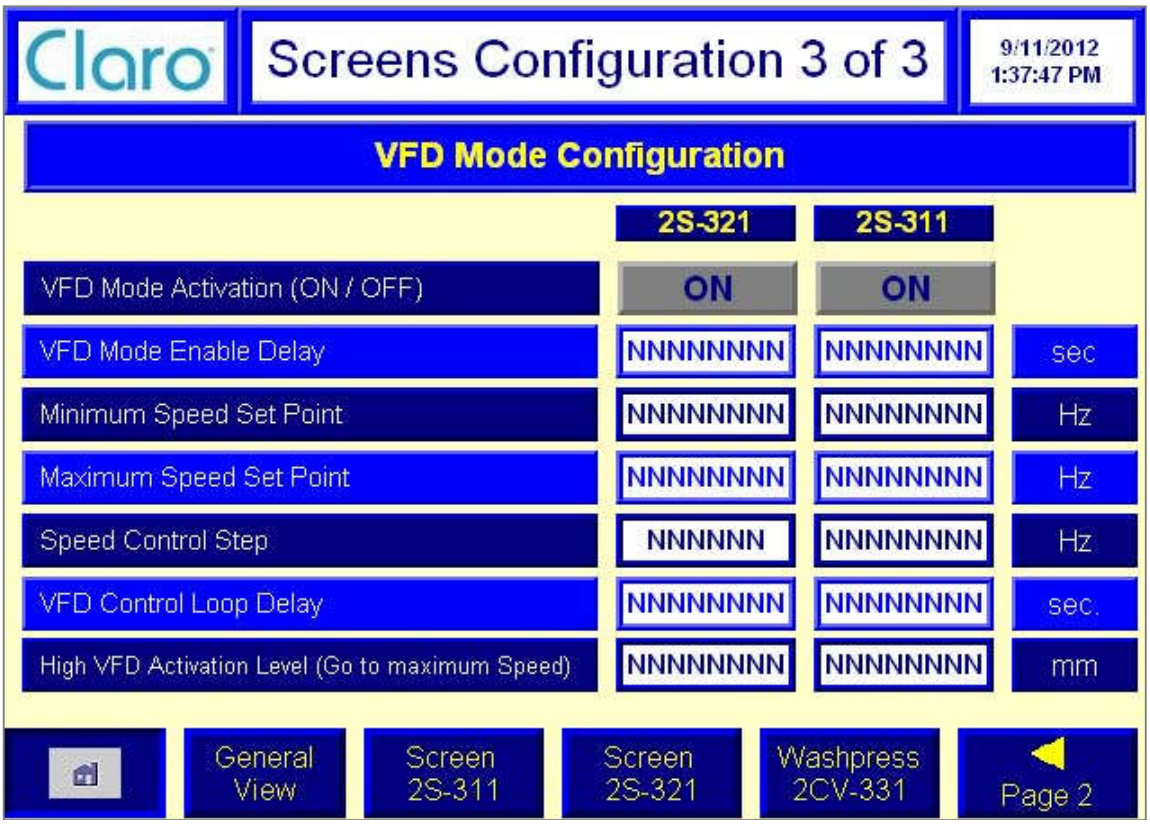


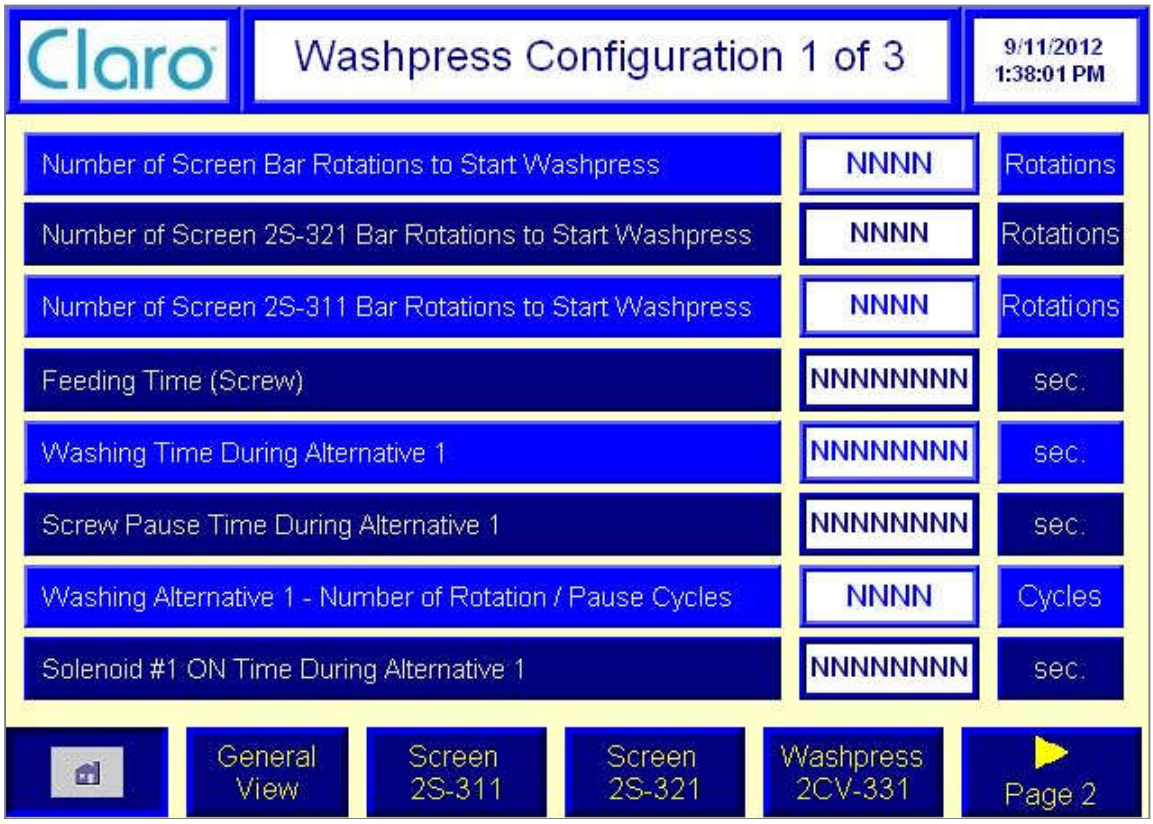


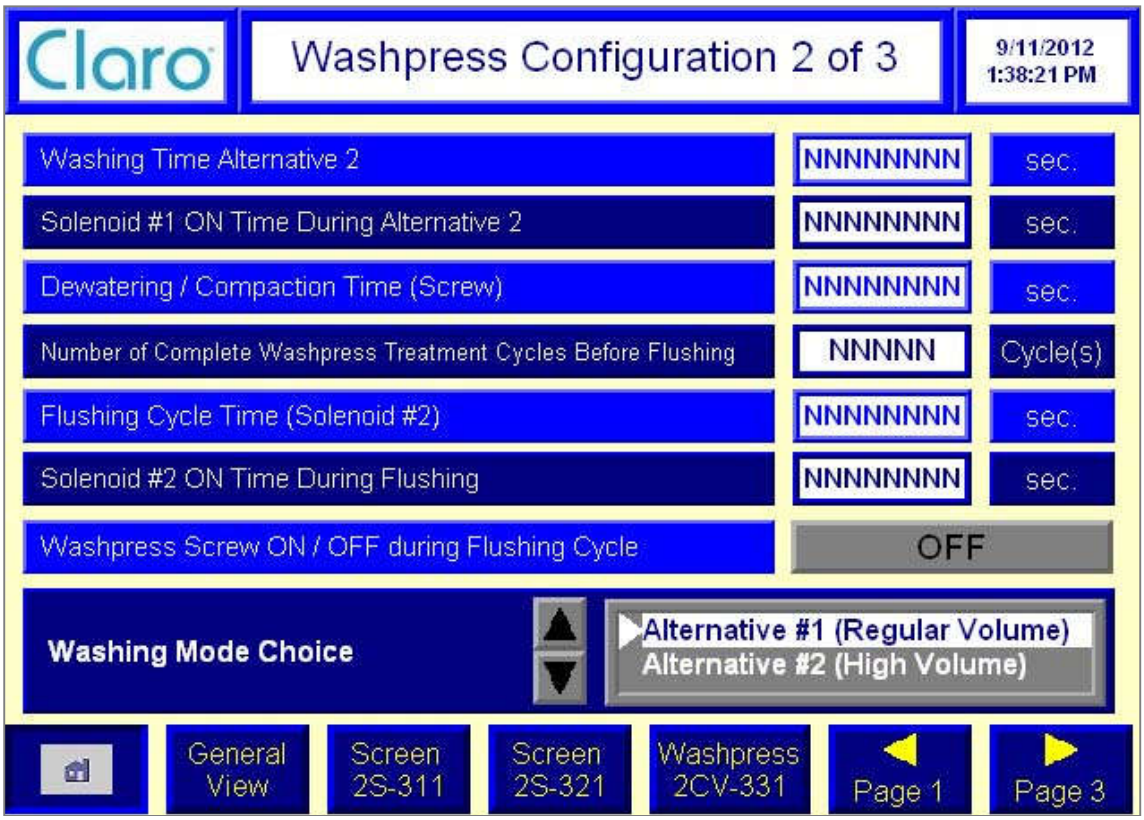


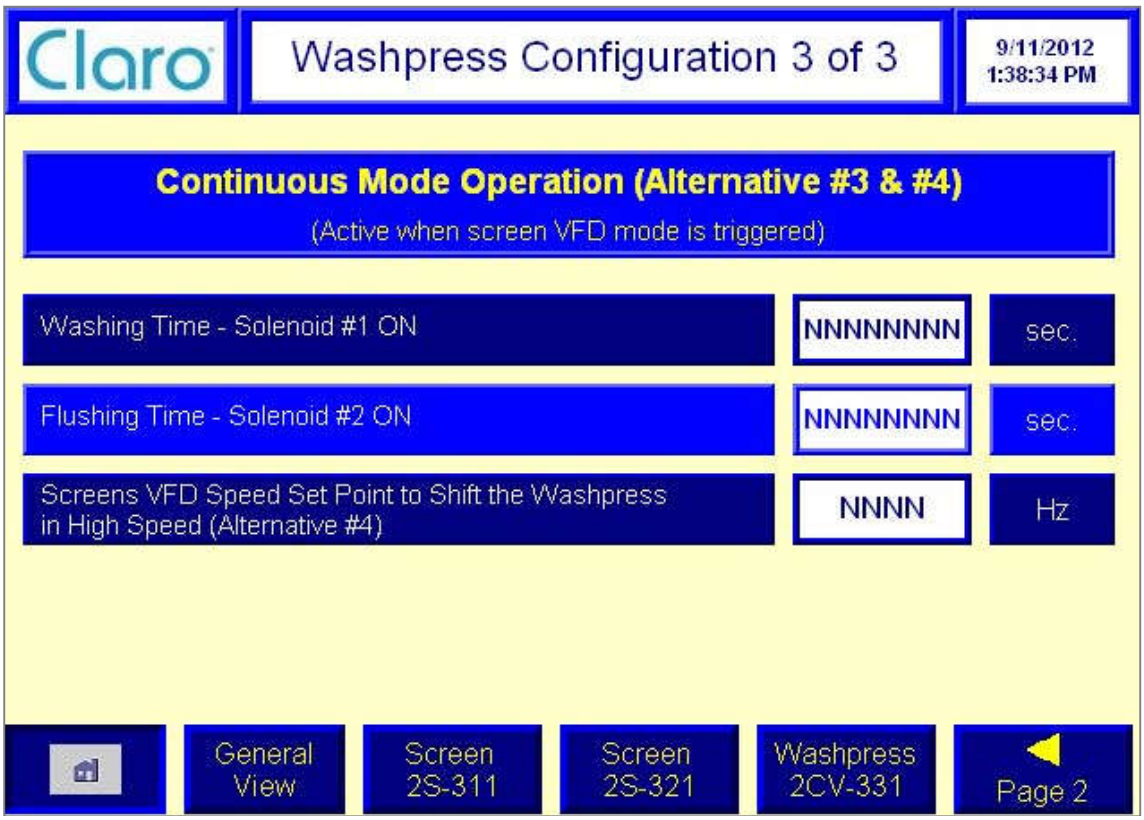


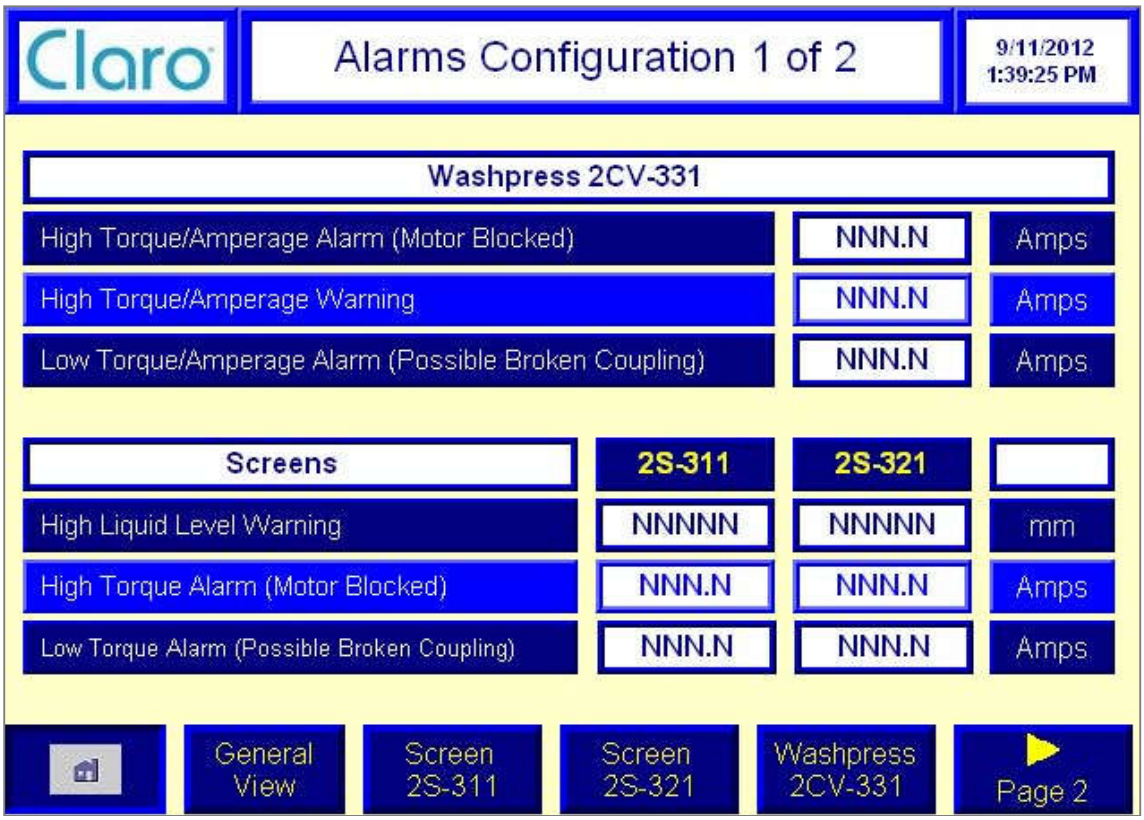


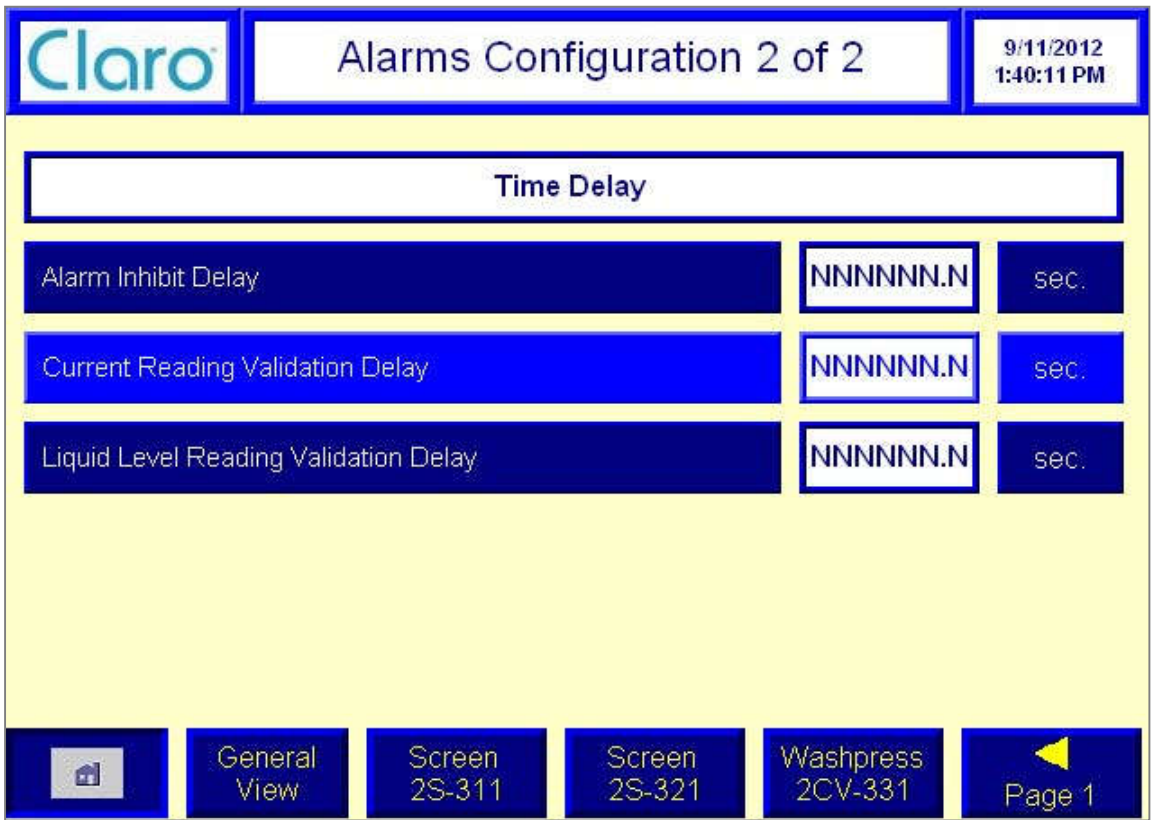


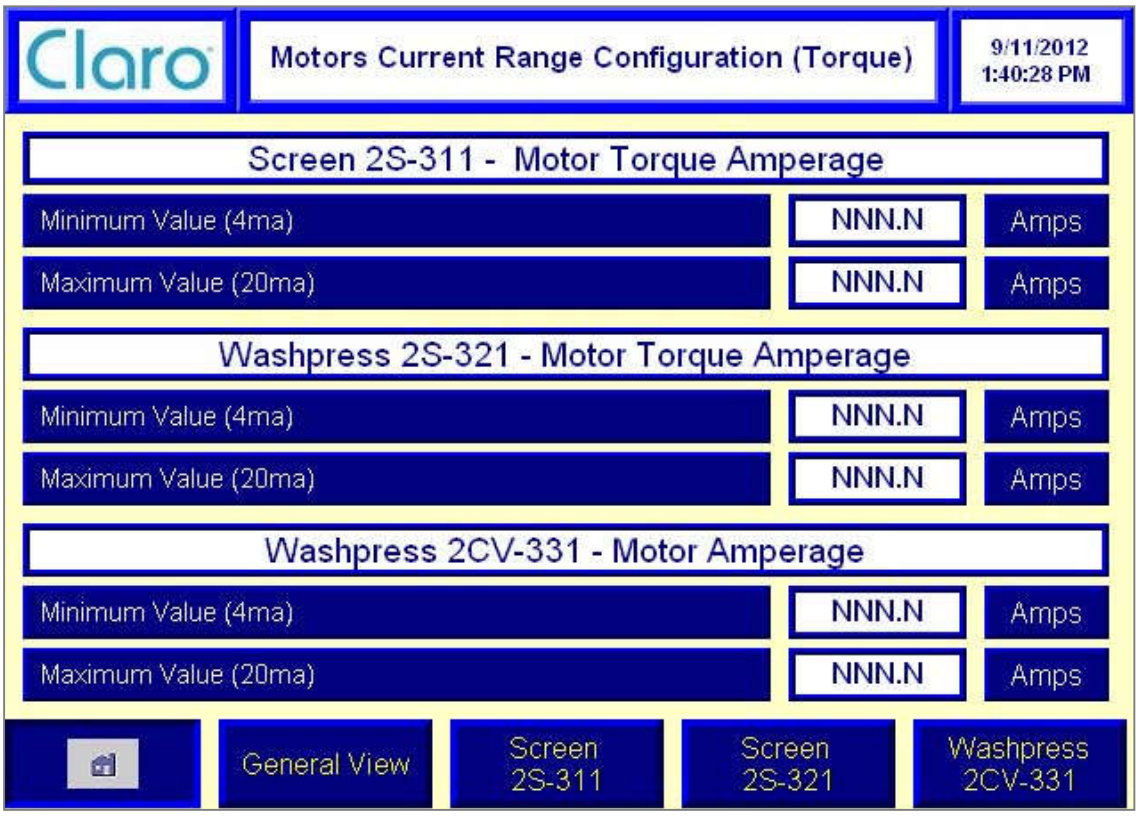


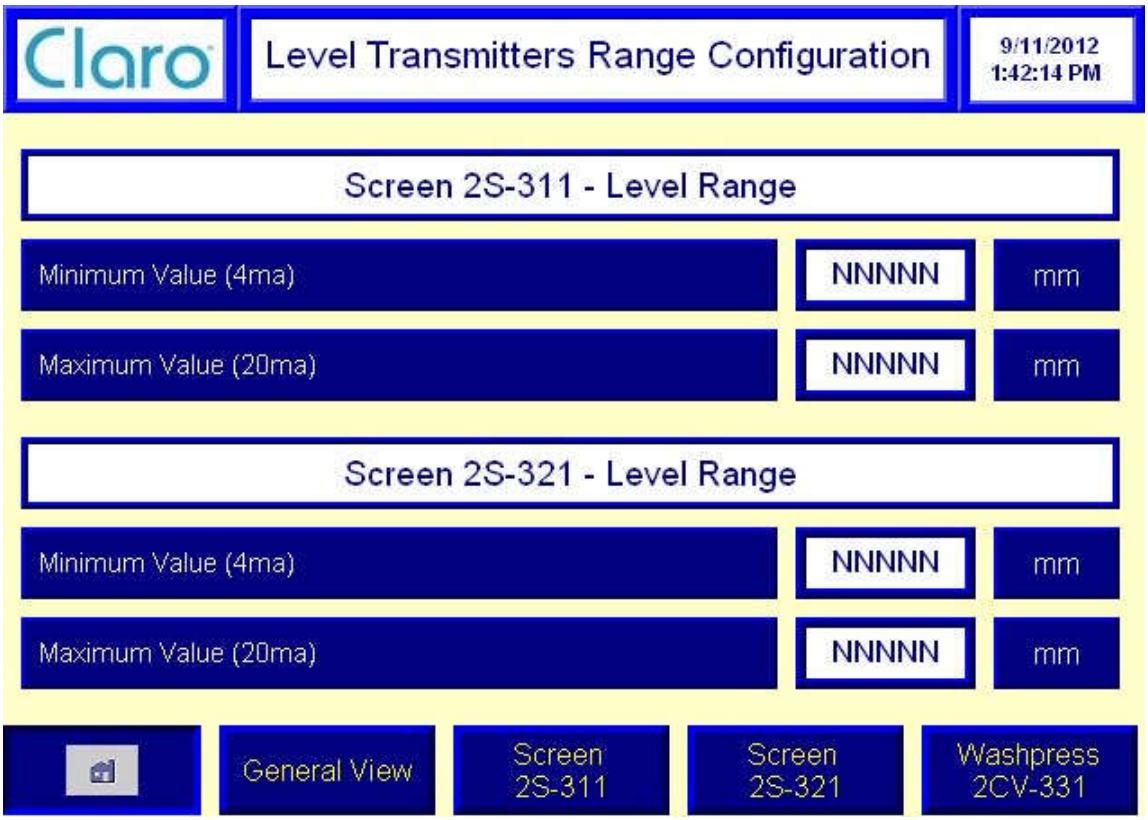












v. Sample Control Narrative – Ingleside, ON (Preliminary): Two (2) Fine Step Screens + One (1) Wash Press Compactor

A. Automatic Operation:

• Fine Screen:

1. All duty operation switches in position AUTO.

2. The screen will start when the start criteria reaches its preset value—either:
   a. high liquid level preset value (i.e. **Normal Start Level②**), measured by an ultrasonic level detector ahead of/upstream of each fine screen unit
      (or)
   b. an adjustable level differential value measured by upstream & downstream level detectors
      (or)
   c. high liquid upstream level, achieved differential value (or) max pause time preset value has been reached.

• Note: Controls shall allow for operator adjustment of preset max liquid level, differential & max pause time. Approach "a" and "b" is the standard approach that delivers the highest level of separation by encouraging the formation of a screenings filter mat. Also, this minimizes the function time of the screen—it will move only when necessary, which significantly reduces energy usage, wash press water usage, and mechanical wear-&-tear. Typically, the max. preset time interval approach "c" is turned OFF and only the level detectors control the movement of the screen. This timer function is provided as a precaution in case the level sensor(s) is out of service.
Precautionary back-up routine: A relay on each level transmitter will also automatically switch to timer mode if the transmitter happens to fall into fault or the sensor experiences a loss of echo or other issue. The control panel will return the system to normal operation mode automatically once the level sensor returns to normal operation. This automatic, precautionary switch will be indicated to SCADA & recorded on the Alarms History page on the HMI.

3. The screen will make one moveable lamellae rotation and then it will stop in its initial position (moveable and stationary lamellae will return to an aligned position). A home position switch, installed on the cam, indicates where the motor must stop for perfect lamellae alignment. An electrical brake integrated internal to the motor will stop the lamellae at the indicated position and prevent them from moving out of aligned position when the screen is at rest.

4. Coping with extreme peak flows/debris loads: after the screen has completed its initial rotation and is stopped, the following subroutine will begin:
    a. If the start signal is still active above **Normal Screen Start Level②**, the screen will start after an adjustable 0 to 10 sec delay and complete one moveable bars rotation.
    b. If the start signal is still active for another adjustable 0-10 second delay period, the screen will be locked in running mode during the next start until the level reading is below a second preset maximum level, the **Continuous Run Shut-Off Level①**, which is typically just below the normal start level preset.

• Note: controls shall allow for operator adjustment of the delay settings, the number of consecutive rotations before continuous run mode is initiated, the continuous run mode shut-off level, and will enable subroutine <<a>> and/or <<b>> to be turned ON or OFF. Typically, they are left ON.

• Wash Press

5. A counter will start the wash press after a preset number of total moveable bar rotations of the fine screen. Note: Each rotation delivers a relatively consistent volume of screenings, which enables optimization of wash press settings. Once the total preset number of rotations is reached for the screen (i.e. an approximate volume has been discharged), the wash press will perform the following standard cycle:

    a. The screw runs continuously for a preset time (feeding time). This time is relatively short and is employed in order prevent the use of wash water before the screenings have had a chance to enter the wash zone.

    b. When the feeding time has elapsed, the wash cycle starts. The wash cycle has 3 alternative sequence routines:

    c. Wash Cycle Sequences (Alternative 1, 2 & 3):

    Alternative 1: wash press screw time interval routine (with pauses setting)
    - The screw runs for a preset time interval and then pauses for a preset time interval
    - The number of these run and pause cycles is adjustable (1 or more times)
    - The wash water valve (solenoid #1) is open for an adjustable preset duration during the selected number of run/pause sequences (i.e. over top of these run/pauses cycles)
    - Note: Wash water time is not allowed to be greater than the total amount of time of the run/pause sequences (equal or shorter than this combined value only)

    Alternative 2: wash water interval selected (without pauses setting)
    - The screw is running during the whole wash cycle for an adjustable preset run time (i.e. no pause).
    - The wash water valve (solenoid #1) is open for an adjustable time value while screw is operating. Also, since the system implements a common wash press that accepts material from 2 fine screen discharges, the controls also enable the operator to reduce water use as follows: after the first fine screen's batch of screenings have been treated by the wash press, the wash water jet can be stopped for an adjustable time until the second batch of screenings from the screen farther away from the washing zone arrives at the washing zone. This adjustable wash water pause acknowledges that there is a space between the 2 input points that will not contain screenings debris at the moment of wash press actuation.

