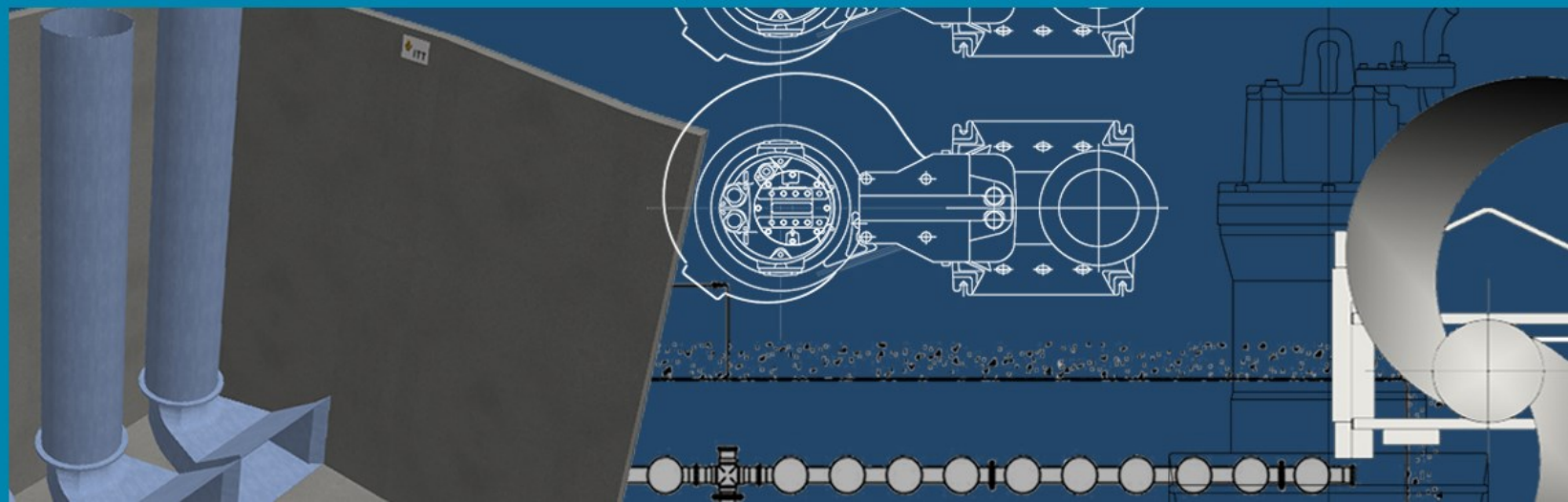
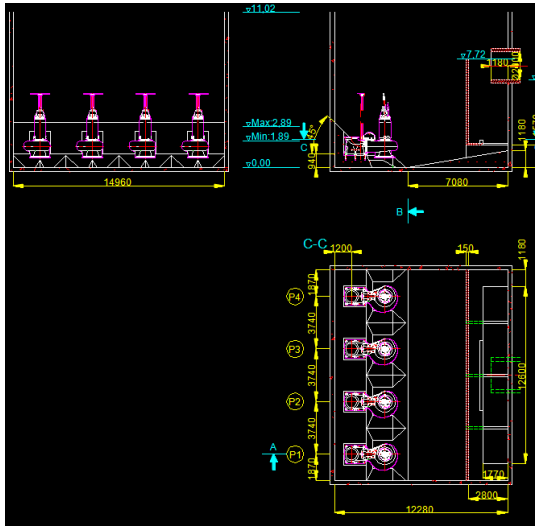
# SECAD and pump sump design

***Systems Engineering Computer Aided Design***



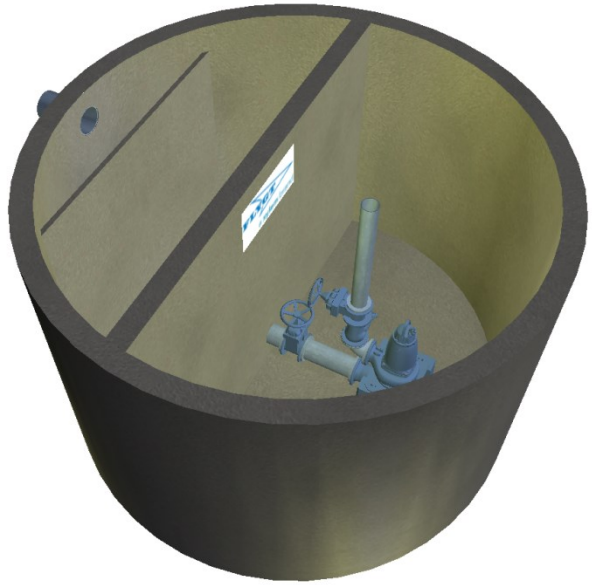
# Why SECAD?




- Efficient tool to design wastewater pump sumps
  - Quick, for example when making the spec
  - Creates a reliable solution

- Help deepen the relationship between consultants and Xylem

- Increase quality of quotation,  for example 3D drawings (dry installed small pumps and large installed PL pumps)





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# Agenda

## Introduction
- History of SECAD
- Oasis information on SECAD

## The importance of station design
- Adverse hydraulic phenomena

## SECAD Program Information
- Setting up SECAD
- Different sections of SECAD
- How to edit or send SECAD stations
- Keeping SECAD up to date

## List of SECAD Super users

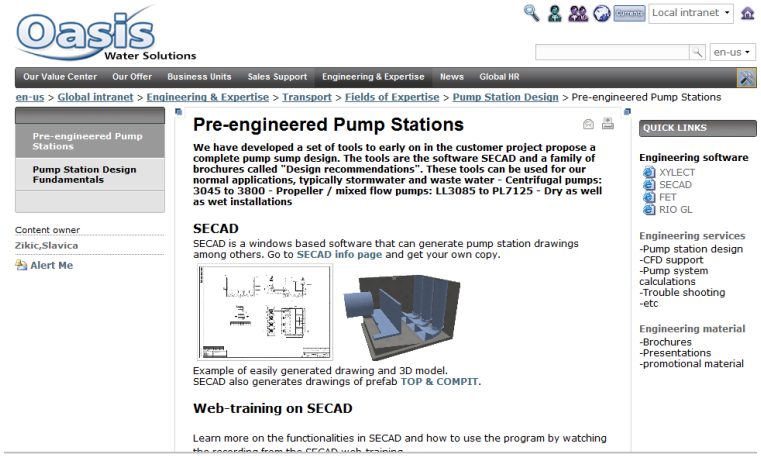
## SECAD Examples

# SECAD – A History

- SECAD version 1.0 was released in 1986 as an AutoCAD addon
- SECAD version 4.0 was released in 2004 and was the first stand alone version
- The current release version is 5.2.6.1
- 1000 CDs are sent out yearly to sales companies

# Oasis Links for SECAD

- Information on SECAD can be found in two places on Oasis:
  - Global intranet > Our Value Center > IS/IT > Software > SECAD
  - Global intranet > Engineering & Expertise > Transport > Fields of Expertise > Pump Station Design > Pre-engineered Pump Stations

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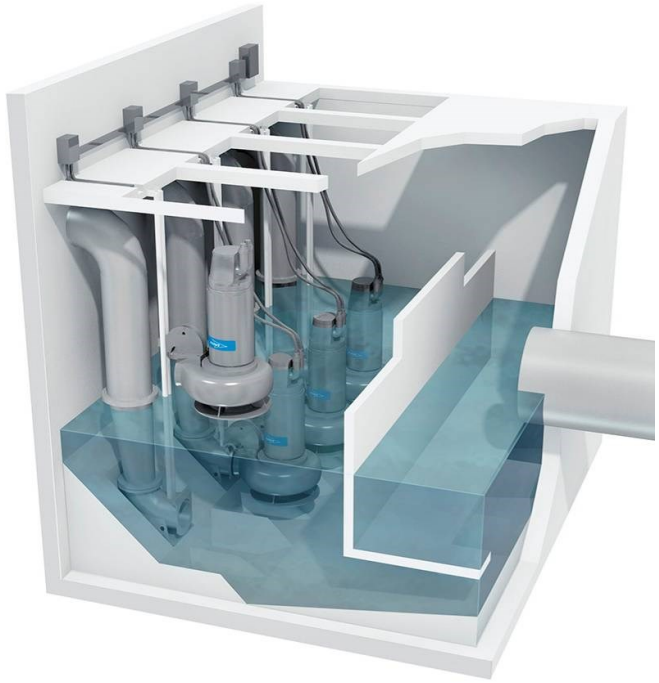
# The importance of station design

