

MAELOR FOODS

HYDRO INTERNATIONAL

SLUDGE SCREW PRESSES
PLATFORM & BUILDING



HYDRO INTERNATIONAL



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29th August 2022

Ref: Hydro 2No. 400 Screw Press with Flocculation Tank & Polymer Make-Up unit Complete with, Prefabricated Building and Galvanised Platform

Dear Sean,

Further to our discussions please find below the supply and installation of 2No. Hydro 400 Screw Press Unit for the dewatering of the combined DAF and WAS sludge.

Design Basis for Maelor Foods Sludge Dewatering

- The existing DAF Sludge and Waste Activated Sludge are mixed in the existing Sludge Holding Tank.
- Currently 6 to 9 tankers per week at 30 m³/tanker remove wet sludge from the site.
- 9 tankers x 30 m³/tanker = 270m³/week wet sludge = ~40 m³/day over 24-hours = 1.6 m³/hour
- Doubling the production capacity from 1m to 2m birds/week = 'worst case' approximately doubles the sludge production at the wastewater treatment plant, therefore 3.2 m³/hour.
- Hydro Double Screw Press is capable of dewatering 8-12 m³/hour of wet sludge depending on solids loading.
- The dewatered sludge cake produced will be 18-22% Dry Solids.
- Completely automated operation with the operating principle of consistent 'slow and steady'. The Screw Press system will simply start and stop based on the level in the Sludge Holding Tank.

Therefore, Hydro double 400 will be more than capable of handling the future sludge dewatering capacity of the wastewater treatment plant.

Sludge Screw Press

Sludge Screw Press Scope of Supply:

1. New Duty/Standby Progressive Cavity Sludge Pumps, VSD controlled, with dry running protection to match the new Screw Press flow rate requirements. New suction line from Sludge Tank, new pressure level sensor, new concrete pad for pumps and new sludge delivery line to Screw Press Building, power & signal cable ducting/tray.
2. 1No. Galvanised Access Platform with Galvanised Stairs and Handrailing to position the Screw Press equipment over an articulated sludge trailer – same as photos below.
3. 1No. Prefabricated Building with 25mm roof insulation 13m x 7.5m x 6.2 side wall, Electric Roller Shutter Door (4.1m High x 4.5m Wide) and Pedestrian Access Door. All steelwork galvanised.
4. Civil Works concrete pad for Building and Screw Press will be part of a larger civil works package of works.
5. Centrate/filtrate from dewatering process to gravitate to existing drainage system back to the inlet works.
6. 1No. Electromagnetic Flow Meter.
7. 1No. Flocculation Tank, Mixer & High-Level Alarm pressure level sensor.
8. 2 no. 400 Hydro Screw Press system.
9. 1No. Electrical Control Panel with VSDs & PLC mounted in existing adjacent dewatering building.
10. Mechanical & Electrical Installation, Transport & Mobilisation costs.
11. Operator Training on site with long-term backup and maintenance support.

