



It's more than Grayscale: Busting Myths about High Performance HMI

© GE Digital 2020

In tandem with



1

Webinar Moderator



Billie Emas
Sales Associate
American Water Works Association

Billie Emas is the Sales Associate to the NE and SE territories in the Sales Department at AWWA. She has been with AWWA for six months and she has been corresponding and building relationships with the members, advertisers, exhibitors and sponsors with AWWA. She has over 20 years of experience marketing, sales, event planning and membership. Billie has a BS in Business Administration from Bowling Green State University.

2

Enhance Your Webinar Experience

Close

- ✓ Email Programs
- ✓ Instant messengers
- ✓ Other programs not in use

GoToWebinar Support

<https://support.logmeininc.com/gotowebinar?labelid=4a17cd95>

3

3

Webinar Survey

Immediately upon closing the webinar

- Survey window opens
- Thank you!



4

4

Products or Services Disclaimer

The mention of specific products or services in this webinar does not represent AWWA endorsement, nor do the opinions expressed in it necessarily reflect the views of AWWA

AWWA does not endorse or approve products or services

5

5

Today's Presenters



Scott Duhaime
GE Digital



Leigh McDermott
Region of Waterloo



Aaron Knight
GrayMatter



6



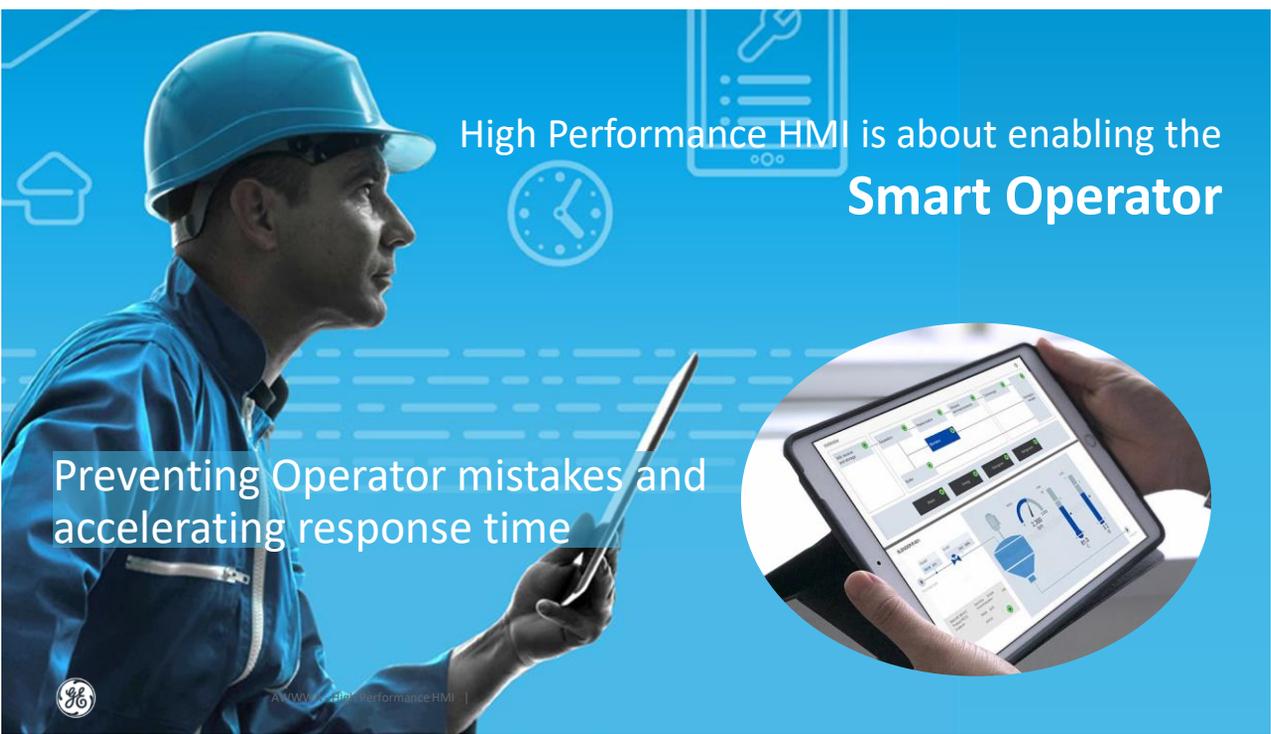
GE Digital

It's more than Grayscale: Busting Myths about High Performance HMI

Scott Duhaime
9 June 2020

© GE Digital 2020 / BC

7



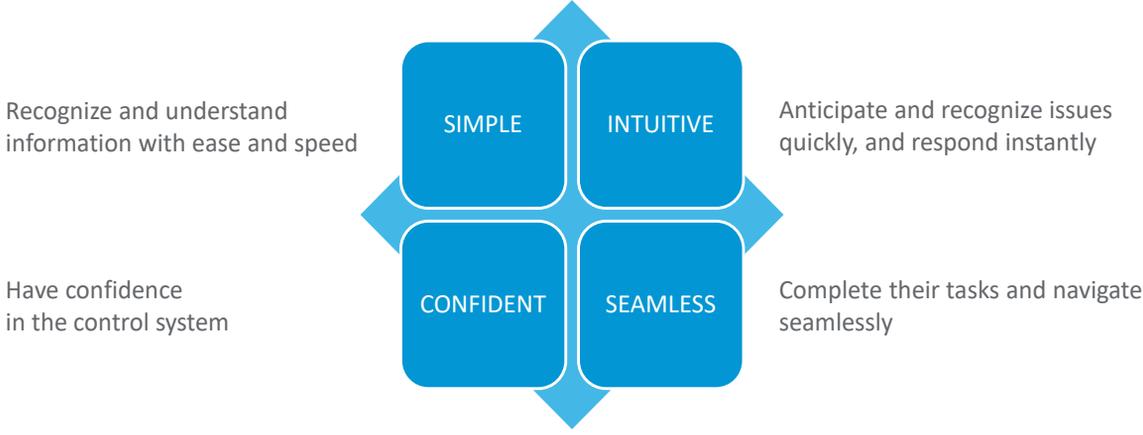
High Performance HMI is about enabling the **Smart Operator**

Preventing Operator mistakes and accelerating response time

www.ge.com/performancehmi

8

What makes a good operator interface from an Operator perspective?



© GE Digital

I know what you're thinking



"High Performance HMI is just a bunch of boring, grayscale, feature less screens, and it can't make me a better Operator."



"I need a complete, real-world representation of the process. That's all that makes sense."



"My screens are unique to me and my process. That HP HMI stuff is cookie cutter and one-size-fits-all. That doesn't apply to me."



"I've been using the same screens for 10 years, I know where everything is."



© GE Digital

So let's bust a few myths!



"High Performance HMI is just a bunch of boring, grayscale, feature less screens, and it can't make me a better Operator."



"I need a complete, real-world representation of the process. That's all that makes sense."



"My screens are unique to me and my process. That HP HMI stuff is cookie cutter and one-size-fits-all. That doesn't apply to me."



"I've been using the same screens for 10 years, I know where everything is."



© GE Digital

11

It's not just 50 shades of gray

High Performance HMI Design



The standard includes:

- Shape & style
- Typography
- Colors
- Navigation
- Situational analysis
- Intelligent alarming
- Trending



© GE Digital

12

Color is used to draw attention...

warm colors **neutral colors** **cool colors**

Alarms, Alerts, Warnings, Urgent Notifications

Contextual Elements, Assets, Connectors, Labels

All Clear, Good State, Normal

NOTE: Do not rely on color alone to communicate explicit states. Color blindness or lighting conditions can greatly affect the perception of color.