Alternative 3: Reverse Mode Setting

- The screw runs forward for an adjustable time, pauses for an adjustable time, and then runs in reverse for an adjustable time
- The wash water valve (solenoid #1) is open for an adjustable time value while screw is operating
- Note: Wash water time is not allowed to be greater than total screw running time (equal or shorter than screw runtime only)

- Note: Wash water time is not allowed to be greater than screw running time (equal or shorter than screw run time only)
- Note: controls shall allow for operator selection between Alternative 1, 2 or 3 and adjustment of all respective setpoints.

d. When the washing time sequence (step c) has elapsed. The wash press screw runs continuously for a preset time (dewatering/compaction time). The wash water valve (solenoid #1) is closed.

e. When preset number of complete wash press time/cycles has been reached, the flush water valve (solenoid #2) opens for a preset time and cleans outside the perforated wash/compaction cylinder and flushes removed organics down the drain and into the channel for treatment downstream. The screw can be turned on or off during this time sequence.

- Note: controls shall allow for operator adjustment of wash press time/cycles [i.e. number of times the wash press has completed a full sequence before effecting a flushing cycle (for reduction of water use in jurisdictions where water availability is limited)] & adjustment of preset solenoid #2 on time and screw on/off mode.

• •

B. Manual Operation:

1. When fine screen #1 & #2 MAN/OFF/AUTO selector switch is in the <<Manual>> & <<Forward>> position, the fine screen will operate continuously in forward until the spring-loaded <<Forward>> selector is released.
2. When the wash press MAN/OFF/AUTO selector switch is in the <<Manual>> & <<Forward>> position, the wash press will function continuously in forward until the spring-loaded selector is released. Solenoid #1 & #2 are off. N.B. The operator must be careful not to feed too large a volume of material into a stationary conveyor when operating the wash press in manual.
3. When fine screen #1 & #2 MAN/OFF/AUTO selector switch is in the <<Manual>> & <<Reverse>> position, the fine screen will operate continuously in reverse until the spring-loaded <<Reverse>> selector is released.
4. When the wash press MAN/OFF/AUTO selector switch is in the <<Manual>> & <<Reverse>> position, the wash press will function continuously in reverse until the spring-loaded selector is released. Solenoid #1 & #2 are off.
5. The wash press's solenoids can be operated manually via the HMI. When the Solenoid #1 or Solenoid #2 manual operation button for the wash press is pressed on the HMI, the respective solenoid will open until the button is pressed a second time. These buttons only appear/are active

on the HMI screen if the wash press MAN/OFF/AUTO selector is in the <<Manual>> position. These instructions are represented on the HMI screen.

6. A fine screen # 1 or #2 start signal can be actuated via a button on the HMI.
7. A wash press cycle can be actuated via a button on the HMI.

• Note: All manual HOA operation by-passes the PLC.

• •

C. Failure Alarm (Overload Function):

1. Screen #1: During overload or jamming of a screen, the overload guard switch (Emotron M20) is triggered. If the torque overload switch (e.g. Emotron M20 or equivalent) signals an overload, the screen will run in reverse for 1 to 3 sec. Overload setting & reverse time is adjustable. If overload occurs >2 times / 1 min, the screen will stop and signal an alarm. These settings are adjustable.
2. Wash Press: A current transformer (CT) in the main panel senses the torque readings on the wash press motor in order to protect the unit from possible jam. There is a warning amperage level alarm & a high amperage shutdown alarm. If the warning level alarm setpoint of the amperage sensor is reached, the control panel issues an alarm. If the amperage sensor reaches the high amperage shutdown setpoint, the wash press is shutdown and an alarm is issued. A low current reading during spiral operation indicates a possible spiral detachment/breakage. In this scenario an alarm is issued, however, the wash press is allowed to continue operating (i.e. no shut-down).
3. Any in-field emergency stop (i.e. fine screen or wash press) halts the respective machine in both Manual & Auto modes. The control panel door main E-stop halts all equipment.
4. Resetting/clearing alarms: Reset by push button (RESET) on the main panel and by pulling mushroom into original position, if it was depressed. Clearing of alarms are also effected by clearing the alarm status message represented on the HMI.
5. A high level warning message is provided at the panel HMI suggesting that the level in the channel has risen to a level that is equivalent to a by-pass level. This level setpoint is adjustable.
6. An alarms page lists current active alarm conditions. An Alarms History page logs a history of alarms.
7. All alarm status messages are available to SCADA. All alarm levels are adjustable via the HMI (& SCADA, if selected).
8. A watch dog feature enables SCADA to monitor the health of the control panel PLC.
9. Back-in-Service Courtesy Alarm – Wash Press: If the wash press is left in OFF or Man at the local HOA while either or both screens are in service, an alarm will sound after an adjustable time delay.

• •

D. Real-Time Readings/Trends

- The HMI screen interface will have a page(s) graphically & numerically representing the real-time values for upstream & downstream liquid levels for the screens, the torque/current motor(s) torque readings, all the respective set points, and the current stage in the operational sequence for the screens and wash press. The graphics representing the screen and wash press will be adapted from the project drawings in order to faithfully reflect the Ingleside screening & compacting system.

• Continued following page →

- A trends page records:
  a) the number of motor starts for screens and wash press.
  b) the total amount of time each motor has run.
  c) total number of treatment cycles completed for the wash press.
  d) Scada can log this activity across time and provide graphs representing activity over time on a separate trends page (liquid levels, equipment run times & treatment cycle count etc.)

'Screenings Mat' Operation:

exceptional screening & low-impact mechanical operation

Examples of the 'screenings mat' filter. As screenings accumulate into a filter mat, the water level rises in front of the bar screen. Once the water level reaches a predetermined level, the step screen advances one step. This single rotation of the moving bars shifts the entire screenings mat up the bar screen and frees the bottom step from screenings. The water level falls until the mat is reconstituted and the cycle begins again.

screening grit removal Claro

'Screenings Mat' Operation:

exceptional screening & low-impact mechanical operation

Example of the step-by-step discharge of screenings into a Claro washpress. The interval between step movements is coordinated by a water-level detector. The screen moves only when the volume of screened material necessitates a self-cleaning rotation of the mobile bars. This intermittent cycle of intelligent, step-by-step movements significantly reduces mechanical wear & tear.

screening
grit removal
Claro

vi. Deviation Listing (Separate Listing As Specified)

- The proposed screening, wash press compactor and control system is in conformity with the project specifications. The only deviation is the employment of a common wash press in lieu of a conveyor & wash press arrangement. This approach employed in systems described in this proposal enables the elimination of an unnecessary piece of equipment and the reduction of the discharge height of the screens, which provides a more cost effective, elegant and ergonomic design.

• •

B. System Performance: Separation Efficiency, Maintenance History and Reliability, & Ease of Use/Hygienic Work Environment Advantages of Claro Fine Step Screening Equipment

i. Separation Efficiency

• Part A: Introduction

It is important to substantiate the screening efficiency of our 3 mm step screens relative to the alternate perforated plate technology. In our view, long-term separation performance across many facilities and the practical experience of operators is the key benchmark indicator of performance and quality. We have provided additional references in the reference section (Section 2, Part B, Item 1.2.5: 'Claro Contact References including Project Information, Thumbnail Drawings & Installation Photographs') in an effort to enable a due diligence review of the performance of the system. We would be happy to provide dozens more contact references on request. Below we also include a brief survey of installations that show that the proposed 3 mm step screening technology has been:

a) successful in protecting treatment systems that demand a high level of separation (systems that are more sensitive to debris than the envisioned SBR, UV & other systems); and,
b) preselected by both large & small municipalities in Canada in lieu of the specified 6 mm perforated plate on the basis of separation performance, initial capital cost, low maintenance requirements, and hygienic operation.

Following this survey, we address the claims made within the UKWir / ThompsonRPM report by briefly reviewing how the study has significant methodological deficiencies that undermine its credibility as a benchmark for screen technology evaluation and that have an oversized impact on its evaluation of step screens in particular. This synoptic review is the basis of a paper that is currently under review by a recognized industry journal focused on wastewater treatment research.

• Part B: Long-term, Proven Performance & Operator Experience / Testimonials

The following review of installations provide a quick snapshot of the proven efficiency of Claro's 3mm step screen project designs.

Selected Examples:

1. Hawkesbury (2012): At Hawkesbury WWTP (ON), two (2) x 3 mm Claro step screens have been protecting a Veolia IFAS system constituted of 'honeycomb' media & cylindrical sieve drains – components sensitive to screenings debris contamination – since 2012. The IFAS & other systems have been exceptionally well protected. Please see reference letter included below & RFP references list for contact information.

Hawkesbury WWTP, ON (2012)

• Please see reference letter following pages →

Corporation de la ville de of the Town of HAWKESBURY
600, Higginson, Hawkesbury, ON K6A 1H1
T. (613) 632-0106
www.hawkesbury.ca

September 9, 2020

To whom it might concern:

The Hawkesbury Wastewater Treatment Plant has two Claro 3 mm step screens, a wash press and a bagging system that were installed in 2012 along with new downstream treatment processes. I have been at the facility since before the start-up, first as the Quality Management Representative and subsequently as the Superintendent.

Before the upgrade, operations needed to regularly clean the aeration tanks due to screening by-passes through the previous screening equipment. Since the upgrade 8 years ago, we have seen a radical improvement. There is an absence of screening debris downstream and we see no floatable. For example, the two grit systems grit pumps and hydrocyclones have remained clean. Operations have not needed to clean or drain the IFAS treatment basins. The tubular IFAS drains within the tanks have remained clear and trouble-free. Pumps, the UV system and other systems have functioned without fouling since the start-up. This performance has enabled downstream equipment to function well and to limit maintenance requirements.

The screens & wash press have performed exceptionally well mechanically. They work so well that we almost forget that they are there. There have been no spare parts or maintenance required since 2012, which is a very positive testament to the design & quality of the equipment. We are only considering minor PM maintenance in the upcoming months. The bushings will be changed on the screens in order to guarantee another 8 years of service. The wash press was inspected recently and will not need a change of wear bars for several years since we see almost no wear (1 mm of wear in 8 years). The spiral is in very good condition. The screen works exceptionally well while being simple and easy to work with. Its design is straight forward which means that we do not even need a millwright for the screen bushings PM.

The service response is also exceptional. Claro's personnel are always available for questions, which has been especially helpful as staff have changed over the years. Peter Lipert offered and provided a refresher training for new personnel. It is refreshing to be able to speak to a manufacturer that knows your particular system in detail rather than being directed to a series of anonymous service department personnel.

Corporation de la ville de of the Town of HAWKESBURY
600, Higginson, Hawkesbury, ON K6A 1H1
T. (613) 632-0106
www.hawkesbury.ca

We really like the entire approach to the system and the philosophy of Claro as a manufacturer. Screening is an essential part of every wastewater treatment plant. We would highly recommend this system for a facility considering an upgrade. I would be happy to answer additional questions at the contact information included above.

Sincerely,

Martin Perron

Martin Perron
Environmental Service Superintendent

2. Mascouche (2010): Commissioned in 2010, the Mascouche-Lachenaie WWTP (QC) 3 mm step screens continue to successfully protect a Veolia Anox Kaldnes MBBR, which is constituted of plastic 'honeycomb' media and cylindrical drain sieve equipment. After 10 years of service, the four (4) Mascouche screens still look new and have had their linkage system sleeve bushings changed once (approx. year 7). The MBBR has also worked well in conjunction with the screening system. The operations manager responsible for this facility also operates another 3 mm Claro system at St-Eustace WWTP (QC; installed 2013). Please see RFP references list for English-speaking operator contact information.
3. Ste-Marianne (2015): Two (2) x Claro 3 mm step screens protects a Suez Meteor MBBR. Based on the performance of these units, the municipality purchased 2 x 3 mm units for a sister facility, St. Canut WWTP (QC).
4. Campbell River, BC (2016): Campbell River WWTP, BC preselected two (2) x 3 mm Claro step screens in lieu of the originally specified 6 mm perforated plate units. Please see separation efficiency testimonial included at right & the RFP reference list for operator contact information.
5. Fish Creek WWTP (City of Calgary, AB): The City of Calgary preselected two (2) x Claro 3 mm step screens in lieu of adding additional 6mm perforated plate screens (Veolia Escalators) on the basis of a) an evaluated review of Claro installations & preselection proposal and b) due to the perennial breakdowns and spare parts costs of the perforated plate unit. The Claro screens are delivered and currently being installed. Installed in 2011, the existing Escalator screen will be retired for precautionary back-up service (exercised only to maintain lubrication of parts). When visiting the facility, operators reported that spare costs for this machine ranged in the area of 60K per year with broken bottom bearings, cracked filter plates, and other spare parts required.
6. Adelaide Pump Station (London, ON): City of London has operated Claro influent works equipment since 2009. A conveyor & wash press c/w extended 5.5 meter

Mascouche-Lachenaie WWTP, QC (2010)

From: Lorne Sandberg <Lorne.Sandberg@campbellriver.ca>
Subject: FW: Mequipco - Claro Screen Review
Date: April 3, 2017 at 4:25:03 PM GMT-4
To: Michael Greig <mgreig@mequipco.com>
Cc: Steve Roehr <Steve.Roehr@campbellriver.ca>

Hi Mike,

Please see Steven's comments below. He says it all, I couldn't have said it better, and I share his sentiment.

Lorne Sandberg
Wastewater Supervisor

City of Campbell River
Tel: 250.286.4833
Cell: 250.204.4262
Fax: 250.286.4832
Email: lorne.sandberg@campbellriver.ca

From: Steve Roehr **Sent:** March-31-17 1:25 PM **To:** Lorne Sandberg <Lorne.Sandberg@campbellriver.ca> **Subject:** Mequipco - Claro Screen Review

With the addition of the Claro Fine Step Screens into our process we have seen a marked improvement in the removal of solids from our treatment stream. This has led to a significant reduction of labour by virtually removing all need for what was once daily manual rag removal in our plant. By allowing the build up of a 'screenings filter mat' on the unit we have managed to capture and remove significant amounts of grease from our system as well. The screens themselves are simple and robust and are built for quick and easy maintenance. Installation of the screens into our system was painless. Peter from Claro was always quick to answer any questions we may have had. Knowing he was, and still is, there in case we need him has given us great peace of mind. I strongly recommend Claro if you're looking to improve your screening needs.

Thanks,

Steven Roehr
Wastewater Foreman II
City of Campbell River
Tel: 250.286.7801
Cell: 250.203.3973

discharge tube & bagger installed in 2009. Two (2) x 6 mm step screens at Vauxhall PCP since 2011. And more recently, two (2) x 6 mm step screens and corresponding wash presses and screenings outloading system including pneumatic gates at Pottersburg PCP (2018) and two (2) x 3mm step screens, a wash press and transfer & outloading conveyors equipped with pneumatic gates at Adelaide PS (2018). The 6 mm screens have performed remarkably well solving debris fouling issues and, as reported by operators soon after installation at Vauxhall, issues related to grease fouling of the downstream process.

At Adelaide, Claro encouraged the installation of 3 mm aperture screens (Note: The initial request & proposal was for 6 mm units; 200 MLD peak capacity per unit; 100% redundancy). Soon after installation, operators reported a between 50% - 75% reduction of disposal volume at the existing forced vortex grit removal systems. If considered conservatively, this indicates that the step screening system is removing a significant portion of grit and the organics with a higher specific density such as corn and other debris that are not typically separated in the vortex and tend to foul and retain moisture in the discharged grit product. The original screens had an aperture of 1/2". Please see RFP contact reference list for City of London contact information.

7. Fort St. John WWTP (BC): Installed in 2018, Fort St. John currently has one (1) x 3 mm fine step screen as part of a larger screening & grit removal system provided by Claro. Based on the review of installation references and the broader technical package, the step screen was selected over a 6 mm perforated plate unit. The influent works is conceived to protect a future MBBR system that will be installed as part of a Phase 2 project once funding is available. Please see RFP contact reference list.

   Conclusion: These experiences of separation performance are shared by other facilities as attested to by operators. Indeed, 3 mm screens are a standard approach to protecting sensitive systems such as MBBRs in Europe – they are seen as equivalent to 6mm perforated plate. There is no question that the proposed systems will thoroughly protect the unit treatment processes that will constitute the Ingleside facility. As another measure of separation performance, 2mm step screens are protecting flat sheet MBRs at Arbutus Ridge WWTP (CVRD, BC) & Twin Cedars WWTP (CVRD, BC). Testing of the downstream tanks show that the screening equipment is performing well. A third system was recently preselected & delivered for Mill Bay (CVRD, BC) and is waiting for construction to begin this Fall (contractor delayed due to Covid preparations).

• Part C: Step Screen Capture Rate Efficiency & the UKWir / ThompsonRPM Report

Experience demonstrates that the Claro fine step screen provides a high level of screenings separation that effectively protects sensitive treatment processes over many years of service. Given this experience, we have been asked why the UKWir / ThompsonRPM report, which is cited by competing manufacturers, claims that the 3 mm step screen has a capture rate in the mid-50s percent range when compared to 6mm perforated plate that has a reported mid-70s percent range. Once one reads the report in full, the answer is clear: the test methodology mandates that the step screen be operated in a manner that is never seen in practice. In the test, the step screen is run nearly continuously rather than intermittently according to the 'screenings filter mat' operational philosophy. Once operated as recommended – with an intermittent control

philosophy that enables the formation of a screenings filter mat – the capture rates increase and reflect a percentage range equivalent to the tested 6mm perforated plate.

The methodology & data/appendices of the report indicate that the SCR (Screen Capture Rate) value is an average of tests where the screen is "ON" or run continuously & "Off," which appears to allow a matting to occur (note: more on the 'Off' aspect below). The head losses shown in the report corroborate that the step screens have been run continuously or near continuously – and thus either entirely or largely clean. In practice, the Claro step screen does not run clean even at peak flows, which is a function of proper sizing and superior head loss performance. The screens are sized to run at 35% blockage at peak. Thus, the step screen's reported SCR is immediately handicapped by an operational scenario that is not representative of how the unit performs in application.

We have requested that Thompson effect the test with the recommended control philosophy but were refused. Given this response, we effected a test on an installed 6mm screen that emulated the Thompson methodology but operated the screen via our control panel. These test results were presented at the Americana conference in 2015. The SCR was 71% for 6 mm aperture when operated according to the recommended control program. It is evident that 3 mm aperture step screens will have a higher capture rate with an opening that is half the size. Indeed, the clean open area of a 3 mm step screen is the same as for 6 mm perforated plate – 50% open. The superior head loss and capacity performance of the step screen, however, enables the screen to run much less – 10 to 30 minutes per 24 hours – and thus enables its 3 mm apertures to be coated with a mesh of screenings that further augments its separation efficiency and explains the in-practice operator experience of the technology.

The superior capacity & head loss performance of the step screen is due in part to the absence of the perforated plate unit's downstream belt through which the flow must pass a second time. Perforated belt screens such as the Escalator have openings on the downstream side of the screen frame that alleviate only a portion of this flow pressure. The downstream belt, and a frame that takes more space within the channel, effectively yield a screen that has significant daily run times that are often measured in hours. This compromises separation efficiency since the unit repeatedly presents large areas of clean filter media throughout the day. Additionally, more actuation also risks that the brush will miss more material that can re-enter the flow on the downstream side of the filter belt. And, with higher head losses across the flow spectrum, there is more head pressure on the screenings, which will encourage material to be pushed through the perforations. A step screen's operation is restrained and effects gentle handling of the screenings without maceration and has low head losses that enable high removable efficiencies.

Here are further methodological issues re: the Thompson study that call into question its significance and that disproportionately effect step screen efficiency evaluation results.

- 'OFF' Test Methodology Inconsistent: The UK report's "'Off' test' methodology is also questionable. Given the acknowledged positive effect of screenings matting, it is surprising that the report approaches this part of the test, which accounts for the balance of the average SCR value (i.e. 50%), in a manner that appears profoundly unsystematic. It is worth quoting this section of the report at length:

> During each SCR test, the performance of the screen is measured with the screen running continuously ('ON' test), and also with the screen stationary and blinding ('OFF' test). One complete test comprises one 'ON' test and one 'OFF' test. Thus, during the three month test periods of Phase 1, 12 'on' and 12 'OFF' values were obtained for each screen. During the two week test periods of Phase 2, generally 6 'ON' and 6 'OFF' values were obtained for each screen. These values were then averaged to give a single average combined SCR for each screen.
>
> The practice of reporting screen process performance by a single SCR was adopted to enable the Water plcs to conveniently benchmark the performance of different screens. This approach assists in the future implementation of WIMES 5.03 (Specification for Screens for Sewage Treatment), since it is possible therein for purchasers / specifiers to enter their minimum SCR requirements in the WIMES 5.03 datasheet.
>
> To prevent overflow during the 'OFF' test, the screen may be operated for a few seconds if necessary to reduce screen curtain blinding and lower the upstream-downstream head differential.

The screen "*may be operated for a few seconds if necessary to reduce screen curtain blinding and lower the upstream-downstream head differential*" [emphasis added]. There is no consistency in this practice and no way to account for its effects. The head loss statistics suggest that the OFF test is actually very close to the continuous ON portion of the test. The report strives to assert scientific authority by reference to standards and in its formal presentation. We do not believe that this practical allowance that enables the test to keep functioning is somehow dishonest – rather it speaks to how difficult it is to design a good and practical test methodology for this kind of equipment. It is difficult to capture how screens work in the field and even more difficult to design an experiment that will provide for a reliable comparative portrait of different technologies. As the UKWir report suggests, it aims to provide treatment facilities a manner "to *conveniently benchmark* the performance of different screens" [emphasis added]. Convenient, summary benchmarks although elegant and synoptic can be misleading when seen in isolation and applied without consideration for the different ways that technologies achieve their performance targets. In our view, the aggregate experience of many operators over the long term and across different facilities provides the required context.

- Water Content, Mass Balance Calculations, Material Characterization & Non-linear Capture Rate of Copa-Sacs: The method outlined in the UKWir report includes the weighing of screenings debris captured by the respective screen. The tray at the discharge of the screen is allowed to "drip dry" for 30 minutes and is subsequently weighed as a means of indicating how much the screen captures – the heavier the material after 30 minutes, the better the calculated capture rate will be.

> The screenings load removed from the sewage flow by the screen (Y) is obtained by inserting a collection tray below the screen discharge. This is made from 3mm diameter perforated plate to permit drainage of excess liquid.

Perforated plate screens, however, add wash water at their discharge as part of the filter belt cleaning approach and thus tend to produce wet screenings at outlet. Step screens do not use wash water and allow the screenings to drip dry in advance of the discharge, delivering comparatively dry screenings. It is reasonable to expect that this

design difference would tend to increase the perceived capture rate for screens that use wash water. The exact impact of this variance is not known. It is clear, however, that a seemingly equanimous methodology can risk producing unbalanced results when testing different technologies.

Indeed, the nature of the captured material should be better characterized / understood. The actual percentage of water content is not known or accounted for in a drip dry test. The material composition of the captured material is also not studied.

Moreover, as a static screen with 4-6 mm openings (2 photos inserted below for reference), the CopaSacs will not capture material in a linear manner. The mesh bag would capture finer screenings the longer it is in the flow since its openings become progressively more matted with screenings. At some point on this timeline the capture of material would diminish and eventually stop as the bag no longer would be able to pass influent due to a high level of blinding. Given this variability, one can wonder what kind of debris SCR describes. For instance: What size of material is being captured? How much of the captured material is an organic material that should be passed to the downstream process for treatment? How much are inorganics that should be removed?

In fact, the UKWir report's approach to material characterization remains "visual" – not empirical.

> For both methods it is important to understand that the Copasacs do not collect all the screenings passing through or over the screen, therefore, the true SCR of the screen may be slightly less than the value calculated. The SCR, therefore, does not give an indication of the retention of "6 mm" solids, although visual inspection of the screenings collecting equipment indicates that almost all '6 mm' solids are removed by the screen. Notwithstanding this limitation, the calculated SCR is a useful comparator of the process performance of different screens.

- Sample Photographs of the CopaSacs used in testing

Copasac taken from our stock with an 8.5x11 paper sheet inside to suggest scale

- Note: There are other aspects to be considered. We would be keen to discuss further.

ii. Listing of the a) Separation Efficiency, b) Mechanical / Maintenance record, & c) Ease of Use / Hygienic Work Environment Advantages of Claro Fine Step Screening Equipment

Part A. Separation Efficiency/Reliability:

.1 Comparable to significantly finer aperture separation: a 6 mm or 3 mm aperture screen in conjunction with screening filter mat at the flows indicated delivers excellent separation. The screen captures hair and other debris that often causes problems with downstream equipment. We have solved pump clogging issues (i.e. elimination of hair & rags that necessitate repeated pump disassembly and cleaning), channel and tank debris accumulation (solved aerated tank & digester tank debris accumulation), and other perennial problems related to poor screening. We encourage the evaluation committee to contact our contact references regarding separation performance as evinced by the cleanliness of downstream processes and pumps. We also include an expanded Canadian installation contact reference list. We would be very pleased to help organize virtual facility tours as part of the RFP evaluation process.

.2 No screenings carry-over: The proposed screen-in-tank design provides no opportunity for captured screenings to by-pass the screen. With no cleaning brushes to adjust and no rotating filter belt that reenters the downstream flow, there is no possibility of screenings carry-over to the downstream side of the channel/pipe. Also, there are no bottom brushes or seals or side seals that are used to close the gap between a rotating belt of perforated plates and a perforated plate screen frame. Thus, a step screen's separation efficiency will stay constant over the course of its operational life. Separation efficiency will not fluctuate based on the state and adjustment of wearable parts such as other designs' cleaning brushes or filter belt seals.

.3 Self-cleaning & effective with greasy influents: A self-cleaning screen that does not use brushes, deadplates, or scrapers. The fine step screen's moveable lamellae bars move through the apertures of the bar screen with every rotation and thus clean the apertures of grease and other debris. This self-cleaning function ensures that the screen does not get blinded by even the greasiest influents as demonstrated by our Canadian bacon/abbatoir screening applications (1 mm aperture screen in stainless steel tank; review of film available via Claro's films web site). This accommodation of especially greasy influents also makes the Claro step screen well suited for the acceptance of FOG (e.g. into anaerobic digesters) and for septage screening (please see septage screening films available on Claro films web site).

1mm Screen Removing Bacon Processing Grease Without Hot Water Spray Addition

• Continued following page →

Part B. Mechanical/maintenance record:

.4 Extremely low wear-&-tear operation: The screenings filter mat control philosophy means that the screen is at rest most of the time. Typical operation is 10 to 30 minutes per 24 hour cycle. This significantly reduces mechanical wear-&-tear, as well as wash water and electricity resource use. The screen(s), conveyor (s), & wash press compactor(s) function intermittently and only when there is screenings material to treat rather than continuously. We sell almost no spare parts other than spare hygienic bags for the hygienic bagger. We base our business on references and new applications.