## Good station design:

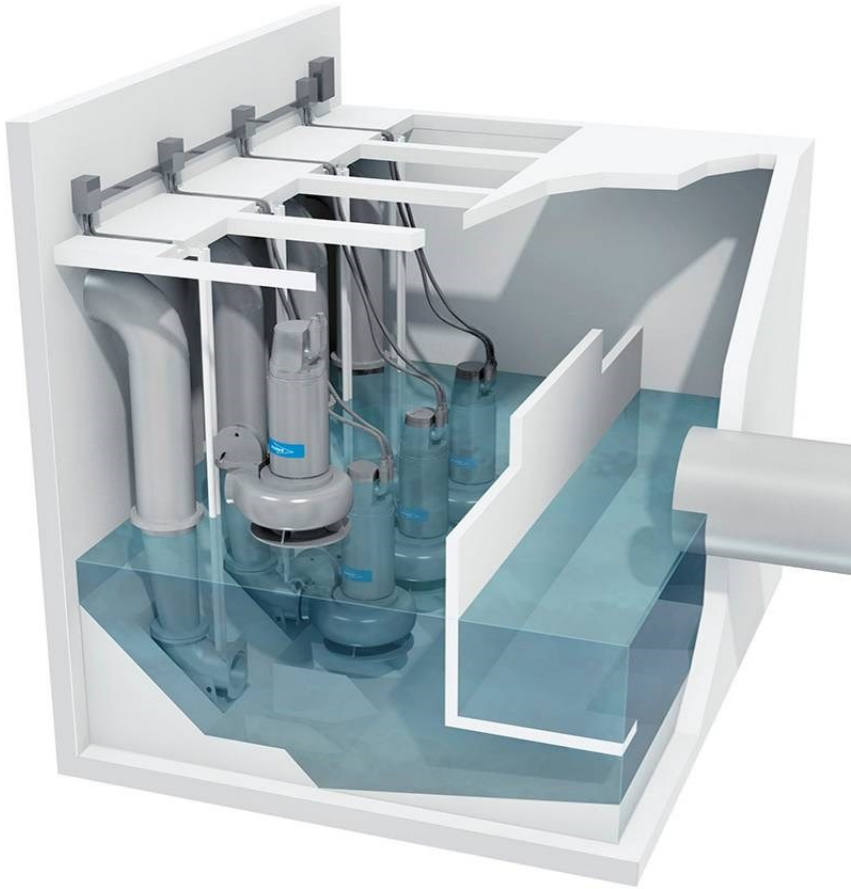


- Ensures meeting duty point
- Ensures smooth and safe operation of pumps
  - Noise, vibration
  - Fluctuating load
  - Physical damage
- Reduces the need for service and maintenance
- Reduces operational cost
- Reduces investment cost

# Sump design fundamentals

## Proper sump design ensures:

- Reliable pump operation
- Specified performance is met
- Minimal sedimentation and floating debris



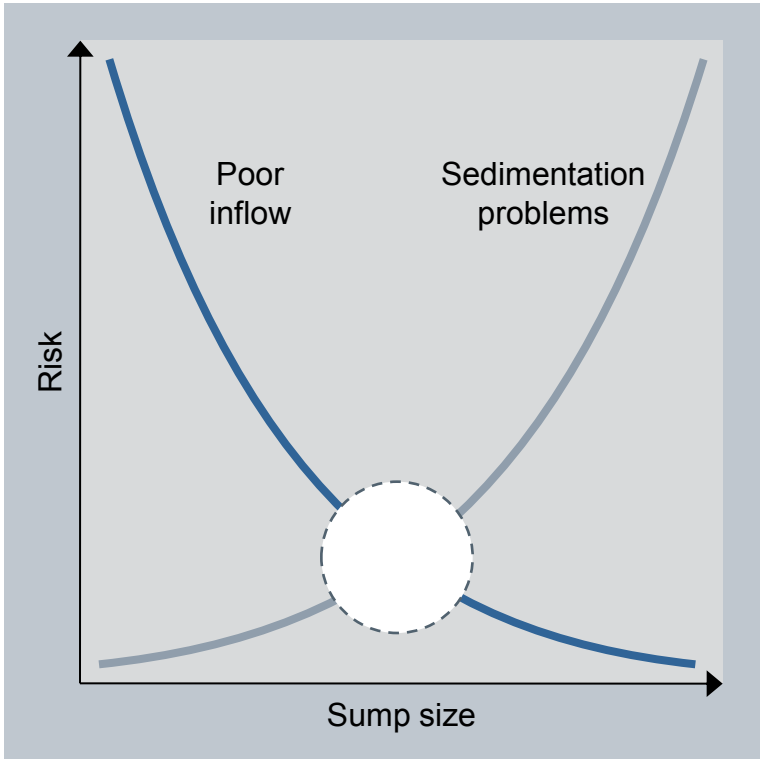
# Optimal sump sizing criteria

## Two important factors to consider are sedimentation and poor inflow

Small sump – High risk of poor inflow
Large sump – Low risk of poor inflow

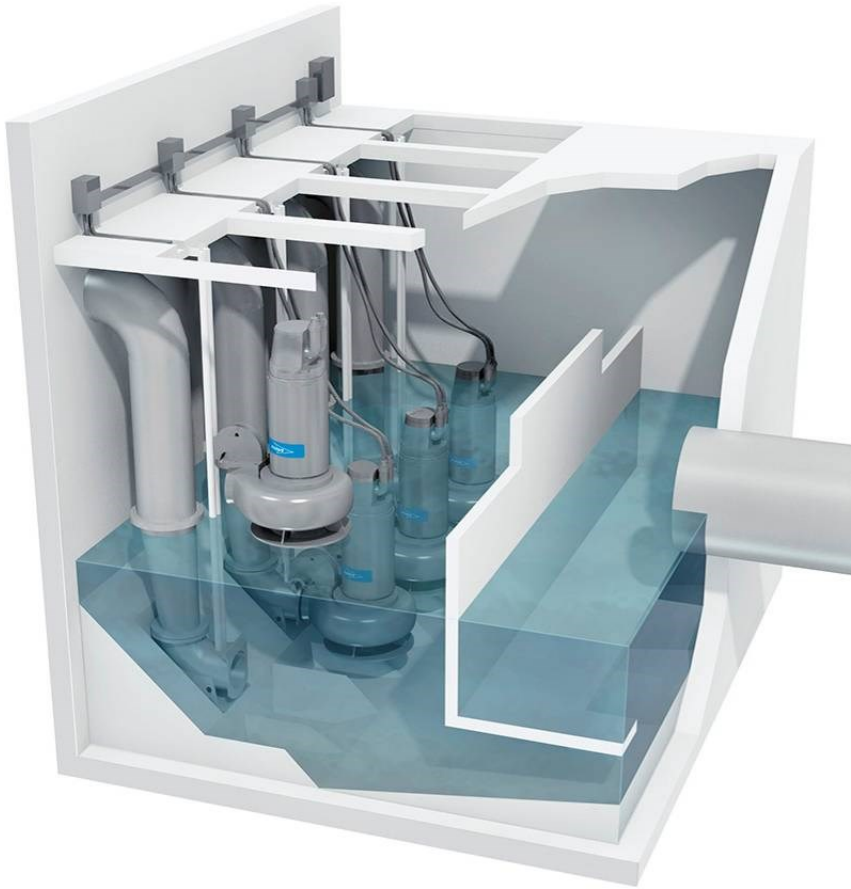
Small sump – Low risk of sedimentation problems
Large sump – High risk of sedimentation problems

Optimal sump size



# Standard Flygt wet well designs

- Reduces sump size
- Meet all intake design criteria
- Prevent adverse hydraulic phenomena
- Minimize sedimentation, clogging and floating debris