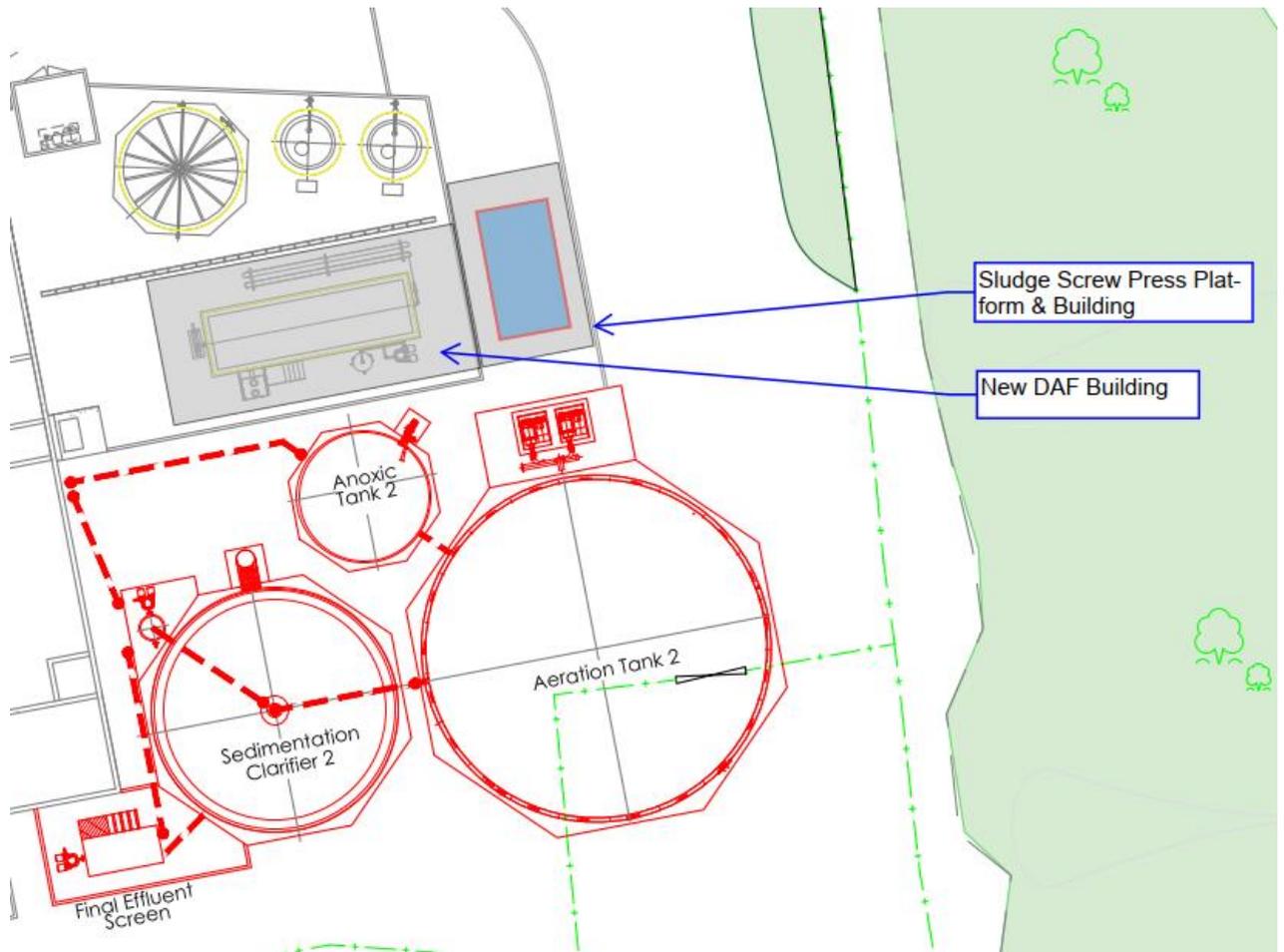
Recommendations

In order to achieve the best performance from the Hydro Sludge Screw Press we recommend DAF Sludge and Waste Activated Sludge be mixed thoroughly together before being processed through the Screw Press. As a minimum the mix should >20% DAF Sludge, with a maximum of approximately 40% DAF Sludge.

The Hydro Sludge Screw Press unit will be set up to run 24/7 based on level controls in the sludge holding tank, with very little operator intervention.



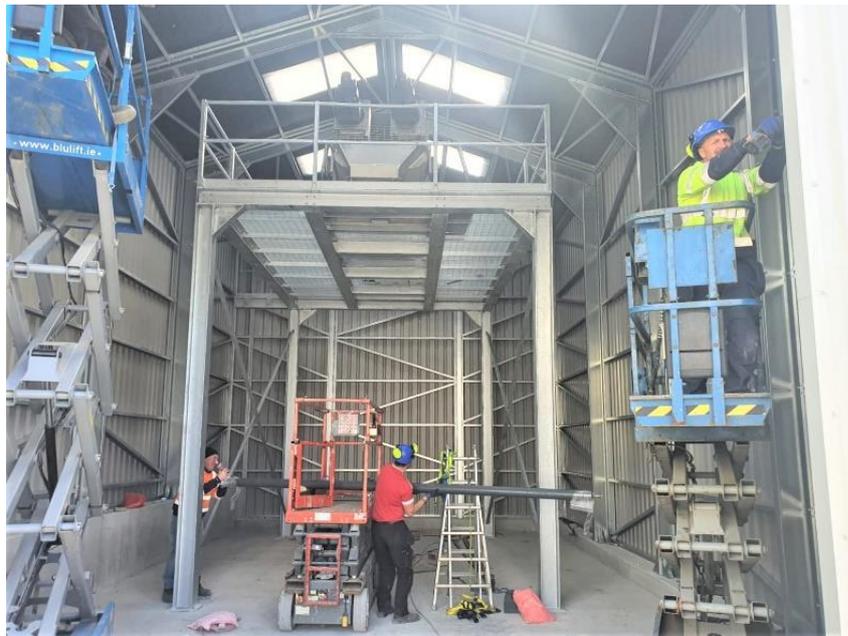
Tipperary CoOp Dairy Screw Press Building



