Fine Screens

Optimum Design for Maximum Results

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Or Really:

What do I need to know about getting new screens at my WWTP

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When considering a screening project, these are the critical things you need to know

- Not all screens are created equal
- Design criteria should always be followed
- Hydraulics drive design

We are all aware of the challenge of screenings

Advanced sludge processes continue to drive us to finer screening

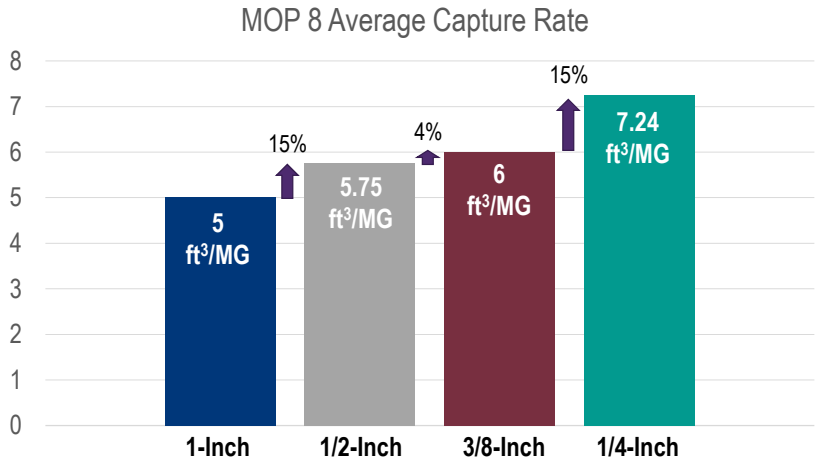
First, let's discuss why all screens are not created equal

Not all screens are created equal

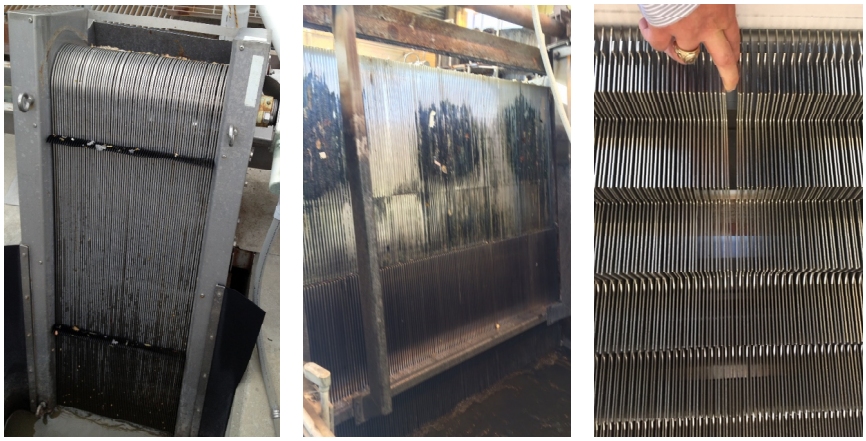
Design criteria should always be followed

Hydraulics drive design

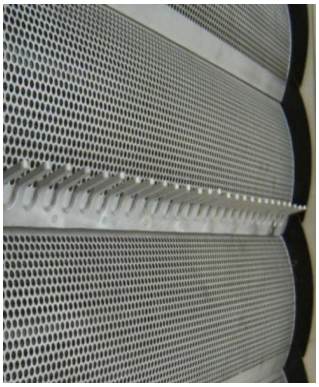
Finer screens allow for more capture of screening solids



Fine screens are typically defined as openings of 6mm or less



The three most common type of fine screens are…

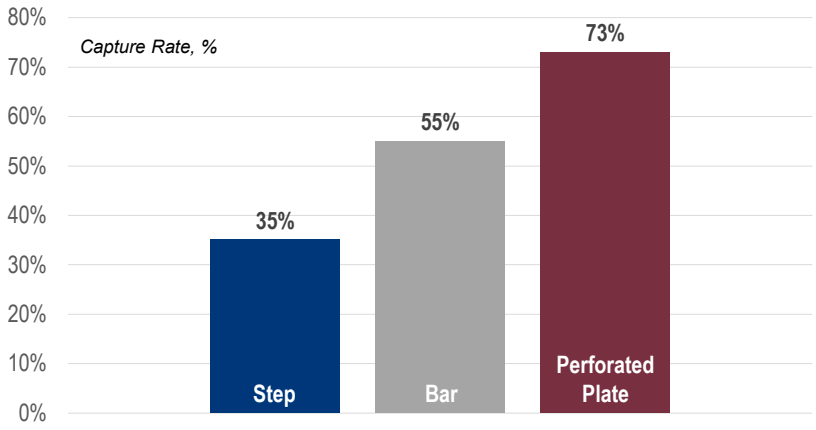


Perforated Plate

Step/Stair Bar

Rake Bar

Capture rate is significantly different among 6mm screens



Source: United Kingdom Water Industry Research (UKWIR)