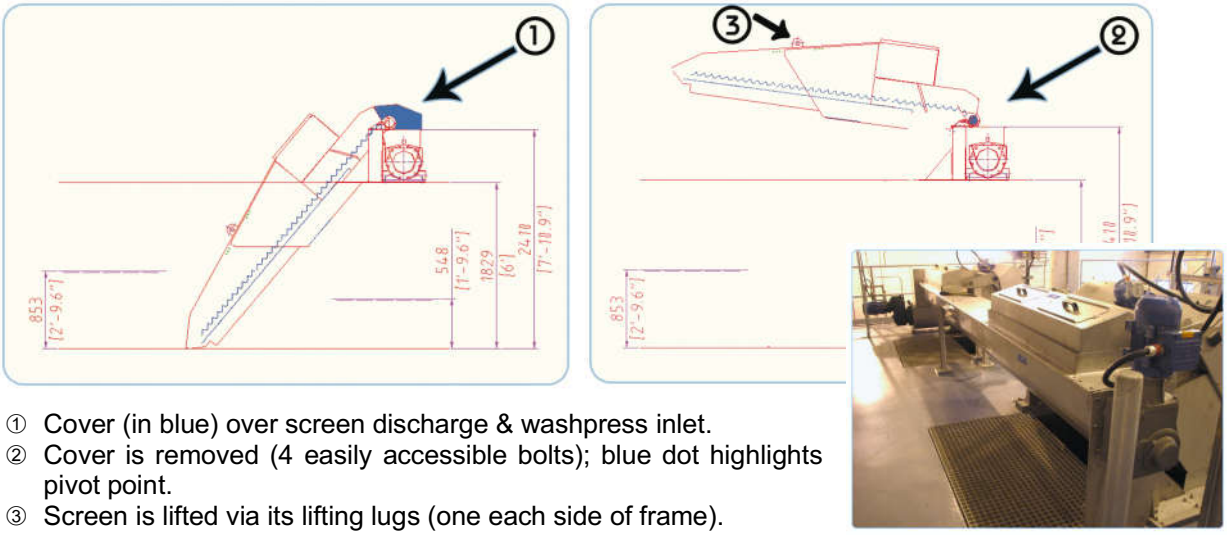
The controls are designed for the monitoring & optimization of every element of the screen's & wash press compactor's operation—screen operation and wash press wash water application, washing times, compaction & dewatering times, etc.

.5 Easy and safe operator access to all components: Screen pivots out of channel or out of tank to workbench level for ease of inspection and maintenance attention. All components are accessible from the screening room floor without the use of ladders or access structures. All components, such as the motor, are a maximum of approx. 1 to 1.5 m above the screening room floor. Other than the pivoting of the cover over the screen discharge (2 x 13 mm bolts; ratchet provided), there is no disassembly or movement of any downstream equipment required. Due to the support design, the discharge of the screen lifts up when the screen is pivoted, which avoids conflict with downstream elements. All inspection and maintenance can be effected from the regular floor level. Platforms, ladders and/or closed space entry into the channel are not required.

Asbestos WWTP, QC

• Continued following page →

Here is an Acad drawing that illustrates the nature of the screen pivot out of a channel



① Cover (in blue) over screen discharge & washpress inlet.
② Cover is removed (4 easily accessible bolts); blue dot highlights pivot point.
③ Screen is lifted via its lifting lugs (one each side of frame).

.6 The screen & wash press compactor require very little maintenance attention other than periodic cleaning and checking for grit deposition in the channel. Please feel free to contact our installation references for a review of the equipment's maintenance performance record. Replacement of spare parts is largely limited to the high-load sleeve bushings on the screen (typical life cycle of 5 to 6 years depending on the application) and the wear bars on the wash press (6 to 9 years depending on the application) and the spiral (8 – 15 years).

.7 The all-bolt-on construction of the screen makes disassembly or changing spare parts quick and straight-forward.

.8 All stainless steel construction (AISI 304L or AISI 316L)

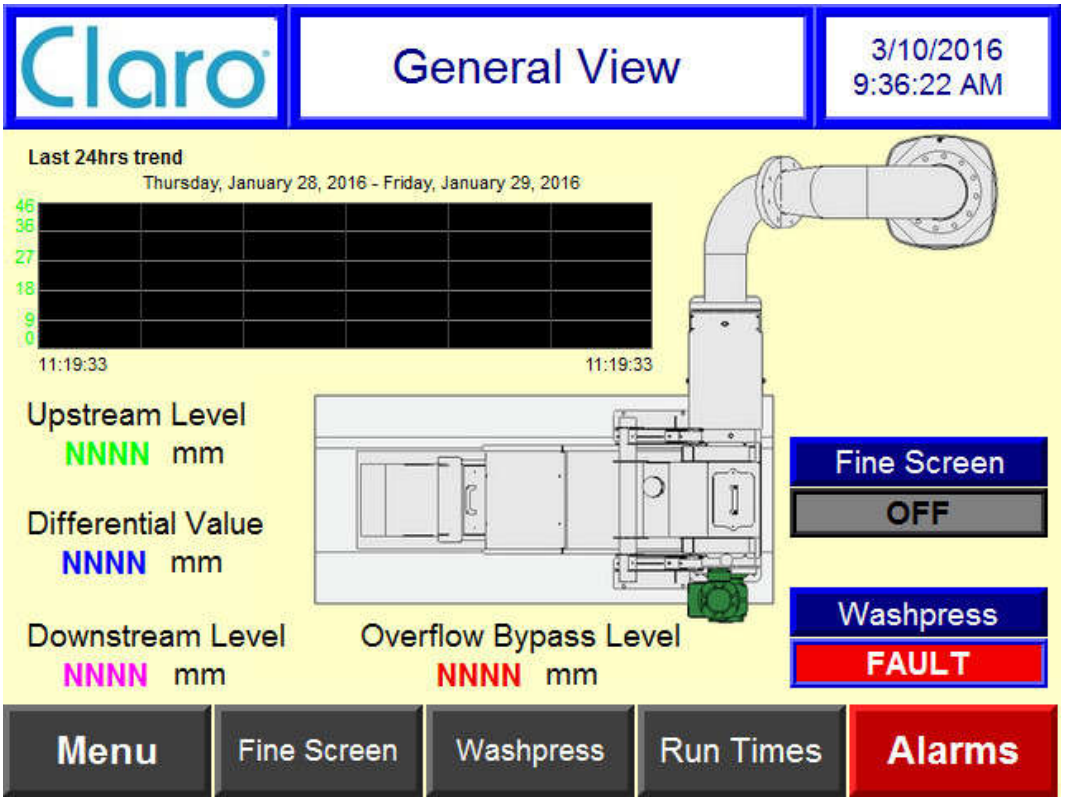
.9 No maintenance-prone chains, sprockets, tensioners, or belts. No brushes to clean, adjust or replace. Unlike multiple rake screens, the step screen drive system is on the clean side of the screen and is elevated off the bottom of the channel and is thus not exposed to maintained grit abrasion. Unlike spiral conveyor-type screens, step screens do not experience plugging at their discharge & do not use brushes.

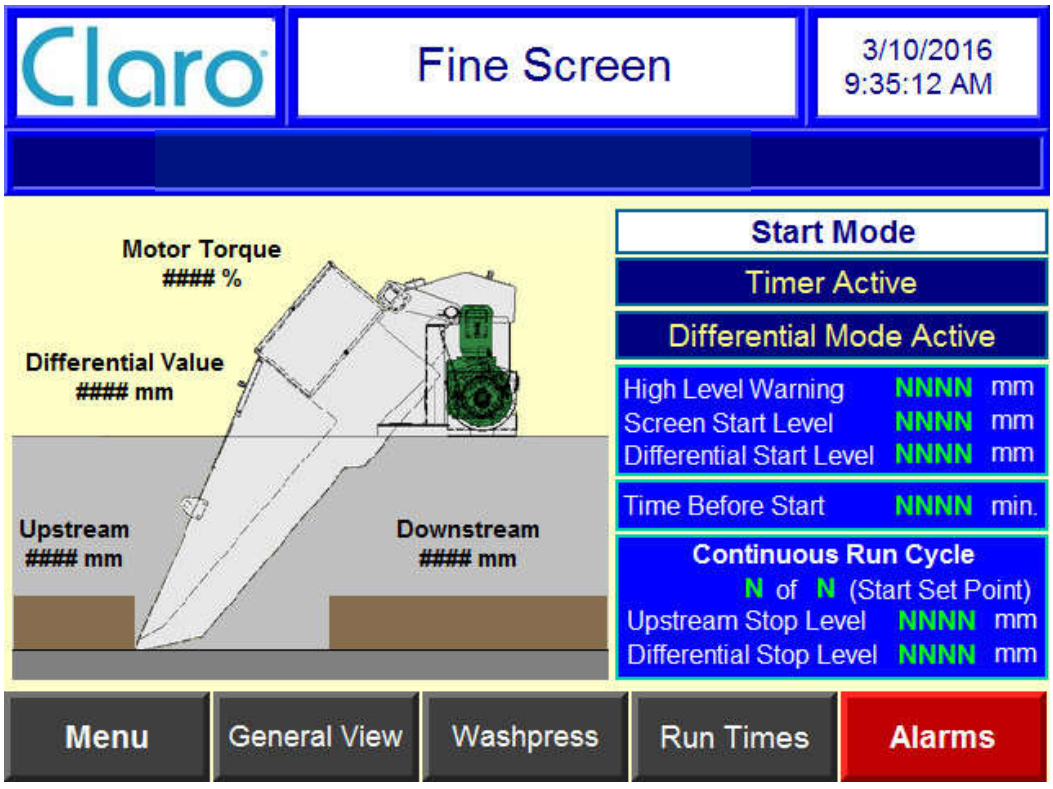
.10 The curved 1:1 ratio rise-to-run design of the lamellae steps enable the screen to pick-up large debris. The design also avoids screenings roll-back into the channel which can be seen with earlier generation step screens and perforated plate screening units.

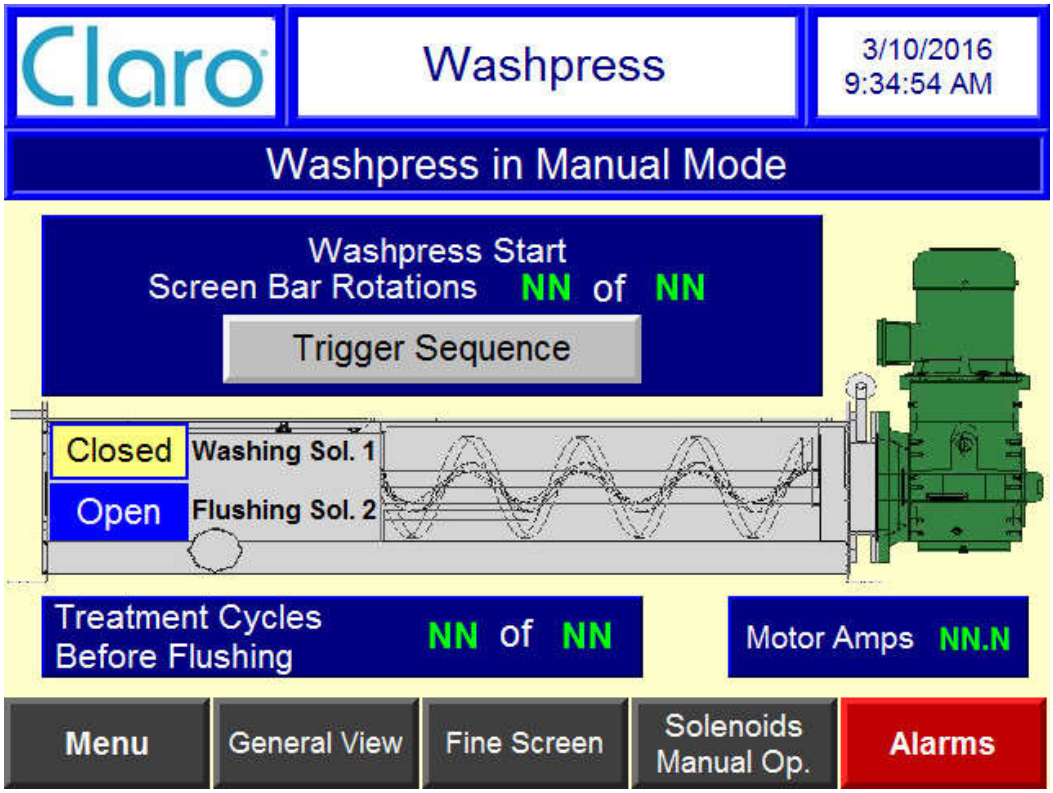
Part C. Ease of use/hygienic work environment:

.11 Diagnostics/monitoring/ease of use: The controls programming & HMI design provides an easy-to-use intuitive graphic interface that provides a real-time overview of the system's operation: e.g. stage of operational sequence (mode), all setpoints, real-time value as the system approaches a current timer setpoint, real-time influent level & start-level setpoint, real-time motor amperage reading, solenoid on/off status, record of alarm conditions etc. All setpoint & real time values are available to Scada. The HMI includes a trends & a runtimes/treatment cycles log. This data is read by Scada and can be compared to other plant operational values at the Scada level. Solenoids and other elements can be operated in manual from the HMI. Here is a fine screen status screen from an Allen Bradley PanelView Plus colour HMI screen (please see below & complete sample screen shots provided as part of this proposal package):

- **Sample HMI Screen Shots from Sample WWTP**







.12 Hygienic operator work environment & standard odor-control venting: The screening equipment provides a hygienic operator work environment with no screening debris or splash on the floor. The system looks like an industrial kitchen for its entire service life. The system is also enclosed with no special additional odor-control enclosure required. Odor-venting connections are a standard feature on the screen and require only a -25mm WC draw. Please see bookmarked PDF brochure showing sample installations.

• Please also see installation requirements outline included in this pre-selection proposal.

• •

Part D. 'Screenings Filter Mat' Operation—Description/Overview

Claro fine screen & wash press systems function intermittently – only when screenings are present for extraction from the bar screen or for transport, washing, dewatering and compaction by the wash press compactor. Intermittent operation reflects a "screenings filter mat" operational philosophy, which is defined immediately below.

- 'Screenings Filter Mat' Operation (please also see Claro Fine Step Screens Features Overview Film for visual illustration of the filter mat principle; review available via Claro films web site)

i. Screenings filter-mat' operation of Claro screening equipment maximizes screenings separation and minimizes mechanical wear and tear since it enables the screen to run only when necessary as opposed to continuously.

ii. As screenings are allowed to accumulate into a "screenings filter mat" on the fine screen's lamella bars, the water level rises in front of the bar screen. This filter mat enables the extraction of fine debris such as hair and grit.

iii. Upon reaching a preset water level in front of the screen, the fine screen's moveable lamella bars assembly will automatically run one or more rotations as needed. This rotation of the screen's steps will transport the screenings mat retained on the lamellas upward toward the screen's discharge/wash press inlet where they are received by the wash press unit for treatment.

The single or multiple rotations of the moving bars shifts the entire screenings mat up the bar screen and frees the bottom step(s) from screenings. The water level falls until the mat is reconstituted on these lower steps and the cycle begins again.

- Fig. 1: 'Screenings Filter Mat' on bar screen—separation comparable to finer aperture screens. Please see provided films web site for further illustration..

iv. Conveyor (if used) and wash press unit runs when filled > 50% - not continuously in order to maximize life cycle of spiral. Screenings wash cycle of the wash press is triggered once screenings enter wash press zone. Screenings feed cycle and timed washing operation will be adjusted in field by Claro technician to maximize operational efficiency.

- By working symbiotically with the screenings caught on the bar screen, our 6 mm bar aperture screen achieves separation comparable to a significantly finer aperture screen. 3mm screens (or less) provide an even finer separation. Although Claro screens can function continuously or on a timer, they deliver these exceptional separation efficiencies when the screenings mat functions as an augmented debris-catching filter. Flow capacities and differentials are based on an extensive library of in-field and shop performance tests and their resultant flow curves. Finer aperture step screens are also available: 2 mm, 1 mm & 0.5 mm. These units, however, tend to be used in industrial applications (e.g. protection of no-suspended solids anaerobic digesters (e.g. Biothane), reduction of extreme grease loading of DAF systems (e.g. Food industry bacon/chicken preparation), protection of membrane systems (various OEM manufacturers) & other applications.
- Note—Channel Overflow Protection: The speed of bar rotation, controls design, and fail-safe sizing of the screen for more than peak flow conditions (including spring leaf influx) protects against channel overflow.

claroglobal.com

iii. Claro Fine Step Screen (3rd-Generation Design) – Brief Summary of Distinguishing Design Features/Advantages Compared to Earlier Generation Step Screen Designs

The Claro step screen is a 3rd generation design that is informed by over 35 years of design and implementation experience by the original inventor of the step screen concept. The Claro unit incorporates all of the mechanical and controls features outlined below. We would be pleased to provide additional information, photographic/video illustration, operator references, and/or a full technical presentation.

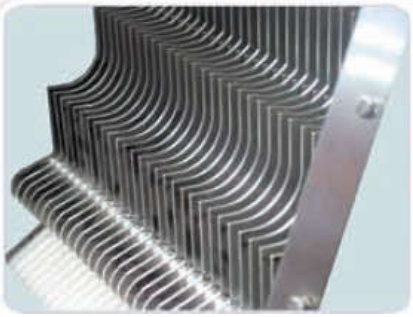
1. **Bottom Deflector Plate Design**: Enables the Claro step screen to properly interface with grit deposition on the channel bottom without damage, wear or screen jamming. This patented feature marks a signal departure from earlier designs. Earlier generations of the step screen have plastic or other material end-shoe spacers at the base of the screen that risk jamming and damage due to grit abrasion/deposition. Some earlier screens also have flexible lamellae that enable grit/debris to pass through the base of the unit as a means of preventing jamming issues – a counterintuitive solution that protects the screen rather than downstream process equipment. Other units also can implement jets and/or channel notches as a means of addressing grit; these approaches carry a risk of failure and needlessly imply additional equipment and/or formwork.

2. **Linkage Drive System**: The linkage drive system eliminates chain/belt, sprocket and tensioner drive systems that require chain maintenance and risk major screen damage if a chain breaks or skips a cog. The Claro linkage drive system eliminates this risk, requires no greasing or other maintenance attention other than yearly inspection. Replacement of sleeve bushings is typically 5-6 years after start-up on a PM basis – typically no maintenance for the first 5 years at a minimum.

screening grit removal Claro

• Continued next page →

3. **Curved Step Design & 1:1 Ratio Rise-to-Run Steps**: A curved step enables the Claro step screen to better cradle larger and softer debris up towards its discharge. Earlier generation step screens have tall steps with a short horizontal run. This design necessitates that the screen be installed at a lower installation angle and also risks screenings debris 'roll-back' into the channel. Roll-back can create a 'screenings log' that eventually blocks the channel with a mass of rolled screenings material. The Claro step screen has had no incidences of roll-back due to its curved step configuration and to its 1:1 ratio rise-to-run proportions.



There is an earlier step screen design that incorporates very small steps at its base that are made progressively larger towards the screen discharge. This small step design eliminates plastic end shoes, however, it also renders the lower section of the screen ineffective at cleaning itself of captured screenings – the lower half of the screen is effectively blinded. These screens are especially not appropriate for channels of 2 m depth or less.

There is a vertical design step screen that is installed at approx. 70 degrees with a hook-like step design. This design needlessly increases the risk of screenings roll-back into the channel.

The Claro screen also has all-stainless steel lamellae bars rather than incorporating plastic lamellae. Its lamellae are also 3 mm thick minimum rather than 2 mm thick as seen in other designs in order to protect against deflection.

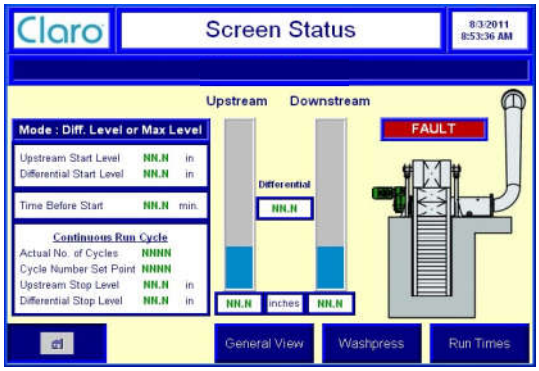
4. **All Stainless Steel Discharge In Lieu of Plastic Spacers @ Discharge:** The all-stainless steel 'finger' design discharge of the Claro step screen enables the screen to effectively deliver screenings into the inlet of downstream transport and/or treatment equipment without hang-up or winding. Earlier designs have plastic shoe spacers at the discharge that typically require operators to periodically clean the discharge of stringy and other material. We would be happy to illustrate the stainless steel 'finger' design with on-line video.

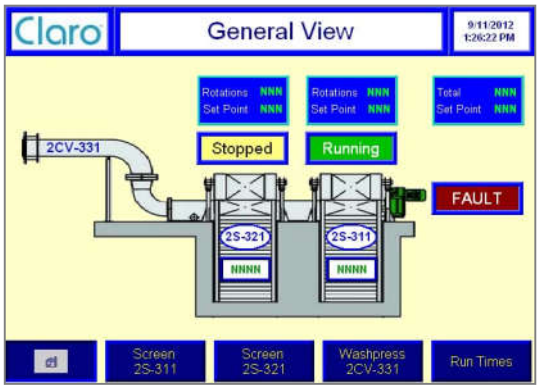
5. **Support System Enables No Disassembly of Downstream Equipment**: The Claro step screen incorporates a support design that includes a forward arm section that enables the screen discharge to travel higher when the screen is pivoted out of channel. Earlier designs tend to have a simple hinge-like design that has the discharge travel down towards the inlet of the downstream equipment when the screen is pivoted out of channel. This means that earlier designs require the disassembly of chutes & the movement of downstream equipment, which adds significant time to inspection activities & tends to dissuade operators from effecting maintenance inspections due to the extra time required.

6. **Protective Motor Compartment:** motor, gear drive, drive shaft & proximity switch protected from dust & screenings debris due to an enclosed motor compartment design with hinged door and/or easy-to-remove covers.

7. **Miscellaneous Mechanical Features:** Various state-of-the-art details that preclude screenings accumulation and other maintenance hazards/annoyances. Like the more palpable mechanical features outlined above, these detail design aspects are the product of over 35 years of uninterrupted design & applications experience by the designer and inventor of the step screen concept.

8. **Controls Features:** Control panel programming incorporates a range of fail-safe and precautionary automated features that enable full flexibility of control for minimization of operation time and optimization of energy and wash-water use. Every element of the system can be adjusted for best adaptation to actual application conditions. Program incorporates sub-routines that enable automatic fail-safe features to address larger-than-specified flows and debris loading and other scenarios such as level sensor fault. The HMI touch screen interface reflects an elegant intuitive visual design based on project drawings that graphically & numerically represents the real-time values for upstream liquid level, the real-time motor(s) amperage readings, all the respective set points, and the current stage in the operational sequence for each piece of equipment.





• • •

iv. Operation & Maintenance Requirements

- **Information provided in this section aims to allow the Owner and Engineer to assess the installation requirements as well as the ongoing operation and maintenance requirements for the screening equipment. We provide the following information:**

Description of the installation requirements, including number of person hours that are expected for the assistance during installation, start-up and commissioning, as well as any special requirements for this work. An outline of the requirements for the General Contractor to make the system work as intended.

i. Description of Commissioning Procedures

.1 In addition to a written installation instruction package, an experienced Claro technician will advise on/inspect the installation. While the mechanical install is inspected & finalized, a Claro controls technician verifies the control panel & electrical installation. Once the basic install is approved, the two technicians run thorough a 60 item checklist that covers the setting of transmitters, calibration of level sensors, & the testing of all elements of the control logic. Once the system has been verified, the controls technician ensures that the SCADA ethernet connection is functioning & that the SCADA contractor is able to communicate all desired exchange table data points, which have been provided prior to SCADA design & start-up.

A wet start-up follows with the introduction of influent flow. The Claro technician surveys the system for minimum one full day cycle in order to verify and adjust the response of the screening equipment. Controls settings adjustments aim to optimize operation by reducing operation times & resource use to a minimum while ensuring high removal efficiency and thorough washing treatment of the screenings. The control panel provides flexibility and real-time value reporting that enables this process of optimization. Claro follows up with the responsible operator(s) regarding the performance of the system over the following months. The Claro technician takes photographs of the HMI screens c/w set point values in order that Claro can easily guide an operator through the HMI screens to update settings by telephone, if required.

Number of commissioning days is as specified.

ii. Anticipated Maintenance Requirements, such as Periodic Inspections, Calibration, Cleaning, Servicing, & Replacement of Parts

.1 General: In addition to its separation performance, the maintenance history of the proposed system has made it a valued technology for our client operators. This performance is grounded in a thoughtful & robust design that has been refined over 35 years by the inventor of the step screen and the complementary co-evolution of the system's recommended control philosophy: the 'screenings filter mat' controls approach that augments the separation efficiency of the screen by restraining its runtimes to a minimum. The following is an overview of the recommended inspection, preventative maintenance & spare parts requirements for the system.

.2 Preventative Maintenance Inspection Schedule Outline

- The fine screen and wash press function intermittently—only when screenings have accumulated sufficiently on the bar screen to cause upstream level rise or a level differential start signal, which prompts the screen to start one moveable lamellae rack rotation. Typical runtimes range from approx. 10 - 30 minutes per 24 hours. This low wear-&-tear philosophy is generalized to the operation of downstream receiving/treatment

equipment. The wash press is cued to an adjustable number of screen moveable lamellae rack rotations, which represents a consistent volume of screenings discharged for washing and compaction treatment. Like the screen, the downstream equipment operates only when there is sufficient captured screenings material to justify mechanical movement/treatment cycle.

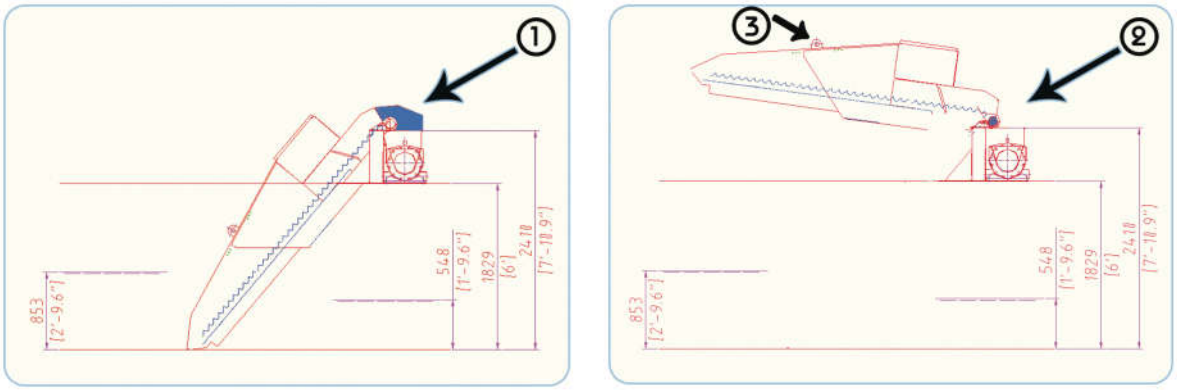
Recommended maintenance attention is comprised of:

- Typical visual & aural inspection of the equipment as part of regular rounds on an approx.. weekly basis.
- Checking for grit deposition in the channel ahead of the screen(s) & flushing this accumulation downstream (schedule to be determined based on specific plant experience; typically once every 12 to 16 weeks; 15 - 20 minutes depending on the type of lift system & the application). Grit flushing is achieved by pivoting the screen off the bottom of the channel/tank bottom with its lifting lugs and agitating grit with a rake or by closing the upstream gate/valve and flushing the material downstream just beyond the screen with a plant water hose. All fine screens would benefit from this precautionary routine.
- When the screen is pivoted out of the channel/tank for grit flushing, the linkage system Allen key bolts, which are secured with Loctite, can be visually inspected for tightness.
- Change of automatic greaser on wash press once a year once grease is depleted from see-through cartridge.
- Check wash press wear bars/spiral on yearly basis.
- Once a year, pivot of screen out of channel to inspect linkage system including bushings and general walk around inspection. Screen can be run in pivoted position to aid in inspection. Claro will suggest how to recognize a healthy linkage drive system.
- Every 5 to 6 years change of drive system sleeve bushings on a precautionary basis or due to observed wear. Often the bushings, however, can last 9 years.
- Note: Claro follows up with operators periodically to see how the system is functioning and in order to review/prompt maintenance inspection practice.