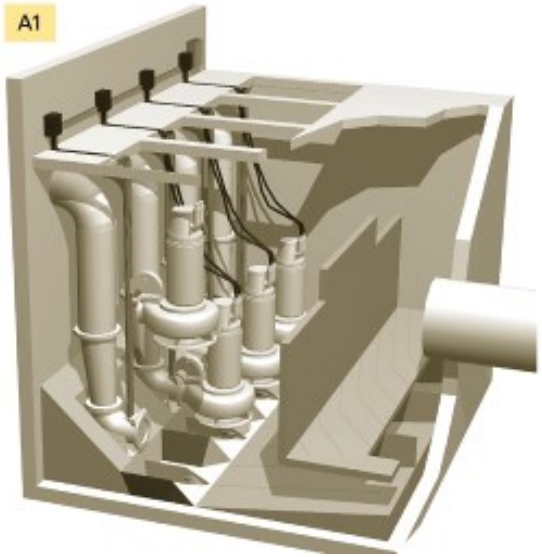


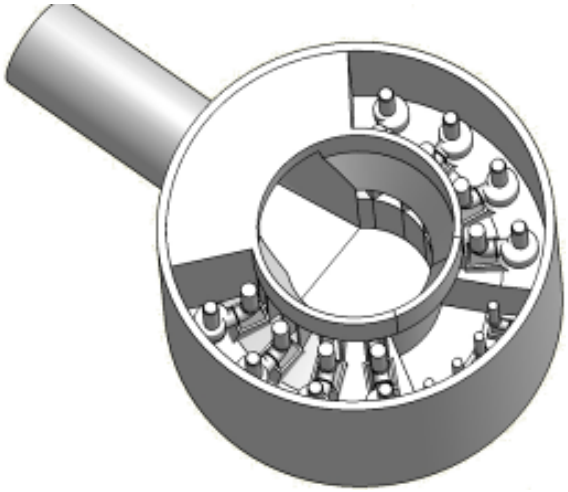
# SECAD

## Solutions

Complexity

*Packaged* *Pre-Engineered* *Custom*



Included in SECAD

SECAD as a starting point



FLYGT Training Weeks

# SECAD


## Powerful tool for consultants, design engineers, application engineers.....



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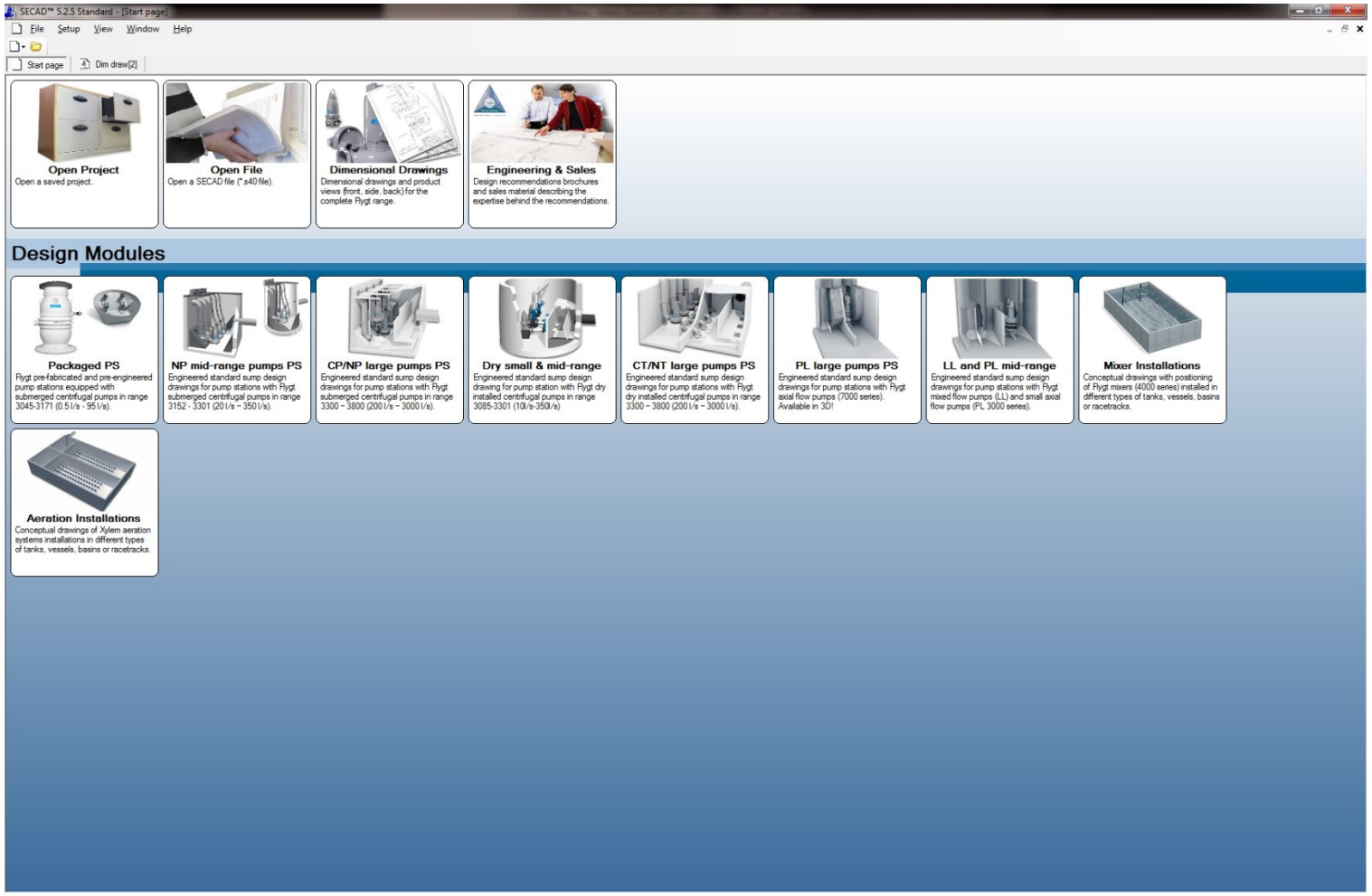
# SECAD Start Screen



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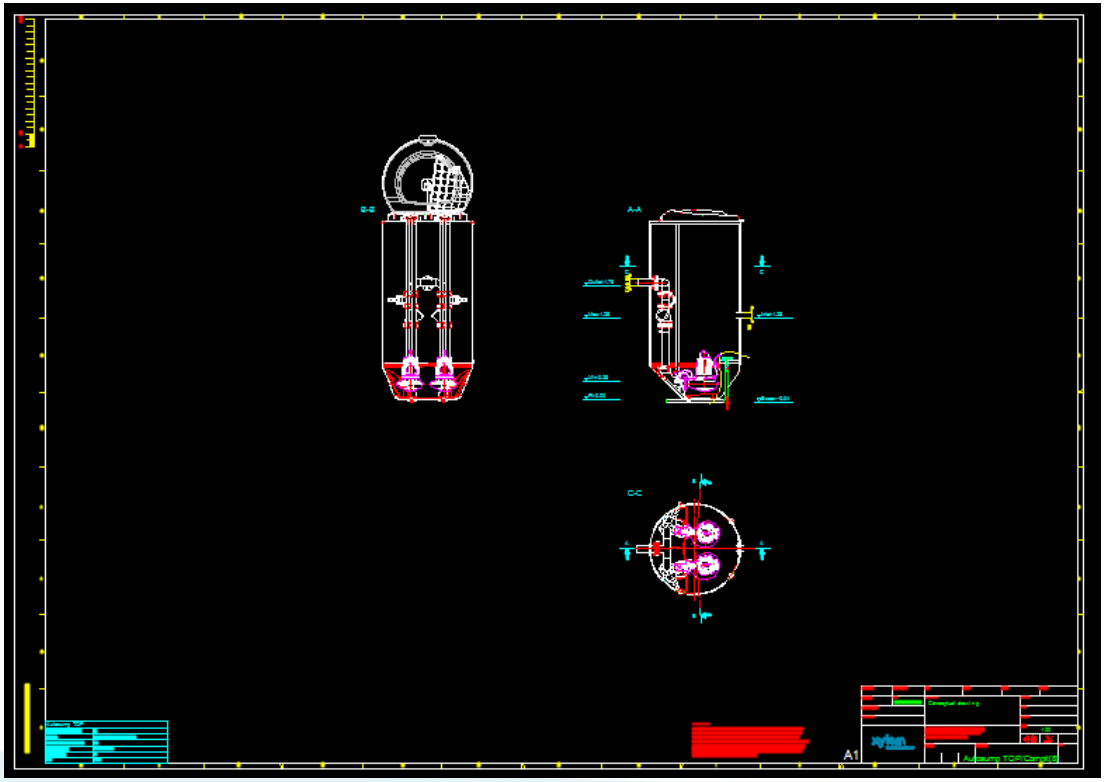
# Different Modules, similar workflow

- Define Product
- Choose Layout
- Define Station Settings
- Define Start Levels (optional)
- Draw