The primary difference comes down to open area of the screen

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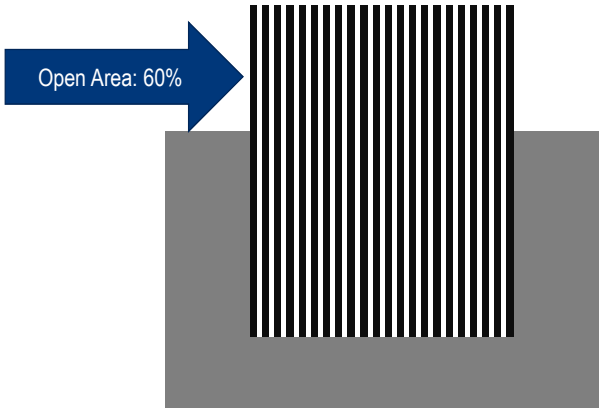

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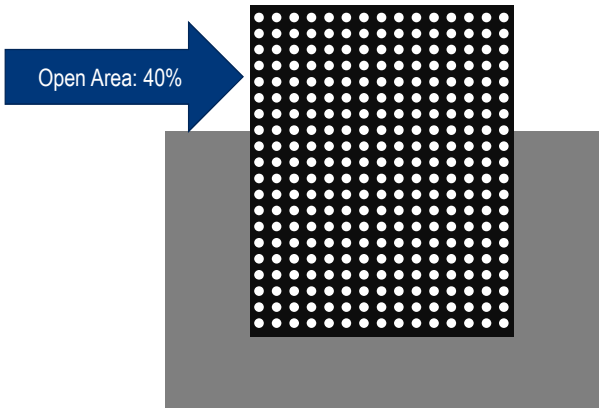
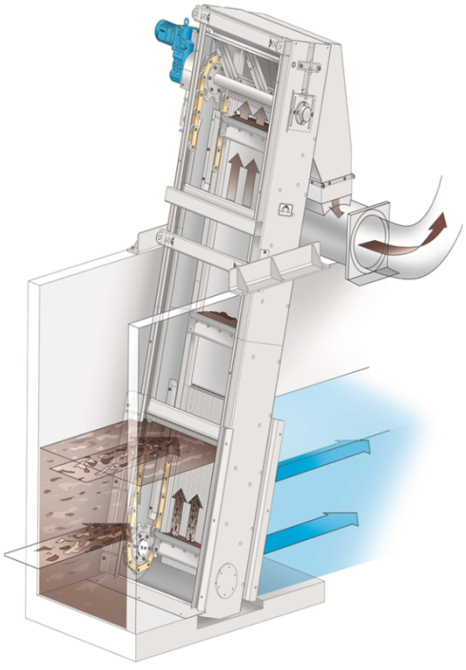
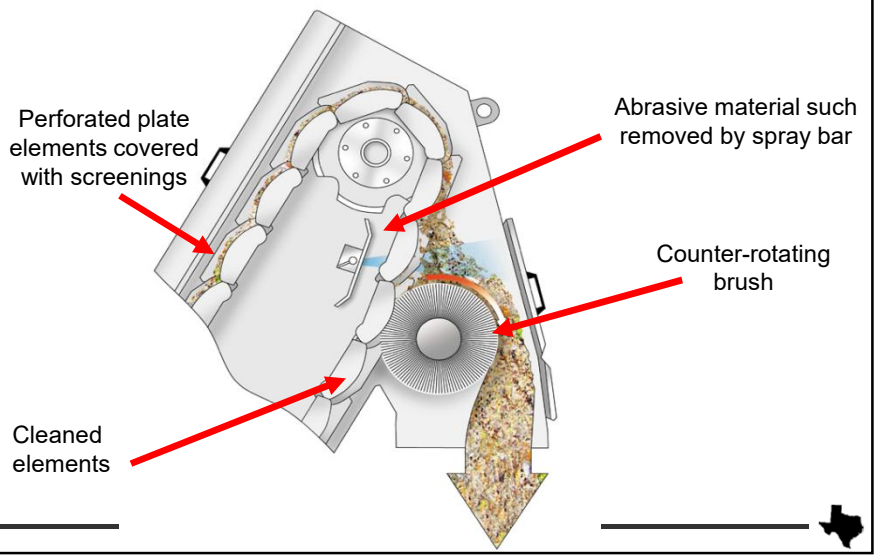