Wash Press Automatic Greaser Cartridge

- Note on gear drive oil: given the low runtimes & type of low impact, non-continuous service, the manufacturer's recommended oil change interval (e.g. 10,000+ hours for intermittent use) will take many years to reach for the screen & wash press. Operator can check the gear drive seals on a yearly basis.

Pivoting the screen out of channel: Inspection & maintenance access is facilitated by the screen's ability to easily pivot out of channel to work-bench level with a chain block-type lift as represented in the photo at right. All screen components are accessible from the screening room floor—no entry into channel/tank nor ladders or access platforms required. Also, this pivot does not require the movement of the corresponding wash press compactor. Here are 2 Acad thumbnail drawings of a screen pivoted out of channel & point form instructions outlining how to pivot the screen:



① Cover (in blue) over screen discharge & washpress inlet.
② Cover is removed (2 easily accessible bolts); blue dot highlights pivot point.
③ Screen is lifted via its lifting lugs (one each side of frame).

- Photo (right): removable cover with inspection lids & pivot point of 2nd screen circled.
- A similar approach is followed for in-tank & single screen & wash press units.

iii. <u>Component/Wearable Parts Typical Life Cycle & Recommended Spare Parts</u>

.1 <u>General</u>; All mechanical screening equipment will require spare parts at some point in its operational life. The Claro fine step screen, however, has an exceptionally low maintenance burden. Below we provide a preventative maintenance schedule that is based on experience.

.2 Stainless Steel Lamellae:
- lasts the life of the screen;
- replacement: almost never; for taller screens, the lamellae are modular which means that if a replacement is required only the lower segment would be replaced. In earlier generation fine step screens, the lamellae sometimes suffered from grit abrasion due to the presence of end-shoes at the base of the screen. The patented deflector plate eliminates end-shoes and the screen's susceptibility to grit near the channel bottom. Also, since there is no chain and sprocket drive (where a chain can break or skip a cog), there is no possibility of screen distortion on the Claro step screen.

.3 High Load Sleeve Bushings (Main Wear Part):
- We recommend that 80% of screens have a preventative maintenance replacement every approx. 5- years. Bushings, however, typically last longer and can be tracked for wear before replacement e.g. 6 to 9 years. The cost and time commitment for a bushings change, however, is quite small.
- These bushings can be changed in 5 - 6 hours total (pivot screen, unbolt linkage system, replace bushings, reassemble bolt-on linkage). We provide a film that illustrates the step-by-step procedure.

- We provide seminars on how to maintain the screens including bushing replacement. A Claro or Pro Aqua representative can guide operators through a bushings replacement or complete the change for operators.

.4 Wear Bars for Wash Press:
- Recommended preventative maintenance schedule would call for a replacement every 4 to 8 years; wear is dependent on the amount of grit/rocks in the influent. Wear bars are checked once a year since wear is very incremental. We have changed very few wear bar sets over the last 15 years.

.5 Wash Press Spiral & Mounting Parts:
- Precautionary maintenance schedule would call for a replacement every 8 to 15 years. We have, however, changed only two spirals since 2006. Since wear is very incremental, it is easy to assess wear and plan for a change only when the life of the spiral is actually coming to a close. The spiral is checked once a year.

.6 Wash Press Automatic Greaser Cartridge:
- The automatic greaser cartridge is changed once per year. We recommend stocking 2 years worth of spares max.

.7 Hygienic Bag Magazine Cartridges:
- A bagger is integrated onto the screenings wash press discharge/compaction tube. Operators tend to like the added isolation from screenings and their odour. The hygienic bag sequesters the material. Claro shows operators how to tie a used portion of bag and start a new section without opening the bag.
- 90 m. long bag ties off like a sausage once the respective bin is full. A cover on the screenings bin is not required during operation.
- Frequency of bag use is determined by monitoring bag use over the first 6 months of operation.

There are also:

.8 Four (4) sealed grease-filled bearings at the top of the screen linkage system:
- Lasts for life of screen in nearly all cases. We have not changed a bearing in the last 15 years.

•

iv. List of Spare Parts for 10 Years of Operation (Conservative PM Basis)

.1 List of spare parts for 10+ years of operation as per RFP requirements described above. Please see spare parts costing section in Section 3, Part A, Item ii, (immediately following the itemized scope of supply). Typically, no spare parts required for the first 5 years.

•

v. Support Services Provided by the Supplier.

.1 Here is a point-form listing of the support services provided for installation, start-up, and follow-up:

- Complete technical submittal as specified including design & installation tips checklist.
- Timely support/technical advice, including (virtual) office meeting(s) with consultant on request, during the pre- &/or post-selection design phase of the project if required.
- Coordination of delivery with installing contractor including offloading instructions.
- Complete installation instructions/tips check list, & prestart-up checklist.

- A Claro start-up technician, typically Peter Lipert Jr., and the designer and programmer of the subject control panel, typically Claude Samson or Sebastien Ouellet (Franklin Empire), will be on site to verify the mechanical and controls installation. Having both technicians offers flexibility and assurance that the start-up will proceed well. For instance, programming updates can be effected on site if, for instance, the SCADA integrator needs an extra requirement or if operators would like an extra feature added to the HMI. SCADA connectivity is verified/tested. All controls narrative sequences are re-tested. The system is then observed for a minimum of one day after influent is introduced in order to optimize settings to reduce runtimes, wash water use, power consumption & to increase life of wearable parts.
- Complete operations and maintenance requirements training review in a classroom setting & in the field c/w video, slides and practical review of the installed treatment system.
- After start-up Claro technician follows up with operators in order to ensure that system is running well. A 24-hour phone line is available for operations questions/comments. Note: if no immediate pick-up, operators are asked to leave a message for call back within 30 minutes. Claro technician has a photograph of each HMI screen with latest settings so that an operator can be guided though a setting change by phone, if requested.
- Periodic follow-up with operators.
- If a VPN connection is provided by the SCADA designer, Claro can support the control panel and operators from Montreal with immediate login. Access to be controlled by operators.

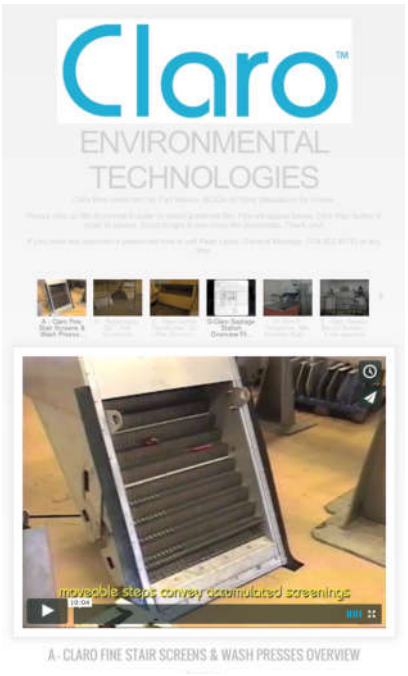
v. Operation Costs Overview – Electrical & Spares

Ingleside, ON: Fine Step Screening System - Estimated Spares, Man Hours, & Electrical Costs (Summary)

Equipment / Daily Operation Time	kW for Individual Equipment System	Hrs/day Operation Max.	Total kW-H/year	Parts cost, replacement frequency, MH/replacement	x kW/hour electrical cost: 0.12 CAD (estimated)	Electrical Cost Currency
Fine Screen 01: Fine Screen motor x 1 (30 minutes per day worst case scenario)	0.75 kW	0.5	136.88	Bushings PM basis once every 5 - 6 years but up to 10 years also possible as described in this proposal; 2000 CAD + some deflector plate springs + interspacers (perhaps 100 CAD every 2 years max.); Man-Hours: 6 hours for bushing replacement; 45 minutes for springs + spacers, which are non-critical items (perhaps install during yearly inspection every 2 years if required) + Agitating/clearing of grit from bottom of channel once every 3 - 4 months (25 minutes)	16.43	CAD total per year
Fine Screen 02: Fine Screen motor x 1 (30 minutes per day worst case scenario)	0.75 kW	0.5	136.88	Bushings PM basis once every 5 - 6 years but up to 9 years also possible as described in this proposal; 2000 CAD + some deflector plate springs + interspacers (perhaps 200 CAD every 2 years max.); Man-Hours: 6 hours for bushing replacement; 45 minutes for springs + spacers, which are non-critical items (perhaps install during yearly inspection every 2 years if required) + Agitating/clearing of grit from bottom of channel once every 3 months (25 minutes)	16.43	CAD total per year
Wash Press (40 minutes per day worst case scenario)	1.5 kW	0.666667	365.00	In the Ingleside application, we expect wear bar replacement every approx. 6-9 years; Spiral approx. 8-15 years; Wear bars are approx 600 CAD; Spiral, drive shaft + bearing & seals are approx. 5700 CAD . Man-Hours: 2 hours for wear bars; 4 hours for spiral approx. Also, 1 automatic greaser per year (95 CAD)	43.80	CAD total per year
					60.23	**Electrical Cost per Year**

• Note: Motor efficiency of approx. 85-90% not taken into account in this calculation.

vi. Claro Screening Films Website – Ingleside, ON



We have prepared a special website that provides viewing access to selected films that pertain to the Ingleside application. Included films provide an overview of the screening system and review of individual applications. Of most relevance is the Claro fine step screens & wash presses overview film, which provides an overview of the mechanical characteristics and operational philosophy of the system (other films showing project installations are also provided).

Link & Login information:

Here is the Claro fine screens film link:
https://vimeopro.com/user10768107/ingleside-on-evb

This link brings you to a web site that will first ask you for a case sensitive password, which is: "ClaroFilms". This film viewing site and password are exclusive to the Ingleside project.

The films & presentations are represented by thumbnails. Once the thumbnail is selected, the corresponding video appears just beneath. Click the play button and the selected film/presentation will start. If the site gives you any difficulty, please feel free to let Claro know (Peter Lipert Jr.; 514.562.4575; pjr@claroglobal.com). We would be glad to help. Also, if there are any follow-up comments or questions regarding the content of the films, Claro will be glad to field them.

Note: selected films do not have sound.

3. Technical Proposal (Continued)

C. Materials of Construction

.1 Step screen is constructed of the following materials:

• Frame assembly	5 mm AISI type 316L stainless steel
• Bars (lamellas) fixed and movable	3 mm AISI type 316L stainless steel
• Support leg	3 mm AISI type 316L stainless steel
• Screen deflector plate	3 mm AISI type 316L stainless steel
• Inspection lids	1.5 mm AISI type 316L stainless steel
• Discharge chute	1.5 mm AISI type 316L stainless steel
• Side seals	Neoprene rubber
• Lamella spacers	UHMW plastic
• Top sealed bearings	Double row high load bearings; sealed (no greasing required)
• Slide bearings:	High Load PTFE (Teflone self-lubricating)
• Drive shaft:	Carbon shafting steel; bearing housing in cast iron

.2 Wash Press is constructed of the following materials:

• Inner & Outer Trough	5 mm AISI type 316L stainless steel
• Discharge/Compaction Tube	2 mm AISI type 316L stainless steel; progressively flared
• Spiral	AISI type 316L stainless steel or special abrasion-resistant micro alloy steel as preferred; 220-250 Brinell Hardness

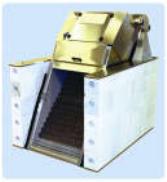
3. Technical Proposal (Continued)

D. Work (Install & Supply) to Be Completed by the Installing Contractor

Contractor Installation Requirements Outline

Introduction: The following is an outline of the installation requirements for the Claro fine screening system equipment proposed for the Ingleside application. Complete & final instructions will be issued before delivery of the fine screening system equipment. A Claro representative will be on site to provide final installation advice and check the installation. Start-up services include an experienced Claro technician & an experienced control technician to ensure proper integration with SCADA and smooth start-up.

.1 Installation of Mechanical Equipment – Outline:



- The fine screen has two supports - one to each side of the screen. Each support column is anchored to the screening room floor slab with 3 bolts for each support. Vertical supports are installed flush with the opening of the channel.

  The screen is positioned in order to enable a pivot of the screen out of channel for maintenance inspection without entry into the channel.

  Final adjustments to these supports can be made at the top of the supports by adding provided shims to achieve required height above the channel invert and to enable the placement of the wash press. Claro on-site installation inspection/assistance will ensure proper alignment, plumbness etc. The screen arrives with the gear drive preinstalled and filled with oil as required. Class 1, Div. I motor to be bolted on site – stainless steel bolts & key provided by Claro.

  The screen's neoprene side channel seals will mate with the inner surface of the channels' vertical walls in order to prevent by-pass of influent. No channel indentation or embedded steel/frame is required for the proposed screen. The channel, however, should to be straight and true (not a parallelogram or bowed walls). The bottom of the channel must also be level & straight.
- Each screen has 4 lifting lugs for a controlled 4-point lift during installation: 2 on the forward area of its frame & 2 located in the motor compartment (motor compartment panels should be removed for access to these lifting lugs) or the support system's structural cross-member can be used as a lifting point.
- Screen-to-wash press chute covers c/w operator-safe removable inspection lids are shipped loose for bolting on to the screens on site (2 retaining bolts).

- The wash press arrives with the gear drive preinstalled & filled with oil as required. Class 1, Div. I motor to be bolted on site – stainless steel bolts & key provided by Claro. The wash press is bolted to the screening room floor slab and leveled with 4 bolts. The inlet hopper box is preinstalled on the wash press inlet flange. The wash press discharge tube floating flange is bolted onto the outlet flange of the wash press (with the provided gasket also installed) and the vertical support legs for the discharge tube are anchored to the screening room floor slab and bolted to the discharge tube.

- Water piping to the wash press: One (1) isolating ball valve and one (1) solenoid valve are connected to the wash press washing and flushing water connections (total of 2 isolating ball valves and 2 solenoids provided by Claro). A pressure gauge and isolating ¼" ball valve is also provided by Claro and installed by the contractor.
- Wash press drain (3" / 76 mm O.D.) can be piped from either side of the unit (a cap is provided for the opposite unused drain connection). Typically, a rubber sleeve is used to join the drain stub to a PVC drain pipe. This drain pipe can be piped downstream or upstream of the screens. The wash press is installed level with the screening room floor.
- If wash water supply is not potable (i.e. final effluent or well water), install provided ½" dia. Y-strainer upstream of the pressure gauge assembly including the provided Y-strainer mesh basket flush ball valve.

•

.2 Power Supply & Control Wiring Summary:

- General Note: All motor, instrumentation & in-field local HOA station wiring runs from the field back to the Claro main control panel since all starters and transmitters are installed inside the main control panel.

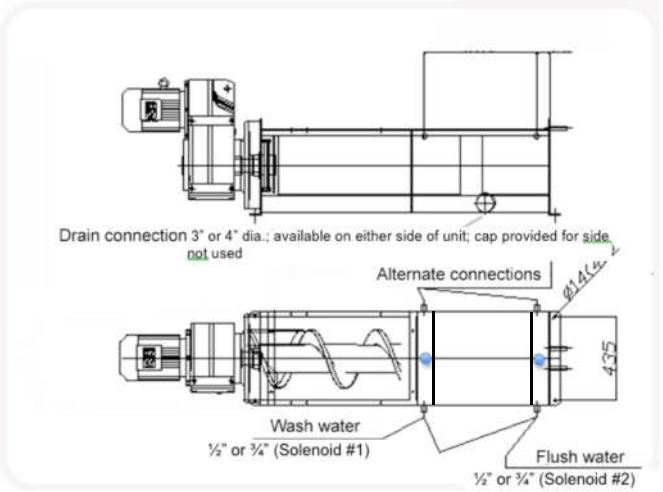
- Each screen has the following electrical elements:
  a) One (1) reversible motor (600V/60/3; Class 1, Div. 1) that has one (1) internal electrical brake for perfect lamellae alignment. The brake is also wired back to the panel in a Class 1, Div. I application;
  b) One (1) home position proximity switch (24 VDC) that tells the motor to stop for perfect lamellae bar alignment (preinstalled in the motor compartment area);
  c) Two (2) ultrasonic level detector probes (24 VDC or 120VAC) that sense liquid level upstream/downstream of the screen and start the screen's sequence of operation. Transmitter is installed inside the control panel. All set points are adjusted via the password protected HMI or via SCADA, as preferred;
  d) One (1) Flygt ENM-10, Class 1, Div. 1 float switch wired back to control panel;
  e) One (1) combination Man/Off/Auto + Forward/Off/Reverse + latchable E-Stop push button local station rated Class 1, Div. I in cast aluminum enclosure; and,
  f) One (1) local power lock-out for operator safety on control panel door.
  g) One (1) motor disconnect provided by others as specified.

- Wash press has:
  h) One (1) motor (600V/60/3; Class 1, Div. I);
  i) Two (2) solenoid valves 2 x ½", Class 1, Div. I (120VAC);
  j) One (1) combination Man/Off/Auto + Forward/Off/Reverse + latchable E-Stop push button local station rated Class 1, Div. I in cast aluminum enclosure;
  k) One (1) local power lock-out for operator safety on control panel door; and,
  l) One (1) motor disconnect provided by others as specified.

•

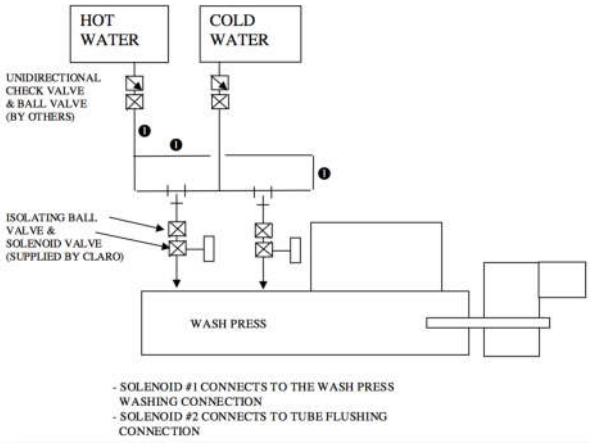
.3 Service Water Supply Requirements Summary:

General: Required water supply to the wash press is one (1) x ½" dia. supply that splits via a T to: a) a washing connection & b) a flushing connection. The supply comes from above the wash press to 2 inlet points on top of the press (as shown by the blue circles shown at right; please disregard the side connections shown since top connections are selected for the Ingleside application).



• Note: The washing & flushing connections are alternately supplied on the top of the unit as indicated by the blue circles above:

These connections are supplied with unheated water. Some applications also include an option for the selection of hot water supply during the winter months for more thorough removal of grease (selected where we have digesters and hot water is essentially free since the boilers heat with biogas). At Ingleside, hot water will not be used. The schematic below shows suggested piping for both the base unheated and heated water options. Claro supplies 2 stainless steel solenoid valves and 2 stainless steel full port ball valves. The ball valves are used to isolate the solenoids and thus are installed upstream of the solenoids. Claro also supplies a pressure gauge & corresponding stainless steel isolation ball valve. Please also see additional notes on the following page.



Note 1: For cold-water-only arrangement, eliminate the hot water supply and loop indicated with the following: ❶

Note 2: Unidirectional check-valve is optional; please refer to project drawings, client preferences, and/or local codes regarding the isolation of potable water supply from contamination zones. If plant Final Effluent (FE) is used for wash & flushing water supply, unidirectional valves are not required.

Note 3: If final plant effluent (FE) or well water is to be used in lieu of potable water, a 50 mesh minimum filter must be used in order to protect the wash press spray

nozzles & to prevent fouling of the solenoid valves. Claro supplies a Y-strainer for the Ingleside application if required.

Note 4: Claro supplies a pressure gauge for the Ingleside application. The gauge is installed on the main water supply pipe before the piping branches to the 2 solenoids. The pressure gauge is isolated with a ¼" dia. ball valve also supplied by Claro.

Water Supply Specification: Water supply should be approx. 40 l/min. @ between 40 PSI to 55 PSI. The unit can function at 40 PSI, however, the optimum is typical plant pressure (55 PSIG & up to 95 PSIG). The wash press will actuate only when there is sufficient material in the inlet to justify mechanical movement. Thus, the number of actuations per day will depend on the volume of material captured by the screens & thus, in turn, by the number of discharges per day & the quantity of solids in the flow.

•

E. Fine Screening System Training Agenda (Duration: approx. 2.5 hours) – Ingleside WWTP, ON

Part 1: Mechanical Overview – Fine Screen & Wash Press

• Classroom

a. Review of Claro fine step screen & wash press features and operational philosophy film (12 minutes);
b. Review mechanical components of fine screen & wash press – power point slides;
c. Questions / comments are welcomed throughout the classroom presentation and at its conclusion;

• Duration of classroom portion is approx. 90 minutes.

• Screening Room – Walk Through & Demo of Installed Equipment

d. Re-cap of screen operational philosophy with the installed equipment used for illustration i.e. filter mat/intermittent actuation and rationale behind upstream & differential liquid level detection;
e. Demonstrate movement of lamellae in Manual Forward & Reverse modes
f. Remove cover over motor and identify home position switch, motor and gear drive arrangement;
g. Review screen discharge arrangement;
h. Demonstrate how to pivot the screen out of channel with a manual chain block after removing the protective cover over the screen discharge;
i. Review the bottom deflector plate – its function, operation, and the recommended schedule of checking for grit deposition in front of / under the screen;
j. Review other regular maintenance inspection requirements as defined in the O&M manual with the installed equipment used for illustration;
k. Review safety requirements related to the screen i.e. power lock-outs & local E-Stop;
l. Review of how the wash press is coordinated with the fine screens;
m. Re-cap the wash press's major components (motor & gear drive, inlet, washing zone, solenoids and water jets, spiral, drain, discharge tube & hygienic bagger) and the location and method of changing an automatic greaser cartridge;
n. Re-cap the controls narrative/stages of operation of the wash press i.e. feed, two washing alternatives, dewatering/compaction, and cylinder flushing;
o. Review maintenance inspection procedures with the installed equipment used for illustration;
p. Review the function of the discharge tube i.e. backpressure and motor amperage readings on the HMI;
q. Demonstrate how to install a hygienic bag magazine on the bagger unit and how to tie off the bag in a manner that isolates the operator from the screenings material;
r. Review safety requirements related to the wash press i.e. power lock-outs & local E-Stop;

Part 2: Control Panel Overview – Fine Screen & Wash Press

a. Review the major components and features of the control panel including the operation of the HMI, which can be used to control all control narrative settings, alarm settings, & transmitter settings;

b. Review of system visualization screens;
c. Review of settings input screens;
d. Review of alarm and transmitters settings input screens;
e. Review of possible alarms and their significance;
f. Review of motor starter panel internals including torque sensors, current transformers, thermal overloads, starters, etc.;

• Hand-outs: All visual materials will be presented in film & PowerPoint slide format with a reinforcement/re-cap of training items via a review of the installed equipment: fine screens, wash press, bagger & control panels including intuitively designed graphic HMI interface. Claro will bring a portable projector. Training will require a classroom with white wall or projector screen & one extension cord with two (2) x 120V outlets.

F. Brochures / Catalog Cuts: Fine Step Screens, Wash Press Compactor & Auxiliary Equipment

.1 Fine Step Screen Brochure

Claro

Screening & Grit Removal

Fine Step Screens

Claro is pleased to offer a high quality fine step screen that delivers exceptional screening capabilities, long-term reliability, and an ultra-hygienic & odor-free working environment. Removes hair & fine grit to protect downstream equipment & processes without the possibility of screenings carry-over.

A preferred separation technology in water & wastewater screening applications, the step screen's superior design is backed by over 25 years of practical design & installation experience. Hundreds of installations.

Design features & advantages

- Water & wastewater screening, septage receiving stations, & raw sludge screening applications
- Protects pumps, digester tanks, & other equipment from hair & other debris build-up
- Bar space opening / aperture: 0.5 to 6 mm (0.039" to 1/4"); discharge height up to 5 meters (16.5 ft.)
- 6 mm (1/4") screen achieves separation equivalent to a 1 mm aperture screen with use of accumulated screenings filter mat on bar screen
- **Low headloss / high flow**-through capacities / no possibility of screenings downstream carry-over
- Proven anti-overflow control even with large debris influx (e.g. spring leaves etc.)
- Self-cleaning, low-friction, anti-distortion design bar screen (no wearable brushes & no scrapers)
- Fully-enclosed, odor-controlled, ultra-hygienic operation
- **Durable**, self-lubricating linkage system with no maintenance-prone chain drives, sprockets, or belts
- Modular, bolted, all-stainless-steel construction
- Unique step design ensures effective screenings transfer
- All stainless steel discharge with no plastic discharge spacers
- Screen pivots out of channel in minutes for inspection—without moving receiving wash press compactor or conveyor
- Patented bottom deflector-plate ensures constant screening aperture throughout the whole operating cycle & eliminates plastic end-shoes / spacers
- For installation in channel or in dedicated stainless steel tank
- Very low equipment height profile—ideal for constricted headroom applications
- Equipment life especially long due to low wear-&-tear control approach—screen only operates mechanically when necessary (not continuously)
- **Increase capacity** of existing channels with screen-in-tank unit adjacent to existing installation without modification of channel
- Municipal wastewater & water headworks, industrial wastewater, pulp & paper, pharmaceutical, food processing, mining, & many more industrial applications including reject material recovery
- Complete systems for sole-supplier responsibility

Fine Step Screen (0.5 to 6 mm Bar Spacing)

Fine Step Screen, Wash Press, & Hygienic Bagger (Assomption WWTP, QC)

Fine Step Screen and Wash Press (Repentigny WWTP, QC)

Fine Step Screen and Shaftless Screenings Transfer Conveyor

.2 Wash Press Compactor Brochure

Claro

Screening & Grit Removal

Wash Press Screw Compactor

Claro is pleased to offer a high-quality wash press screw compactor for the effective washing, dewatering, compaction, & transport of screenings. Screenings are well-cleaned of organics, dry, diminished in disposal volume, & deposited into an optional hygienic bagger that automatically unfolds into receiving bin. Robust & versatile construction. Fully-enclosed & odor-controlled.

Standard capacity sizes & configurations are available to meet a broad range of application scenarios. Hundreds of installations. Screw press compactor also available without washing feature.

Wash Press Screw Compactor

Wash Press Screw Compactor (Assomption WWTP, QC)

Design features & advantages

- Effective washing with a very compact footprint
- Integrated heavy-duty thrust bearings & a high-torque drive unit to assure optimal dryness & compaction of screenings material
- Slow transportation of screenings for gentle, thorough washing without maceration
- Completely enclosed, odor-controlled hygienic operation
- Robust screw press compactor unit including double-body construction
- Tight tolerances between screw & trough delivers superior process performance
- Only one moving part: a special alloy steel spiral
- Easy access for inspection / maintenance of wash & press zone: unit easily dismantles at both front & back end
- No maintenance-prone wedgewire & no wearable brushes to replace
- Long compaction tubes up to 6 m. (20 ft.) in length for transport of screenings – can eliminate conveyor
- Optional hygienic bagger
- Complete systems for sole-supplier responsibility

Claro

.3 Hygienic Bagger Brochure

Claro

Screening & Grit Removal

Hygienic Bagger System

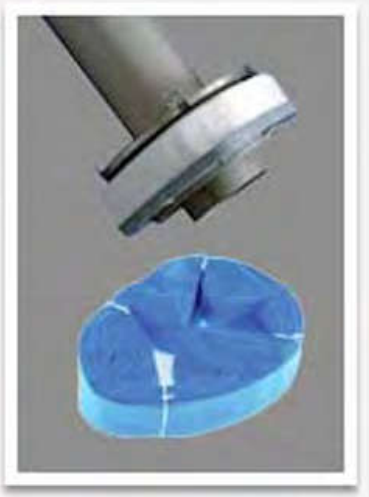
Claro provides hygienic baggers that isolate screenings or other reject materials in a continuous, tubular plastic bag that automatically unfolds into a standard receiving bin. Favored by facility operators, the bagging unit prevents contact with reject materials & promotes a hygienic, odor-controlled working environment.

