

## UNC Charlotte – Lee College of Engineering Senior Design Program

### Senior Design Project Description

<b>Company Name</b>	<i>Jim Myers and Sons, Inc.</i>	<b>Date Submitted</b>	<i>06/10/2019</i>
<b>Project Title</b>	<i>Improved Design for MEGA-Settler Plate Line Handling Fixtures</i> <b>JMS MEGA</b>	<b>Planned Starting Semester</b>	<i>Fall 2019</i>

#### Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	4	Electrical	
Computer		Systems	1
Other			

#### Company and Project Overview:

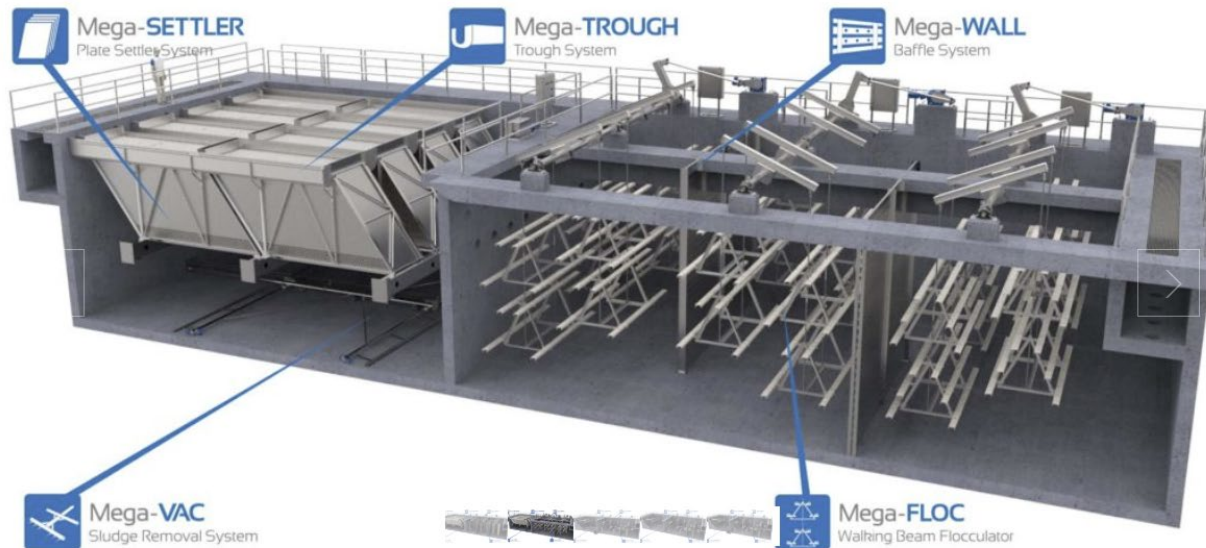
Since being established in Charlotte in 1962, Jim Myers & Sons, Inc. (JMS) has grown continually and today is recognized as one of the nation’s leading designers and manufacturers of water and wastewater treatment equipment and systems. We have reached this point by incorporating equal parts innovation, quality and reliability into every component bearing the JMS name. We maintain that leadership position through one of the most comprehensive, solution-driven product offerings available. In 2016, JMS moved to an expanded 72,000 sq ft facility on Westinghouse Boulevard. At this location, customer solutions are designed and manufactured for water treatment plants around the world.

#### Project Requirements:

JMS makes a variety of products for different stages and applications within water treatment plants. One of the products is the “Mega-TREATMENT” system for sedimentation basins.