General Preliminary Layout for new Sludge Dewatering Equipment Maelor Foods WWTP



Rosderra Edenderry Pig Abattoir Screw Press Building



**Tipperary CoOp Sludge Screw Press permanent installation on high level platform inside a building
Building erected around completed Screw Press & Platform installation**

Description	Cost
<p>Sludge Feed Pumps</p> <p>New Progressive Cavity Pumps Duty/Standby c/w VSDs, Dry Running Protection & Electromagnetic Flow Meter. New suction line from Sludge Tank, i.e., T-Piece & Valve off existing Bauer connection outlet.</p>	
<p>Flocculation Tank</p> <p>Elevated Flocculation Tank 304 StSt c/w Platform, Mixer & Level Sensor</p>	
<p>Hydro Screw Press 400 (3No.)</p> <p>304 StSt with VSD control on a StSt frame at ground level dewatering maximum 20 m³/hour of waste sludge discharging 18-22% DS. Include Wash Water Bar for self-cleaning on each screw. Pressurised Water Supply to base of platform by Client.</p>	
<p>Liquid Polymer Make-up and Dosing Unit</p> <p>304 StSt Tank, Paddle Mixer, Level Sensor, Neat & Dilute Polymer Dosing progressive cavity pumps</p>	
<p>Elevated Platform and Stairs</p> <p>Galvanised Elevated Platform with Handrails and Access Stairs</p>	
<p>Control Panel – Form 2</p> <p>Mild Steel Painted enclosure with ABB VSDs and fully automated operation. Automation is based on PLC & HMI Control. Approximately 1200(W)x 2000 (H) x 600 (D).</p>	
<p>Electrical Install, Field Wiring & Cable Tray</p> <p>Electrical Power & Signal Cables on Galvanised Cable Tray from Screw Press equipment back to locally mounted Control Panel.</p>	
<p>Prefabricated Building</p> <p>Prefabricated Building with 25mm insulation 13m x 7.5m x 6.2 side wall, Electric Roller Shutter Door (4.1m High x 4.5m Wide) and Pedestrian Access Door</p> <p>Cold formed, high tensile, Galvanised structural grade steel sections, consisting of Portal Trusses: S350 G275 - Framework & Purlins: S450 G275 as per EN10346:2015</p> <p>Designed, fabricated and installed to CE standards: EN 1090-1:2009+A1:2011</p> <p>Including general electrical services and lighting</p>	
<p>Civil Works – under separate civil works contract</p> <p>Concrete pad for new Sludge Feed Pumps at existing Sludge Tank. Pumped sludge line to new building through existing below ground services including power & signal cable ducting.</p> <p>Building and sludge trailer concrete pad to accommodate the new building and platform.</p> <p>Centrate/filtrate from dewatering process to gravitate to existing drainage network across the roadway through existing below ground services to Balance Tank 3 to be processed through the DAF with the raw effluent.</p>	
<p>Transport & Installation</p> <p>Freight to Site, off-loading and positioning, chemical dosing equipment and pumps, pipework and Screw Press installation, commissioning, training and O&M manuals.</p>	
<p>Odour Abatement</p>	

<ul style="list-style-type: none">• Allowance to be made in new building to accommodate odour extraction to existing relocated odour abatement unit currently used on the Balance Tanks.	
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Single Hydro 400 Screw Press



Double Hydro 400 Screw Press



Double Hydro 400 Screw Press on high level platform inside a Building



Double Hydro 400 Screw Press on high level platform ABP Shrewsbury

HYDRO SCREW PRESS ADVANTAGES

Polymer Consumption

- Polymer consumption on a centrifuge system will average 8 to 10 kg per 1,000 kgs DS.
- Polymer consumption on the Screw Press will average 5 to 6 Kg per 1,000 kgs of DS.