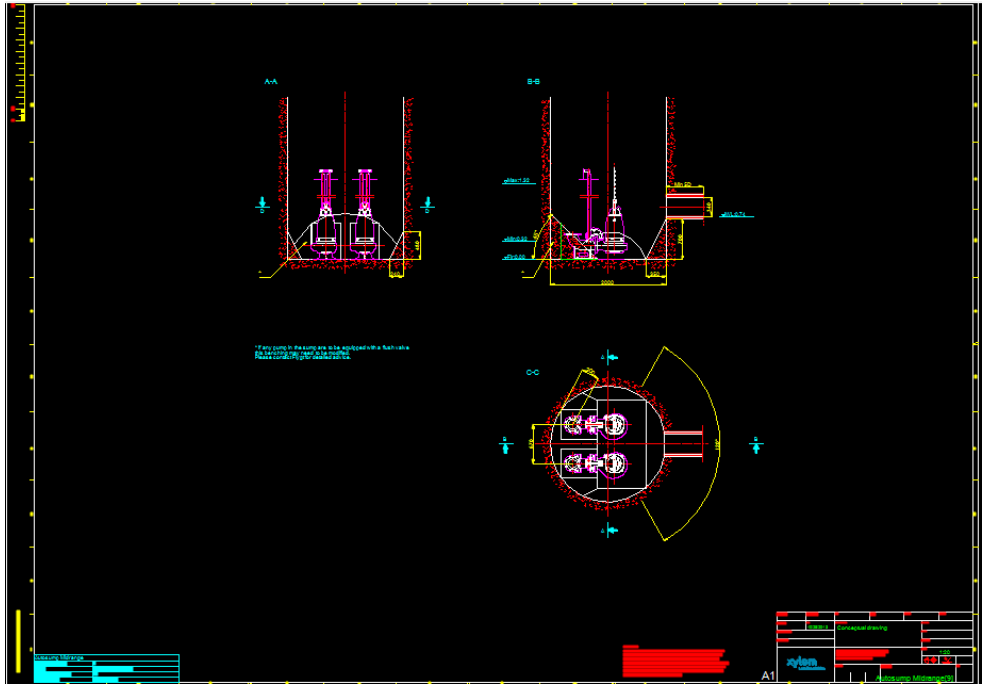
# SECAD Examples

- Package Pump Station Example:
  - We need a drawing for a duplex NP 3127 HT TOP station with valves
  - Flow is 30 lps



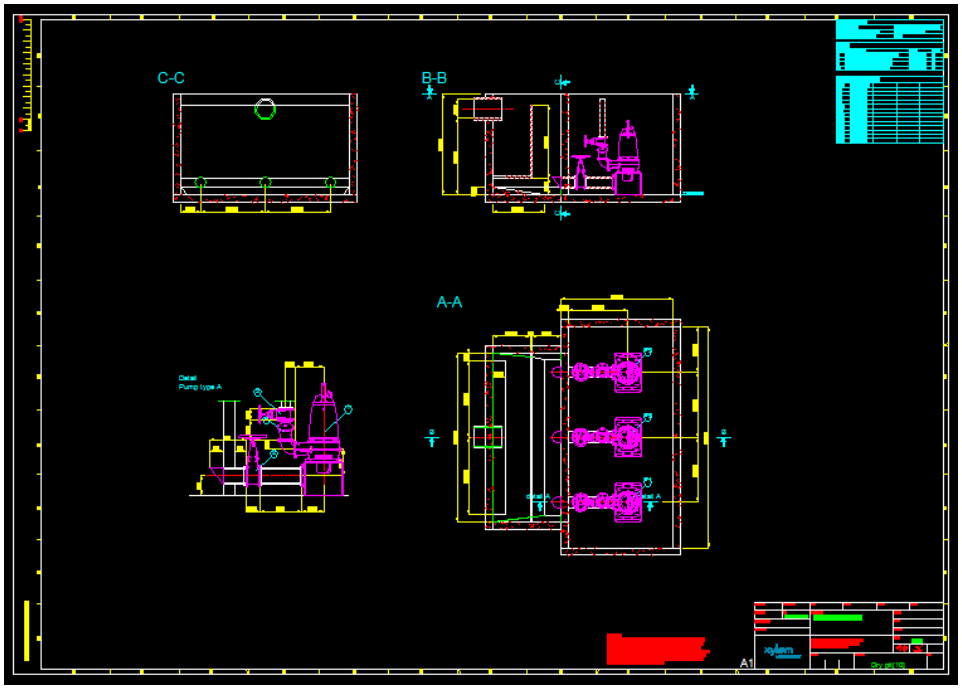
# SECAD Examples

- Midrange Wet Installed Pump Station Example:
  - We need a drawing for a duplex NP 3153 MT circular wet installed pump station
  - Flow is 75 lps



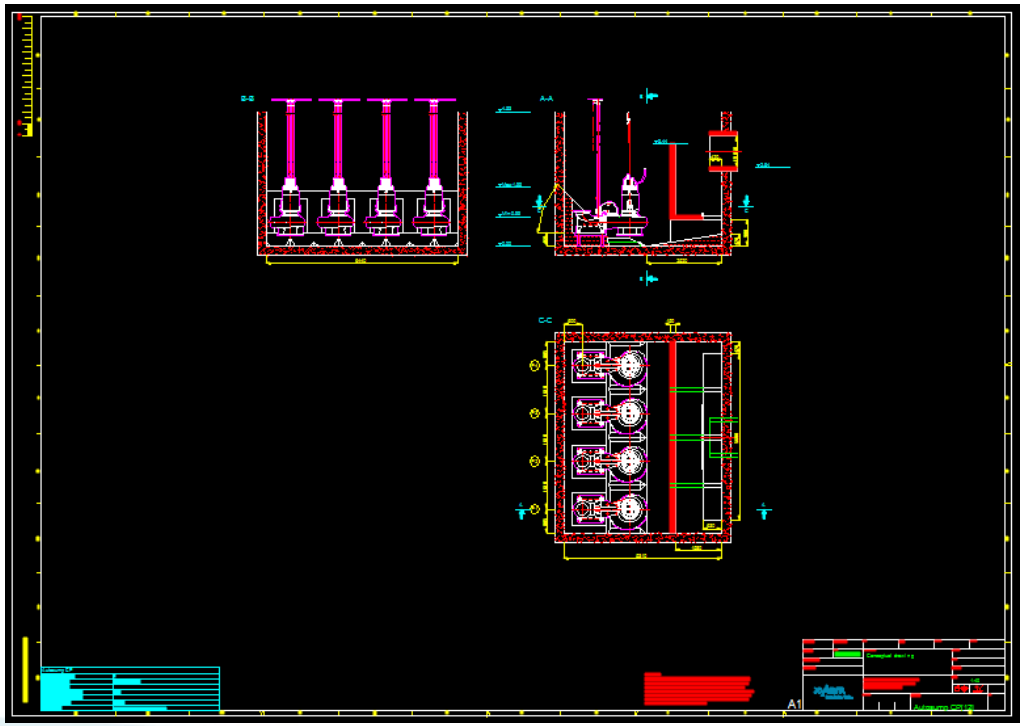
# SECAD Examples

- Midrange Dry Installed Pump Station Example:
  - We need a drawing for a triplex NT 3301 HT dry installed pump station with rectangular wet pit sump
  - Flow is 115 lps



