25 10 10.00 24 UMCS Front-End Integration (NAVFAC NW)
APPENDICES A – F

Version 3.1 Issued: April 2018

Revision Log:

Appendix Changed	Date	Description
(throughout)	APRIL 2018	General: "CS" (Control System) changed to "UMCS" (Utility Monitoring and Control System) to align with NAVFAC nomenclature used enterprise-wide.

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APPENDIX A: PRE-FUNCTIONAL AND FUNCTIONAL PERFORMANCE TEST CHECKLISTS

UMCS Pre-Functional Tests

Item To Check:	Was It Compliant? Y/N	Was it left Compliant? Y/N
Was the "DB loss" test run on the fiber acceptable?		
Verify all trend and histories meet approved naming conventions.		

UMCS Functional Performance Tests

Item To Check:	Was It Compliant? Y/N	Was it left Compliant? Y/N
Does the intrusion alarm generate an alarm on the alarm portal?		
Verify alarm source name nomenclature is correct and that the hyperlink ord is for the correct alarmed component.		
Generate a different alarm: did it display on the alarm portal?		
Is this building or facility on the base or installation graphic?		
Is the building's supervisory controller communicating across the network?		
Do the graphics display correctly at the central operator workstation?		
Run a diagnostic review of the facility via Skyspark. Did it find data?		
Is the facility's data stored in the archive server?		

APPENDIX B: Graphical User Interface Standard Requirements

Graphical User Interface Overview

The UMCS graphical user interface (GUI) is an enterprise system that provides the Operator with the ability to view and modify the operations of all controlled systems in each building and utility. The user shall be able to navigate to each building on various Naval Bases without leaving the UMCS GUI. All graphics shall be viewable through a web browser and shall meet the standards stated in this document.

The Government can provide, after contract award, generic station templates to assist with development of Niagara PX pages. The intent is to provide the contractor with examples that can be used to speed up PX development as well as ensure the contractor will conform to the graphic standards. The template includes standard screens for the common systems and their sub-systems (Ventilation, Cooling, Heating and Utilities) as well as examples of common screen components (Title bar, main menu, sub menus, legends, system information). These screens will also have examples of the required color schemes, fonts, size and position of elements.

Graphic Image Quality: All graphic components of the system shall be designed and edited in full resolution, prior to saving in a lossy (compressed) format such as *.jpeg of *.gif for use in the system. Image details in each graphic item shall be sharp and clear first-generation products. Editing and reusing compressed graphic items generally leads to blurry graphics or pixel crawl; graphics containing blurry objects or pixel crawl will be rejected for resubmittal.

The Contractor shall use a dedicated graphics program such as Adobe Photoshop for the editing of existing and creation of new graphics. At the completion of the project, the Contractor shall provide the high definition .PSD vector (editable and non-flattened) versions of all project artwork in the appropriate folder on the UMCS File Server in the appropriate Operations Center. If the Contractor uses software other than Adobe Photoshop, , use of this software must first be approved by NAVFAC NW CIO. Once approved, 4 copies of the appropriate graphical editing software shall be provided to the Government, and installed on the appropriate development computers.

GRAPHICAL User Interface Structure

All graphical pages designed and installed on the UMCS shall meet the page standards specified in this Appendix, and shall have page content similar to the graphic content examples listed in the Appendix C.

Graphical Page Size
Graphical pages for a standard Operator's workstation shall be designed for a 1920 x 1080 pixel display screen resolution.

Text:
All text shall be MS Reference San Serif or default program text, 10 point and color Black unless noted otherwise.

Colors (all RGB):

Black:	0, 0, 0
White:	253, 253, 253
Dark Gray:	128, 128, 128
Neutral Gray:	192, 192, 192
Gray:	161, 161, 161
Gray-blue:	156, 178, 198
Navy blue:	41, 60, 107
Pale gray-blue:	206, 215, 231
Bright blue:	9, 91, 255
Blue:	1, 7, 121
Pale blue:	204, 204, 255
Yellow:	255, 255, 0
Red:	255, 0, 0
Green:	0, 218, 100

Graphical Page Components

Page Background
The web browser page background shall be Neutral Gray.