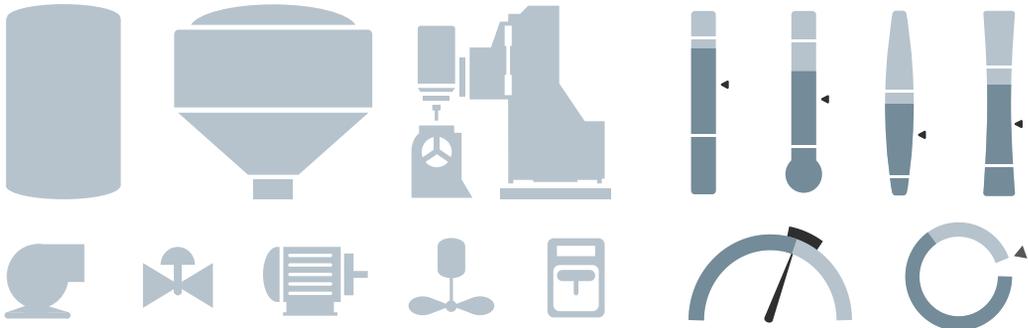


© GE Digital

13

Shape & Style

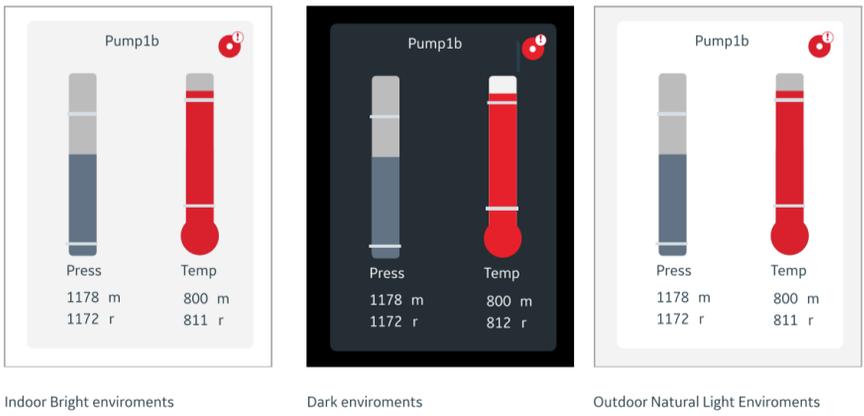
Use basic shapes with common accent elements (e.g., rounded corners or a repeating design element)



© GE Digital

14

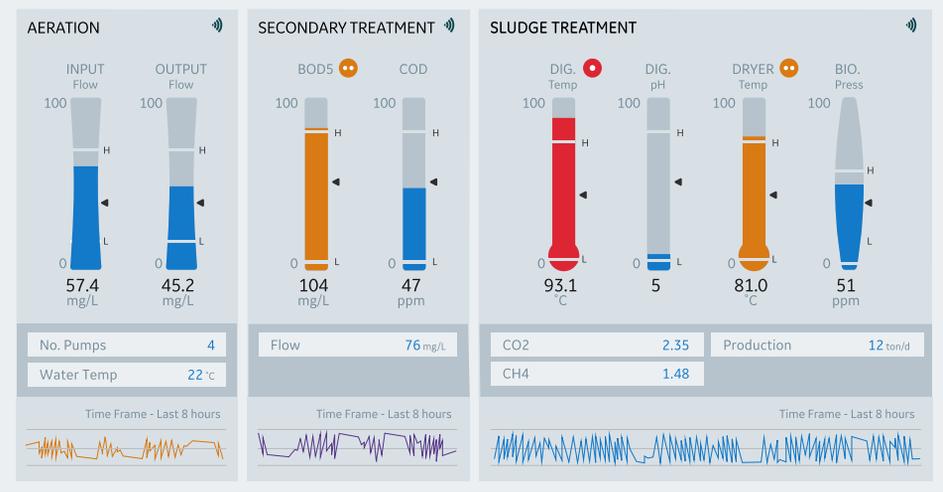
Color themes



© GE Digital

15

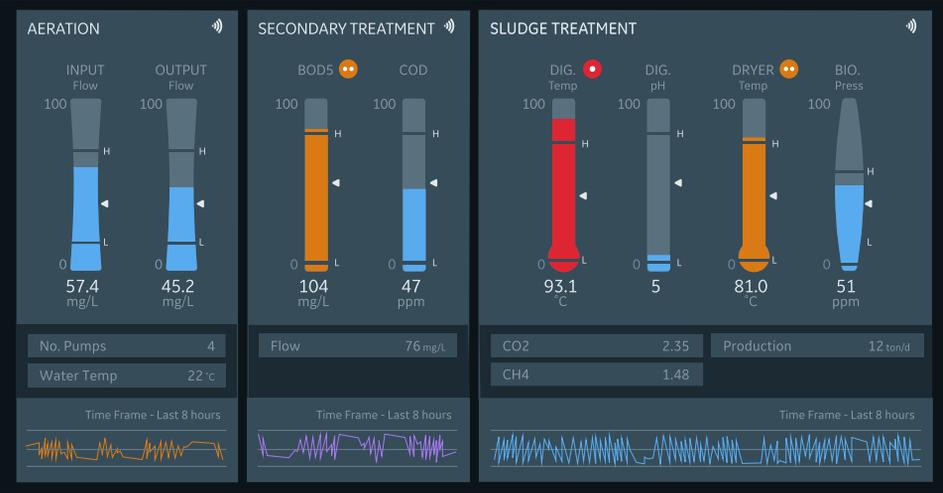
Environment Low vs. High Contrast Settings



© GE Digital

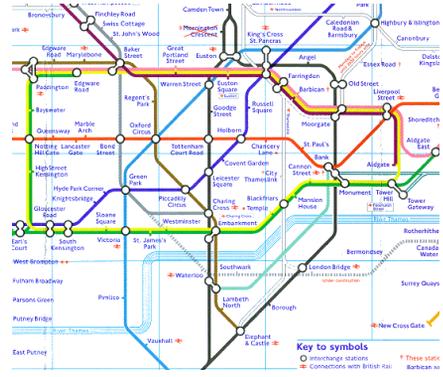
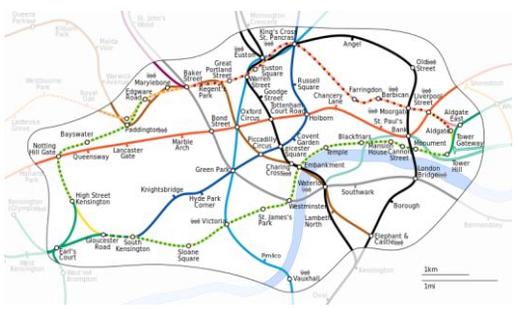
16

Environment Low vs. High Contrast Settings



17

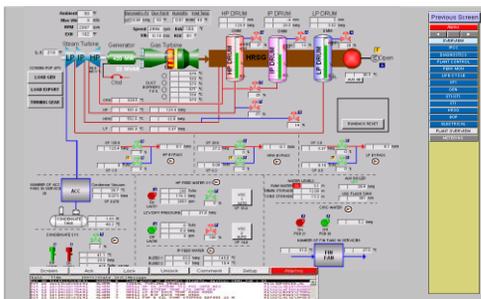
The real world can be really hard to navigate



© GE Digital

18

Keep it simple – the eye should be drawn to the abnormal



- Too much information
- Hard to detect process status

- Less content improves detection
- Show details only to put data in context



© GE Digital

19

But I know where everything is...