Perforated plates have the best screenings capture rate

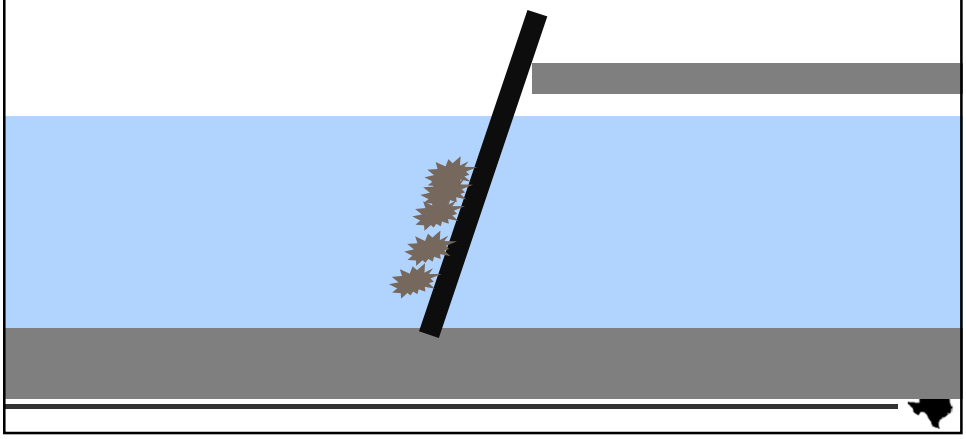
What is the trade off?



A back cleaned screen has some significant disadvantages



On a front cleaned screen, the screenings are never introduced on the backside of the screen



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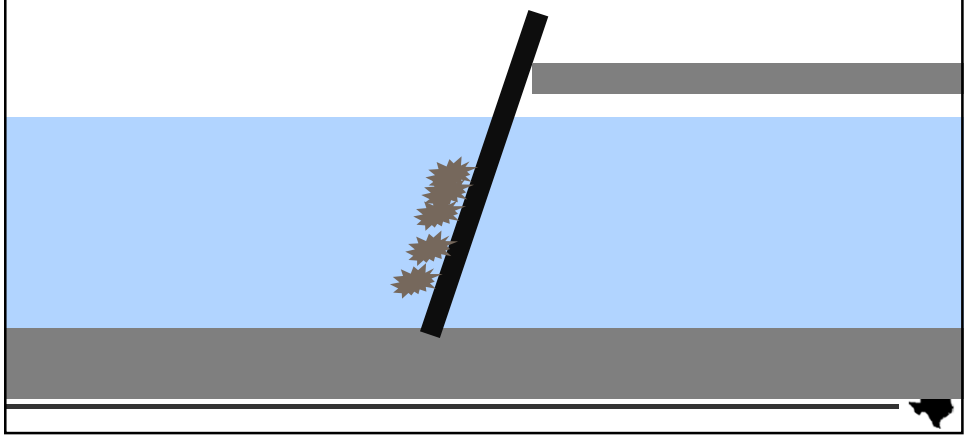
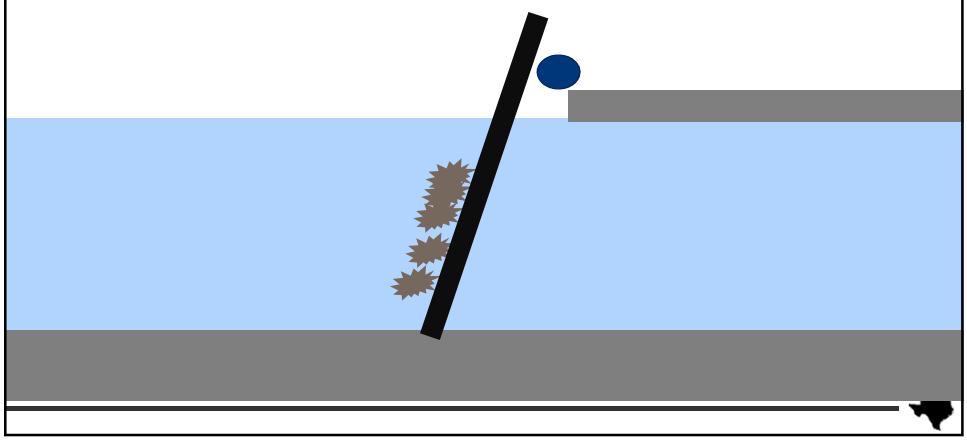
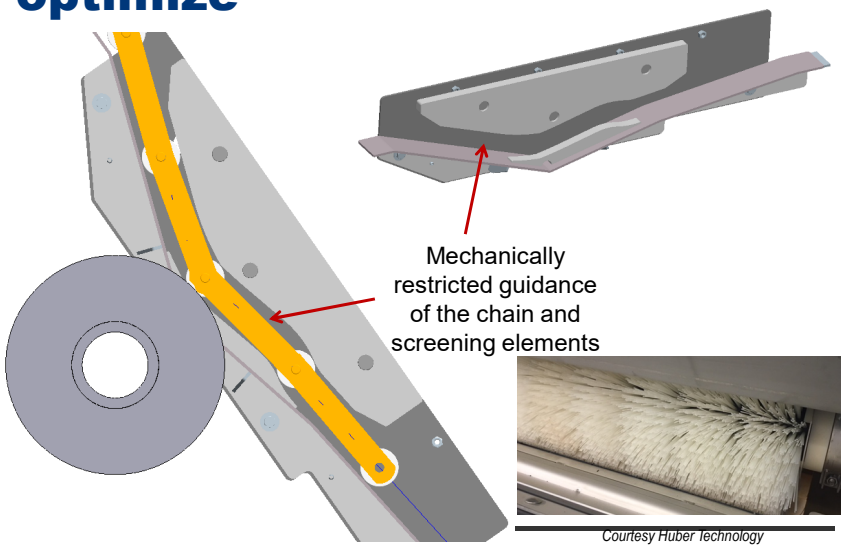