# SECAD Examples

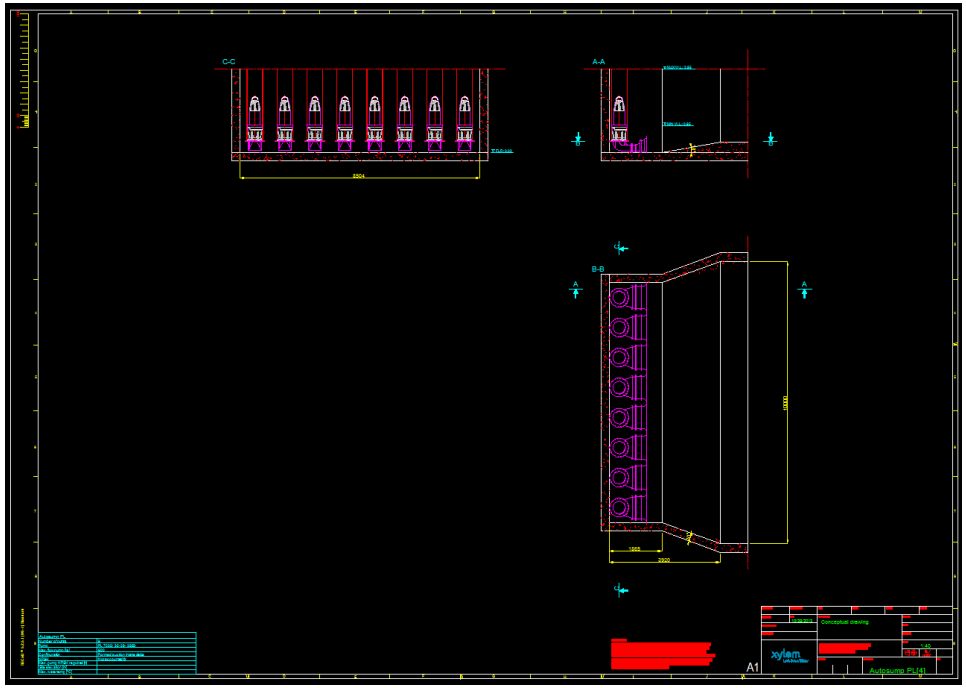
- Large Wet Installed Pump Station Example:
  - We need a drawing for a four pump NP 3400-805 wet installed pump station with rectangular wet pit sump
  - Flow is 800 lps



# SECAD Examples

- Axial Pump Station Example:
  - We need a drawing for a  pump PL7035 pump station.
  - Flow is 600 lps

  - Make a station with as small footprint as possible.



# Sum-up

## The importance of station design to ensure long pump life and high pump performance

- Adverse hydraulic phenomena:
  - Excessive pre-swirl
  - Uneven velocity distribution
  - Air entrainment
  - Surface vortex
  - Sub-surface vortex
  - Sediment and floatables

## SECAD Program Information

- Different sections of SECAD
- Input
- How to edit or send SECAD stations

# Workshop
# Station Design Review

Pump station design

# Workshop

You are now experienced station design experts!  Your first task will be to split into groups and review a station design that a customer has sent in.

There will be 4 groups reviewing 4 different stations

Each station has a challenge associated with it, that needs to be solved.

We ask that you review the stations and challenges associated with them and:

- Report on what station design ideas that can be used to fix the challenge.
- Look to see if there any other possible challenges that may be possible, and if so, suggest what other changes that need to be made.
- If this was a new station design and it was also very early in the design process, are there any suggestions that could be made to save the customer money (for instance, a smaller pump station?).

# #1 ALEXANDRIA EAST
# RETURN SLUDGE PUMPING STATION

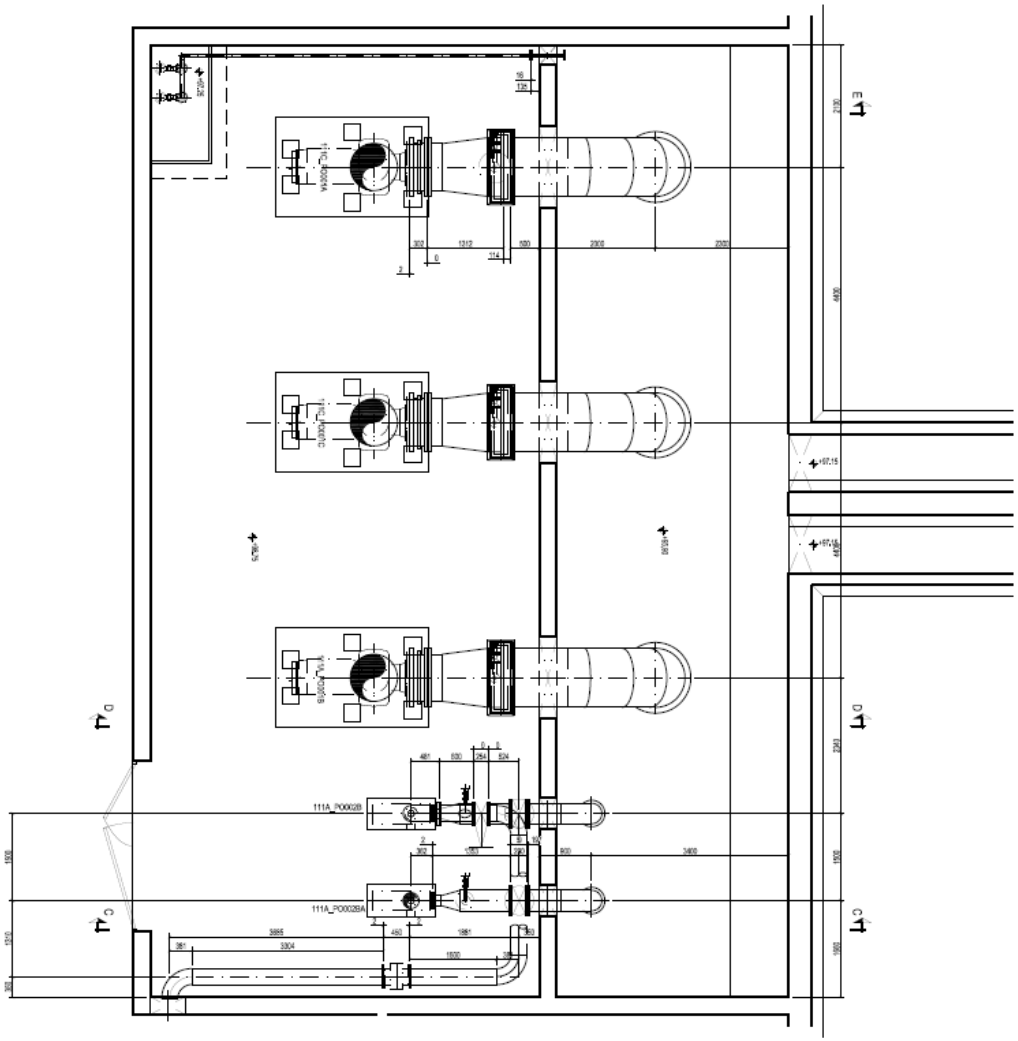
Pumps to be used:

3 CZ3501/805

1.1 $m^3/s$ (per pump)

Customer designed station that they would like to be reviewed for any potential problems.

# #1 ALEXANDRIA EAST
# RETURN SLUDGE PUMPING STATION



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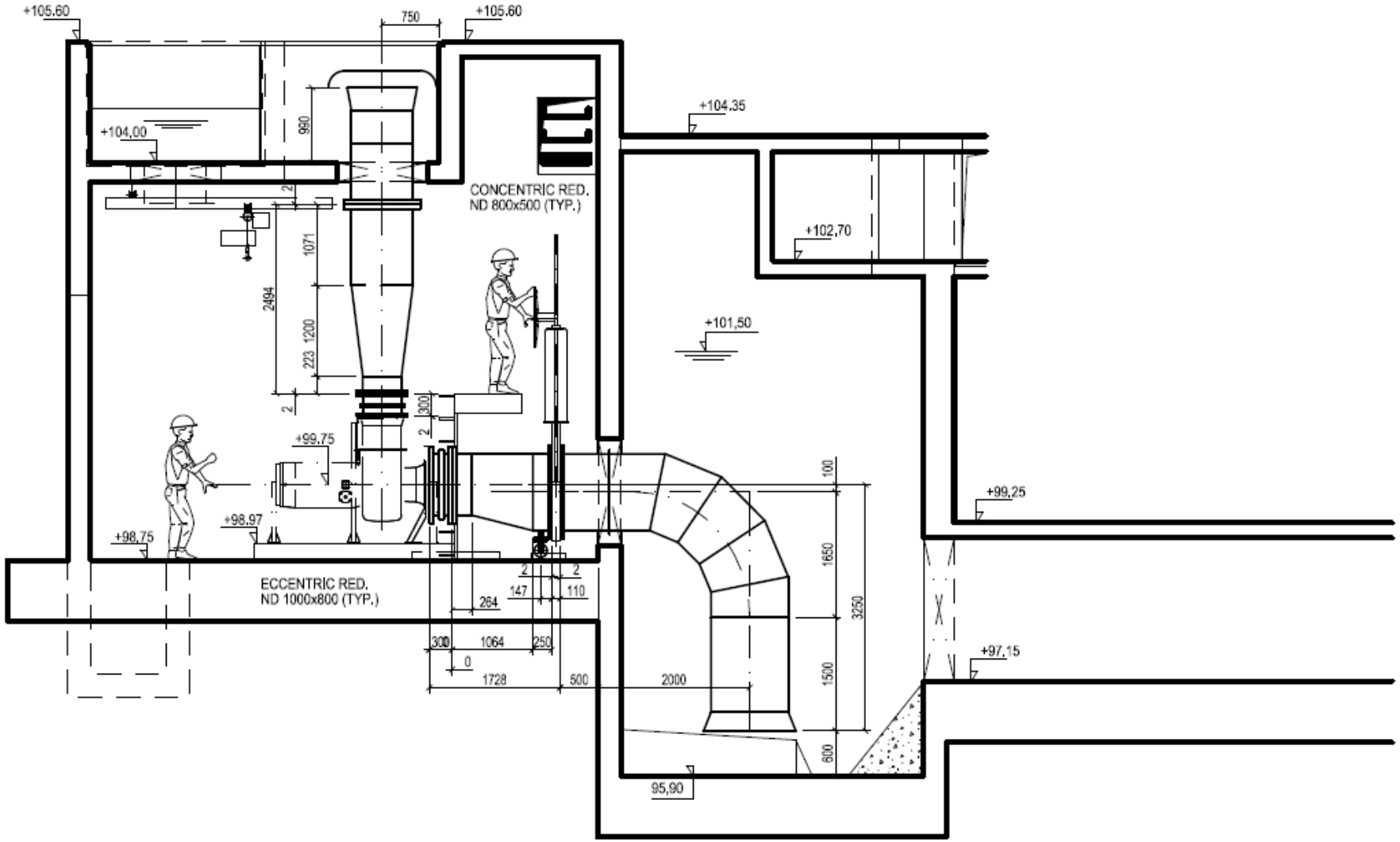