Composed of a stainless steel & resilient ABS plastic dispenser and a 3-ply 90 m. (295 ft.) bag magazine cartridge, hygienic baggers are mounted at the end of wash press compactor, grit classifier, conveyor, & other discharge tubes and chutes. When the bin is filled, the bag ties off at both ends with a tie-wrap similar to a sausage—closing the filled bag & providing the new bag section with a closed bottom.

Design features & advantages

- Used for screenings, grit, & other reject materials
- Isolates operators & work environment from reject material & odors
- Bag magazines 90 m. (295 ft.)
- Automatic operation—bag unfolds/unwinds into bin under weight of bagged material
- Standard & custom dimensions available
- Mounted on wash press compactor, grit classifier, conveyor, & other discharge points
- Bag easily ties off at both ends when bin is filled & ready for disposal

Hygienic Bagger with 90 m. / 295 ft. Long Bag Magazine



Hygienic Bagger Dispenser and Bag Magazine

Claro

.4 Level Probe(s) & Transmitter – Endress + Hauser Prosonic S

Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Technical Information

Prosonic S
FDU90/91/91F/92/93/95/96

Ultrasonic sensors for non-contact continuous level and flow measurement, for connection to the transmitters FMU90 and FMU95

Application

- Continuous, non-contact level measurement of fluids, pastes, sludges and powdery to coarse bulk materials
- Flow measurement in open channels and measuring weirs
- Maximum measuring range
  - FDU90: 3 m (9.8 ft) in fluids
    1.2 m 3.9 ft) in bulk materials
  - FDU91/FDU91F: 10 m (33 ft) in fluids
    5 m (16 ft) in bulk materials
  - FDU92: 20 m (66 ft) in fluids
    10 m (33 ft) in bulk materials
  - FDU93: 25 m (82 ft) in fluids
    15 m (49 ft) in bulk materials
  - FDU95: 45 m (148 ft) in bulk materials
  - FDU96: 70 m (230 ft) in bulk materials
- Suited for explosion hazardous areas

Your benefits

- Non-contact measurement method; minimizes service requirements
- Integrated temperature sensor for time-of-flight correction. Accurate measurements are possible, even if temperature changes are present
- Hermetically welded PVDF sensors FDU91/92 for fluid measurement, for highest chemical resistance
- Integrated automatical sensor detection for transmitters FMU90, simple commissioning
- Can be installed up to 300 m (984 ft) from the transmitter
- Suited for rough ambient conditions thanks to separate installation from the transmitter
- Reduced build-up formation because of the self-cleaning effect
- Integrated heating against a build-up of ice at the sensor (optional), ensures reliable measurement
- Weather resistant and flood-proof (IP68)
- Dust-Ex and Gas-Ex certificats available (ATEX, FM, CSA)

TI00396F/00/EN/13.11
71132597

Endress+Hauser
People for Process Automation

Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Technical Information

Prosonic S FMU90

Transmitter in housing for field or top-hat rail mounting for the ultrasonic sensors FDU90/91/91F/92/93/95/96

Application for level measurement

- Continuous, non-contact level measurement of fluids, pastes, sludge and powdery to coarse bulk materials with 1 or 2 ultrasonic sensors
- Measuring range up to 70 m (depending on sensor and material measured)
- Level limit detection (up to 6 relays)
- Pump control (alternating); rake control
- Option: additional pump control functions (pump function test, ...)
- Calculations: average, difference, sum

Application for flow measurement

- Flow measurement in open channels and measuring weirs with 1 or 2 ultrasonic sensors
- Simultaneous measurement of level and flow in a stormwater overflow basin with only 1 sensor
- Flow measurement with back water detection (2 sensors) or sludge detection
- Up to 3 totalizers and 3 (resettable) counters; optionally resettable via digital inputs
- Counting or time pulse output for control of external units

Your benefits

- Simple, menu-guided operation with 6-line plain text display; 15 languages selectable
- Envelope curves on the display for quick and simple diagnosis
- Easy operation, diagnosis and measuring point documentation with the supplied "ToF-Tool - FieldTool Package" operating program.
- Option: four digital inputs (e.g. for pump feedback) and one external temperature input
- Time-of-flight correction via integrated or external temperature sensors
- Linearisation (up to 32 points, freely configurable)
- Linearisation tables for the most common flumes and weirs pre-programmed and selectable
- Online calculation of the flume-/weir-flows via integrated flow curves
- Pre-programmed pump control routines
- System integration via HART or PROFIBUS DP
- Automatic detection of the sensors FDU9x
- The sensors of the former series FDU8x can be connected (for certificates see note on page 8)

TI397F/00/EN/07.09
71098286

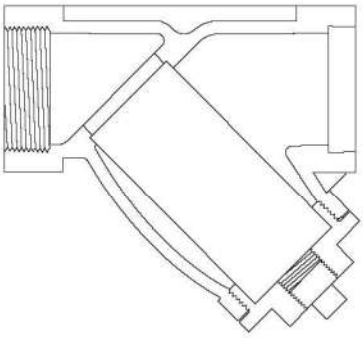
Endress+Hauser
People for Process Automation

Claro

.5 Y-Strainer ½" dia. (IFC, Model Y300TSST, 50 mesh, stainless steel cast body & screening basket)

ISLIP FLOW CONTROLS Inc.

IFC Series Y150 and Y300 Cast Steel Threaded and Socket Weld Y-Strainers



Design Features:

- Strainers are available with threaded (N.P.T.) or socket weld inlet/outlet connections.
- Strainer body meets applicable ASME Standard..
- One piece precision investment cast body.
- Strainers equipped with threaded cover cap that utilize a flat gasket seal.
- Upper and lower machined seats.
- 304 SS perforated screens are standard.
- Drain/Blow-off connection furnished with plug as standard.
- Generous screen area and properly proportioned straining chamber to minimize initial pressure drop while maximizing time between cleanings.

Parts List and Standard Materials

Part	Carbon Steel	Stainless Steel
Body	A216-WCB	A351-CF8M
Cap	A216-WCB	A351-CF8M
Screen [1]	304SS	304SS
Plug [2]	A105	A182-316
Gasket [1]	Teflon	Teflon

Notes: 1. Recommended Spares.
2. Materials of equivalent strength may be substituted at manufacturer's option.

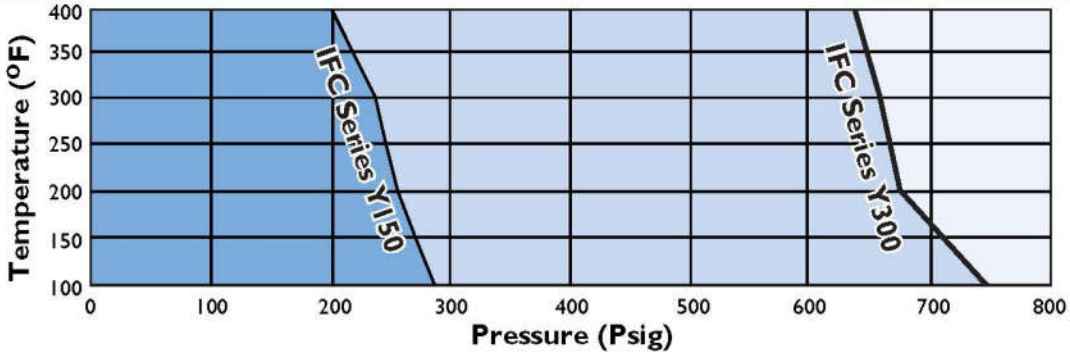
Upper Pressure Limits (Non-Shock)

IFC Model (Threaded)	Body Material	M.A.W.P. psig (Bars)
Y150TST	WCB	285 (19.65)
Y150TSST	CF8M	275 (18.96)
Y300TST	WCB	740 (51.02)
Y300TSST	CF8M	720 (49.64)

Lower Temperature Limits

Body Material	Lower Limit ¡F (¡C)
WCB	-20 (-28.9)
CF8M	-20 (-28.9)

Pressure Temperature Chart (in accordance with ASME B16.34, WCB)



Note: Teflon limited to 400°F maximum sustained operating temperature.
When operating IFC series Y150 and Y300 cast steel strainers at higher temperatures please consult factory.

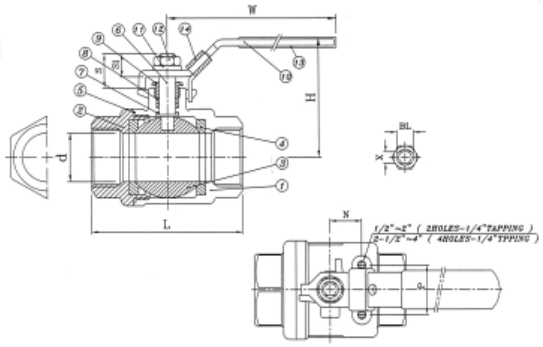
Tel. 905-335-8777 Fax. 905-335-0977 Toll Free Tel. 1-866-872-0072 Toll Free Fax. 1-866-872-0073

.6 Ball Valves (Full Port; AISI 316 – 2 x ½" WOG for Wash Press Washing & Flushing Connections + 1/4" WOG for Isolation of Pressure Gauge

122/212

2-PC Full Port SS Ball Valve

Flow+ B01

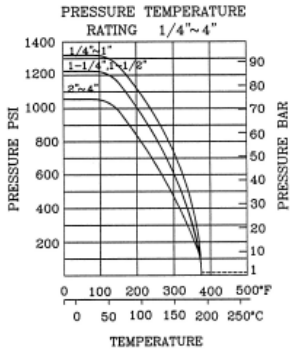


No	Parts for B01	Qty	Material
01	Body	1	ASTM-CF8M-A351
02	End Cap	1	ASTM-CF8M-A351
03	Ball	1	ASTM-CF8M-A351
04	Ball Seat	2	15% R-PTFE
05	Joint Gasket	1	PTFE
06	Stem	1	AISI 316
07	Thrust Washer	1	PTFE
08	Stem Packing	2	PTFE
09	Gland Nut	1	AISI 304
10	Handle	1	AISI 304
11	Spring Washer	1	AISI 304
12	Stem Nut	1	AISI 304
13	Handle Sleeve	1	Vinyl Grip
14	Lock Device	1	AISI 304

Pressure rating:
- 1000 psi (69 Bar)
WOG for 1/4" to 2"

Features:
- Investment Cast Body and Cap
- Blow-out proof stem / Full Port
- FNPT threaded on both ends
- Material: ASTM A351-CF8M
- Locking Handle

Size	dia (mm)	L	H	W	S	S1	X	N	P	BL	Cv Factor	Wt kg
1/4"	11.6	44.5	51	95	16.8	10.2	5	12.5	25	5/16"	7	0.21
3/8"	12.7	44.5	51	95	16.8	10.2	5	12.5	25	5/16"	7	0.22
1/2"	15	57	53	95	16.8	10.2	5	12.5	25	5/16"	15	0.29
3/4"	20	65	59.5	110	21	13.5	6.5	21	24	3/8"	45	0.42
1"	25.4	76	73	135	24	16	8	22.5	33.5	7/16"	65	0.71
1-1/4"	32	87.5	79	135	25	16	8	23.5	38.1	7/16"	125	1.06
1-1/2"	38	102	90.5	165	26.5	17	9	23.5	38.1	1/2"	175	1.68
2"	50.8	123	98.5	165	26.5	17	9	23.5	38.1	1/2"	380	2.71



.7 Solenoid Valves (Full Port; AISI 316 – 2 x ½" for Wash Press Washing & Flushing Connections)

ASCO® Red-Hat®

Pilot Operated
General Service Solenoid Valves
Brass or Stainless Steel Bodies
3/8" to 2 1/2" NPT

NC
NO

2/2 SERIES 8210

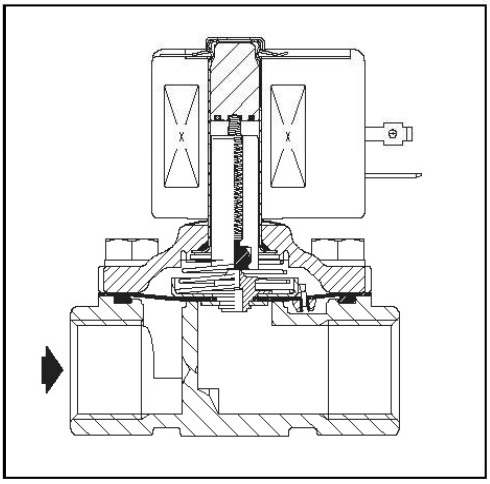
Features

- Wide range of pressure ratings, sizes, and resilient materials provide long service life and low internal leakage.
- High Flow Valves for liquid, corrosive, and air/inert gas service.
- Industrial applications include:
  - Car wash
  - Laundry equipment
  - Air compressors
  - Industrial water control
  - Pumps

Note: Claro Will furnish a 316 equivalent As specified

Construction

Valve Parts in Contact with Fluids		
Body	Brass	304 Stainless Steel
Seals and Discs	NBR or PTFE	
Disc-Holder	PA	
Core Tube	305 Stainless Steel	
Core and Plugnut	430F Stainless Steel	
Springs	302 Stainless Steel	
Shading Coil	Copper	Silver



Electrical

Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part Number			
		AC			General Purpose		Explosionproof	
	DC Watts	Watts	VA Holding	VA Inrush	AC	DC	AC	DC
F	-	6.1	16	40	238210	-	238214	-
F	11.6	10.1	25	70	238610	238710	238614	238714
F	16.8	16.1	35	180	272610	97617	272614	97617
F	-	17.1	40	93	238610	-	238614	-
F	-	20	43	240	99257	-	99257	-
F	-	20.1	48	240	272610	-	272614	-
H	30.6	-	-	-	-	74073	-	74073
F	40.6	-	-	-	-	238910		238914

Standard Voltages: 24, 120, 240, 480 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz). 6, 12, 24, 120, 240 volts DC. Must be specified when ordering. Other voltages available when required.

Solenoid Enclosures

Standard: Red-Hat II - Watertight, Types 1, 2, 3, 3S, 4, and 4X; Red-Hat - Type I.
Optional: Red-Hat II - Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9; Red-Hat - Explosionproof and Watertight, Types 3, 4, 4X, 7, and 9.
(To order, add prefix "EF" to catalog number, except Catalog Numbers 8210B57, 8210B58, and 8210B59. Valves not available with Explosionproof enclosures.)
See Optional Features Section for other available options.

Nominal Ambient Temperature Ranges:

Red-Hat II/
Red-Hat AC: 32°F to 125°F (0°C to 52°C)
Red-Hat II DC: 32°F to 104°F (0°C to 40°C)
Red-Hat DC: 32°F to 77°F (0°C to 25°C)
(104°F/40°C occasionally)
Refer to Engineering Section for details.

Approvals:

CSA certified. Red-Hat II meets applicable CE directives.
Refer to Engineering Section for details.

SERIES
8210

Specifications (English units)

Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Operating Pressure Differential (psi) Min.	Max. AC Air-Inert Gas	Max. AC Water	Max. AC Light Oil @ 300 SSU	Max. DC Air-Inert Gas	Max. DC Water	Max. DC Light Oil @ 300 SSU	Max. Fluid Temp. °F AC	Max. Fluid Temp. °F DC	Brass Body Catalog Number	Brass Body Constr. Ref. No. ④	Brass Body UL ⑤ Listing	Stainless Steel Body Catalog Number	Stainless Steel Body Constr. Ref. No. ④	Stainless Steel Body UL ⑤ Listing	Watt Rating/Class of Coil Insulation ⑦ AC	Watt Rating/Class of Coil Insulation ⑦ DC
NORMALLY CLOSED (Closed when de-energized), NBR or PTFE ② Seating																			
3/8	3/8	1.5	①	150	125	-	40	40	-	180	150	8210G73 ③	1P	●	8210G36 ③	1P	●	6.1/F	11.6/F
3/8	5/8	3	0	150	150	-	40	40	-	180	150	8210G93	5D	○	-	-	-	10.1/F	11.6/F
3/8	5/8	3	5	200	150	135	125	100	100	180	150	8210G1	6D	○	-	-	-	6.1/F	11.6/F
3/8	5/8	3	5	300	300	300	-	-	-	175	-	8210G6	5D	○	-	-	-	17.1/F	-
1/2	7/16	2.2	①	150	125	-	40	40	-	180	150	8210G15 ③	2P	●	8210G37 ③	2P	●	6.1/F	11.6/F
1/2	5/8	4	0	150	150	-	40	40	-	180	150	8210G94	5D	○	-	-	-	10.1/F	11.6/F
1/2	5/8	4	0	150	150	125	40	40	-	175	150	-	-	-	8210G87	7D	●	17.1/F	11.6/F
1/2	5/8	4	5	200	150	135	125	100	100	180	150	8210G2	6D	○	-	-	-	6.1/F	11.6/F
1/2	5/8	4	5	300	300	300	-	-	-	175	-	8210G7	5D	○	-	-	-	17.1/F	-
1/2	3/4	4	5	-	300	-	-	300	-	180	125	8210G227	5D	○	-	-	-	17.1/F	40.6/H
3/4	5/8	4.5	0	150	150	125	40	40	-	175	150	-	-	-	8210G88	7D	●	17.1/F	11.6/F
3/4	3/4	5	5	125	125	125	100	90	75	180	150	8210G9	9D	○	-	-	-	6.1/F	11.6/F
3/4	3/4	5	0	150	150	-	40	40	-	180	150	8210G95	8D	○	-	-	-	10.1/F	11.6/F
3/4	3/4	6.5	5	250	150	100	125	125	125	180	150	8210G3	11D	○	-	-	-	6.1/F	11.6/F
3/4	3/4	6	0	-	-	-	200	180	180	-	77	8210B26 ② ‡	10P	-	-	-	-	-	30.6/H
3/4	3/4	6	0	350	300	200	-	-	-	200	-	8210G26 ② ‡	40P	●	-	-	-	16.1F	-
1	1	13	0	-	-	-	100	100	80	-	77	8210B54 ‡	31D	-	8210D89	15D	-	-	30.6/H
1	1	13	0	150	125	125	-	-	-	180	-	8210G54	41D	●	8210G89	45D	●	16.1/F	-
1	1	13	5	150	150	100	125	125	125	180	150	8210G4	12D	○	-	-	-	6.1/F	11.6/F
1	1	13.5	0	300	225	115	-	-	-	200	-	8210G27 ‡	42P	●	-	-	-	20.1/F	-
1	1	13.5	10	300	300	300	-	-	-	175	-	8210G78 ②	13P	-	-	-	-	17.1/F	-
1 1/4	1 1/8	15	0	-	-	-	100	100	80	-	77	8210B55 ‡	32D	-	-	-	-	-	30.6/H
1 1/4	1 1/8	15	0	150	125	125	-	-	-	180	-	8210G55	43D	●	-	-	-	16.1/F	-
1 1/4	1 1/8	15	5	150	150	100	125	125	125	180	150	8210G8	16D	○	-	-	-	6.1/F	11.6/F
1 1/2	1 1/4	22.5	0	-	-	-	100	100	80	-	77	8210B56 ‡	33D	-	-	-	-	-	30.6/H
1 1/2	1 1/4	22.5	0	150	125	125	-	-	-	180	-	8210G56 ‡	44D	●	-	-	-	16.1/F	-
1 1/2	1 1/4	22.5	5	150	150	100	125	125	125	180	150	8210G22	18D	●	-	-	-	6.1/F	11.6/F
2	1 3/4	43	5	150	125	90	50	50	50	180	150	8210G100	20P	●	-	-	-	6.1/F	11.6/F
2 1/2	1 3/4	45	5	150	125	90	50	50	50	180	150	8210G101	21P	●	-	-	-	6.1/F	11.6/F
NORMALLY OPEN (Open when de-energized), NBR Seating (PA Disc-Holder, except as noted)																			
3/8	5/8	3	0	150	150	125	125	125	80	180	150	8210G33	23D	●	-	-	-	10.1/F	11.6/F
3/8	5/8	3	5	250	200	200	250	200	200	180	180	8210G11 ⑧ ⑨	39D	●	-	-	-	10.1/F	11.6/F
1/2	5/8	4	0	150	150	125	125	125	80	180	150	8210G34	23D	●	-	-	-	10.1/F	11.6/F
1/2	5/8	3	0	150	150	100	125	125	80	180	150	-	-	-	8210G30	37D	●	10.1/F	11.6/F
1/2	5/8	4	5	250	200	200	250	200	200	180	180	8210G12 ⑧ ⑨	39D	●	-	-	-	10.1/F	11.6/F
3/4	3/4	5.5	0	150	150	125	125	125	80	180	150	8210G35	25D	●	-	-	-	10.1/F	11.6/F
3/4	5/8	3	0	150	150	100	125	125	80	180	150	-	-	-	8210G38	38D	●	10.1/F	11.6/F
3/4	3/4	6.5	5	-	-	-	250	200	200	-	180	8210C13	24D	●	-	-	-	-	16.8/F
3/4	3/4	6.5	5	250	200	200	-	-	-	180	-	8210G13	46D	●	-	-	-	16.1/F	-
1	1	13	0	125	125	125	-	-	-	180	-	8210B57 ⑥ ⑩	34D	●	-	-	-	20/F	-
1	1	13	5	-	-	-	125	125	125	-	180	8210D14	26D	●	-	-	-	-	16.8/F
1	1	13	5	150	150	125	-	-	-	180	-	8210G14	47D	●	-	-	-	16.1/F	-
1 1/4	1 1/8	15	0	125	125	125	-	-	-	180	-	8210B58 ⑥ ⑩	35D	●	-	-	-	20/F	-
1 1/4	1 1/8	15	5	-	-	-	125	125	125	-	180	8210D18	28D	●	-	-	-	-	16.8/F
1 1/4	1 1/8	15	5	150	150	125	-	-	-	180	-	8210G18	48D	●	-	-	-	16.1/F	-
1 1/2	1 1/4	22.5	0	125	125	125	-	-	-	180	-	8210B59 ⑥ ⑩	36D	●	-	-	-	20/F	-
1 1/2	1 1/4	22.5	5	-	-	-	125	125	125	-	180	8210D32	29D	●	-	-	-	-	16.8/F
1 1/2	1 1/4	22.5	5	150	150	125	-	-	-	180	-	8210G32	49D	●	-	-	-	16.1/F	-
2	1 3/4	43	5	-	-	-	125	125	125	-	150	8210103	30P	●	-	-	-	-	16.8/F
2	1 3/4	43	5	125	125	125	-	-	-	180	-	8210G103	50P	●	-	-	-	16.1/F	-
2 1/2	1 3/4	45	5	-	-	-	125	125	125	-	150	8210104	27P	●	-	-	-	-	16.8/F
2 1/2	1 3/4	45	5	125	125	125	-	-	-	180	-	8210G104	51P	●	-			16.1/F	-

Notes:
① 5 psi on Air; 1 psi on Water.
② Valve provided with PTFE main disc.
③ Valve includes Ultem (G.E. trademark) piston.
④ Letter "D" denotes diaphragm construction; "P" denotes piston construction.
⑤ ○ Safety Shutoff Valve; ● General Purpose Valve.
Refer to Engineering Section (Approvals) for details.
⑥ Valves not available with Explosionproof enclosures.
⑦ On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts.
⑧ AC construction also has PA seating.
⑨ No disc-holder.
⑩ Stainless Steel disc-holder.
‡ Must have solenoid mounted vertical and upright.

G. O&M & Installation Manuals – Fine Step Screen & Wash Press Compactor

i. Fine Step Screen Manual (Sample)
ii. Wash Press Manual (Sample)

• Please see following pages →

Claro™

ENVIRONMENTAL TECHNOLOGIES & EQUIPMENT

claroglobal.com

Claro Fine Step Screen

O&M Manual

Installation – Operation – Care

Electronic Copy

Bookmarked PDF

Fine Step Screens

Claro is pleased to offer a high quality fine step screen that delivers exceptional screening capabilities, long-term reliability, and an ultra-hygienic & odor-free working environment. Removes hair & fine grit to protect downstream equipment & processes without the possibility of screenings carry-over.

A preferred separation technology in water & wastewater screening applications, the step screen's superior design is backed by over 25 years of practical design & installation experience. Hundreds of installations.

Design features & advantages

- Water & wastewater screening, septage receiving stations, & raw sludge screening applications
- Protects pumps, digester tanks, & other equipment from hair & other debris build-up
- Bar space opening / aperture: 0.5 to 6 mm (0.039" to 1/4"); discharge height up to 5 meters (16.5 ft.)
- 6 mm (1/4") screen achieves separation equivalent to a 1 mm aperture screen with use of accumulated screenings filter mat on bar screen
- Low headloss / high flow-through capacities / no possibility of screenings downstream carry-over
- Proven anti-overflow control even with large debris influx (e.g. spring leaves etc.)
- Self-cleaning, low-friction, anti-distortion design bar screen (no wearable brushes & no scrapers)
- Fully-enclosed, odor-controlled, ultra-hygienic operation
- Durable, self-lubricating linkage system with no maintenance-prone chain drives, sprockets, or belts
- Modular, bolted, all-stainless-steel construction
- Unique step design ensures effective screenings transfer
- All stainless steel discharge with no plastic discharge spacers
- Screen pivots out of channel in minutes for inspection—without moving receiving wash press compactor or conveyor
- Patented bottom deflector-plate ensures constant screening aperture throughout the whole operating cycle & eliminates plastic end-shoes / spacers
- For installation in channel or in dedicated stainless steel tank
- Very low equipment height profile—ideal for constricted headroom applications
- Equipment life especially long due to low wear-&-tear control approach—screen only operates mechanically when necessary (not continuously)
- Increase capacity of existing channels with screen-in-tank unit adjacent to existing installation without modification of channel
- Municipal wastewater & water headworks, industrial wastewater, pulp & paper, pharmaceutical, food processing, mining, & many more industrial applications including reject material recovery
- Complete systems for sole-supplier responsibility

Fine Step Screen (0.5 to 6 mm Bar Spacing)

Fine Step Screen, Wash Press, & Hygienic Bagger (Assomption WWTP, QC)

Fine Step Screen and Wash Press (Repentigny WWTP, QC)

Fine Step Screen and Shaftless Screenings Transfer Conveyor

Contents

1. About the Screen 5

1.1 Structure & Function 5

1.2 Use 6

2. Safety 7

2.1 General 7

2.2 During Operation 8

2.3 Lifting / Pivoting the Screen – General 8

2.4 Machine Safety Protections 8

2.5 Electrical Work 9

3. Storage, Transportation & Packaging 9

3.1 Scope of Delivery 9

3.2 Storage 10

3.3 Transportation 10

3.4 Packaging 10

4. Functional Description 10

4.1 Principle of Operation 10

4.2 Operation 11

5. Assembly & installation 11

5.1 Assembly 12

5.2 Channel Installation 14

5.3 Channel Wall Seals 17

5.4 Automatic Greaser Cartridge 17

5.5 Tank Installation (e.g. for Septage Stations) 17

5.6 Downstream Equipment 17

5.7 Installation of Level Sensor 18

5.8 Electrical Installation 19

6. Operation 20

6.1 Automatic Operation – Step-by-Step Mode (Level Sensor) 20
6.2 Automatic Operation – Timer (& Level Sensor) Mode 21
6.3 Manual Operation 21
6.4 Overload/Alarms 22
6.5 Reverse Operation 22
6.6 Other Elements 22

7. Settings 23

7.1 Default Values 23
7.2 Additional Settings 23
7.3 Operation Modes 23

8. Settings 25

8.1 Test Run without Water (Dry Start-Up) 25
8.2 Test Run with Influent/Water (Wet Start-Up) 26
8.3 Adjusting the Start Level 26

9. Regular Verifications & Maintenance 27

9.1 Weekly 27
9.2 Monthly 27
9.3 Yearly 28
9.4 Before Starting the Disassembly 30
9.5 Disassembly 30
9.6 Disposal 30

10. Components / Spare Parts Drawings & Spare Parts List 30

Introduction

The Claro Operation & Maintenance manual is intended to provide operations staff with a clear description of the fine step screen and its parts. This manual also contains important instructions on how to install & start-up the fine screen and maintenance advice. All who come in contact with the screening system shall comply with the safety precautions, warnings, regulations and other instructions in this manual as well as local provincial/state and facility regulations and safety practices.