On a back cleaned unit, screenings can be sent downstream



Advanced manufacturers provide key features to optimize



Courtesy Huber Technology

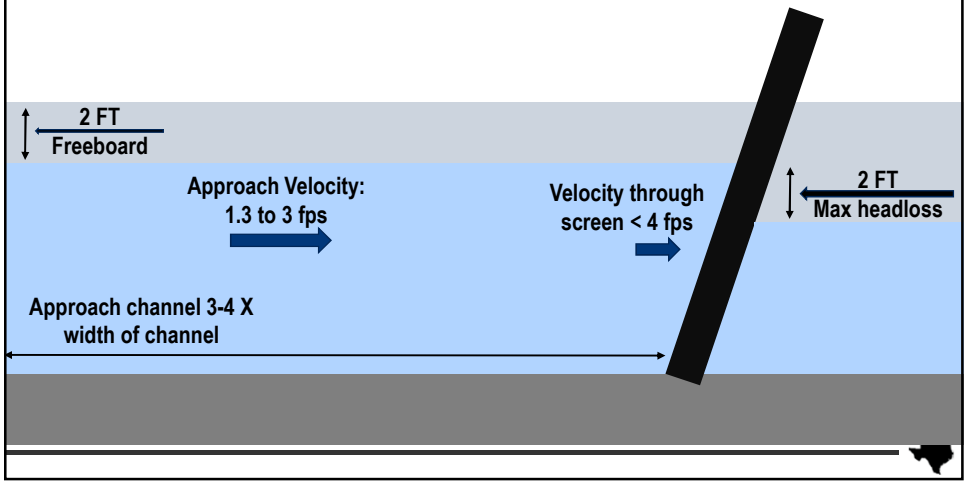
Next, engineering should focus on meeting critical design criteria

Not all screens are created equal

Design criteria should always be followed

Hydraulics drive design

There are five standard design criteria parameters for fine screens



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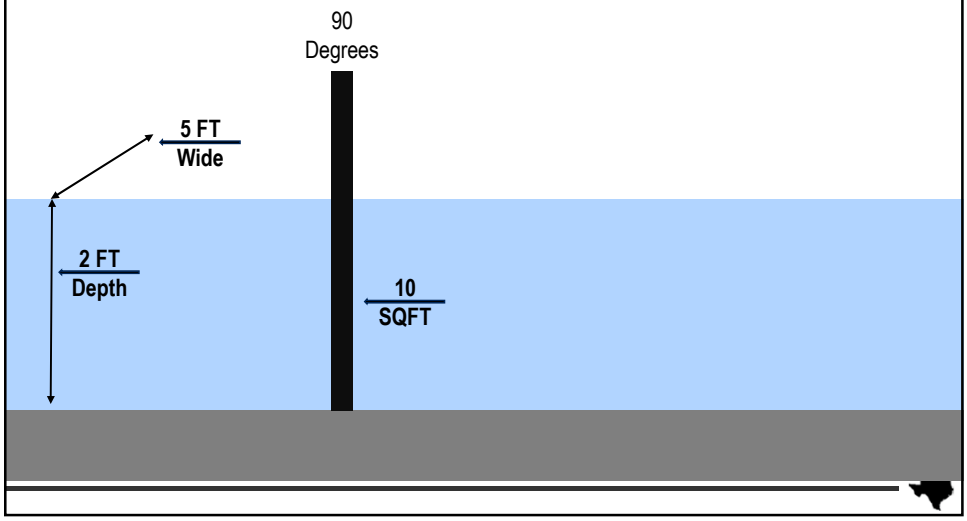