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# #2 Lake Winnebago

Pumps to be used:

3 NP 3400/

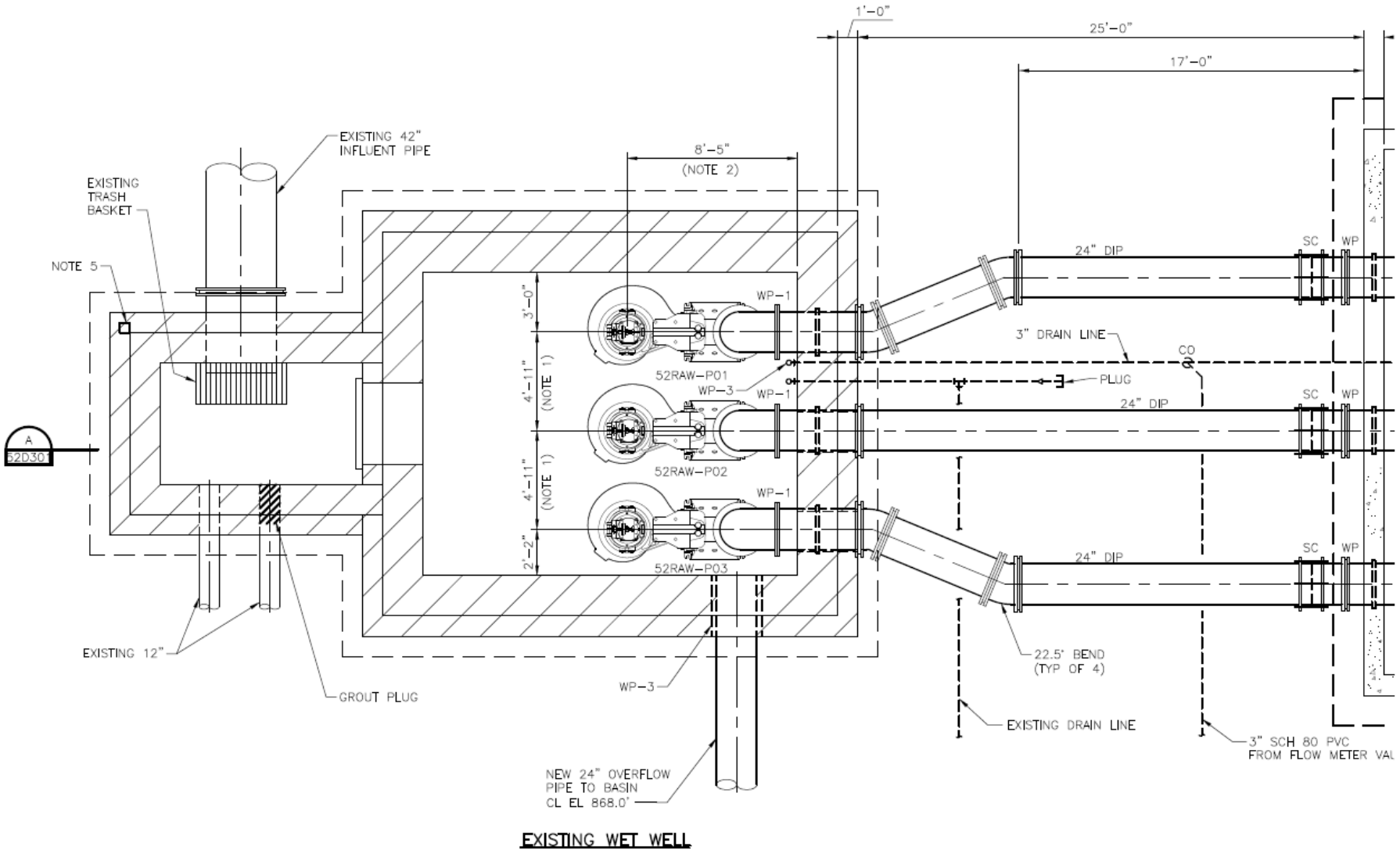
640 lps (1280 lps total flow)

(2 duty, 1 standby)

An Existing Station that the customer would like to rebuild to Flygt standards and recommendations.

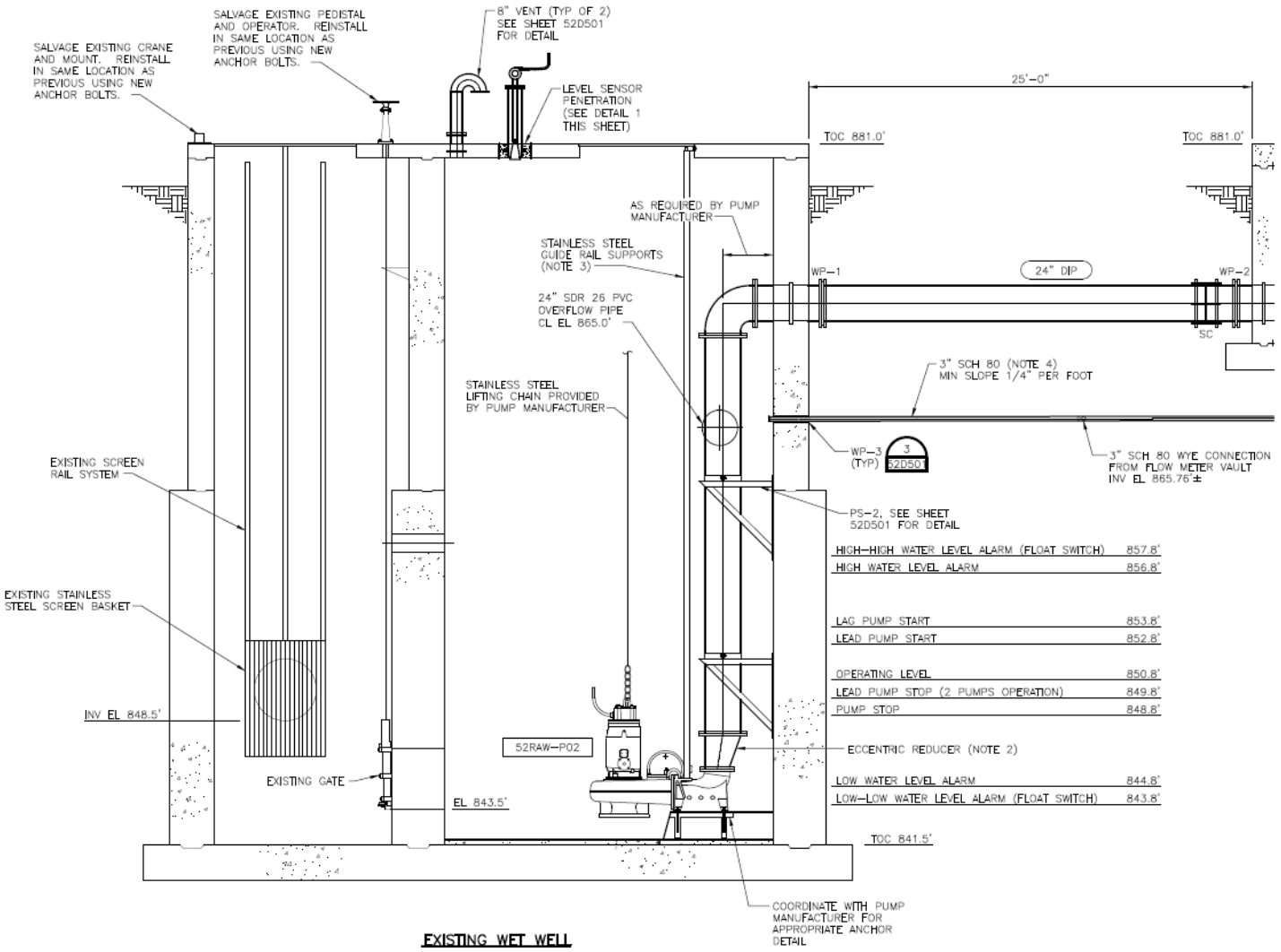
One design concern is that the customer would like to be able to drain the pump station of water when not in use.