Energy Consumption

- Electrical Consumption for the centrifuge system will average 15-20 kW versus 1.5 kW (2 x 0.75kW drives) for the screw presses. 1kW = 0.14 cents

Maintenance

- Yearly Maintenance costs on the centrifuge system €5,000 to €7,000 vs. Screw Press ~€1,000 including labour and parts.
- Typically for any significant maintenance on a new generation centrifuge requires the unit to be taken off site and a rental unit hired in.
- Simple Screw Press maintenance with no specialist knowledge required.
- All Screw Press spares readily available.

Odour

- No odour generated from the Screw Press sludge dewatering process. All slow-moving parts and operation.
- High speed sludge dewatering with centrifuge generates odours.

Noise & Vibration

- Screw Press generates very low noise levels (55db at 1m free field) and no vibration.

Overview of the system;

The Hydro Screw Press is designed for the continuous dewatering of all types of sludges to a high sludge cake solids concentration.

The dewatering process is carried out through three main stages:

1. Gravity filtration of free water
2. Low pressure compaction section
3. High pressure compaction section

Process Description:

Polyelectrolyte is added to the sludge to induce its flocculation and therefore increase the efficiency of the Gravity Drainage Section.

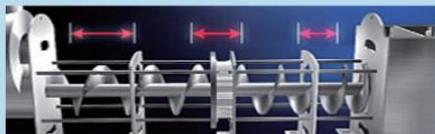
Typically, the flocculant is injected prior to the flocculation tank when the sludge and polymer enters the flocculation chamber both are mixed to produce a strong floc, the flocculator works on the principal of a paddle mixer rotating at a speed where the polymer and sludge is conditioned into a strong floc.

The flocculation tank is equipped with a sludge weir assembly that will let the flocculated sludge overflow onto the gravity draining section of the Hydro Screw Press.

Technical details of the main mechanical elements are noted below;

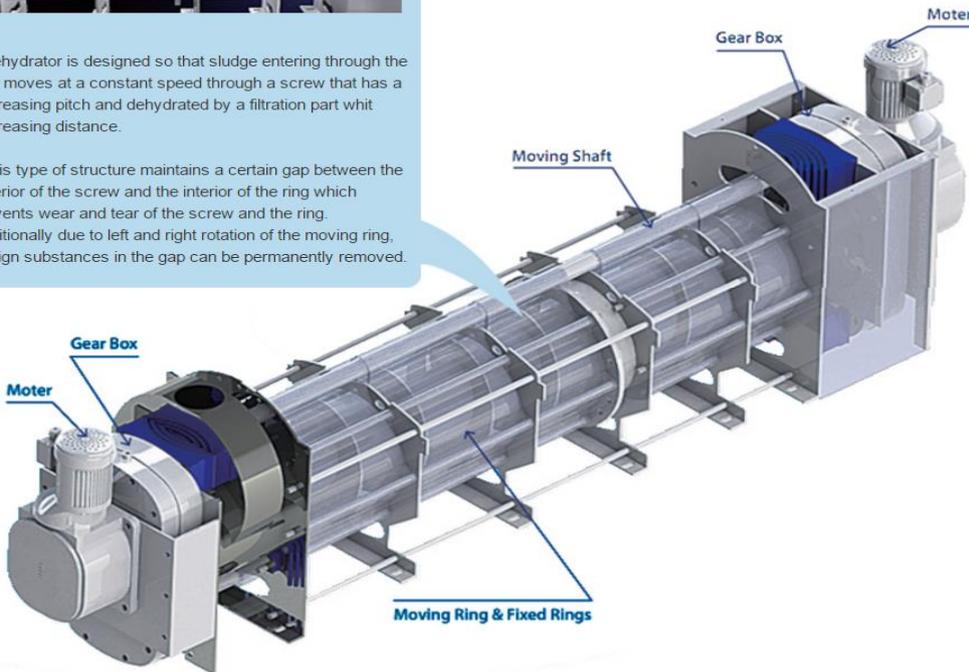
Hydro Screw Press (1-400)

SCREW



- Dehydrator is designed so that sludge entering through the inlet moves at a constant speed through a screw that has a decreasing pitch and dehydrated by a filtration part with decreasing distance.

- This type of structure maintains a certain gap between the exterior of the screw and the interior of the ring which prevents wear and tear of the screw and the ring. Additionally due to left and right rotation of the moving ring, foreign substances in the gap can be permanently removed.