This Operation & Maintenance manual must be available to all personnel involved in the screening system's installation, commissioning, operation, service / maintenance and transportation.

Claro Environmental Technologies assumes that the personnel responsible for or working with this equipment are familiar with local regulations regarding the work safety environment and especially safety regulations and practices for sewage treatment plants and other applicable regulations.

Never start installation or assembly prior to reading and fully understanding the contents of this manual. The safety instructions and warnings are especially important. If personnel have any comments or questions, please feel free to contact Claro.

It is forbidden to use the fine screen in any other manner or for purposes other than those described in this manual.

N.B. Claro cannot be held responsible for damage caused by negligent handling of the machine or neglect of the directives outlined in this manual. If personnel have comments or questions, please feel free to contact Claro. We are here to help !

Claro's responsibility is limited or ceases once:

- The machine or any individual component is loosened or disassembled without Claro consent and/or advice

- Parts that do not belong to the screen are integrated into the machine
- Parts that are not original spare parts are installed without Claro's approval

Modification, renovation or re-build of the machine is not permitted without written consent of Claro Environmental Technologies. Please feel free to contact Claro for advice. We are here to help !

1. About the Screen

The Claro fine step screen is designed to mechanically separate solids from wastewater or process water. The machine is designed for automatic operation and starts automatically depending on operational settings.

The Claro fine step screen is available in different models with discharge heights from 0,8 to 5,5 m. For each model, custom screen widths and aperture widths (from 0.5 to 6 mm) are available

The model number format is as follows:
e.g. 1700-500-3 (model – effective width of the bar screen – aperture width)

1.1 Structure & Function

The machine consists of three main parts:

1. Motor including gearbox, bearings and eccentric assembly (Figure 1).
2. Lamellae bar rack package (made of moveable and stationary bars (Figure 2)).
3. Side plates including linkage drive mechanism (Figure 3).

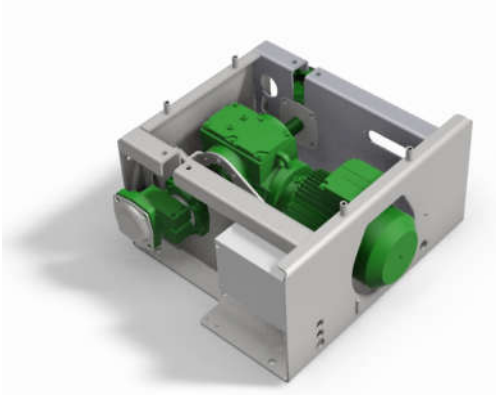


Figure 1, Drive unit

The machine consists of a separate drive unit package that includes gear drive & torque arm, electric motor, frame, crank bearings and electrical equipment. The electrical equipment consists of a home position (proximity) sensor, overload protection (installed in the control panel or MCC) and connection terminals / junction boxes for external connection.

The drive unit is bolted to two robust side frame elements that serve as guide plates for incoming influent and as the supporting frame for the "fixed" lamellae bar package.

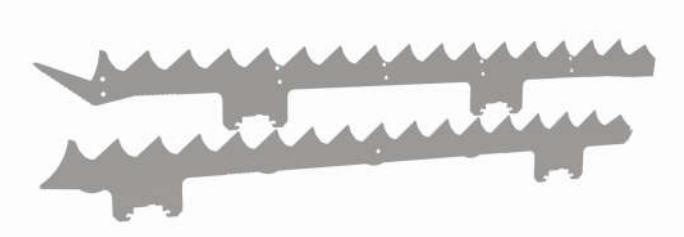


Figure 2, lamellae bar package elements (fixed & moveable)

The bar package consists of two sets of parallel-positioned and individually-attached bars. One set is fixed and the other is moveable. The bars have steps that have a curved run element, are roughly 1:1 ratio of rise-to-run, and are designed to optimize screenings conveying capacity. The fixed bars are bolted to structural cross members & to the frame of the screen. The moveable lamellae bar package is interposed within the fixed package – thus, every other bar is moving and every other is fixed. The distance between a fixed and a movable lamella bar is the aperture width.

The moving lamellae bar package is suspended by a side-frame mounted linkage mechanism (one on each side of the screen), which is connected to the motor & gear drive mechanism. The movable bars effect a circular motion (a "rotation").

Figure 3, side plates including linkage mechanism

1.2 Use

The Claro step screen is used for separation of solids from waste or process water.

Typically, the Claro step screen is employed in one of the following scenarios: municipal and industrial wastewater treatment plants, paper industry, food industry, tanneries and textile industries.

It is forbidden to use the fine screen for any purpose other than the above without written consent from Claro.

2. Safety

The safety section contains important safety information and should be followed closely. There is a risk of personal injury or other damage if the safety instructions are not followed.

Before any work is started, the personnel who will perform the work or related personnel must read this safety section.

2.1 General

- It is forbidden to use the fine screen for other than its intended purpose.
- Personnel can be injured if the fine screen is employed for other than its intended use and when personnel with inadequate knowledge of the system manipulate, engage with or operate the machinery and/or control elements.
- All personnel who operate the machine must have read and understood this manual, especially the safety section.
- Rebuilding and/or modification of the machine is prohibited without written consent from Claro. Please feel free to contact Claro – we are here to help !
- Exercise caution when lifting; never walk under a suspended load.
- Before cleaning, servicing or dismantling, the motor power lock-out switch and/or the control panel must be turned off and a padlock installed.
- In addition to the directives specified herein, the safety regulations and practices that apply at the local plant shall be followed. State, provincial and/or country regulations shall also be followed.
- All warning signs shall be maintained in the same condition as when the fine screening system was delivered.
- All fine screen protecting elements and covers must be mounted and locked / bolted in position before starting the fine screening system.
- The fine screen supports must be firmly attached to the machine and to the floor slab (or to the tank) before starting the machine.

2.2 During Operation

- Work on the fine screen is forbidden when it is in operation.
- Keep in mind that the machine starts automatically without notice.
- Protective plates and covers for the drive linkage system & gear drive and motor shall be installed and bolted in position.
- Inspection cover at the fine screen discharge can be opened, however, it is forbidden to touch or otherwise engage with moving parts.

2.3 Lifting / Pivoting the Screen – General

- Use only approved lifting equipment and check the maximum load of the lifting equipment before lifting begins.
- Use caution – do not work or walk under suspended loads.
- The machine must only be lifted at the designated lifting lugs.
- Lifting equipment must not be removed before the machine is properly bolted to the floor slab (or stainless steel tank).
- For details on the lifting procedure, please see "Lifting the Equipment – Details," Section 5.1.1.

2.4 Machine Safety Protections

The fine screen is equipped with bolted protective lids &, depending on the application, inspection covers or other operator-safe access points. These should always be installed, locked/bolted in position when the machine is in operation.

Loose items that are not typical screenings debris (such as tools and other items) can cause injury as well as damage to the machine.

Inspection covers and bolted protective plates are placed over the linkage drive package units. There are also one or more inspection covers under which parts of the screen, incoming water and the screenings filter mat will be visible.

At the discharge, there is an inspection lid. Under this lid with handle there is a safety grating that prevents access to moving parts. When the inspection lid is removed, the operator can see the screen discharge to the downstream equipment such as a wash press or conveyor.

WARNING: The screen and downstream equipment starts automatically and without notice. An HOA station for manual operation shall be provided local to the fine screen. Ideally, the operator will be able to see the effect of manual operation.

It is forbidden to clean the fine screen discharge or the downstream equipment's inlet by hand or with a tool without the safety power lock-out switch turned off and locked with a padlock.

2.5 Electrical Work

Electrical work must be performed by a licensed electrician and in accordance with applicable laws, regulations and rules. Work shall also be carried out in accordance with local regulations.

- To avoid accidents including fatal electrical shock, it is important that the electric motors, instruments and cables are in good working order with no breaks or other anomalies.
- Electrical cables should be routed so that there is no risk of wear against the fine screen's stationary or moveable parts.
- All equipment and instruments should be grounded. Humid environments and water screening applications carry an increased risk of accidents caused by electric current. Remember that the screening system is a high voltage system.
- When replacing or repairing an electrical component, the power supply must always be turned off and the relevant switch and/or breaker element padlocked before starting work.

It is forbidden to connect the machine to a live electrical power source while installation or other work on the machine is in progress.

3. Storage, Transportation & Packaging

3.1 Scope of Delivery

In addition to the screen, the following is included in a standard in-channel fine step screen delivery. Note: an in-tank screening unit, such as a septage receiving station, arrives on site with the screen pre-installed within its stainless steel tank and thus eliminates some of the installation requirements. Typical delivery items include:

- Two (2) support legs.
- Two (2) support leg linkages.
- One (1) torque guard. If a control panel is also part of the supply, the torque guard is pre-installed within the control panel.
- One (1) discharge cover (sometimes already mounted on the screen).
- One (1) square fine screen suspension beam (sometimes already mounted on the screen).

3.2 Storage

Storage of the machine may be made for a short period and only in / on its original packaging. Ensure that the fine screen is stored in an indoor environment and not exposed to freezing. If outdoor storage is unavoidable, please contact Claro. Before the fine screening unit is kept in storage for a longer period, please contact Claro for storage instructions.

3.3 Transportation

Transportation shall be made in a manner in order that the fine screen is secured from falling or other mishap damage. Lifting the machine over personnel is absolutely forbidden. Suitably trained staff should perform lifting, loading, load securing, unloading and driving of the transport truck.

3.4 Packaging

The packaging (pallets or crating) is specially designed and adapted for the delivered fine screening equipment and provides maximum protection. Ensure that the packaging is not damaged when you receive the delivery. If the packaging is damaged, please document with photographs & contact Claro.

4. Functional Description

4.1 Principle of Operation

The screen is installed at an installation angle of between 45 - 50 ° in a channel or in a stainless steel tank. The sides of the screen that are adjacent to the channel or stainless steel tank walls are sealed with neoprene rubber seal strips. This ensures that all liquid & solids (i.e. screenings) must pass through the screen filter media, which is composed of a number of moving and fixed lamellae bars. As the influent passes through the lamellae bars, the solid particles (i.e. the screenings) remain on the bars and form a 'screenings filter' mat. The thicker the mat, the better the separation of small particles. The size of the captured particles depends on the screen aperture width and the screenings filter mat thickness.

As the screenings filter mat accumulates and becomes thicker, it causes the water level in the channel or stainless steel tank to rise upstream of the screen. Once the upstream liquid level reaches the adjustable pre-set liquid start level, the screen will start and the moveable lamellae bars will run for one rotation. When the machine makes one rotation of the lamellae bars, the screenings will be transported upwards towards the fine screen discharge. When this rotation and screenings transport occurs, the bottom area of the lamellae bars are cleaned of screenings material, which enables the passage of liquid. The step-shaped lamellae bars will transport the screenings filter mat step-by-step upwards towards the screen discharge where it will be deposited into the downstream equipment.

Typically, the screen will rotate only once in response to an upstream start level signal. Since a thicker screenings filter mat helps to increase separation efficiency, it is important that the screen does not run more than necessary. Therefore, make sure that the adjustable start level setpoint is at the correct value. Claro will set this level or advise on the recommended value. If you have any comments or questions, please feel free to call Claro.

4.2 Operation

The fine screen is operated via a control panel, which is typically included in the equipment delivery from Claro

The level sensor mounted in the channel/tank upstream of the screen provides a signal to the control panel that indicates that the upstream water level has risen to the adjustable pre-set start level. The screen will start and run one rotation, which will cause the upstream water level to fall. If the level does not fall, the fine screen will respond to a maintained start level signal and will rotate again until it shifts into continuous run mode. Continuous run mode will cease once the upstream liquid level returns to just underneath the normal start level (adjustable Continuous Run Mode Shut Off Level). This level is typically 50mm (2 inches) below the normal fine screen start level.

5. Assembly & installation

Experienced installation personnel must carry out the installation in a professional manner. All electrical wiring must be performed by a qualified electrician and must comply with current CSA, UL or other applicable regulations.

5.1 Assembly

For ease of installation, maintenance inspection and maintenance work, it must be possible to pivot the fine step screen. The lifting device (overhead beam, davit crane, or other) must be approved and adapted to the machine weight. The weight of this machine is indicated on the screen nameplate.

Before lifting the machine, check the following:

- Verify the channel width and compare it to the total width of the machine. Ensure that there are no obstructions that could damage the screen or its neoprene side seals when the screen is pivoted out of channel.
- The fine screen support legs should not be installed too close to the channel edge. Follow the project drawings regarding the placement of screen supports. Ensure that the concrete is in good condition for the purpose of supporting the screen weight.
- Power must be switched off and the power lock-out switch locked with a padlock. All cables should be disconnected.
- Attach the fine screen support legs to the floor slab with appropriate fasteners (e.g. expanding bolts or chemical anchors). If a screen-in-tank unit has been supplied, anchor the tank to the floor slab.

5.1.1 Lifting the Equipment

- Use only approved lifting equipment and check the maximum load of the lifting equipment before lifting is initiated.
- Use caution – do not stand or extend limbs under suspended loads.
- The machine must only be lifted at the designated lifting lugs – please see Figure 4 below.
- Lifting equipment must not be removed before the fine screen is fastened to the floor slab.
- If the machine shaft bearings are fitted with grease cartridges (for taller models), these shall be unscrewed & removed before lifting/pivoting in order to avoid accidental damage to the automatic greasers.
- The machine must be lifted with approved steel shackles or hooks or similar in order to avoid slings or other lifting elements from being damaged by the fine screen steel frame or lifting lugs.
- For screens with a model number of 1700 to 4500, there are also lifting lugs under the motor covers. These must also be used during lifting if the entire screen is to be raised out of the channel (Please see figure 5).

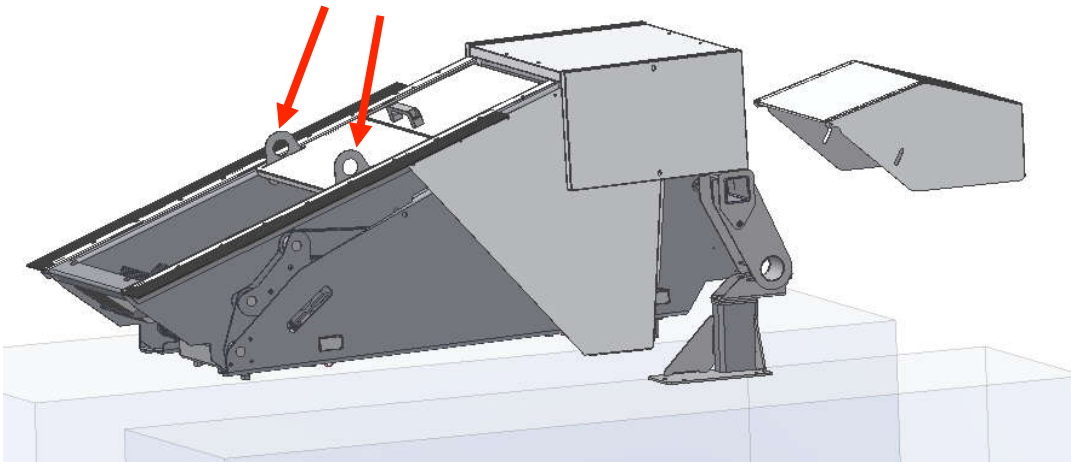


Figure 4. Lifting the screen, arrows showing lifting lugs.

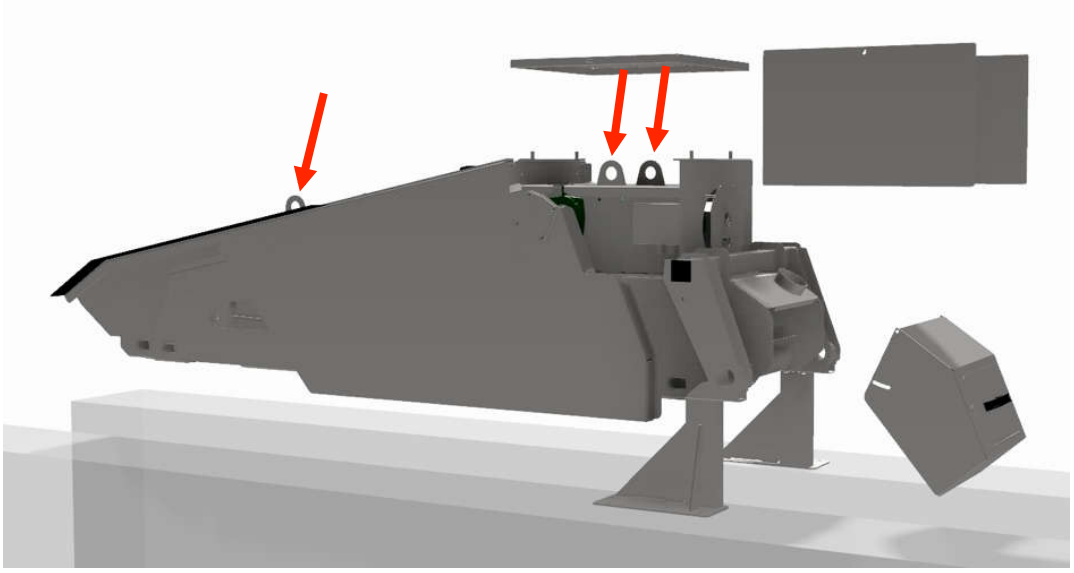


Figure 5. Lifting lugs for fine screens with a model number from 1700 to 4500; use all 4 lifting lugs for a 4-point controlled lift if lifting the entire screen out of channel or during installation.

• Please see following page →

5.2 Channel Installation

Carefully lower the screen into the channel.

ALWAYS use the supplied bolts for mounting the discharge cover because longer screws can damage the machine (conflict with moveable lamellae, which can cause lamellae damage/breakage (please see Figure 6)). The bolt No. 1 (M8x8 with washer) shall terminate in line with the inside 2 in order to prevent contact with movable lamellae.

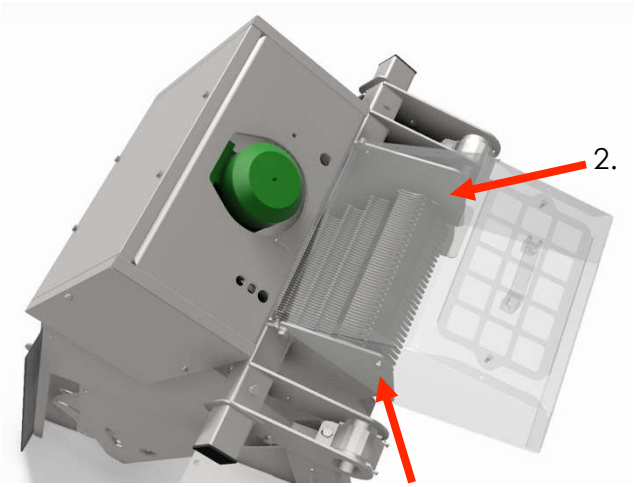


Figure 6.

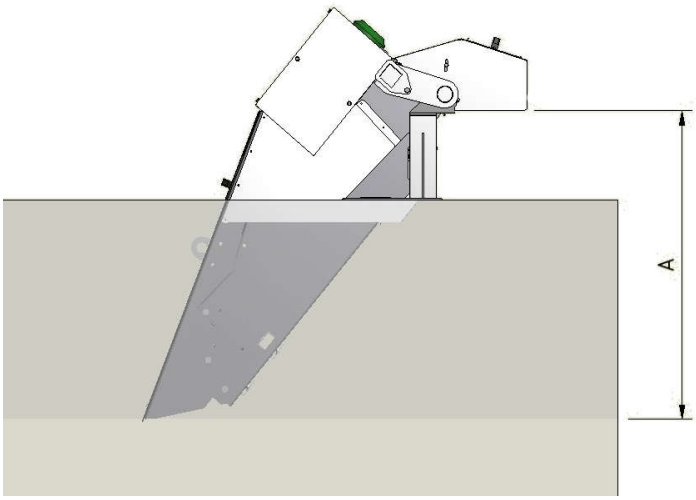


Figure 7. Discharge height measurement

Place the screen in the correct position, measure the correct discharge height A. Please see figure 7.

Check that the channel is level (please see figure 8). Also verify that the channel bottom where the bottom of the machine is to be placed is level & parallel to the floor slab. Check that the bottom corners of the channel are not chamfered. The sides of the channel should also be square and smooth. Channel covers (i.e. checker plate or grating) should have no supporting structure attached to the inside wall of the channel in order to ensure that the fine screen can pivot out of channel un-impeded. Instead, channel covers should be suspended from notches at the top corners of the inner channel walls.

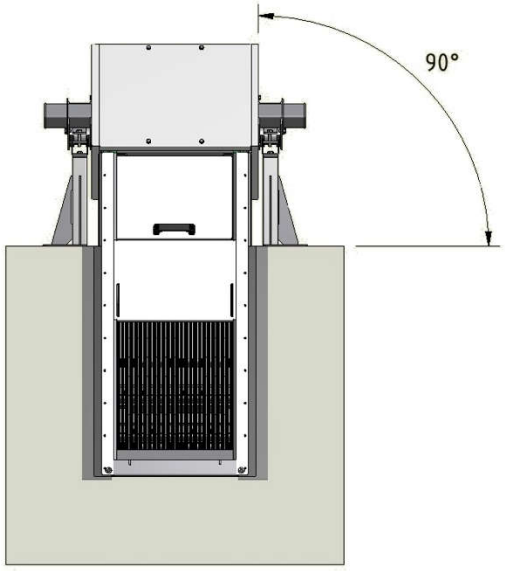
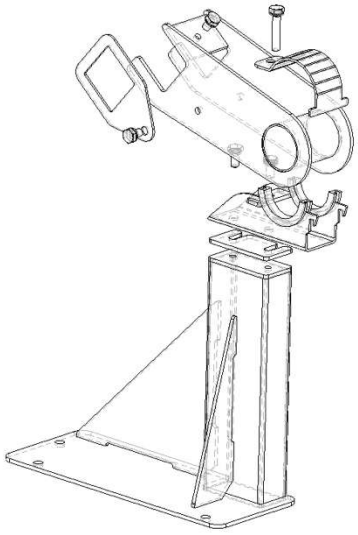


Figure 8.

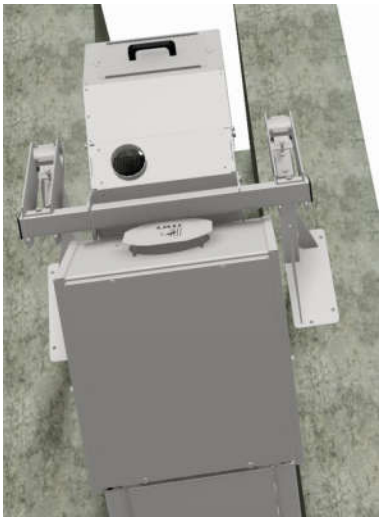
Install the support legs on the fine screen and fasten them to the floor slab.

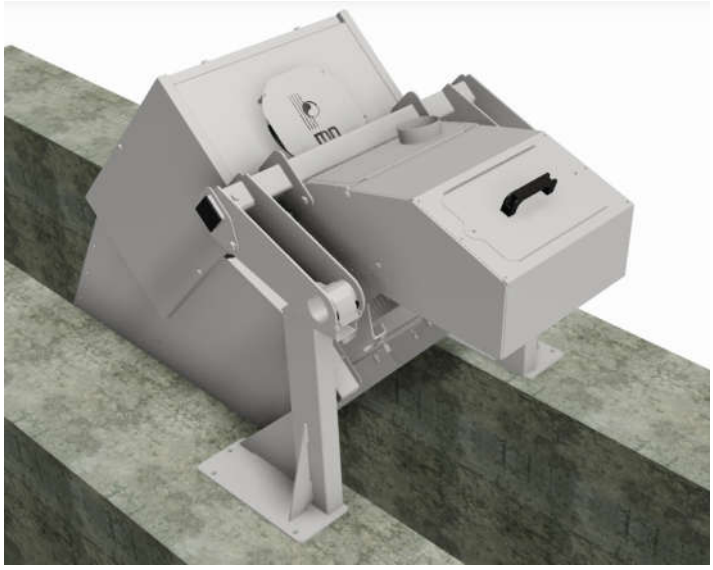
There are various types of pivoting screen support mechanisms depending on the unit size/model. Support legs and pivoting mechanisms shall be mounted as shown below. Typically, installation guide stickers are placed on the supports in order to aid in assembly.

5.2.1 Support Leg Installation – Fine Screen Models 1100 - 1400

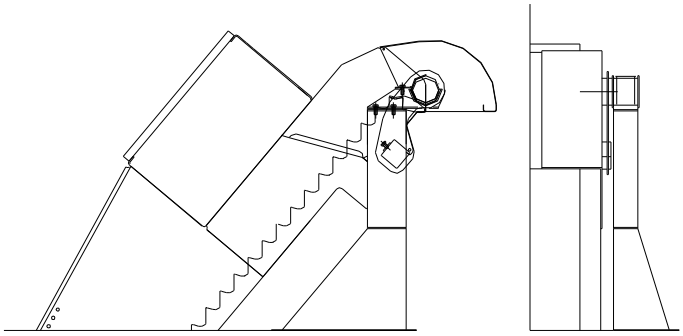


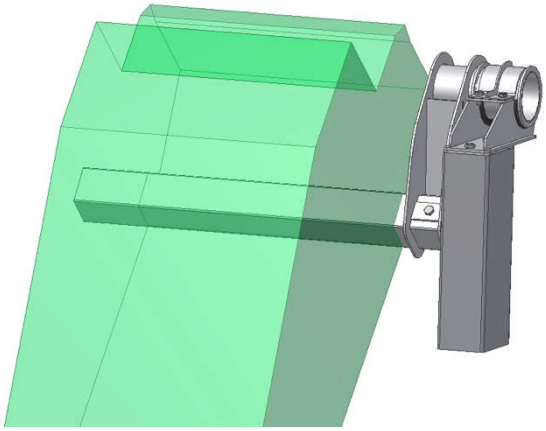
5.2.2 Support Leg Installation – Fine Screen Models 1700 - 2100

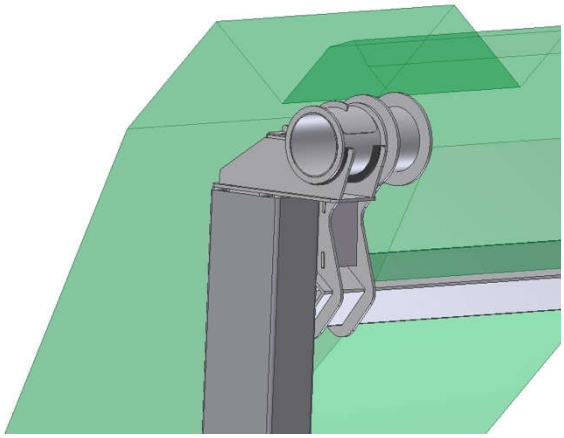




5.2.3 Support Leg Installation – Fine Screen Models 2200 - 4500







5.3 Channel Wall Seals

On the screen frame, neoprene rubber strips are mounted for the purpose of sealing the gap between the screen frame and the channel or tank walls. Typically, the gap between the screen frame and channel walls is 15 to 40 mm. Please contact Claro if the gap is smaller or larger. Channel width is to include the screen frame width plus channel side seals width.