# #2 Lake Winnebago




EXISTING WET WELL

# #2 Lake Winnebago



# #3 Reedy Creek Improvement District

Wastewater Treatment Plant

Recirculation Pumps

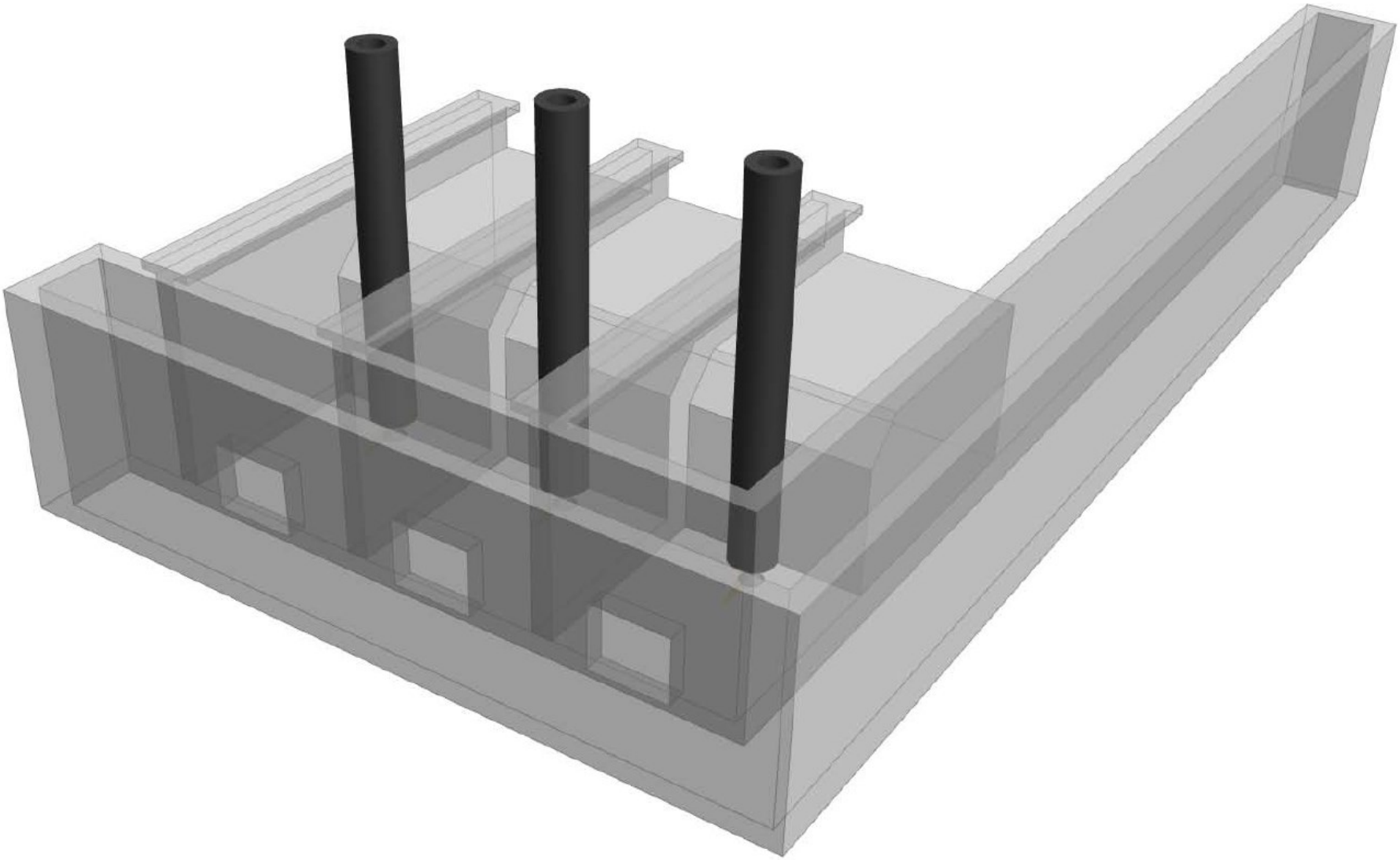
PL-7081/705

N Technique Propeller

Average flow per pump = 1 m3/s

The customer has a pump station where the pumps are overamping and soft clogging. There is long fibrous material that has been observed in the pumps.

# #3 Reedy Creek Improvement District



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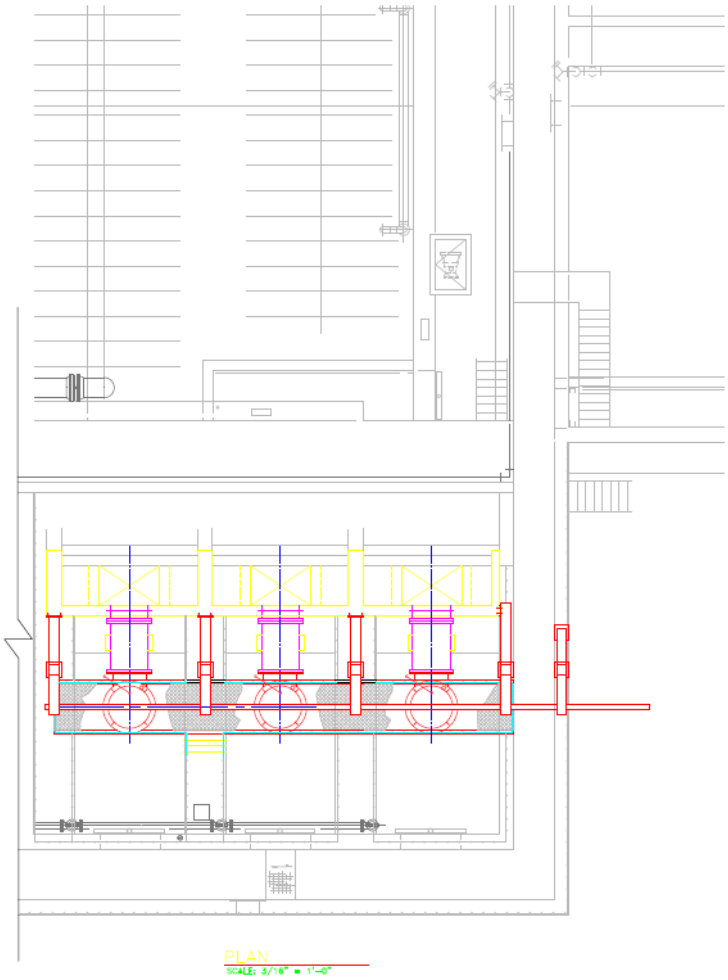