No. of units	2 no.
Flow Capacity	8-12 m ³ / hour (site specific depending on solids concentration)

Sludge Flocculation Tank:
<ul style="list-style-type: none"> • The Hydro Screw Press is provided with a frame-mounted distribution tank in stainless steel AISI 304L. • The tank is vertical with one central inlet flange and two outlet flanges one for each screw press. • The flocculation tank provides enough retention time and avoids the sludge flow going directly into the screw press, minimizing the risk of floc breakage. • The design of the flocculation tank allows an even and smooth distribution of the flocculated sludge into the three Hydro Press units. • The sludge enters the Hydro Press from the overflow of the flocculation tank, to facilitate control of flocculation quality and even distribution of sludge into each Screw Press • At the bottom of the tank, a UPVC pipe with a ball type valve is fitted, so as to empty the tank at the end of the working day if required.

Gravity drainage section:
<ul style="list-style-type: none"> • At the exit of the flocculation tank, sludge slides into a declined AISI 304L pipe and into the Hydro Screw Press. • Gravity drainage zone on the Hydro Screw Press is inclined towards the inlet to release the free water created by the flocculation system in the inlet zone of the Hydro Screw Press.

Covers:
<ul style="list-style-type: none"> • The Hydro Press frame is designed to receive an odour extraction system if required by the client. • The cover structure is made of stainless steel AISI 304L. • The cover can be removed easily, for maintenance or adjustment.

Automatic Polymer Dosing System	
Polymer Preparation Unit	
No. of units	1 no.
Material	SS 304
Description	Fully automated Polymer chemical dosing unit shall be supplied for use with emulsion polymer.
	The unit shall be 380 V, 50 Hz, and shall be capable of feeding 0-3.5 litres per hour of neat polymer at a dilution rate of 38-378 litres per hour. The system shall come supplied with one neat polymer pump & one diluted polymer dosing pump along with one 1000 L stainless steel holding tank complete with mixer, probes and valves.

Electrical Installation:
Hydro shall provide all necessary equipment and hardware for complete installation and operation of the Hydro Press unit. All cables supplied shall be SWA and YY type. All electrical supplies, hardware and workmanship shall conform to machinery directive 89-392 EEC and subsequent changes. Power source to be provided by the client.

Mechanical Installation:

Hydro shall provide all necessary equipment and hardware for complete installation and mobilization of the Hydro Press unit. All bolts and nuts will be SS316 for suitability to the environment. All pipework will be corrosive resistant PVC for use on feed lines and dosing feed line.

Local Control Panel

Local Control Panel

No. of units

1 no.

Description

1 no. local control panel will be installed to operate the Screw press assuming the control panel will be installed indoors.



Control Panel with PLC & HMI Birds Eye Pizza (Nomad Foods)



Control Panel with PLC & HMI Plastics Recycling facility Cotesbach, Rugby, UK



Control Panel with PLC & HMI Creative Foods Burton-on-Trent, UK



Odour Carbon Filter recently installed on the Sludge Dewatering Building, Keurig Dr Pepper WWTP, Newbridge, Co. Kildare



Alternative GRP Tanks & Bulk Carbon Filters



Single Hydro Screw Press 400 Including Local Control Panel. Picture included for indicative purposes only.



ABP Food Group Waterford Abattoir & Rendering



**Lakeland Dairies Bailieborough
Hydro Double 400 Screw Press mounted on high level platform**





Lakeland Dairies Bailieborough
Hydro Double 400 Screw Press mounted on high level platform



Glanbia Belview
Hydro Double 400 Screw Press mounted at low level discharging into a Sludge Cake Pump



Foster Farms, California, USA, 3No. Hydro Double 400 Screw Press mounted at low level discharging into a common Screw Auger

Typical Payment Terms:

- 30% down payment with Purchase Order
- 60% on installation
- 10% on commissioning

Exclusions:

- Power Supply to new control panel
- Chemicals to be supplied by others
- Client to provide clean water connections (2-3 bar) for polymer make-up unit
- Hydro do not include for pH correction, if necessary
- Odour sampling, analysis or testing
- Odour modelling
- Hydro do not include for VAT or other taxes.
- Civil Works

Should you have any questions on the above please do not hesitate to contact me at any stage,