The High Performing Operator is organized



A good operator interface means

- Less training
- Faster reaction
- Safer operations
- Increased productivity

With a glance, operators should be able to recognize which information they need to attend & what it indicates



© GE Digital

20

High Performance HMI can mean changing the way you operate

 ... and change can be uncomfortable

 There are ways to introduce change

 Get your operators on board early



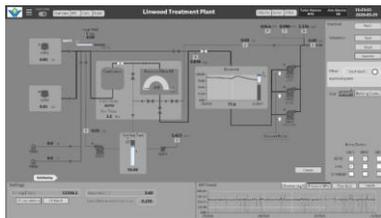
© GE Digital

Next Presenter



Leigh McDermott
Program Manager
Region of Waterloo





It's More Than Grayscale: High Performance HMI Deployment for the Region of Waterloo Water System

Leigh McDermott | Nancy Kodousek | Region of Waterloo
Dave Geiger | Aaron Knight | GrayMatter Systems
June 9, 2020



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

23

Outline

- Background *what we needed to do*
- Decisions *why we needed to upgrade*
- Screen Fundamentals *our design process*
- Development & Deployment *how we rolled out the screens*
- Lessons Learned *how to make it better*



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

24

Background: Region Water Supply System



- 80+ facilities
- 2 Tier (Waterloo, Cambridge, Kitchener, Woolwich, Wilmot)
- 1 Tier (North Dumfries & Wellesley)

Screen redevelopment started as part of a **SCADA Upgrade Program** (change-out of 175+ controllers)

SCADA = Supervisory Control And Data Acquisition



 Region of Waterloo Water Services | www.regionofwaterloo.ca/water

25

Background: Technical Challenges of Program

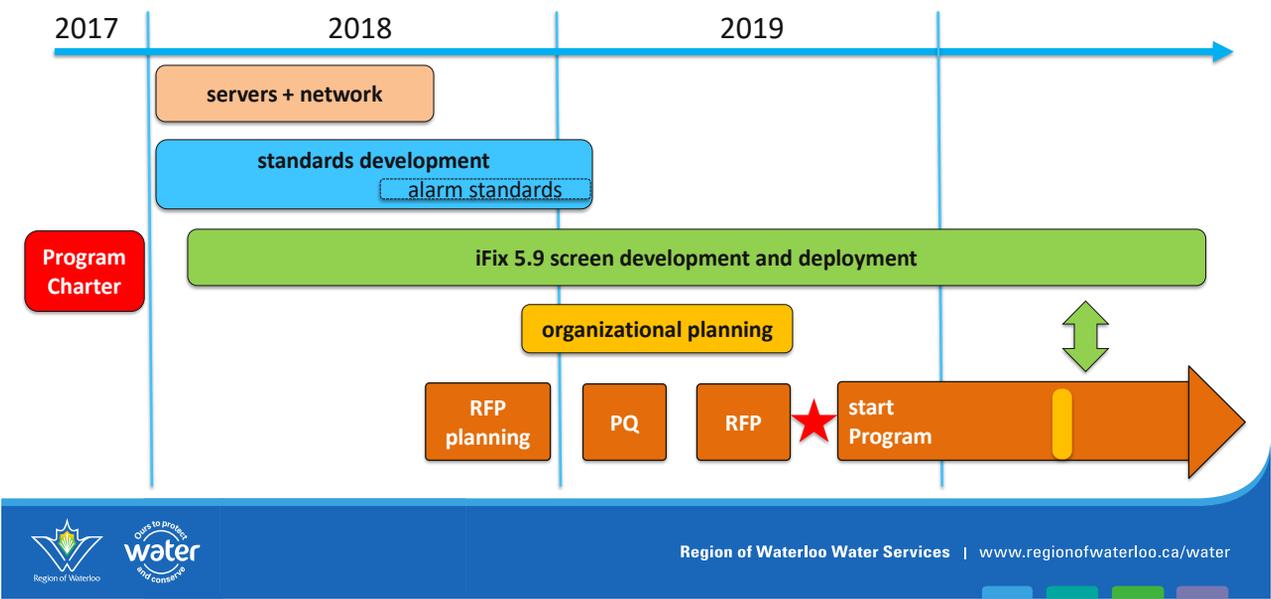
	Water	Challenges...
PLC Hardware	SCADAPack	manufacturer has discontinued
SCADA Screens	GE iFix (5.5) Screens: multi-colour	iFix support ended in 2019 : no easy conversion to new product
Standards	unique to SCADAPack	consistent standard for both w/WW
Servers/ Network	4 physical clusters on separate network	effort to maintain and no ability to share common applications with WW
Alarming	no alarm prioritization	too many nuisance alarms



 Region of Waterloo Water Services | www.regionofwaterloo.ca/water

26

Background: Program Planning

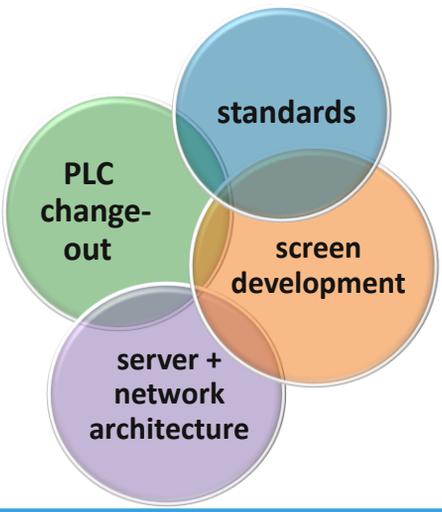


27

Background: Organization Challenges

the path to success is complicated...

...how can we ensure all stakeholders are engaged?



28

Decisions

	Decision
PLC Hardware	standardize on Allen-Bradley
SCADA Screens	GE iFix (5.9) <i>high-performance screens (ISA101)</i> <input checked="" type="checkbox"/>
Standards	combined water and wastewater
Servers/Network	shared server clusters and network changes
Alarms	alarm management standard



Decisions: Rationale for High Performance

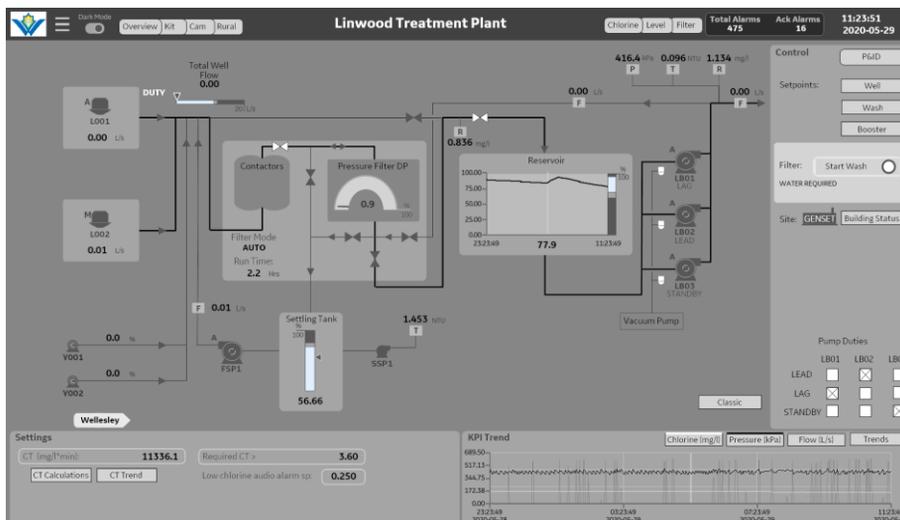
- Opportunity....
 - Need for redevelopment of iFix 5.5
 - Advantages offered by iFix 5.9
- Performance....
 - Better enunciate the most critical issues in the water system
- Succession Planning....
 - Providing a new platform with reduced training



<http://clipart-library.com/>



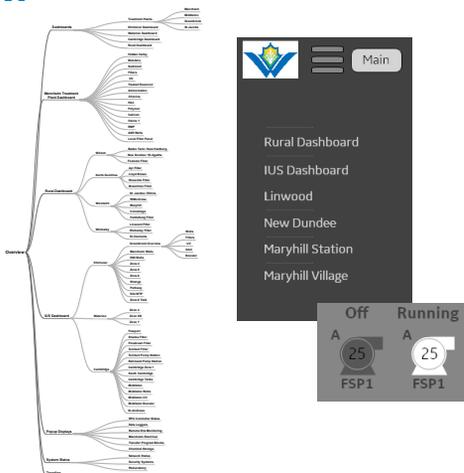
Decisions: SCADA Screens



31

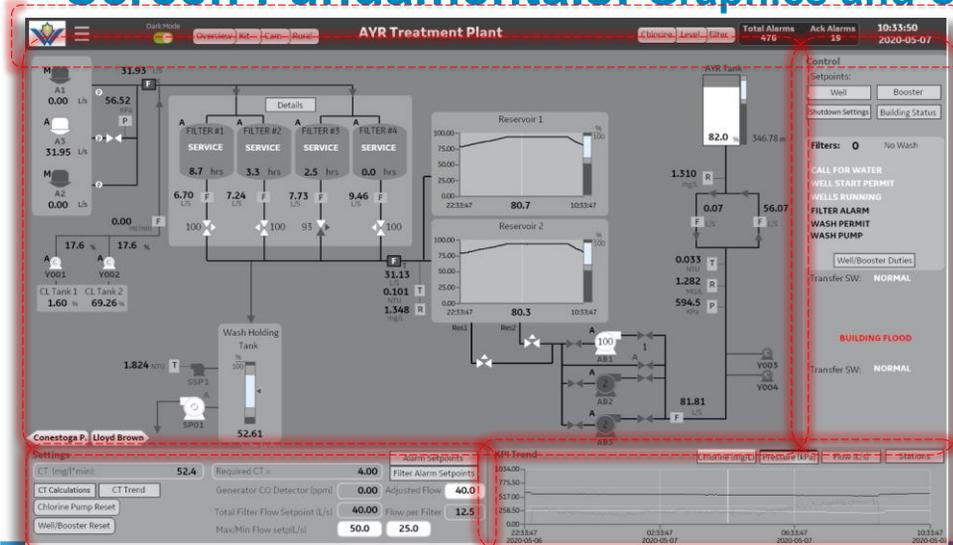
Screen Fundamentals: Starting with Standards