**JMS Mega-TREATMENT (Water Treatment Systems) that are used for surface water treatment:**

- Mega-FLOCS (Paddle Wheel Flocculators)
- Mega-SETTLER (Plate Settler System)
- Mega-VAC (Hoseless Sludge Removal System)
- Mega-SCRAPER (Sludge Removal System)
- Mega-TROUGH (Trough System)
- Mega-WALL (Baffle System)



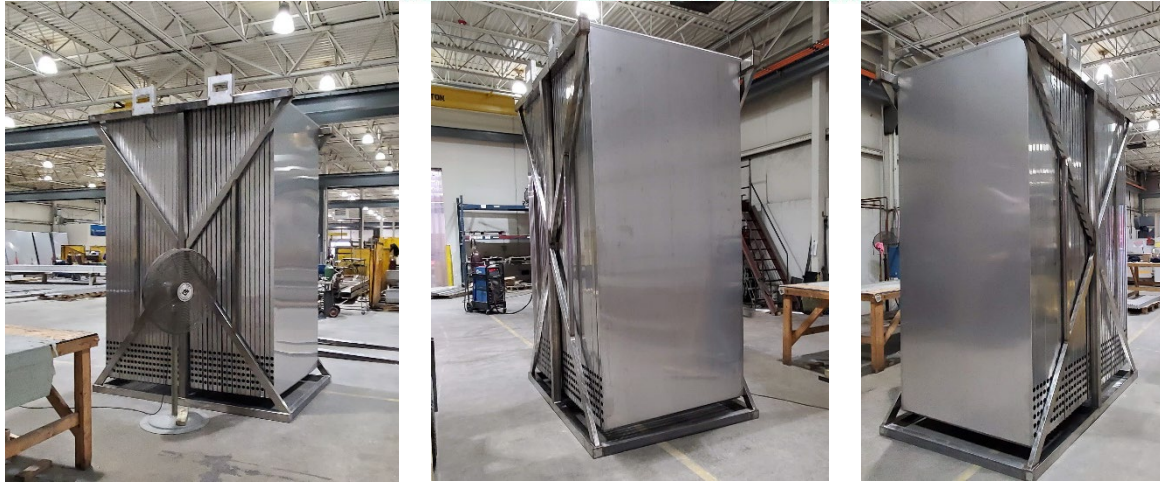
Within this system is a sub-product called “Mega-SETTLER” which is a plate settler system comprised on a custom designed number of settling plates packed into a frame which is part of the sedimentation basin.

Currently, individual plates are produced on a production line, then loaded manually (two-man lift) into a storage rack that holds 40 plates. Each plate weighs approximately 55 pounds. See pictures below of the storage rack:



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The storage racks provide a buffer of supply so that plates are always available to be loaded into the Mega-Settler plate pack system:



When plates are ready to be assembled into the plate pack system, two operators lift the plate off of the storage rack and carry it to the nearby plate pack frame and manually insert it into the frame and move it into the proper depth and angle orientation. Over the course of a shift, the operators may move up to 300 plates.

This project will focus on improving the storage rack system and enhancing its capability to aid in the production of the MEGA-Settler lamella plate packs. The goal is to add in features that will turn the storage rack from just a stationary holding device into a mobile platform that also incorporates features to help the operator move the plate from the storage rack into position on the plate pack rack. Desired results are to reduce operator fatigue during assembly, increase safety and increase production speed. The new system needs to be designed to accommodate a load of 2,750 lb (40 plates) evenly distributed with the capability to be safely rolled around by an operator and be lift capable (crane or forklift) with adjustability for height which will help to facilitate loading into various height plate pack racks.



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**Expected Deliverables/Results:**

- Plate stock storage, movement and loading assist system with the following attributes:
  - 40 Plate capacity (2,750 lb)
  - Single operator moveable
  - Lift capable (For crane or forklift)
  - Height adjustable
  - Pass through for loading assistance from previous operations. (Provide operator assistance in getting plates on the rack and off the rack with less physical exertion by the operator)

**Disposition of Deliverables at the End of the Project:**

Loading rack developed is the property of Jim Myers and Sons, Inc. and will be turned over to JMS at the conclusion of the Expo.

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Interest in mechanical design for development of manufacturing fixtures which improve the human factors of operation.
- Ability to travel to the JMS facility as needed to gather data for the design process and perform testing and verification of design.
- SE student will need to review work physiology documents to be prepared for the project work