Yours sincerely,

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Hydro International References

Recent Projects

Kilkenny Cheese Belview WWTP Design & Build 4,000 m³/day – currently in design phase
Keurig Dr. Pepper concentrates facility WWTP design & build, Newbridge, Co. Kildare.
DAF 80 m³/hour for Plastics Recycling Facility, Cotesbach Leicestershire, UK.
DAF 60 m³/hour for Kerry Foods, Shillelagh, Co. Wicklow.
DAF 50 m³/hour for Creative Foods, Burton-on-Trent, UK.
DAF 50 m³/hour Tullamore Dew Distillery, Co. Offaly.
DAF 50 m³/hour Glanbia Cheese, Portlaoise, Co. Laois.
DAF 25 m³/hour Bird's Eye Pizza, Naas.
DAF 25 m³/hour Linden Foods, Dungannon, Northern Ireland.
DAF 100 m³/hour Karro Food Group, Cookstown, Northern Ireland.
DAF 75 m³/hour Karro Food Group, Malton, UK.
DAF 125 m³/hour Primary & Tertiary DAF 75 m³/hour Phase 2 Arrabawn Dairies, Nenagh WWTP Upgrade.
DAF 125 m³/hour Primary & Tertiary DAF 150 m³/hour Tipperary Co-Op WWTP Upgrade.

Kerry Attleborough
Kerry Carrickmacross
Kerry Enniskillen
Kerry Noone
Kerry Deane Way
Kerry Nass
Kerry Shillelagh
Kerry Coleraine
Bombay Halwa
Irish Water Clareabby Municipal WWTP – Sludge Screw Press
Irish Water Six Mile Bridge Municipal WWTP – Sludge screw Press
Irish Water Old Doolagh WTP – Alum Sludge Screw Press
Irish Water Conakilty WTP – Ferric Sludge Screw Press
ABP Food Group Cahir Ireland – Screening, Balance Tank, DAF, Aeration, Screw Press
ABP Food Group Bandon Ireland – DAF and Sludge Screw Press
ABP Food Group Sturminster UK – DAF, MBR and Sludge Screw Press
ABP Food Group Waterford Ireland – DAF and Sludge Screw Press
ABP Food Group York UK – Screening, DAF and Sludge Screw Press
ABP Food Group Yetminster UK – Screening, DAF, MBR and Sludge Screw Press
ABP Food Group Clones Ireland WWTP – DAF, Diffused Aeration and Sludge Screw Press
ABP Food Group Dalepak UK – Screening, DAF and Sludge Screw Press
ABP Food Group Ellesmere UK – Screening, DAF, MBR and Sludge Screw Press
ABP Food Group Guildford UK – Screening, DAF and Centrifuge
ABP Food Group Langport UK – Screw Press
ABP Food Group Lurgan UK – Screening, DAF and Sludge Screw Press
ABP Food Group Nenagh Ireland – Screening, DAF and Sludge Screw Press
ABP Food Group Perth UK – Screening, DAF and Sludge Screw Press
Dunbia Slane Ireland WWTP – Screening, DAF and Sludge Screw Press
Arrabawn Nenagh Ireland – Primary DAF 100 m³/hr and Tertiary DAF 150 m³/hour, Lift-out diffused aeration
Arrabawn Kilconnell Ireland – DAF and Sludge Screw Press
Glanbia Ballitore Ireland WWTP – Diffused Aeration
Lakeland Dairies Bailieborough Ireland – Screening, Balance Tank, DAF, MBR and Sludge Screw Press
Ashboure Meats Ireland – Lift-out diffused aeration
C&D Pet Foods (ABP Food Group) Ireland – DAF
Irish Country Meats Navan Ireland – DAF and Sludge Screw Press
John Kelly Meats Ireland WWTP – Screening, Balance Tank, DAF, MBR and Sludge Screw Press
Manor Farms Poultry Ireland – Screening, DAF and Lift-out diffused aeration
Largo Foods Ireland WWTP – DAF and Lift-out diffused aeration
Mylan Teoranta Inverin (Pharmaceutical) – MBR
Proctor & Gamble Reading UK – DAF and Sludge Screw Press
Proctor & Gamble WWTP Nenagh – Screening, Balance Tank, DAF, Diffused Aeration and Sludge Screw Press
Proctor & Gamble WWTP Newbridge – pH correction