Title Bar
The title bar exists on every web page in the GUI, and is located at the top of the page. A common title bar graphic is used for each page, and shall have the capability of being changed globally by changing the title bar graphic in only one place on each server and supervisory controller (SC). The title bar dimensions are 1889 x 52 pixels. The title bar is centered on the screen, and the upper edge is located in the 8th row of pixels down from the top edge of the browser window. The title bar is White and fades to dark both upwards and downwards. And has a stylized border.

Text is 24 point and is centered vertically and horizontally in title bar.

Date/Time: The present date and time shall be displayed stacked vertically on the right side of the title bar. This date and time come from the Niagara Operations Server when viewing the Head-end Server, and from the SC when viewing a page served by an SC.
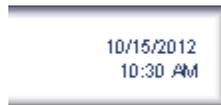
The Date is right justified, starting at x:1804 and y:15
The Time is right justified, starting at x:1825 and y:31
Locations are relative to the top left corner of the title bar.

Temperature/Enthalpy/Humidity: The values for dry bulb temperature, wet bulb temperature, enthalpy and humidity are located on the left side of the title bar. The values for dry bulb temperature and humidity come from the outside air sensors on a selected location(s) for each Naval base. The values for wet bulb temperature and enthalpy are calculated in the SC.

```
Temperature:    53 °F db /   53 °F wb
Humidity:       100 %
Enthalpy:       22 BTU/lb
```

In relation to the top left hand corner of the title bar:
> The location of the dry bulb temperature text is x:12 and y:11
> The location of the wet bulb temperature text is x:131 and y:11
> The location of the Humidity text is x:12 and y:23
> The location of the Enthalpy text is x:12 and y:35

Main Menu

The main menu is composed of the 16 Main Menu buttons which are 120 x 18 pixels wide, separated from each other by a 1 pixel space. The right-most main menu button is 74 x 18 pixels, and is reserved for the "About" button. One button is always active and displayed in a high-lighted color Bright Blue. The other 15 are always shown in Blue.

> Main Menu buttons: Home, (Naval Base name), Building, Ventilation, Cooling, Heating, Utilities, Compressed Air, Electricity, Natural Gas, Sewer, Steam, Network, Trending, Alarm, and About. Text color: White
>
> The main menu shall be located immediately below the title bar.
> Horizontal Text Alignment on each button: Center Justified
> Vertical Text Alignment on each button: the top edge of each capital letter shall begin in the 7th pixel down, and the bottom edge of each capital letter shall begin on the 6th pixel up from the bottom. Capital text shall be 7 pixels tall.
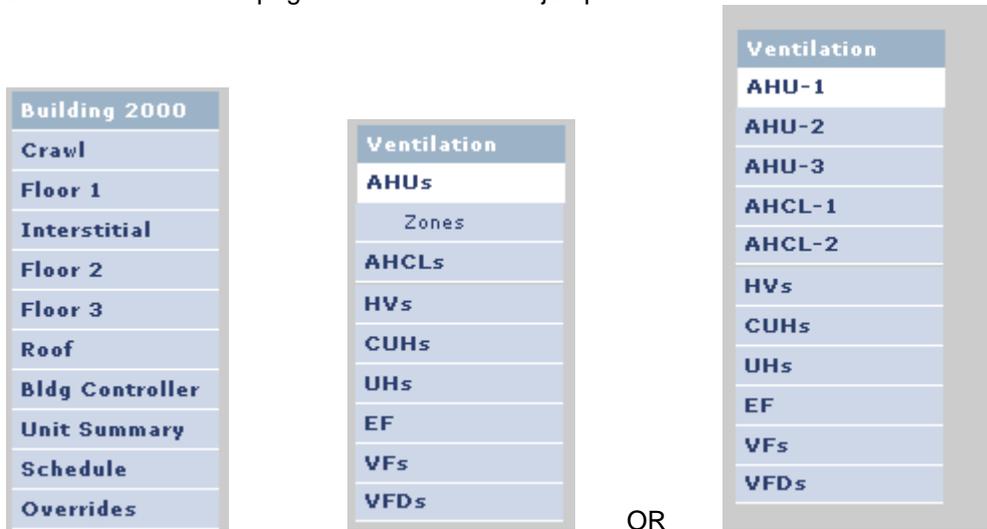
Page Body

The Page Body is a rectangle that is 1889 x 1020 pixels in size. All but the outer 6 pixels of the perimeter of the Page Body are Neutral Gray. The outer 6 pixels are a fade to dark. The graphic background contains the sub-menu, System Information Block, Legend and graphical content / system points.