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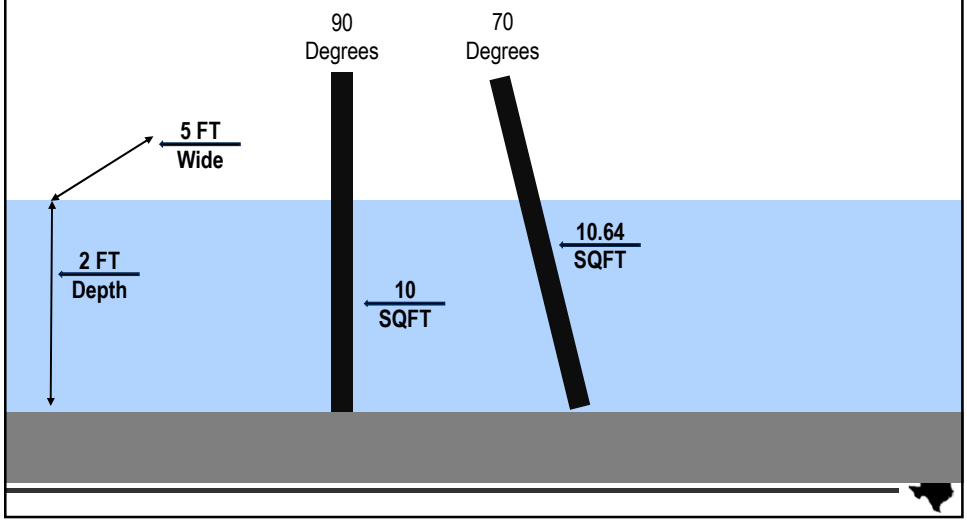

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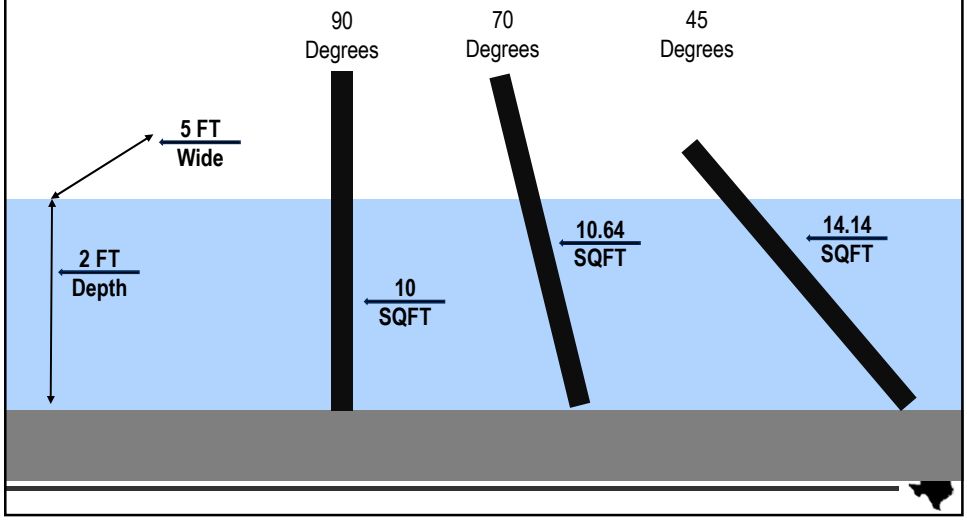
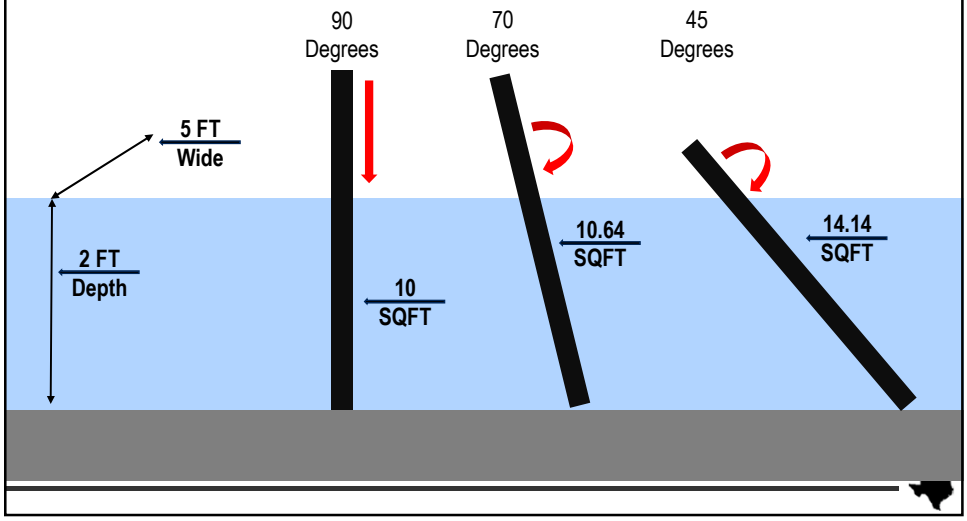