- ISA 101, Human Machine Interfaces
 - Graphics and Color
 - Elements
 - Screen Hierarchy
 - rural & urban systems/process
 - Screen Navigation
 - Alarming and Security



32

Screen Fundamentals: Graphics and Colors



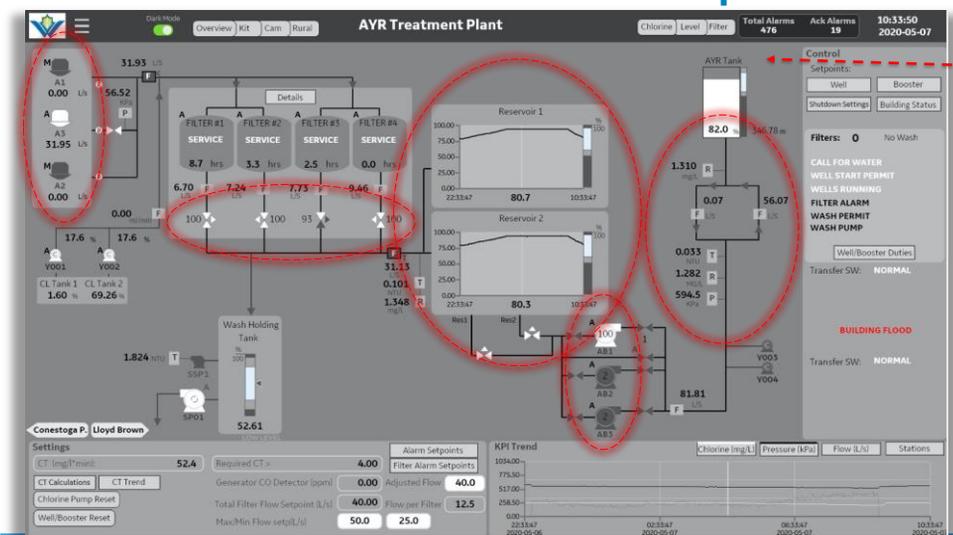
screen layout



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

33

Screen Fundamentals: Graphics and Colors



colors
devices
tanks
instruments



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

34

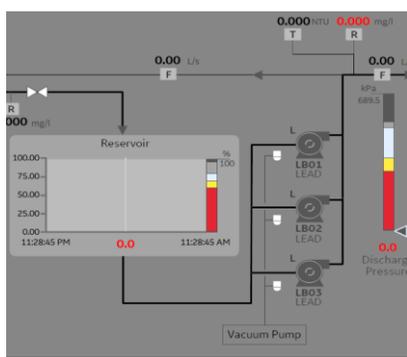
Screen Fundamentals: Elements



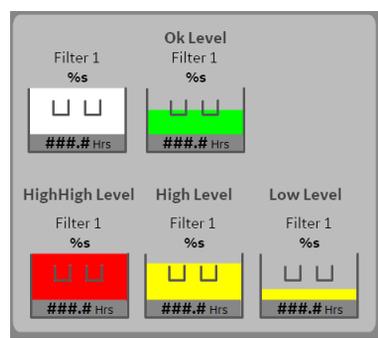
Pumps



Dosing Pumps

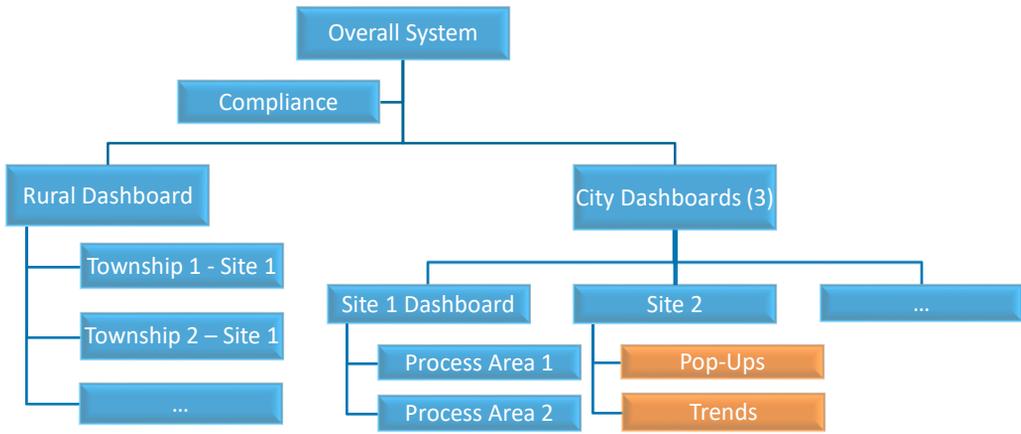


Instruments

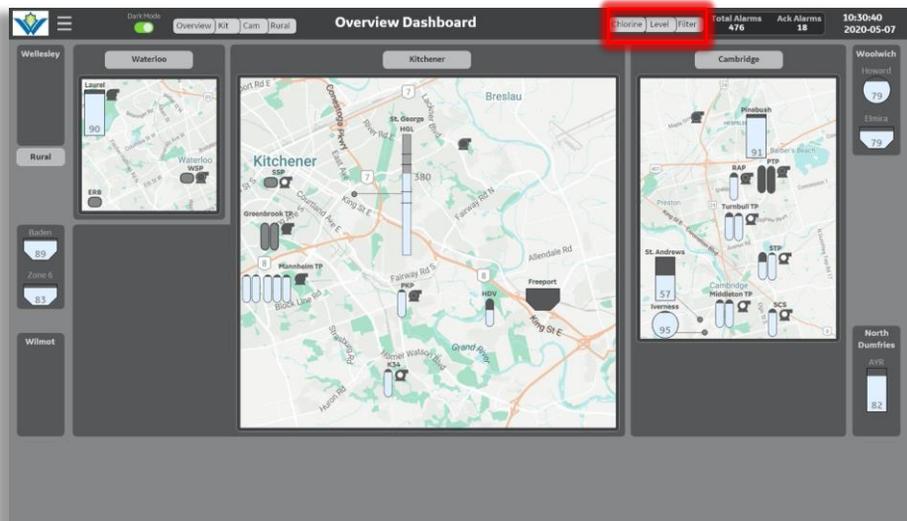


Filters

Screen Fundamentals: Hierarchy