5.4 Automatic Greaser Cartridge

Shaft and eccentric bearings may be equipped with grease cartridges for automatic lubrication (option on larger units). The cartridges shall be set to 12 months by turning the adjustable selector on the top of the cartridge to number 12.

5.5 Tank Installation (e.g. for Septage Stations)

- Check that the floor slab is level.
- Place the tank in the correct position and make sure that the tank is level. Fasten the tank to the floor slab.
- Connect the inlet and outlet pipes.
- Connect the overflow outlet (if present).
- Connect the downstream screenings handling/treatment equipment, if present

5.6 Downstream Equipment

After the screen, screenings handling and/or treament equipment is installed, e.g. wash press or screw conveyor. Any gaps between the screen and subsequent equipment must be sealed with plates or rubber strips in order to prevent access to moving parts. If downstream equipment has been supplied by Claro, these protective elements will already be in place / supplied. Subsequent equipment shall be mounted as close to the screen discharge as possible and in the proper relationship in order to not conflict with the movable lamellae bar rack.

The downstream equipment inlet chute must be designed in order that edges or flanges do not promote screenings debris collection/hang-up or compaction in the discharge area.

• Please see following page →

N.B. Ensure a minimum of five (5) millimetres free passage between the movable bars and the inlet chute when the screen is in motion (i.e. when the lamellae bars are in their lowest rotation position) to prevent mechanical conflict, wear and noise. Claro can advise on relative positioning.

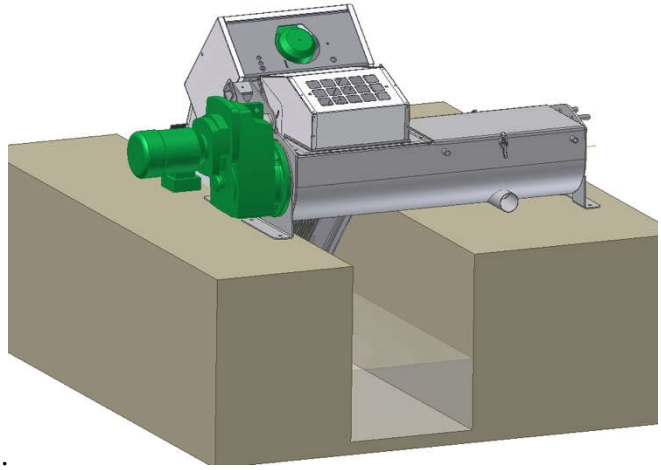


Figure 9. Wash press installed after screen

If the inlet to the wash press / conveyor is narrower than the screen discharge, the chute must be tapered. In order to avoid screenings bridging / blockage, however, the chute must have a minimum of 60° degree side walls.

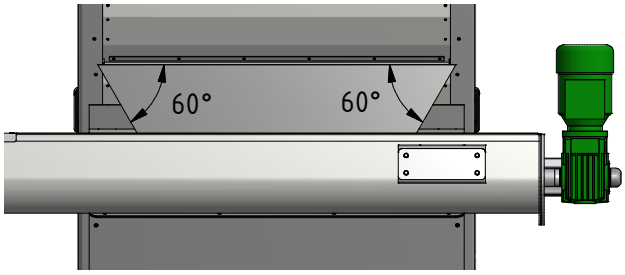


Figure 10. Tapered chute installed at discharge of screen. Typically, chute walls are 90 degrees.

5.7 Installation of Level Sensor

- A level sensor measuring the upstream water level shall control screen operation. Ultrasonic level sensors are typically furnished with the Claro control panel.
- The start level shall, for most installations, be as high as possible. Claro will suggest the recommended start level.

- The level sensor must be installed in order that the screen can be removed / pivoted out of channel for inspection and other maintenance requirements. The sensor should be installed in a location that does not experience significant turbulence or splashing. Claro will advise on sensor placement. In some installations, both an upstream & a downstream sensor are used for a differential back-up start signal.

5.8 Electrical Installation

Electrical work must be performed by a licensed electrician and in accordance with applicable rules, regulations & laws.

Before reading and acting on the information in this section, please read section 2.5 in its entirety in order to ensure personnel safety. Please also see As-Built control panel drawings if a control panel has been supplied by Claro.

- The screen home position switch is connected via the junction box mounted on the side of the screen (located under removable side panel).
- Motor is connected via its own junction box.
- If a Class 1, Div. 1 (or equivalent Class 1, Zone 0) environment, the fine screen's integrated electrical brake will have a separate single phase supply. By contrast, in lower explosion-proof rating classification contexts, the brake will tend to be powered from the motor's junction box. Note: please observe local electrical codes as required and review Claro control panel drawings.
- Torque Guard is supplied for installation in the control panel or, if the control panel is supplied by Claro, this and other safety equipment is typically already pre-installed in this supplied control system.
- Please arrange cable lengths in order to enable the screen to pivot out of channel without over-tensioning the connections. Also, ensure that cables do not block easy access to discharge covers or other elements regularly accessed by operators.
- Physically install & connect the level sensor as shown in the project drawings and/or Claro installation instructions. Typically, the level sensor transmitter is pre-installed inside the Claro control panel, if furnished.

6. Operation

6.1 Automatic Operation – Step-by-Step Mode (Level Sensor)

1. Please also see description of control narrative and HMI touch screen images included in the appendices section of this O&M manual.

2. When all selectors are in Auto and the system is "Ready" or "Waiting", the fine step screen will initiate a rotation of its moveable bars once the adjustable upstream start level is reached or, in applications that have an upstream & a downstream sensor, once the adjustable differential level value is attained.

3. When the liquid level drops after a start signal & moveable lamellae bars rotation, the screen will stop at its "home" position (i.e. moveable & fixed bars aligned), which is indicated to the control panel by the home position proximity sensor located inside the fine screen motor compartment.

4. If the upstream liquid level is maintained at or above the adjustable upstream start level (or differential value) after a rotation, the screen will initiate another moveable bars rotation. If the upstream liquid level (or differential value) remains at or above the adjustable start level after 3 consecutive starts without an intervening pause, the screen will shift into continuous run mode. The number of consecutive starts without pause to initiate a continuous run is adjustable. The typical setting, however, is three (3) consecutive rotations. The maintained level indicates to the controls that the screen is experiencing exceptionally high flow/solids in the flow. The continuous run enables the screen to cope with these conditions automatically. The continuous run will stop once the upstream level (or the differential value) falls to an adjustable level below the start level or differential start value. This indicates to the controls that normal conditions have resumed and causes the screen to shift back into regular step-by-step level sensor mode. The typical continuous mode stop level is 50 mm (2 inches) lower than the upstream start level and, if present, 50 mm (2 inches) below the level differential start level value. Claro will advise on the optimal set points for your application. This controls approach diminishes the run time of the screen to a minimum.
5. Once the upstream level (& back-up differential level, if implemented) is set, the screenings filter mat will be consistent in its thickness. This enables the low wear-&-tear controls philosophy of the screen to be generalized to downstream equipment since the volume of each

screen discharge is consistent – each rotation of the screen's steps will discharge a consistent volume of captured screenings material. Thus, the downstream equipment is started based on an adjustable number of screen moveable bar rotations/discharges. Claro will advise on the optimal start value for downstream equipment.

6.2 Automatic Operation – Timer (& Level Sensor) Mode

If the level sensor(s) should fall into fault or loose echo, the control panel will automatically shift the screen into timer mode. In this mode, the screen will continually initiate a rotation after an adjustable timer delay. Once the level sensor(s) have returned to normal operation (i.e. fault condition is no longer present), the controls will return the screen to regular step-by-step timer mode. Since timer mode is a back-up mode, the screen actuation interval time is short in order to ensure that the level in the channel remains at an acceptable level. Typical setting is 2 minutes. Claro will suggest the optimal setting for your application.

An operator can also switch the screen into timer mode at the controls. In timer mode the screen will continually initiate a rotation after an adjustable timer delay until the start mode is changed back to level mode. If the level sensor(s) are functional, the regular upstream start level (or differential level, if applicable) will also actuate the screen if the upstream liquid level reaches the adjustable set point. In timer mode, the level sensor(s) act as a back-up.

6.3 Manual Operation

When the local HOA control station selectors are in Manual & Forward, the screen will function in forward until the spring-loaded selector is released. When the local HOA control station selectors are in Manual & Reverse, the screen will function in reverse until the spring-loaded selector is released. The spring returns are implemented in order to ensure that the screen is not left running continuously and unattended for extended periods of time in forward and especially in reverse. When operating in reverse, ensure that the screen does not produce any unusual noise. When running in reverse, proceed with caution – start by jogging the screen in small reverse runs in order to verify that a possible issue does not cause damage to the screen.
Note: The local HOA station also typically incorporates an E-stop push button that stops the respective fine screen for operator safety.

6.4 Overload/Alarms

- If the screen torque detector is triggered, the screen will initiate a reverse run sequence that attempts to clear a possible jam. The screen will attempt to run in reverse for an adjustable time (typically 2 seconds). The screen will then re-attempt to respond to its start level signal by running in forward. If the torque detector senses a high torque condition again, the screen will repeat this reverse run sequence. The screen will attempt the reverse run sequence for an adjustable number of attempts within an adjustable timeframe (typically 2 times within 60 seconds). If the screen fails to resume normal operation at under the high torque setpoint, the screen will fall into fault, shut down and alarm. If supplied, the Claro control panel will contain a record of the reverse run attempt(s) in the alarm history (and at Scada, if this alarm recording function is implemented) even if the screen does not fall into fault/shut down. Operators should inspect the screen and channel if the screen initiates a reverse run. Please feel free to call Claro for advice/help. Claro will set the torque detector at start-up.
- High Level Alarm: The control panel monitors the upstream level for a high liquid level. An alarm is issued if this setpoint is met (alarm signal available to Scada). The screening system continues to function in this scenario (i.e. no screen shut down).
- If present, an independent float switch may also be present, which can provide a back-up start signal, a high liquid level alarm of other function.

6.5 Reverse Operation

When the local HOA control station selectors are in Manual & Reverse, the screen will function in reverse until the spring-loaded selector is released. The spring return is implemented in order to ensure that the screen is not left running continuously and unattended for extended periods of time. When running in reverse, proceed with caution – start by jogging the screen in small reverse runs in order to verify that a possible issue does not cause damage to the screen. When operating in reverse ensure that the screen does not produce any unusual noise.

6.6 Other Elements

The local HOA control station should enable the screen to run in both forward and reverse. If the control panel has been supplied by Claro, this functionality will be available to the operator.

Manual operation should also be independent of PLC functionality. N.B. In this case, the thermal overloads function as the amperage/torque protection. As thermal overloads are not as sensitive as the electronic

safety equipment (Emotron / current transformer), manual operation should be effected with caution and with attention paid to the respective screen. Each piece of equipment should be supplied with its own local HOA station.

7. Settings

7.1 Default Values

Claro will provide initial start-up settings for your application. If you have comments or questions about control settings, please contact Claro – we would be glad to help and further outline the nature and rationales informing the controls equipment and controls set points. A record of final set points will be provided a short time after start-up once the screen has been submitted to the full range of flows at the facility.

7.2 Additional Settings

Intentionally Left Blank.

7.2.1 Septic Sludge Receiving Station

Claro will provide initial start-up settings for your septage application. If you have comments or questions about control settings, please contact Claro – we would be glad to help and further outline the nature and rationales informing the controls equipment and control settings.

7.2.2 Level Sensors

Please see catalog cut information describing the nature and typical installation configuration of the provided level sensor(s). If Claro has supplied the control panel & instrumentation, the level sensor(s) will be calibrated at start-up. Changing level settings is effected via the control panel HMI touch screen rather than at the level sensor or level sensor transmitter. Please only change level settings via the control panel touch screen since making alterations at the sensor probe or transmitter can disrupt the coordination between the control panel HMI and the level sensing equipment.

7.3 Operation Modes

The fine screen has four modes:

- Level Start Mode: the screen initiates a rotation based on the adjustable upstream start level.
- Timer & Level Mode: the screen initiates a rotation after an adjustable time delay. If the level sensor is functional/not in fault, the level sensor will also

provide a back-up start signal if the upstream level (or differential value) is met.

- Continuous Run Mode: the screen will run continuously if the upstream start level (or differential value) is maintained to the point where the screen makes a series of consecutive starts without an intervening pause. The screen will shift to continuous run after an adjustable number of these consecutive starts. Continuous run will end and the screen will shift back to normal operation once the upstream start level (or differential value) falls to an adjustable level that is lower than the start level.
- Differential Mode: Typically, the fine screen will operate on an upstream start level only. In certain cases, the design will call for a back-up differential start signal in addition to the upstream start level. In this case, the screen will start if the level differential (difference between the upstream level and downstream level value) is equal to or higher than the adjustable differential set point value.

- Please see HMI graphic touch screen shots & control narrative description in the appendices section included in this manual.

8. Settings

Check the following items before putting the fine screen into operation:

- Support legs are mounted and the screen is properly connected to the floor slab.
- The gap to each side of the screen frame and the channel walls (stainless steel tank) are effectively sealed by the screen's neoprene rubber seal strips.
- Chute between screen and downstream equipment is installed correctly & that there is no conflict between the moveable lamellae bar rack and the downstream equipment chute or other items.
- All electrical connections are complete according to local codes and tested, including the level sensor.
- All covers and protective plates are installed correctly.
- Warning signs are mounted on the fine screening system.
- Personnel have been instructed in the appropriate safety directives & procedures.

8.1 Test Run without Water (Dry Start-Up)

- Wet the screen with water in order to wash out dust that may have infiltrated in-between the spacers during construction. Use a regular hose with plant water pressure flow (e.g. 40 to 70 psi). Never use a pressure washer on the front of the screen since high pressure can dislodge the interspacers.
- Close the inlet gate in front of the screen (and the downstream gate, if applicable).
- Start the fine screen in manual: i.e. local HOA control station selectors in Man & Forward. Be prepared to stop the screen immediately if any concerning noise is heard. Note: One can use food grade spray-on cooking grease on the fine screen discharge in order to eliminate the temporary squeaking noise (if present) before actual screenings material will lubricate the discharge.
- Verify that the screen rotation is correct and that solids will travel toward the discharge when the screen is run in forward.
- Run the screen in forward continuously for a minute or two while checking the screen movement and for concerning noises.
- Switch the system to AUTO mode, simulate a level with a piece of cardboard or similar in order to trigger the screen, and verify that the screen stops in the home position (i.e. moveable lamellae and fixed lamellae aligned). In the home position, the fixed and movable bars shall be level – a deviation of a few millimetres, however, is satisfactory. The home position switch can be adjusted by moving the steel plate that is located in the cam that rotates under the home position switch

(inside the motor compartment). Ensure that the screen is locked out before adjusting the metal plate.

- Check that the downstream equipment starts after the pre-set number of screen rotations.

8.2 Test Run with Influent/Water (Wet Start-Up)

- Ensure that construction debris, tools & sand are removed from the channel before start-up. The Claro screen is very well-adapted to handle typical municipal influent, which contains sand, rags and other debris. If there is a wet well, however, ensure that it has not accumulated significant quantities of sedimented sand while it has been out of service. A high concentration of sand without a mixture of screenings that is pumped to the screen all at once can overwhelm the screen and cause the screen to jam. Contact Claro if you suspect this scenario is present. At start-up the Claro technician will verify for normal debris conditions: i.e. sand, rags, baby wipes, and other screenings, etc.
- Start the screen in Manual & Forward at the local HOA control station.
- Open the channel inlet gates or start the inlet pumps. Start the pumps gently if a VFD is present. If there are significant quantities of sand and other settled material, this initial start-up debris should be removed from in front of the screen. Pivot the screen out of channel with the aim of cleaning the channel. Debris, and especially rocks, should not be resident in front of the screen or in the area of the channel underneath the screen.
- N.B. Never lower the screen down on top of debris or rocks.
- Change from HAND to AUTO when the screen is judged to run properly. Observe that the screen runs normally and follows the correct control sequence.

8.3 Adjusting the Start Level

- The level sensor sends the signal to start the screen.
- Set the upstream start level to the value indicated in the technical submittal or installation drawings. Claro personnel will indicate the optimal start level. If the control panel is supplied by Claro, the start level is adjusted via the control panel HMI.

9. Regular Verifications & Maintenance

For maintenance inspection and/or maintenance work, all safety regulations must be followed. It is absolutely forbidden to carry out service or maintenance work on the fine screen while it is operation. Main power lock-out switch must be turned off and locked with a padlock.

9.1 Weekly

Check for the following items:

- There are no abnormal noises.
- There is no screenings accumulation at the screen discharge / downstream equipment inlet - clean if necessary.
- Home position proximity sensor is adjusted correctly (moveable bars align with the stationary bars after a screen rotation).
- There is no screenings material trapped in between the lamellae bars – clean if necessary.
- The bars do not have grease accumulation, especially on the curved step area – fat can cause screening material to roll back into the channel.
- The level sensor is actuating the screen at the correct level and that no debris, cobwebs or other element at the sensor interferes with proper operation.

9.2 Monthly

Check for the following items:

- No large accumulation of stones and gravel are found in the channel in front or underneath the screen. Pivot screen & clean channel as required. Check for accumulation on a monthly basis until a schedule can be determined. In most wastewater treatment plants, cleaning of the channel is performed every 8 to 12 weeks. It is the responsibility of the facility, however, to determine the proper schedule in order to avoid excessive grit and stone accumulation at the base and under the screen. If you have comments or questions on this point, please feel free to contact Claro. N.B. Never lower a fine step screen on top of rocks or

other debris. N.B. Never shovel accumulated sand and rocks from the channel bottom onto the screen as this can cause significant damage to the unit.

- Seals between the screen and the channel walls are in good working order.
- Screws and bolts are tight - tighten if necessary.
- The gear box does not leak oil.
- If present (on some taller screen models), automatic greaser at the upper bearings is filled with a satisfactory level of grease.

9.3 Yearly

A thorough review of the fine screen should be performed once a year.

Put the fine screen in manual mode and run the unit until all screenings material is removed from the lamellae bar rack. Lock out the power and clean the fine step screen – clean the lamellae, the side linkage system & the discharge area. Remove any accumulated grease and other debris. Clean the outside shell & covers of the screen for aesthetic and hygienic appearance.

N.B. When cleaning the screen never use a power washer on the lamellae bar rack since high pressure can remove UHMW interspacers.

In addition to the weekly & monthly verification tasks, please also check the following. Please contact Claro if you have any comments or questions regarding any aspect of the weekly, monthly or yearly inspection.

- All slide bushings and bearings are in good order.
- The gear box functions properly and does not leak oil. Change the gear drive oil if required. Please see attached gear drive O&M manual.
- Remove sediment present in the channel ahead and underneath the screen.
- Verify the aperture width and straightness of the lamellae bars – straighten bars if necessary. Verify the general health of the bars.
- Check the lower part of the fine screen lamellae bar rack – the deflector plate, hinge pins, springs, retaining washers & cotter pins. Replace any of the elements if required. Check also for missing UHMW interspacers – replace any that are missing.
- Test the operation of the torque guard (i.e. by lowering its set point via the control panel HMI and observing the screen shift to its reverse run sequence).
- Check the movement of the screen lamellae i.e. make certain that the top of the fixed bars are aligned with the movable bar package when the moveable bars are in their home position. Verify that the moveable

bar rack makes a smooth circular motion with no sudden drop or irregular movement. Irregular movement can indicate bushings or stub shaft wear. Inspect linkage drive system.

- Check if there is wear on the stub shafts or other linkage system elements.
- Check for corrosion on stainless steel parts. Corrosion of stainless steel may occur as a result of externally occurring rust or coatings, dirt, chemicals, H2S or other residues. Claro can recommend an easy-to-use and ecological passivator (based on citric acid) if corrosion is a concern.
- Verify protective paint coatings on motors, gear drive and related equipment. If present, repair damage with appropriate touch-up paint.
- Check for damage to electrical cables, cable connectors and seals, junction boxes or similar. Electrical cabling or other damage must be repaired by a certified electrician before putting the fine screen back in operation.

The Claro fine screen's wearable parts typically have an exceptionally long service life. Life span of wear parts, however, will depend on the machine's working load, the amount of sand and gravel, etc. Always strive to restrain the operation of the screen when setting the controls for the lowest possible run times. If you have comments or questions, please feel free to contact Claro – we are here to help !

Before restarting operation of the fine step screen, all protective covers must be reinstalled & safety equipment operational.

Disassembly

N.B. Before reading or acting on this section, personnel must review Section 2: Safety.

9.4 Before Starting the Disassembly

- Put the screen in manual mode and run until the machine is free of screenings debris.
- Turn the screen off and lock out power in order to ensure that the screen does not start while maintenance/disassembly is being performed.
- Clean the machine.

9.5 Disassembly

- Disconnect all electrical connections and cables. Follow the instructions in the section that covers electrical installation.
- Remove covers and protective plates.
- If necessary, disassemble chutes to the downstream screenings handling equipment.
- Connect the lifting device as instructed in the section that covers pivoting/lifting the screen.
- Remove the support legs assemblies.
- Gently lift the screen up from the channel and check that the screen is not damaged while it is being lifted out of the channel.

We recommend that disassembly and significant repairs be carried out by the manufacturer or manufacturer's qualified service representative.
Please contact Claro for any questions regarding service & maintenance.

9.6 Disposal

All parts should be recycled/disposed of in accordance to the applicable regulations. Stainless steel parts can be recycled according to the governing regulations. Disposal of consumables, such as oil, shall be in accordance with applicable local regulations

10. Components / Spare Parts Drawings & Spare Parts List

Please see appendices section for equipment drawings, spare parts drawings & project layout drawings.

Claro™

ENVIRONMENTAL TECHNOLOGIES & EQUIPMENT

claroglobal.com

Claro Wash Press

O&M Manual

Installation – Operation – Care

Electronic Copy

Bookmarked PDF

Claro

Screening & Grit Removal

Wash Press Screw Compactor

Claro is pleased to offer a high-quality wash press screw compactor for the effective washing, dewatering, compaction, & transport of screenings. Screenings are well-cleaned of organics, dry, diminished in disposal volume, & deposited into an optional hygienic bagger that automatically unfolds into receiving bin. Robust & versatile construction. Fully-enclosed & odor-controlled.

Standard capacity sizes & configurations are available to meet a broad range of application scenarios. Hundreds of installations. Screw press compactor also available without washing feature.

Wash Press Screw Compactor

Wash Press Screw Compactor (Assomption WWTP, QC)

Design features & advantages

- Effective washing with a very compact footprint
- Integrated heavy-duty thrust bearings & a high-torque drive unit to assure optimal dryness & compaction of screenings material
- Slow transportation of screenings for gentle, thorough washing without maceration
- Completely enclosed, odor-controlled hygienic operation
- Robust screw press compactor unit including double-body construction
- Tight tolerances between screw & trough delivers superior process performance
- Only one moving part: a special alloy steel spiral
- Easy access for inspection / maintenance of wash & press zone: unit easily dismantles at both front & back end
- No maintenance-prone wedgewire & no wearable brushes to replace
- Long compaction tubes up to 6 m. (20 ft.) in length for transport of screenings – can eliminate conveyor
- Optional hygienic bagger
- Complete systems for sole-supplier responsibility

Hygienic Bagger System

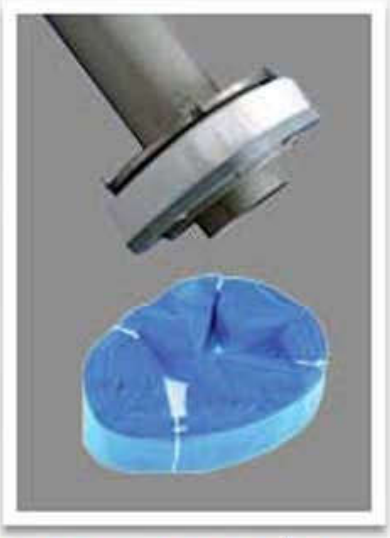
Claro provides hygienic baggers that isolate screenings or other reject materials in a continuous, tubular plastic bag that automatically unfolds into a standard receiving bin. Favored by facility operators, the bagging unit prevents contact with reject materials & promotes a hygienic, odor-controlled working environment.

Composed of a stainless steel & resilient ABS plastic dispenser and a 3-ply 90 m. (295 ft.) bag magazine cartridge, hygienic baggers are mounted at the end of wash press compactor, grit classifier, conveyor, & other discharge tubes and chutes. When the bin is filled, the bag ties off at both ends with a tie-wrap similar to a sausage—closing the filled bag & providing the new bag section with a closed bottom.

Design features & advantages

- Used for screenings, grit, & other reject materials
- Isolates operators & work environment from reject material & odors
- Bag magazines 90 m. (295 ft.)
- Automatic operation—bag unfolds/unwinds into bin under weight of bagged material
- Standard & custom dimensions available
- Mounted on wash press compactor, grit classifier, conveyor, & other discharge points
- Bag easily ties off at both ends when bin is filled & ready for disposal

Hygienic Bagger with 90 m. / 295 ft. Long Bag Magazine



Hygienic Bagger Dispenser and Bag Magazine

Contents

1. About the Wash Press 5
1.1 Structure & Function 5
1.2 Use 6
2. Safety 6
2.1 General 6
2.2 During Operation 7
2.3 Lifting the Equipment – General 7
2.4 Machine Safety Protections 7
2.5 Electrical Work 8
3. Storage, Transportation & Packaging 9
3.1 Scope of Delivery 9
3.2 Storage 9
3.3 Transportation 9
3.4 Packaging 9
4. Functional Description 9
4.1 Principle of Operation 9
4.2 Operation 10
4.3 Manual Operation 11
5. Assembly & Installation 13
5.2 Electrical Installation 16
6. Start-up 17
7. Trouble-Shooting 18
7.1 Warning or High Amperage Alarm 18
7.2 DS Content of Treated Screenings Too Low 19
7.3 Water Remaining in the Wash Press Inlet or Drainage Area 19
7.4 Back-up of Screenings Material in Wash Press Inlet 19
8. Regular Verifications & Maintenance 20
8.1 Weekly 20
8.2 Monthly 20
8.3 Yearly 21
9. Disassembly 22
9.1 Before Starting the Disassembly 22
9.2 Disassembly 22
9.3 Disposal 22
10. Components / Spare Parts Drawings 23

Introduction

The Claro Operation & Maintenance manual is intended to provide operations staff a clear description of the wash press and its parts. This manual also contains important instructions on how to install & start-up the wash press as well as maintenance advice. All who come in contact with the wash press system shall comply with the safety precautions, warnings, regulations and other instructions in this manual as well as local provincial/state and facility regulations and safety practices.

This Operation & Maintenance manual must be available to all personnel involved in the wash press system's installation, commissioning, operation, service / maintenance and transportation.

Claro Environmental Technologies assumes that the personnel responsible for or working with this equipment are familiar with local regulations regarding the work safety environment and especially safety regulations and practices for sewage treatment plants and other applicable regulations.

Never start installation or assembly prior to reading and fully understanding the contents of this manual. The safety instructions and warnings are especially important. If personnel have any comments or questions, please feel free to contact Claro.

It is forbidden to use the wash press in any other manner or for purposes other than those described in this manual.

N.B. Claro cannot be held responsible for damage caused by negligent handling of the machine or neglect of the directives outlined in this manual. If personnel have comments or questions, please feel free to contact Claro. We are here to help !

Claro's responsibility is limited or ceases once:

- The machine or any individual component is loosened or disassembled without Claro consent and/or advice

- Parts that do not belong to the wash press are integrated into the machine
- Parts that are not original spare parts are installed without Claro's approval

Modification, renovation or re-build of the machine is not permitted without written consent of Claro Environmental Technologies. Please feel free to contact Claro for advice. We are here to help !

1. About the Wash Press

The Claro wash press, model TP, is designed to wash, dewater and transport captured material (i.e. screenings) from mechanically screened wastewater or process water. The wash press is designed for automatic operation and starts automatically based on the control narrative and set point value settings.