This is also important for material roll back



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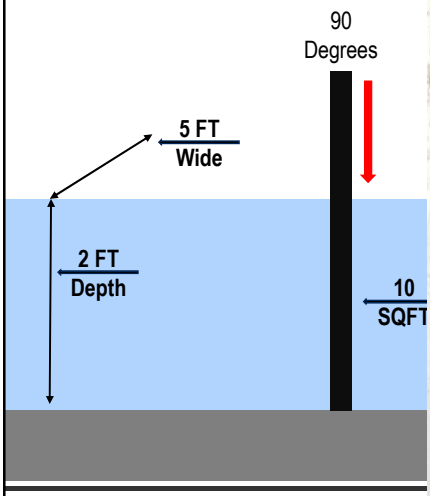
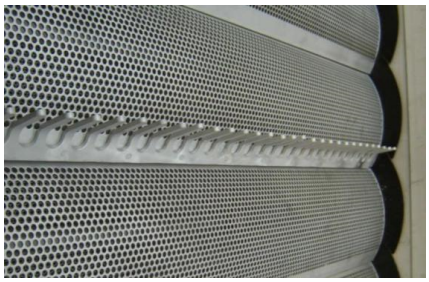


A good screen design will also have these features



Lifting fingers mounted on element

Reduction in thickness of the bars

Finally, hydraulics are critical!