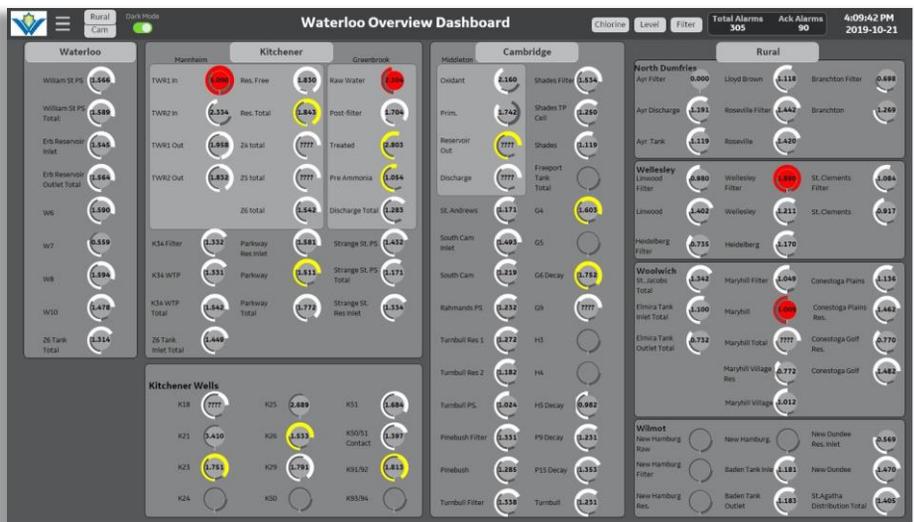
Hierarchy: Overview /




 Region of Waterloo Water Services | www.regionofwaterloo.ca/water

37

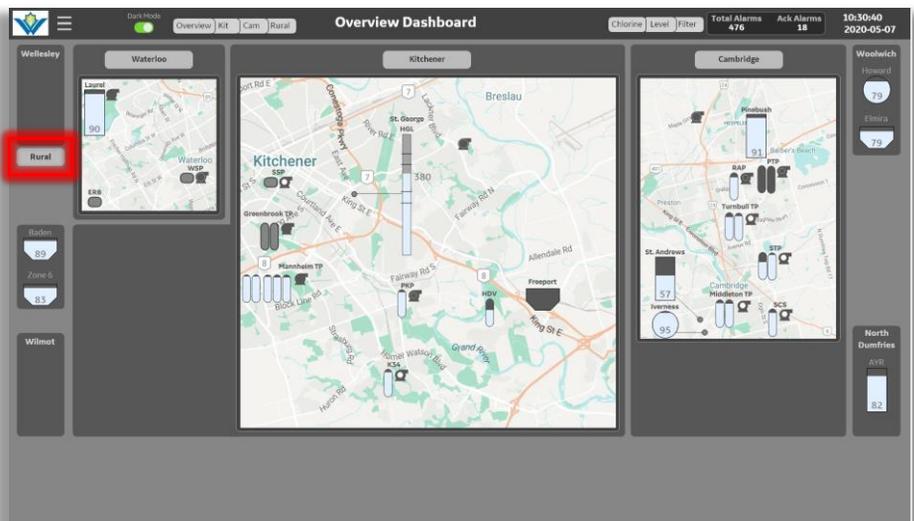
Hierarchy: Overview / Compliance /




 Region of Waterloo Water Services | www.regionofwaterloo.ca/water

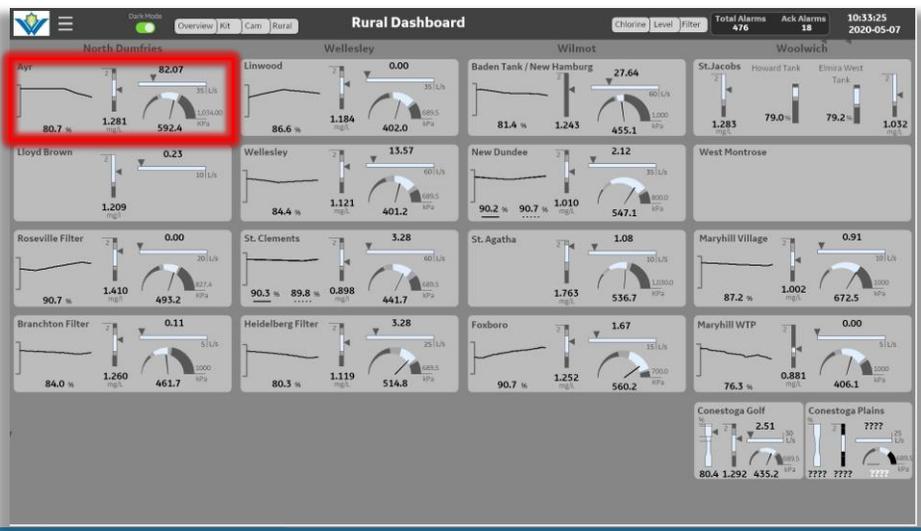
38

Hierarchy: Overview /



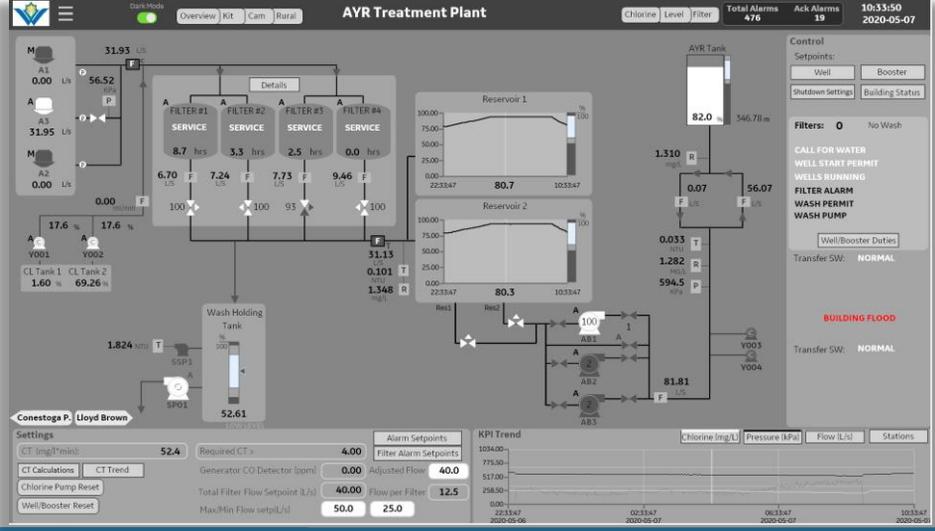
39

Hierarchy: Overview / Rural /



40

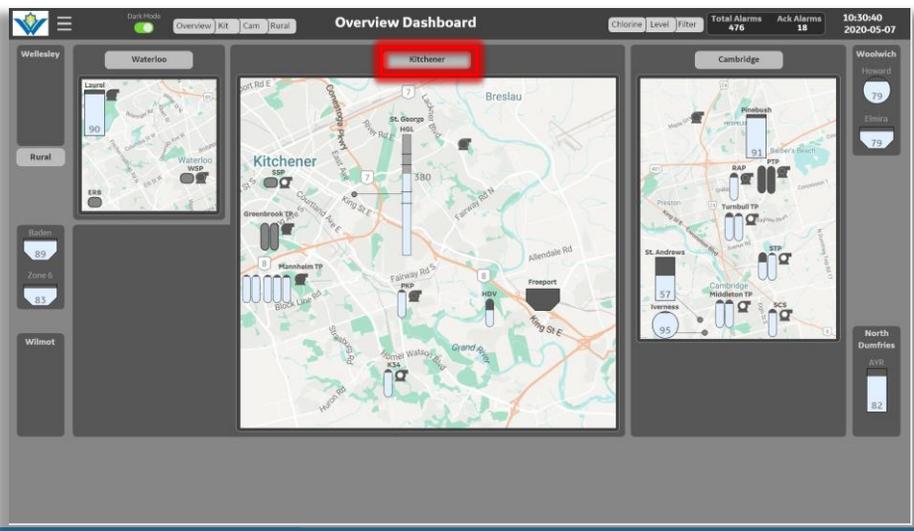
Hierarchy: Overview / Rural / Site /



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

41

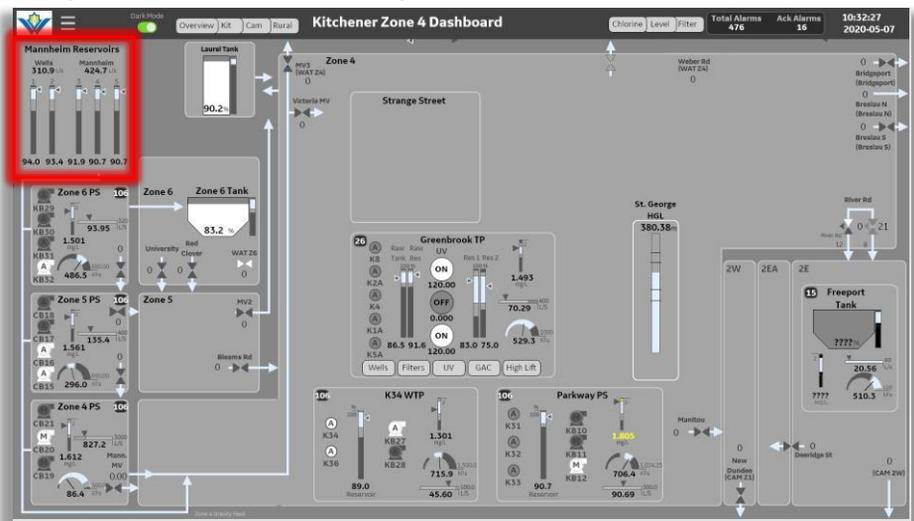
Hierarchy: Overview /



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

42

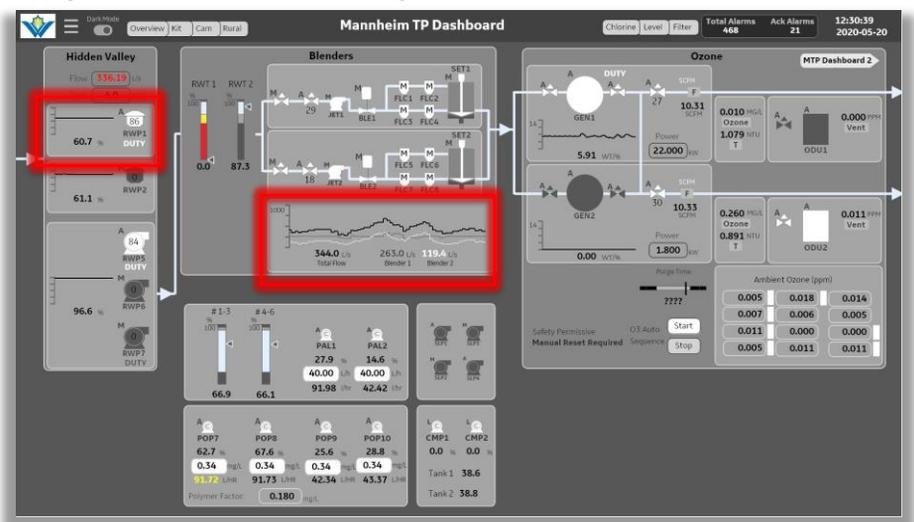