> Location: Separated from the Main Menu by a gap of 4 pixels

Sub-Menu: The Sub-Menu is located stacked vertically on the left side of the page body and is composed of Buttons which are 104 x 21 pixels in size. Sub-Menu Buttons shall be static (non-dynamic) buttons and provided in accordance with the Page descriptions found later in this Appendix. The bottom row of pixels in each button is always White. The top button contains the same text as the currently highlighted main-menu button. The high-lighted sub-menu button denotes the active page. The non-high-lighted sub-menu buttons denote other pages that the user can jump to.

OR

> Location: The top left corner of the Sub-Menu is located on top a location 7 pixels in from the left edge, and 6 pixels down from the top edge, of the Page Body. The Sub-Menu overlaps 1 row of border pixels on its top edge, and is immediately adjacent to the border pixels on its left side.
> Top Button Color: Gray-blue
> Top Button Text Color: White
> Active Sub-Menu Button Color: WhitePassive Sub-Menu Button Color: Pale gray-blue
> Button Text Color (all but Top Button): Navy blue

Legend: The legend is located on the bottom right corner of every page. The Contractor shall place a reference in the Legend for each symbol used in the project.

> Option #1: The legend shall be a box located on the page that has a title bar at the top with the word "LEGEND." Legend shall contain, at a minimum, all of the symbols applicable the current page.

> Location: 8 pixels up and left of the lower right corner
> Legend width: 224 pixels wide
> Legend height: varies based on the content of the Legend.
> Legend outside border color: Black
> Field Color: Gray
> Title Bar
> > Height: 18 pixels
> > Color: Dark Gray
> > Border color: Black
> Vertical space between rows in Legend: 2 pixels

Gap between top- and bottom-most items and Legend border: 4 pixels

Option #2: Provide a White 80x20 button with Black border and Black text labeled "Legend" that brings up a pop-up page containing a legend (formatted similar to Option #1) that contains (at a minimum) all of the symbols and colors used on the page.
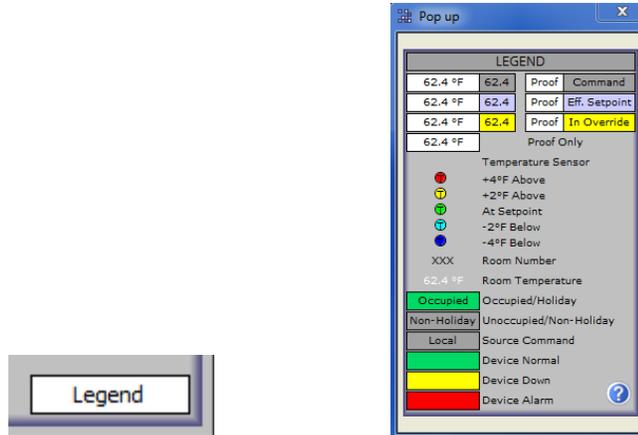
Graphic Links: When the data presented on the screen is one of many typical / identical items, such as Variable Air Volume (VAV) units, a Graphic Links block shall be placed on the page. This title of this block displays *DEVICE* GRAPHIC LINKS, where *DEVICE* is replaced with the name of the device that the link accesses, such as "VAV." The Graphic Links block allows the user to avoid the time need to navigate through a complex menu, and instead jump directly to the device of interest.