The model TP wash press is available in different sizings/models – the diameter of the unit can vary and the inlet length can also vary.

The model number format is as follows:
e.g. TP 150-500 (model diameter - inlet opening length in mm)

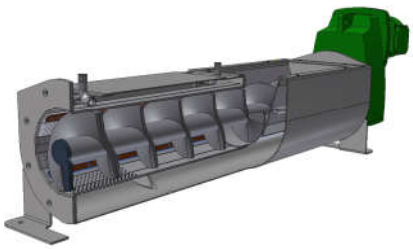
1.1 Structure & Function

The machine consists of two main parts:

1. Motor including gear drive unit, Figure 1.
2. Machine body including wear bars and transport screw, Figure 2.

The machine consists of a separate drive station package that includes gear drive and motor. Between the gear drive and transport screw is an axial bearing. The bearing is lubricated automatically with an automatic greaser cartridge.

Figure 1, drive unit



The screenings are accumulated in the inlet and are then transported by the screw into the washing zone where soluble organic material is washed off the captured debris. Then the screenings are dewatered in the press zone and finally transported out through the discharge pipe.

Figure 2, Wash press body incl. wear bars and transport screw

1.2 Use

The Claro wash press TP is used to wash, dewater and transport captured material (i.e. screenings) from mechanically screened wastewater or process water. The screenings typically are discharged into the wash press from a mechanical screen or filter.

The wash press is typically used in one of the following applications: municipal and industrial wastewater treatment plants, paper industry, food industry, tanneries and textile industries.

It is forbidden to use the wash press for any other purpose than the above without written consent from Claro.

2. Safety

The safety section contains important safety information and should be followed closely. There is a risk of personal injury or other damage if the safety instructions are not followed.

Before any work is started, the personnel who will perform the work or related personnel must read this safety section.

2.1 General

- It is forbidden to use the wash press for other than its intended purpose.
- Personnel can be injured if the wash press is employed for other than its intended use and when personnel with inadequate knowledge of the system manipulate, engage with or operate the machinery and/or control elements.
- All personnel who operate the machine must have read and understood this manual, especially the safety section.
- Rebuilding and/or modification of the machine is prohibited without written consent from Claro. Please feel free to contact Claro – we are here to help !
- Exercise caution when lifting the unit; never walk under a suspended load. Also be careful when disassembling/manuipulating a full wash tube – the tube is heavy when full of screenings.

- Before cleaning, servicing or dismantling, the motor power lock-out switch and/or the control panel must be turned off and a padlock installed.
- In addition to the directives specified herein, the safety regulations and practices that apply at the local plant shall be followed. State, provincial and/or country regulations shall also be followed.
- All warning signs shall be maintained in the same condition as when the screening, conveyor &/or wash press system was delivered.
- All wash press protecting elements and covers must be mounted and locked / bolted in position before starting the wash press system.
- The wash press, including the discharge tube support(s), must be firmly attached to the machine and to the floor slab (or to the back of the stainless steel tank) before starting the machine.

2.2 During Operation

- Work on the wash press is forbidden when it is in operation.
- Keep in mind that the machine starts automatically without notice.
- Protective plates and covers shall be installed and bolted in position.
- Inspection cover at the fine screen discharge/wash press inlet can be opened, however, it is forbidden to touch or otherwise engage with moving parts such as the wash press spiral.

2.3 Lifting the Equipment – General

- Use only approved lifting equipment and check the maximum load of the lifting equipment before lifting begins.
- Use caution – do not work or walk under suspended loads.
- The machine must only be lifted at the designated lifting lugs.
- Lifting equipment must not be removed before the machine is properly bolted to the floor slab (or stainless steel tank).
- For details on the lifting procedure, please see "Lifting the Equipment – Details," Section 5.1.1.

2.4 Machine Safety Protections

The wash press is equipped with an easily-removable (quick-release) cover located above the washing and dewatering zone. The inlet is provided with a frame flange that can be used as the basis of an inlet chute if not already supplied with the wash press unit. The inlet must always be provided with an inlet chute, which will also protect against contact with moving parts of the machine while it is in operation.

The wash press is equipped with inspection covers. These should always be mounted and secured when the machine is in operation.

Loose items that are not typical screenings debris (such as tools and other items) can cause injury as well as damage to the machine.

WARNING: The wash press and connected equipment start automatically and without notice. An HOA station for manual operation shall be provided local to the wash press. Ideally, the operator will be able to see the effect of manual operation.

It is forbidden to clean the fine screen discharge or the downstream equipment's (i.e. wash press) inlet by hand or with a tool without the safety power lock-out switch turned off and locked with a padlock.

2.5 Electrical Work

Electrical work must be performed by a licensed electrician and in accordance with applicable laws, regulations and rules. Work shall also be carried out in accordance with local regulations.

- To avoid accidents including fatal electrical shock, it is important that the electric motors, instruments and cables are in good working order with no breaks or other anomalies.
- Electrical cables should be routed so that there is no risk of wear against the fine screen's stationary or moveable parts.
- All equipment and instruments should be grounded. Humid environments and water screening applications carry an increased risk of accidents caused by electric current. Remember that the screening system is a high voltage system.
- When replacing or repairing an electrical component, the power supply must always be turned off and the relevant switch and/or breaker element padlocked before starting work.

It is forbidden to connect the machine to a live electrical power source while installation or other work on the machine is in progress.

3. Storage, Transportation & Packaging

3.1 Scope of Delivery

In addition to the wash press the following elements are included in a typical delivery:

- One (1) plastic or rubber plug for the wash press reject water outlet / drain.
- One (1) automatic greaser cartridge for the axial bearing.
- Two (2) solenoid valves for wash / flush water (option: other valve type).
- Two (2) ball valves for wash / flush water and solenoid isolation (option: other valve type).

3.2 Storage

Storage of the machine may be made for a short period and only in / on its original packaging. Ensure that the wash press is stored in an indoor environment and not exposed to freezing. If outdoor storage is unavoidable, please contact Claro. Before the wash press unit is kept in storage for a longer period, please contact Claro for storage instructions.

3.3 Transportation

Transportation shall be made in a manner in order that the fine screen is secured from falling or other mishap damage. Lifting the machine over personnel is absolutely forbidden. Suitably trained staff should perform lifting, loading, load securing, unloading and driving of the transport truck.

3.4 Packaging

The packaging (pallets or crating) is specially designed and adapted for the delivered wash press equipment and provides maximum protection. Ensure that the packaging is not damaged when you receive the delivery. If the packaging is damaged, please document with photographs & contact Claro.

4. Functional Description

4.1 Principle of Operation

Captured screenings are discharged from a mechanical screening device, such as a step screen, and deposited into the inlet of the wash press. This captured material is then transported by the wash press screw to the washing zone where organic material is washed off the screenings. The screenings are subsequently dewatered in the press zone as they are pushed against an already extant screenings plug in the wash press

discharge tube. These treated screenings are transported via the discharge tube to an optional hygienic bagger and into an associated receiving bin. When the screenings are pushed against the screening plug, organics are pushed through perforations that are located at the discharge end of the washing zone tube. These removed organics are then conveyed down the drain by flushing jets. Washing and flush water connections are found on the top or on the sides of the wash press body (please see drawings in the appendices sections of this O&M manual).

4.2 Operation

The wash press is operated via a control panel, which is typically included in the equipment delivery from Claro

In order to obtain a clean high and consistent DS content product, it is important to know the amount of screenings being inputted into the wash press inlet. With a step screen this volume is predicable and the washing settings of the wash press can be determined in consequence. An adjustable number of fine screen rotations/discharges cue the operation of the wash press. Since the volume of each rotation is consistent, wash press operation can be optimized. A level sensor positioned in the wash press inlet can be used when other screen types are utilized.

4.2.1 Automatic Operation

1. When all selectors are in Auto and the screen reaches the adjustable wash press start set point (i.e. number of screen rotations/discharges), the wash press will start its treatment cycle (or a level sensor will sense the level of screenings material in the wash press inlet if a level sensor start signal approach is implemented). Please see control narrative in the appendices section for an itemized breakdown of the wash press treatment cycle. The general control pattern and principal of operation, however, is as follows:

2. At its start signal, the wash press will begin with an initial screw feed time that moves the screenings located in its inlet to the edge of the washing tube. This initial washing time is effected without wash water usage in order to diminish water resource use.

3. Next, the washing solenoid (Solenoid #1) is turned on while the screenings material travels through the washing tube. The solenoid pummels the material and removes soluble organic material. The operator can choose between a washing mode without pauses or with pauses. The with-pauses mode increases the washing residence time of the screenings.

4. Next, the washing solenoid is turned off and the screenings are transited by the screw and pressed against the already present screenings plug that is

located in the wash press discharge tube. These already treated screenings present counter pressure to the new transited screenings. This enables the compaction and dewatering of screenings and the evacuation of organics material through the washing tube's perforations under pressure.

5. Next, the screw stops while the flushing solenoid (Solenoid #2) flushes the outside of the washing tube and thus conveys the organics material down the wash press drain and to the screening channel or an appropriately designed floor drain. This organics material is subsequently treated by the downstream unit process(es). The wash press then ends it treatment cycle and waits for the next start signal.

4.3 Manual Operation

When the local HOA control station selectors are in Manual & Forward, the wash press will function in forward until the spring-loaded selector is released. When the local HOA control station selectors are in Manual & Reverse, the wash press will function in reverse until the spring-loaded selector is released. The spring returns are implemented in order to ensure that the wash press is not left running continuously and unattended for extended periods of time in forward and especially in reverse.

The washing & flushing solenoids can be operated from the Claro-supplied control panel HMI when the wash press's local HOA control station is in the Manual position (i.e. buttons appear for manual operation on the respective HMI graphic touch screen).

Note: The local HOA station also typically incorporates an E-stop push button that stops the wash press for operator safety.

4.3.1 Overload/Alarms

- If the overload protection (current transformer or, secondarily, the thermal overload) is tripped, the wash press stops and the control panel signals an alarm. There are two high amperage alarms, a warning level and a high shut-off level.
- A low amperage alarm may also be employed. Low amperage alarms can detect a broken coupling or spiral detachment.
- If the E-stop is pressed on the local HOA control station, the wash press stops and the control panel signals an alarm.
- If a level sensor is employed, a high material level in the inlet will cause the control panel to signal an alarm. In some applications, the wash press will also shift into continuous run mode.

4.3.2 Other Elements

The local HOA control station should enable the wash press to run in both forward and reverse. If the control panel has been supplied by Claro, this functionality will be available to the operator.

Manual operation should also be independent of PLC functionality. N.B. In this case, the thermal overloads function as the amperage/torque protection. As thermal overloads are not as sensitive as the electronic safety equipment (Emotron / current transformer), manual operation should be effected with caution and with attention paid to the wash press.

Each piece of equipment should be supplied with its own local HOA station.

4.3.3 Pre-Set Values

Claro will provide initial start-up settings for your application. If you have comments or questions about control settings, please contact Claro – we would be glad to help and further outline the nature and rationales informing the controls equipment and controls set points. A record of final set points will be provided a short time after start-up once the wash press, and the screening system as a whole, has been submitted to the full range of flows at the facility.

4.3.3.1 Operating modes

The wash press has two modes:

With-Pauses Mode: a control sequence that transports the screenings through the washing zone via an adjustable number of adjustable screw run/pause cycles in order to increase the residence time of the screenings under the washing influence of the solenoid #1 water jet.

Without-Pauses Mode: a control sequence that moves the material through the washing zone and under the influence of the washing jet without pauses. Typically the without-pauses approach effectively cleans the screenings. The with-pauses mode is provided in order to better address especially high loads of organics that have not been broken up during its transport by the collection system (e.g. when waste arrives whole from domestic toilets close to the facility).

Adjustment of wash press settings is an incremental process since the results of a controls adjustment will only be fully seen several weeks after the change. When screenings are washed more, they experience more friction against the inner surface of the discharge tube. With more friction, the screenings will be drier and then, in turn, experience additional friction. This feedback loop will continue until a natural stabilized level is established. The lead time for this type of stabilization can be between 2 and 4 weeks.

When starting the wash press it is best to start with minimal washing and then follow with incremental augmentations in organics removal. This is especially important with long discharge tubes of 4 to 6 meters in length. Claro will advise on the initial settings for the wash press. If you have comments or questions, please feel free to contact Claro.

5. Assembly & Installation

Experienced installation personnel must carry out the installation in a professional manner. All electrical wiring must be performed by a qualified electrician and must comply with current CSA, UL or other applicable regulations.

For ease of installation and future service and maintenance it must be possible to lift the machine (overhead beam, overhead lifting lugs, davit crane or equivalent). The lifting device must be approved and adapted to the machine weight. The weight of this machine is indicated on the nameplate.

Before lifting the machine, check the following:

- The wash press supports should not be installed too close to the channel edge. Follow the project drawings regarding the placement of wash press supports. Ensure that the concrete is in good condition for the purpose of supporting the wash press weight.
- Power must be switched off and the switch locked with a padlock. Cabling must be disconnected.

5.1.1 Lifting the Equipment -- Details

- Use only approved lifting equipment and check the maximum load of the lifting equipment before lifting begins
- Use caution – do not stand or extend limbs under suspended loads.
- The machine must only be lifted at the designated lifting lugs or lifting points – please see Figure 3 (lifting lugs are located on the gear drive & a strap/belt can be used at the wash press discharge flange).
- Lifting equipment must not be removed before the wash press is fastened to the floor slab.

• Please following page →

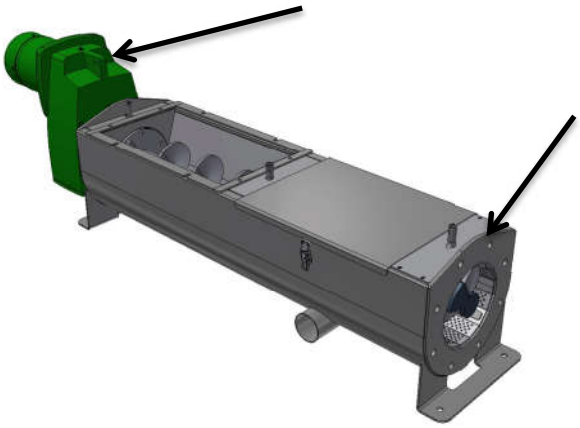


Figure 3 Lifting the machine, arrows showing lifting lug and placement of lifting belt

5.1.2 Installation

Position the wash press in the desired location (as per contract drawings) and bolt it onto the floor slab (or, for in-tank configurations such as septage stations, install the wash press onto the provided support that is typically an integrated part of the screen tank). Install any other loose supports. Please see project drawings included in the appendices section of this manual.

Connect the drain pipe for reject water on the desired side of the wash press. Install the provided plastic or rubber plug on the un-used drain. Add a bead of silicone to create a water-tight seal, if required. Note: drain is not under pressure. The drain piping for an in-channel screening system installation typically consists of a rubber sleeve, two (2) stainless steel gear clamps & a short length of PVC tube. These elements are supplied by the installing contractor.

The drain pipe should be installed with as large a slope as possible in order to best promote drainage. The drainage pipe should also be as short as possible and drain downstream of the screen & wash press. Note: for systems with two screens that discharge screenings into a common wash press, please contact Claro for advice on the drainage pipe configuration. The configuration should enable drainage to either of the 2 channels as preferred. This flexibility will allow operators to shut down either channel and to direct drainage water to the remaining duty channel.

For wash presses that form part of a Claro in-tank screening system (e.g. septage stations), the wash press will either drain back into the tank or into a separate drain. If drainage is to the tank, Claro will have provided a flexible drain pipe & gear clamps for installation. If the drain is to a separate drain, the contractor provides the requisite piping. Note: the drain must be

designed to accommodate reject water that will contain organic solids i.e. with sufficient slope and a minimum number of elbows in order to avoid solids sedimentation and the risk of blockage.

The wash press must be installed perfectly level. The wash press must not be installed at an inclination that promotes wash water to run towards the drive end of the unit.

Connect the wash water for washing and flushing. The washing connection is located towards the drive end of the unit. The flushing connection is located towards the discharge of the wash press unit. The wash/flush water supply is configured as follows: a main wash water supply is equipped with a pressure gauge and its isolation valve and then splits into two lines via a T connection. These two lines are each equipped with an isolating ball valve & a solenoid valve. Note: if the wash/flushing water is non-potable (e.g. plant final effluent (FE) or well water), a 50 mesh filter must be installed on the supply line upstream of the pressure gauge. This filter can be a Y-strainer or other in-line filter. If a Y-strainer, the filter basket voiding connection should be equipped with a ball valve and a drain pipe that empties into the channel, appropriate drain or tank. Y-strainer voiding can be automated via the Claro control panel.

The diameter of the wash/flush connections are provided in the scope of supply section of this manual (please see appendices section below) & in the technical submittal. Solenoids, isolating ball valves, pressure gauge & isolating ball valve, and Y-strainer & ball valve (if applicable) are typically provided by Claro. Please check scope of supply section and the project technical submittal.

The recommended minimum/maximum water pressure is 55 to 75 PSIG (4 – 5.2 bar). Higher pressures should be regulated by a pressure regulator provided by others.

Install the automatic greaser cartridge on the provided connection near the wash press gear drive. The automatic greaser lubricates the axial bearing. Set the automatic greaser cartridge to 12 by turning the selector located on the top of the cartridge.

5.1.3 Installing Auxiliary Equipment

The wash press must be equipped with an inlet chute and a protective discharge/inlet cover that precludes operator contact with moving parts of the wash press. The unit must not be placed into operation before this and other protective safety elements are properly installed.

The wash press pipe is connected to the outlet via a PN10 flange. The wash press piping system design must be developed in coordination with Claro and will be provided with either a floor support or lifting lugs for support from the ceiling. If a ceiling-mount configuration, the ceiling brackets and supporting cable/chain are provided by others.

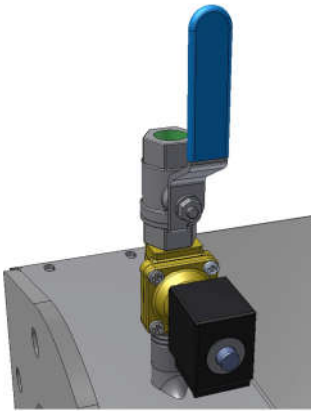
5.2 Electrical Installation

Electrical work must be performed by a licensed electrician and in accordance with applicable rules, regulations & laws.

Before reading and acting on the information in this section, please read section 2.5 in its entirety in order to ensure personnel safety. Please also see Claro As-Built control panel drawings, if a control panel has been supplied by Claro.

5.2.1 Electrical Connections

Please review control panel As-Built drawings. The wash press typically has the following electrical connections:



- Wash press motor.
- Two (2) solenoid valves.
- Typically there is also a local HOA control station with MAN/Off/Auto + Forward/Reverse selectors + E-Stop.
- The wash press will also have a motor lock-out located either on the control panel door or as a separate local station.
- Note: install all electrical wiring connections in a manner that provides clear access to the wash press and in a manner that does not obstruct the removable cover or its quick-release clips.

Figure 4 (above right). Solenoid & ball valve mounted on flushing connection of wash press; alternate placements are also acceptable – please ensure that the ball valves can be opened and closed without obstruction & that the removable cover of the wash press and its quick-release clips are not obstructed.

6. Start-up

Check the following items before putting the wash press into operation:

- All connections are properly fastened and that the machine is properly bolted to the floor slab or screen tank.
- Washing/flushing water connections, solenoids & auxiliary equipment are connected and functional. Also, ensure that wash/flush water is available. Verify for leaks.
- Wash press drain piping and drain plug are installed. Verify for leaks.
- All electrical connections are complete and verified.
- Check the rotation of the screw - screenings should be transported towards the discharge of the unit when run in forward.
- Inlet chute is installed.
- Press pipe including support is installed and properly bolted to the floor slab.
- All covers and protective plates are fitted & installed correctly.
- All warning signs are installed.
- The wash press inlet chute is located in the proper relationship to the discharge of the upstream screening equipment. Captured screenings should fall into the wash press inlet without hang-up and the inlet chute should not obstruct the screen's moving parts. Claro will suggest the proper location of the fine screen in relation to the downstream equipment. If you have comments or questions, please feel free to contact Claro.
- If applicable, please also see screen manual for additional start-up instructions.

7. Trouble-Shooting

General: The wash press's motor amperage is monitored with a current transformer (CT) that is installed in the control panel or in the Motor Control Center (MCC). Please see As-Built control panel drawings for more information regarding amperage protection equipment. The following trouble shooting comments are fully applicable if Claro has supplied the control panel. If you have comments or questions, please feel free to contact Claro. We are here to help !

7.1 Warning or High Amperage Alarm

If the warning amperage level is attained and the high amperage shut off level alarm is not triggered, the wash press has not reached its full FLA. Only an alarm will be issued and the wash press will continue to function. If the shut-off level has been attained, the wash press will automatically fall into fault, shut-down and alarm.

In either of these conditions, verify that no over-size debris has entered into the wash press inlet. Before removing debris, lock the wash press out of operation in order to ensure against personnel injury.

If the inlet is free of debris, verify that all wash press tube flanges are perfectly centered, including at the wash press discharge. The pipe system should not present a raised inner lip to the compacted screenings. The inner lip, which results from a flange offset, will counteract the flared design of the wash press tube & can cause over-compaction and plugging of the discharge tube. Note: incorrect installation of the wash press tube typically does not present higher amperage readings immediately. Amperage may reach alarm levels only after a period of operation.

If the wash press has not reached its shut-off level, it may be possible to push material through the tube after its installation is corrected. If this is not possible, disassemble and empty the tube of screenings.

If all discharge tube flanges are centered perfectly and the shut-off alarm level has been attained, the tube must be dissembled and emptied of screenings material. After the tube is correctly reinstalled, reduce washing time and/or increase the number of screen rotations/discharges set point (i.e. allow a larger volume of screenings to enter into the wash press inlet before the wash press initiates its treatment cycle). This will diminish washing, friction and backpressure against the wash press motor. Washing can be augmented slowly, however, the effect of each change in settings should be observed for 2 - 3 weeks before settings are changed again. Monitor motor amperage. If there are comments or questions, please feel free to contact Claro.

7.2 DS Content of Treated Screenings Too Low

Increase washing residence time and / or decrease the number of screen rotations/discharges between each wash press treatment cycle. N.B. Change only one parameter at a time and observe results over time. Remember that the screenings has a residence time in the discharge tube. If there are comments or questions, please feel free to contact Claro. We are here is help !

7.3 Water Remaining in the Wash Press Inlet or Drainage Area

Water may be backing up in the inlet due to clogged wash press washing tube perforations or a clogged drain. In this instance, perform the following maintenance:

Open the cover above the washing / pressing zone and clean/remove all debris from around the tube, the drainage area, and the drain pipe.

If this area has accumulated material, increase the flushing time (solenoid #2).

Ensure that wash water pressure is adequate and that the washing jets located under the cover of the wash zone and the inlet perforated plate drain are in good working order.

A small amount of water in the trough after the end of a wash cycle is normal. This area, however, should not experience flooding.

7.4 Back-up of Screenings Material in Wash Press Inlet

If screenings build-up in the wash press inlet verify the following:

Ensure that the wash press starts is treatment cycle after a reasonable volume of material enters into the inlet. Claro will advise on correct volume in your application.

Ensure that the screenings material does not include an atypically large plug/quantity of grease (e.g. illegal discharge from restaurant grease trap), congealed plugs of polymer or similarly gelatinous material. If present, remove material and/or contact Claro for advice.

If the screenings are normal and fail to be transported out of the inlet, remove the discharge tube and verify the health of the wash press wear bars and screw. Worn wear bars and/or screw can cause screenings to accumulate within the wash press inlet.

8. Regular Verifications & Maintenance

For maintenance inspection and/or maintenance work, all safety regulations must be followed. It is absolutely forbidden to carry out service or maintenance work on the fine screen while it is in operation. Main power lock-out switch must be turned off and locked with a padlock.

8.1 Weekly

- During the initial start-up period, remove the cover above the wash / press zone in order to adjust the flushing time (Solenoid #2). If debris build-up is experienced, flushing time can be increased.
- The machine runs without irregular noise.
- Remove the cover above the wash / press zone and rinse/clean, if necessary. Make sure the reject water drain is free from debris. Clean if necessary.
- Check that the wash press inlet & inlet chute are free of screenings material. Clean if necessary.
- If implemented, check how much hygienic bag length remains on the automatic bagger unit. Ensure that a replacement bag is available if the bag is nearing full use. Additional bags can be ordered from Claro.

8.2 Monthly

- Verify that there is grease in the automatic greaser cartridge. Replace if necessary and set the lubrication cartridge setting to 12 months by turning the selector on top of the cartridge. Grease cartridges can be ordered from Claro.
- Verify that no oil is leaking from the gear drive unit.
- Verify the function of the solenoid valves.
- Clean the wash press as required for proper function and hygienic appearance.

-

8.3 Yearly

A thorough review of the wash press should be performed once a year.

Run the machine in manual (or) trigger wash press sequence(s) at the Claro control panel until the inlet and washing/compaction tube is completely empty.

Shut down & lock-out the wash press for operator safety.

In addition to the weekly & monthly verification tasks, please also check the following. Please contact Claro if you have any comments or questions regarding any aspect of the weekly, monthly or yearly inspection.

- Gear box functions properly. Change oil if required. Please review gear drive manual included in this manual.
- Remove wash press tube from wash press discharge in order to inspect the health of the screw and the wear bars. Also, inspect screw and wear bars from the perspective of the wash press inlet. Ensure that all wear bar retaining bolts are in position. Retaining bolts are visible by removing the wash press quick release cover. Note: verify wear bar bolts for wear bars located on the lower portion of the wash/press tube.
- For models TP 250 & TP 300, verify wear on the cog sprockets & double chain where the drive shaft and spiral coupling disc meet. For models TP 150 & TP 200, verify the drive shaft/spiral coupling disc star coupling and its opposite mating plate. Please see drawings in the appendices section of this O&M manual.
- Check for corrosion on stainless steel parts. Corrosion of stainless steel may occur as a result of externally occurring rust or coatings, dirt, chemicals, H2S or other residues. Claro can recommend an easy-to-use and ecological passivator (based on citric acid) if corrosion is a concern.
- Protective coating on motors, gear drive and related equipment. Repair damage. Touch-up with paint as required.
- Check for damage to electrical cables, cable connectors and seals, junction boxes or similar. Electrical cabling or other damage must be repaired by a certified electrician before putting the wash press back in operation.

Before restarting operation of the wash press, all protective covers must be reinstalled & safety equipment operational.

9. Disassembly

N.B. Before reading or acting on this section, personnel must review Section 2: Safety.

9.1 Before Starting the Disassembly

- Put the wash press in manual mode (or) trigger wash press sequence(s) and run until the machine is free of screenings debris.
- Turn the wash press off and lock out power in order to ensure that the wash press does not start while maintenance is being performed.
- Clean the machine.

9.2 Disassembly

- Disconnect all electrical connections and cables. Follow all safety rules and precautions.
- Remove all water supply pipe connections and chutes.
- Carefully remove the discharge tube & empty of screenings – N.B. tube is heavy when full of screenings. Ensure that the proper lifting equipment and personnel are available.
- Connect the lifting device as described in the equipment lifting section.
- Unbolt the wash press from the floor slab or screen stainless steel tank.

We recommend that disassembly and significant repairs be carried out by the manufacturer or manufacturer's qualified service representative. Please contact Claro for any questions regarding service & maintenance.

9.3 Disposal

All parts should be recycled/disposed of in accordance to the applicable regulations. Stainless steel parts can be recycled according to the governing regulations. Disposal of consumables, such as oil, shall be in accordance with applicable local regulations

10. Components / Spare Parts Drawings

Please see appendices section for equipment drawings, spare parts drawings & project layout drawings.

Claro™

End of Proposal Document (R0)