Hierarchy: Overview / City Dashboard/



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

43

Hierarchy: Overview / City / Site Dashboard /



Region of Waterloo Water Services | www.regionofwaterloo.ca/water

44

Hierarchy: Overview / City / Site / Process / Pop-Up+Trends





Region of Waterloo Water Services | www.regionofwaterloo.ca/water

45

Screen Fundamentals: Area Navigation

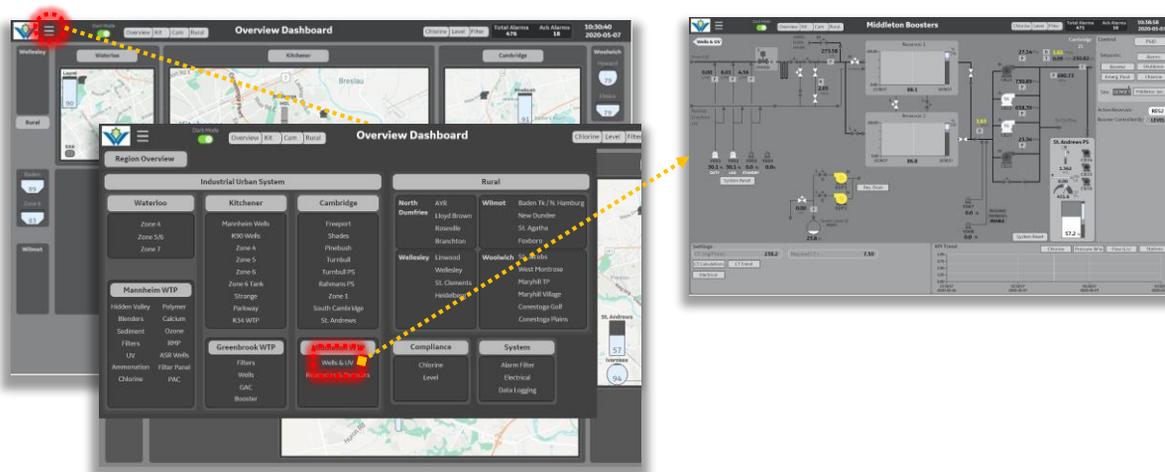




Region of Waterloo Water Services | www.regionofwaterloo.ca/water

46

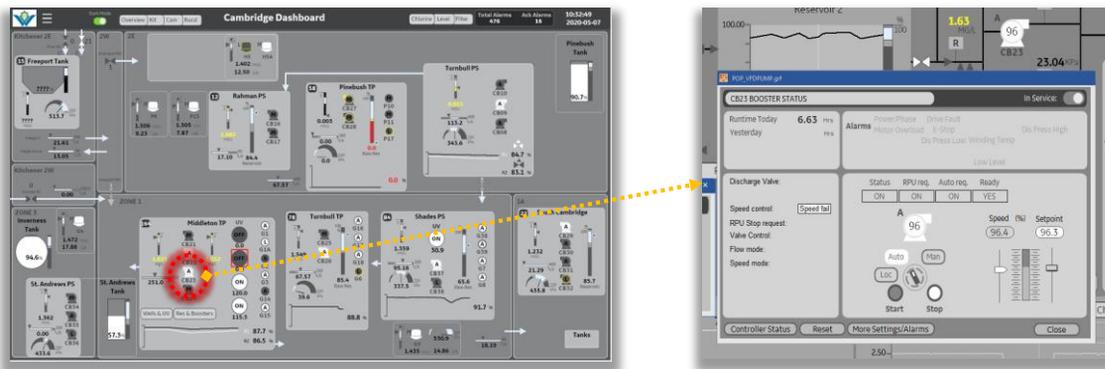
Screen Fundamentals: "Stack" Navigation



 **Region of Waterloo Water Services** | www.regionofwaterloo.ca/water

47

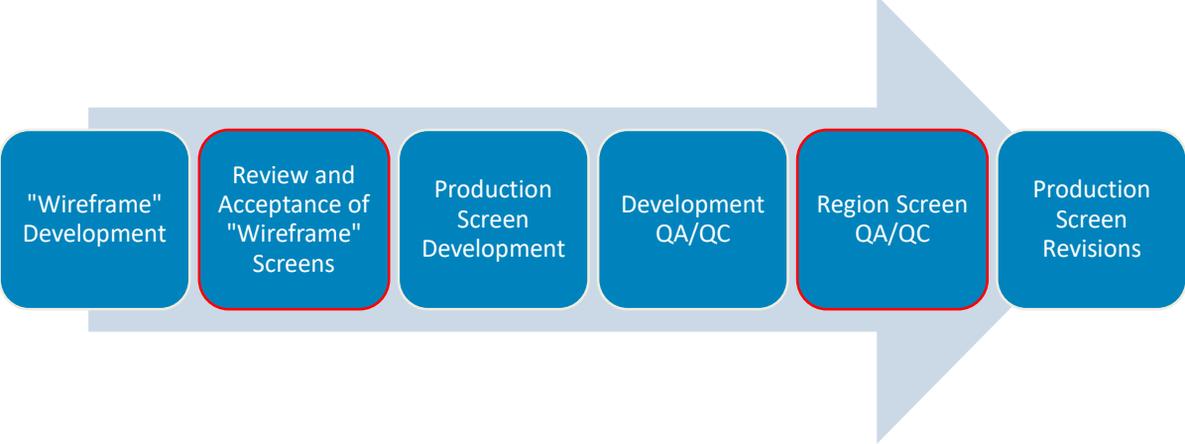
Screen Fundamentals: Direct to Pop-Up Navigation