The Graphic Links block can be a scrollable component grid view or can be custom-created from rows of four 56 x 20 pixel 'cells', surrounded by an additional 1 pixel black outer border.
Vertical Location: directly above the Legend, separated from the Legend by a gap of 3 pixels.
Horizontal Location: directly in-line with the Legend.
Width: As generated by the component grid view or (if custom-created) 224 pixels wide
Height: Varies based on the content . Extra blank rows shall not be shown.
Unused cells shall be shown with no content in the cell and shall not have internal cell borders.
Colors shall be as stated below unless not editable in the component grid view.
    Border color (all): Black
    Non-Active Cells:
        Cell Color: Gray
    Active Cell:
        Cell Color: Gray-blue
        Text Color: White
    Title Bar
        Height: 18 pixels
        Color: Dark Gray
        Font Size: 12 point

Graphic Temperature Sensor: When the system presented on the screen serves an occupied area with one or just a few temperature sensors, those temperature sensors are shown on the screen graphically similar to the look of installed sensor so as to represent it clearly. The display below the sensor should display the setpoint on the right and the real-time temperature on the left. Example temperature sensor graphics are below.

OSA : 57 °F	Building Name		RH : 75 %
Alarm	Controller	Mode	Schedule
OK	OK	Econ	On (Bldg)

VAV	Controller
VAV-101	MNV-101
VAV-101	MNV-101
VAV-101	MNV-101

ZONE DETAIL

	Coldest	Average	Warmest
Zones	69.5 °F	71.4 °F	72.4 °F

SETPOINTS

Occupied:	Heating	
	Cooling	
Unoccupied:	Heating	
	Cooling	
Air Flow:	Maximum	
	Minimum	
Pushbutton Override Time:		
RA Flow % of SA Flow		
Building Static Pressure		

LIMITS

Mixed Air Temp Low Limit	50 °F
Minimum OSA Damper	15 % Open
CO2 High Limit	800 ppm
Enable HWS when OSA: Day	< 65 °F
Night: Day minus	10 °F
Start lead HWP when # FCs call for heat:	1
Start lag HWP when # FCs call for heat:	4

RESET SCHEDULE

When Outside Air Temp is	< 30 °F	> 60 °F
Hot Water Supply Temp is	190 °F	140 °F

RESET SCHEDULE

When Warmest Zone is		
SAT Setpoint is		

LEAD / LAG

Lead / Lag Rotation Interval	72 hrs
System	Unit in Lead
Hot Water Pumps	2
Cooling Towers	1
Chilled Water Pumps	2
Condenser Water Pumps	2

RUN TIME

		Annual	Lifetime	Cycle Count
Fan		4220 hrs	35 days	147
Chiller	1	4220 hrs	35 days	147
	2	4220 hrs	35 days	147
Cooling Tower	1	4220 hrs	35 days	147
	2	4220 hrs	35 days	147
Spray Pump	1	4220 hrs	35 days	147
	2	4220 hrs	35 days	147
ChW Pump	1	4220 hrs	35 days	147
	2	4220 hrs	35 days	147
CW Pump	1	4220 hrs	35 days	147
	2	4220 hrs	35 days	147

System Information Block (Sys Info block / SIB)
The SIB appears on the lower left corner or across the lower portion of every System page and contains facility name, temperature, humidity, alarm and controller status, operating mode, setpoints, lead-lag schedules, rotation schedules, reset schedules, runtimes, and any data that is not intrinsic to the graphical image in the page content.

Option #1, Lower Left Hand Location: Location: 8 pixels up and over from lower left corner of the Page Body
Width: 296 pixels wide
Height: varies based on the content of the SIB.
Border color: Black
Border width: 1 pixel

Option #2, Centered Across Lower Portion of Page
If the system is not a central air-handling unit with zone reheat, this block may be located under the System graphic and oriented so that it is centered on the page with equal height boxes. See graphic example next page.

SIB Title Bar: the SIB Title Bar contains the name for the facility centered in the Title bar. If the building has sensors for outside air temperature and humidity the temperature shall be displayed left of the facility name and the humidity shall be displayed to the right of the facility name.