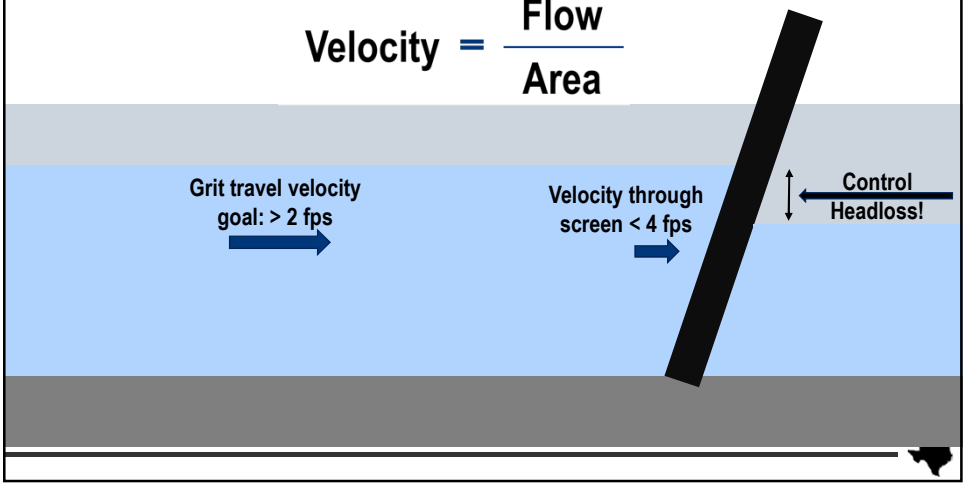
Not all screens are created equal

Design criteria should always be followed

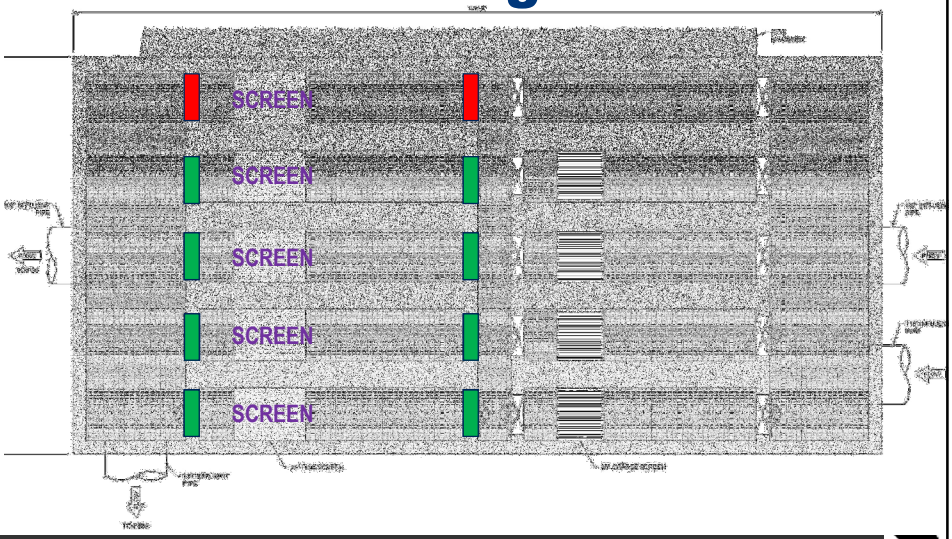
Hydraulics drive design

The velocity requirements are impractical due to narrow flow ranges

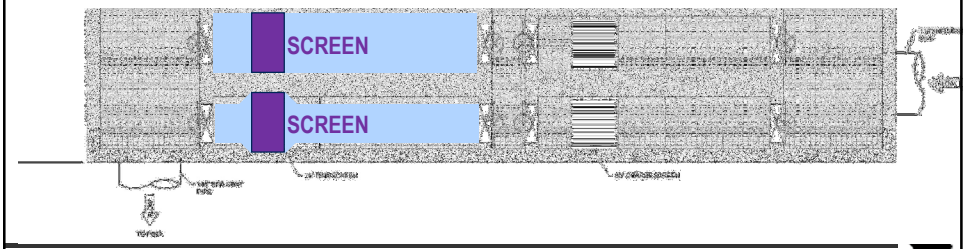
$$\text{Velocity} = \frac{\text{Flow}}{\text{Area}}$$



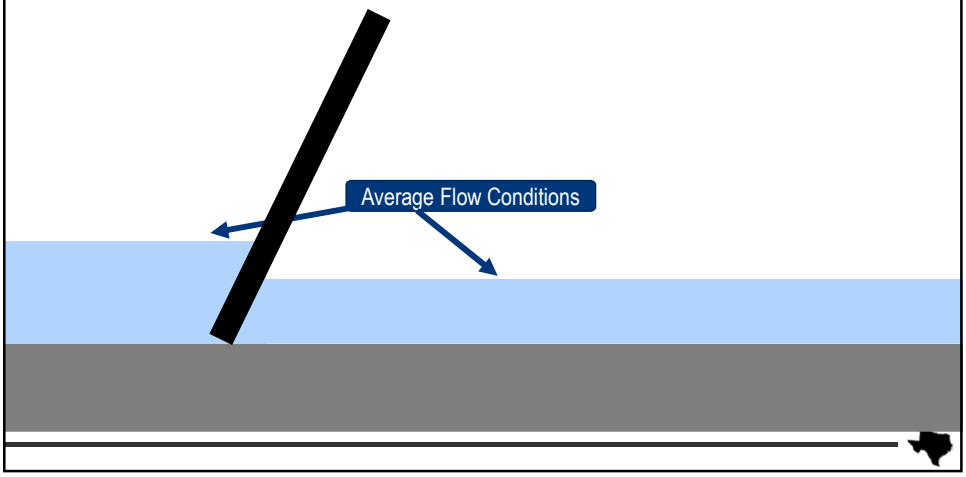
One way to manage flows is to automate gates