 **Region of Waterloo Water Services** | www.regionofwaterloo.ca/water

48

Development: Development Process

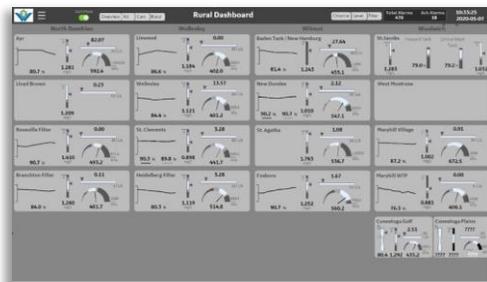


Deployment: Deployment Strategy



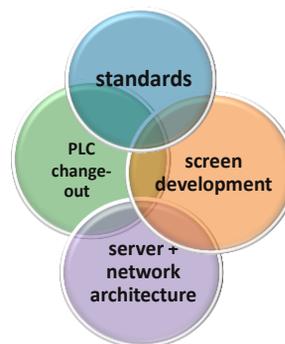
Deployment: Preliminary Deployment Results

- Rural Screens are Live
 - Good acceptance of new elements, layouts and alarm states
 - Staff have embraced the High Performance approach and have assisted with conversion
 - Operator Feedback:
 - easier to learn
 - easier to understand



Lessons Learned

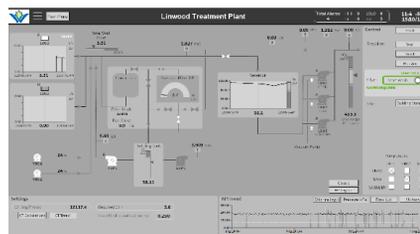
- consider a project charter
 - alignment of stakeholders adds value
 - charter helps to reinforce the road map
- standards are critical!
 - drive to decisions....gaps cost \$s and extend schedule
- understand the organisational impacts of the project work
 - have a fallback plan (resources, etc.)



Lessons Learned

Screen Development:

- develop an early “preliminary” style guide with all stakeholders
- beta test functionality with a representative screen
- incrementally roll-out
- QA/QC/documentation can't be overdone....



Next Presenter

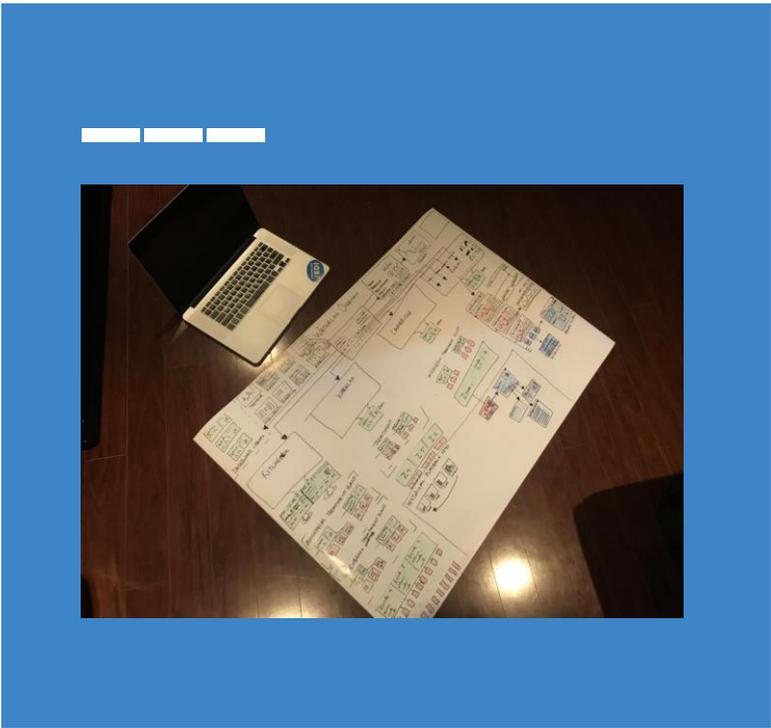


Aaron Knight
Director of Innovation
GrayMatter





57

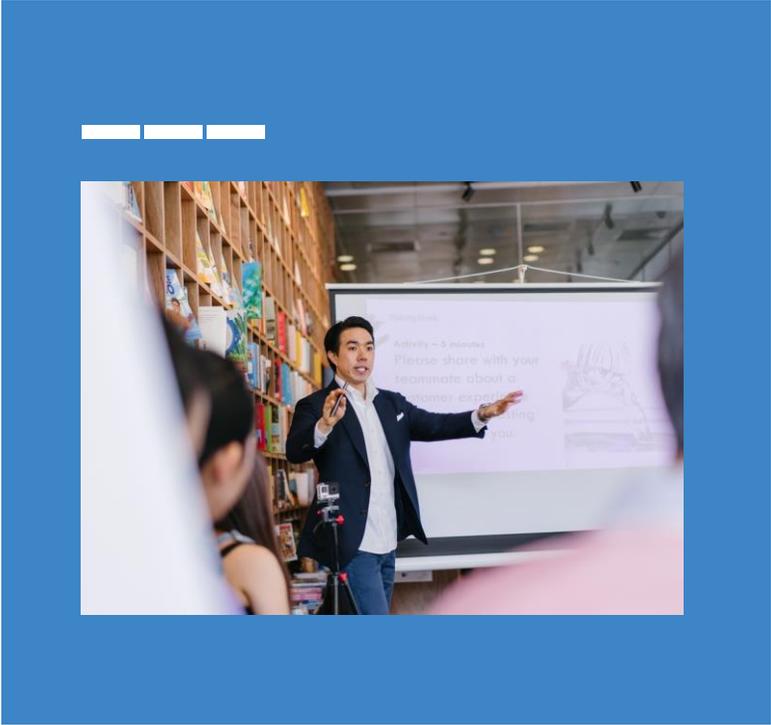


Practical Lessons for Getting Started

- This is a project**
- Get your stakeholders and partners involved
- Workshop/review a lot
- Document and share
- Nuisance or notification alarms



58



Practical Lessons for Getting Started

- This is a project
- Get your stakeholders & partners involved**
- Workshop/review a lot
- Document and share
- Nuisance or notification alarms



59

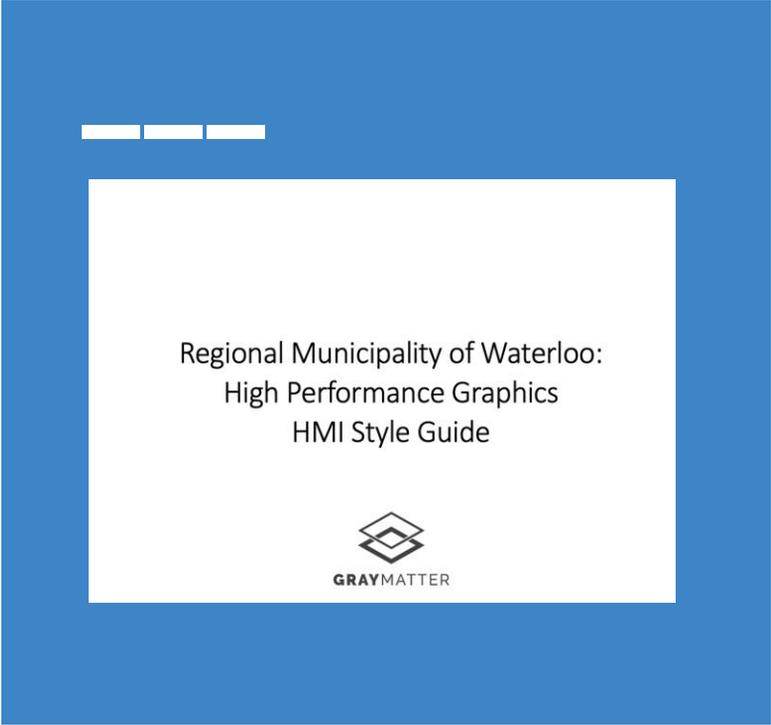


Practical Lessons for Getting Started

- This is a project
- Get your stakeholders & partners involved
- Workshop/review a lot**
- Document and share
- Nuisance or notification alarms



60



Practical Lessons for Getting Started

- This is a project
- Get your stakeholders & partners involved
- Workshop/review a lot
- Document and share**
- Nuisance or notification alarms