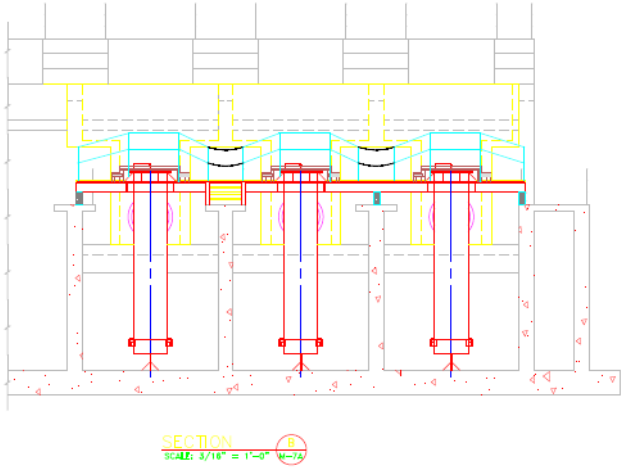


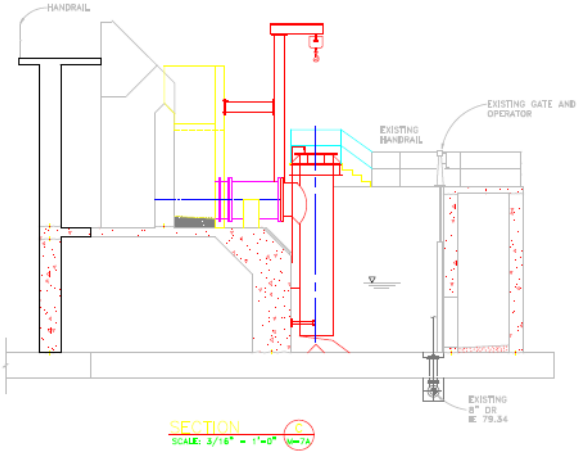


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# #4 Langat Treatment Plant

Wastewater Treatment Plant

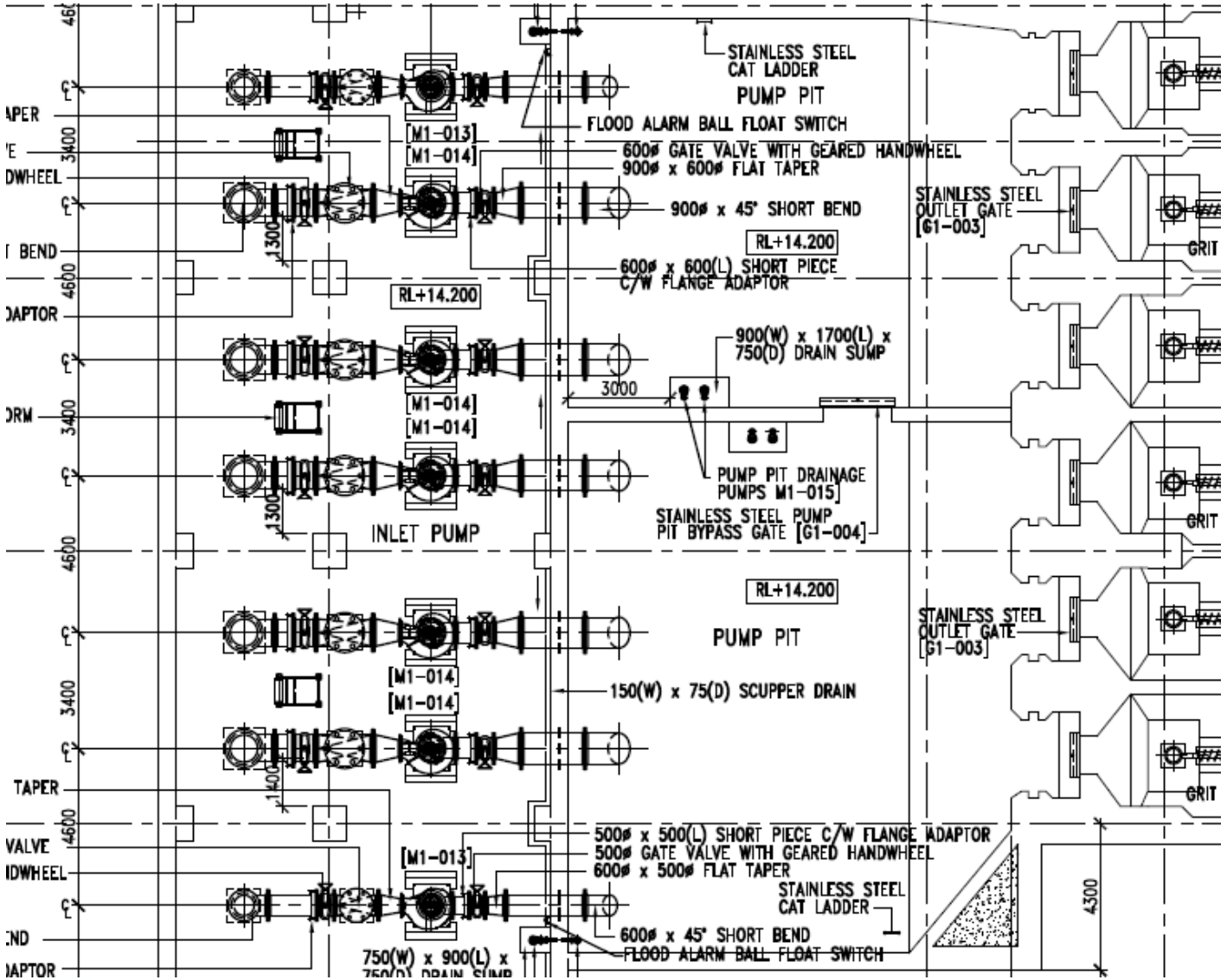
Intake Pump Station

5 x CT 3531, 900 lps

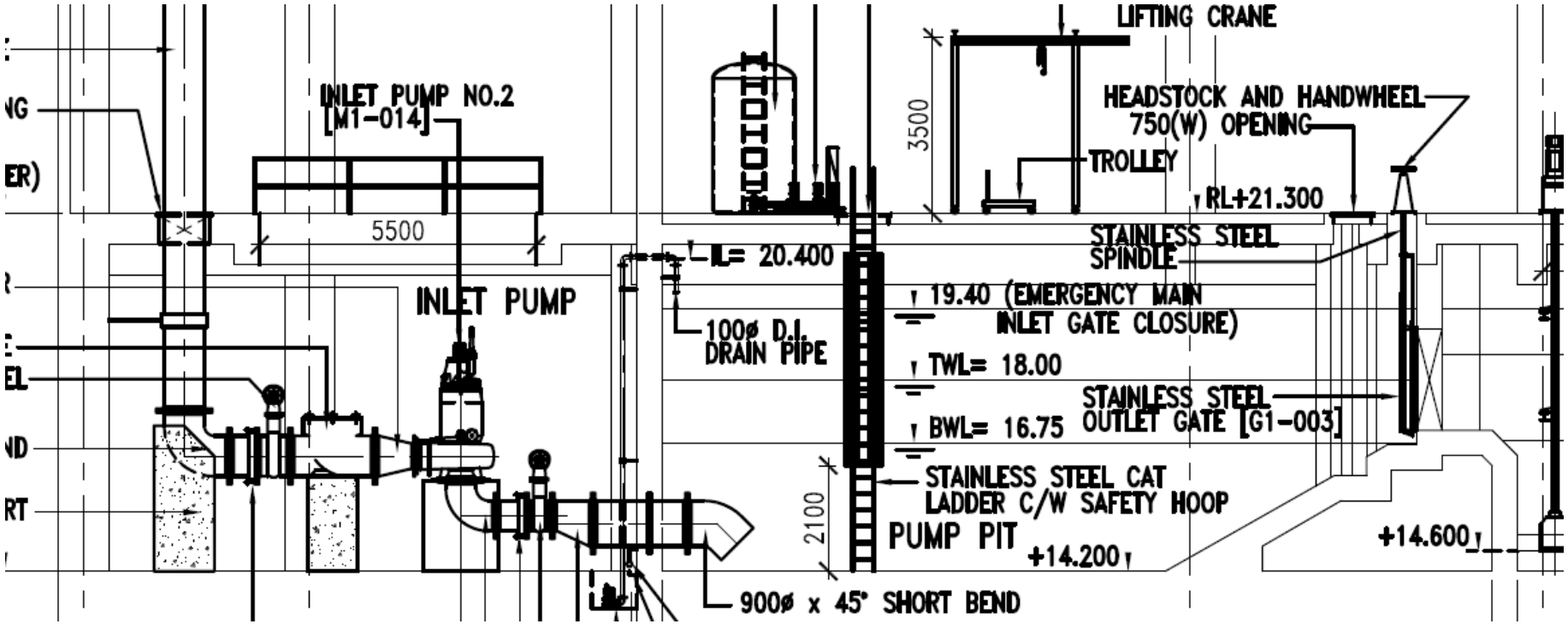
2 x NT 3400, 600 lps

A customer has asked for assistance on reviewing an intake pump station for a treatment plant.

# #4 Langat Treatment Plant



# #4 Langat Treatment Plant



# #4 Langat Treatment Plant