Another way is to modify channel width



Another option to consider: A Hydraulic Control Baffle



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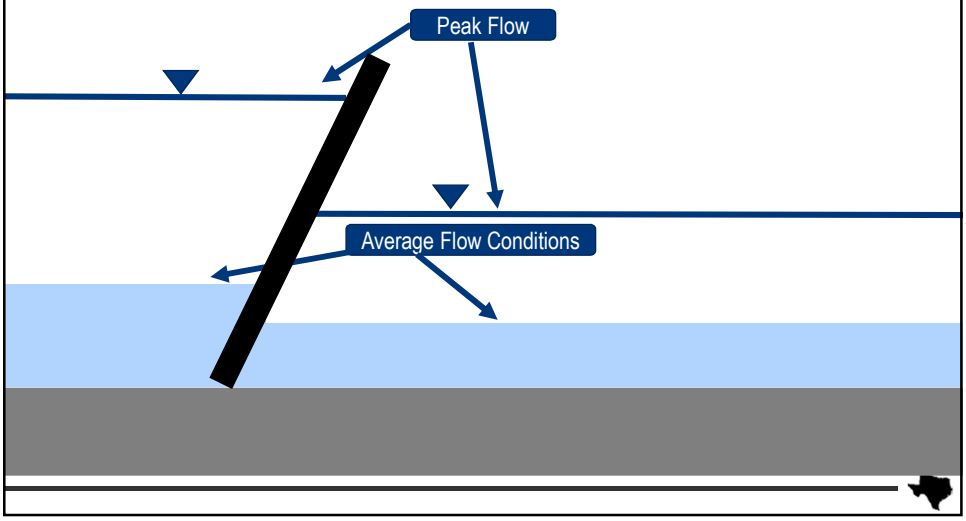

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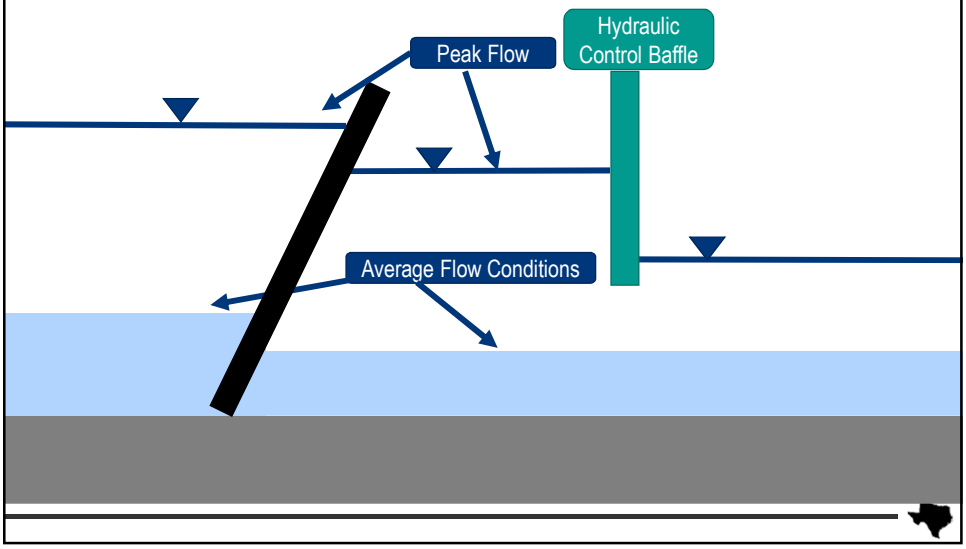
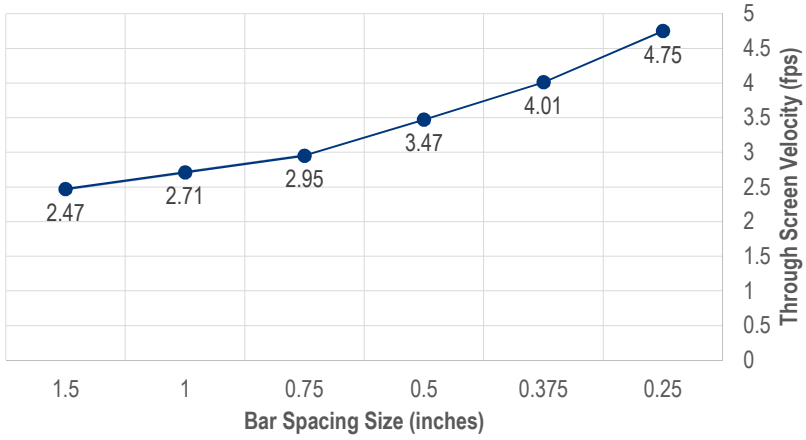


Retrofitting existing screen channels with finer screens may not always be applicable



Elevated head loss and differential pressures can lead to a number of problems

Upstream pressure will push screenings through the screen

Screenings are more difficult to remove

Increased O&M

In conclusion, one size doesn't fit all

- Just because a screen can physically fit in an application does not make a good fit – regardless of what the manufacturer says
- Hydraulics should be closely studied to choose the right angle, technology, operating depth, and control differential
- The most important factor for screen success is velocity through the screen (which is controlled by surface area and differential)

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