61



Practical Lessons for Getting Started

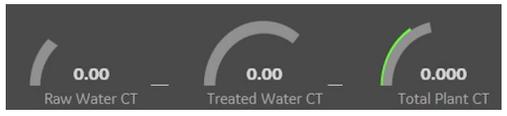
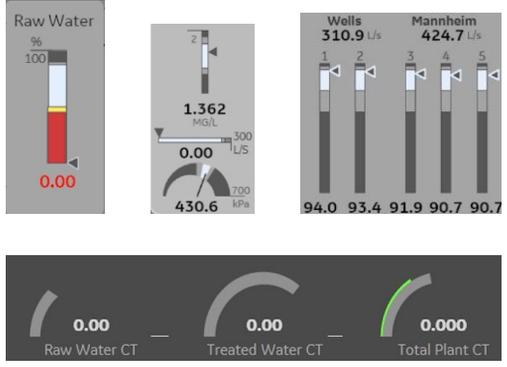
- This is a project
- Get your stakeholders & partners involved
- Workshop/review a lot
- Document and share
- Nuisance or notification alarms**



62

Low-Hanging Fruit

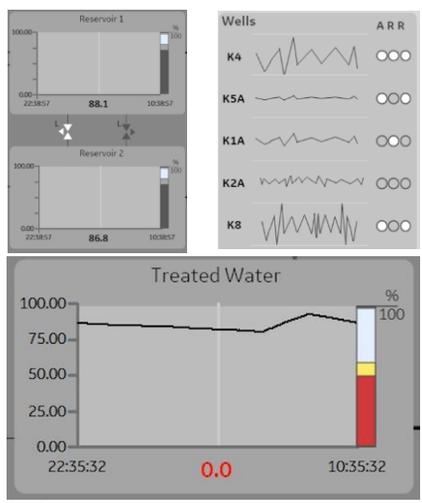
- Replace data links with gauges**
- Use embedded trending objects
- Update piping/other P&ID elements
- Remove gradient coloring/distracting animations/flashing objects elements
- Add or modify background color to improve contrast
- Encapsulate process areas in a card
- Consistent fonts, units and naming conventions



63

Low-Hanging Fruit

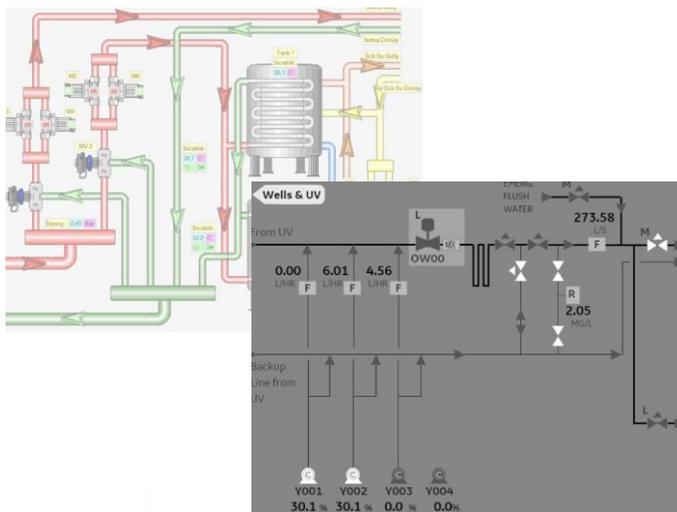
- Replace data links with gauges
- Use embedded trending objects**
- Update piping/other P&ID elements
- Remove gradient coloring/distracting animations/flashing objects elements
- Add or modify background color to improve contrast
- Encapsulate process areas in a card
- Consistent fonts, units and naming conventions



64

Low-Hanging Fruit

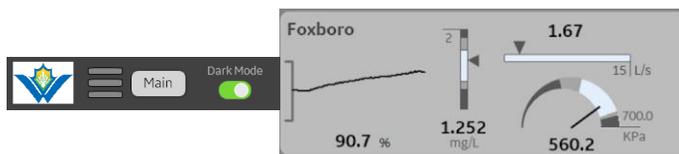
- Replace data links with gauges
- Use embedded trending objects
- Update piping/other P&ID elements**
- Remove gradient coloring/distracting animations/flashing objects elements
- Add or modify background color to improve contrast
- Encapsulate process areas in a card
- Consistent fonts, units and naming conventions



65

Low-Hanging Fruit

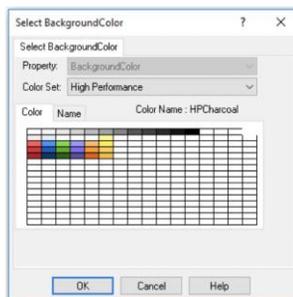
- Replace data links with gauges
- Use embedded trending objects
- Update piping/other P&ID elements
- Remove gradient coloring/distracting animations/flashing objects elements**
- Add or modify background color to improve contrast
- Encapsulate process areas in a card
- Consistent fonts, units and naming conventions



66

Low-Hanging Fruit

- Replace data links with gauges
- Use embedded trending objects
- Update piping/other P&ID elements
- Remove gradient coloring/distracting animations/flashing objects elements
- Add or modify background color to improve contrast**
- Encapsulate process areas in a card
- Consistent fonts, units and naming conventions



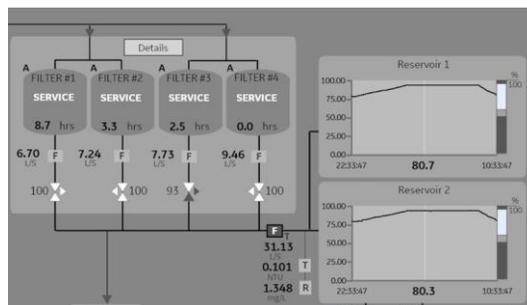
Condition	Description	Color	
Passive	Stopped/Close	HPPitchBlack	0
Active	Running/Open	HPWhite	16777215
Fail	Equipment Fail	HPDeepBlue	12147712
N.A.	Not Available	HPHighlighter	4582911



67

Low-Hanging Fruit

- Replace data links with gauges
- Use embedded trending objects
- Update piping/other P&ID elements
- Remove gradient coloring/distracting animations/flashing objects elements
- Add or modify background color to improve contrast
- Encapsulate process areas in a card**
- Consistent fonts, units and naming conventions



68

Low-Hanging Fruit

- Replace data links with gauges
- Use embedded trending objects
- Update piping/other P&ID elements
- Remove gradient coloring/distracting animations/flashing objects elements
- Add or modify background color to improve contrast
- Encapsulate process areas in a card
- Consistent fonts, units and naming conventions**

SOME TAG NAMES IN ALL CAPS and other not
L/Min. OR Liters/minute OR l/min.
On screen font SIZES and types



Get in Touch

Scott Duhaime, GE Digital

Scott.duhaime@ge.com
978-793-9039

Follow GrayMatter on TechHub
<https://graymattersystems.com/blog-page/>

Aaron Knight, GrayMatter

aknight@graymattersystems.com
647-267-3070

Follow GE's Blog at:
<https://www.ge.com/digital/blog>

Leigh McDermott, Region of Waterloo





Thank you! Questions?

© GE Digital 2020

Scott Duhaime – GE Digital
Scott.duhaime@ge.com
978-793-9039

Aaron Knight – GrayMatter
aknight@graymattersystems.com
647-267-3070

Leigh McDermott – Region of Waterloo

71

CE Credits (CEUs) and Professional Development Hours (PDHs)

AWWA awards webinar attendees CEUs.

If you viewed this webinar live, you will receive a certificate through the AWWA account associated with the email address you used to register.

If you viewed this webinar through a group registration, contact your proctor to log your participation.

If you viewed this as an archive webinar, follow the directions included in your archive webinar email to log your participation.

Certificates will be available on your AWWA account within 30 days of the webinar

72

72

How to Print Your Certificate of Completion

Within 30 days of the webinar, login to **www.awwa.org** or register on the website. If you are having problems, please email educationservices@awwa.org

Once logged in, go to:

- My Account (click on your name in the top right corner)
- My Transcripts
 - To print your official transcript, click **Print list**
 - To print individual certificates, click **Download Certificate**

73

73