> Height: 18 pixels
> Color: Dark Gray
> Font Size:24 point
> Font Color: Black
> Alignment: Centered
> Style: Capitalized
>
> Temperature / Humidity
> Font Size:9 point
> Font Color: Black
> Format: "OSA: xx ⁰F" and "RH: yy%"
> Temperature Alignment: Left Justified
> Humidity Alignment: Right Justified
> Temperature Position: 3 pixels gap from left
> Humidity Position: 3 pixels gap from right

SIB Text (Not Title Bar)
Text Alignment:
> Data Fields: Center
> Descriptive Labels:
> > Above Data fields: Centered
> > Left of Data Fields: Left Justified, 5 pixels from left edge
> > Right of Controller Data Fields: Left Justified

SIB Data Fields
Size: 70 x 18 pixels
Horizontal and vertical separation between Data Fields: 2 pixels
Separation between data fields and any border: 3 pixels

Horizontal Gaps between:
  Data fields: 2 pixels
  Left- or right-most data field and the border: 3 pixels
  Descriptive text ("Pump 1") and left edge boundary: 4 pixels
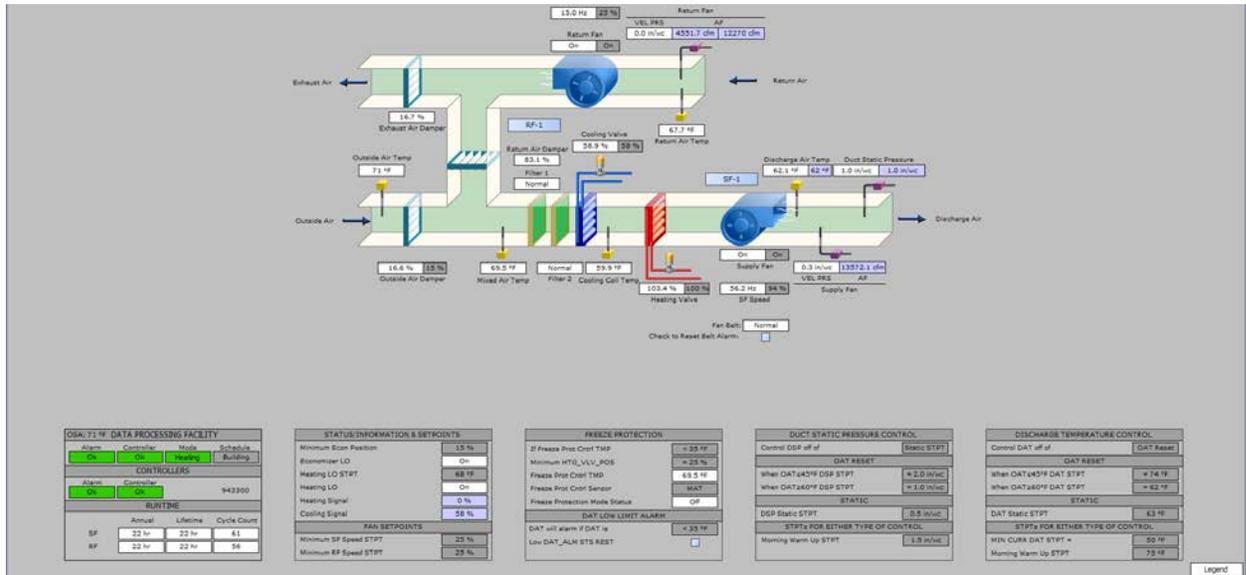Vertical Gaps between:
  Top/Bottom edge of field & section boundary line: 3 pixels
  Title text above field and the field it refers to: 2 pixels
    Excludes descenders
  Field title text and section line above it: 4 pixels

SIB Parts: The following SIB parts are approved. Alternative content or part names require submittal to, and approval by, the Government

Status Area: Shows status of Alarm, controller, Mode and Schedule. See chart below for pre0defined content. For those pages that are not associated with a piece of equipment, such as a Floor Plan page, Buildings Settings page or Unit Summary page this area shall display only an Alarm indicator for the building.

Alarm: This field shall reference all downstream alarms, from the current page down to any sub-page navigable form this page: if there is an alarm on any page or device, this data field will display "Alarm" and turn RED. This is the only field or section in the UMCS user interface that I authorized to be labeled "Alarm." Any Alarm condition shall also escalate up to any Graphics and Settings Pages associated with the device's Major System, and the Building and pages, by turning their Alarm Block in the System Information Block to an Alarm, and escalate up the Building Map Pages as well where a red dot shall be displayed on the effected building. Alarms also escalate up to respective Situation Screen displays and Unit Summary pages. If the building fire alarm control panel is being monitored and is in alarm, the alarm mode text shall state "FIRE" instead of just "ALARM".

Controller: This field shall display the status of controllers that are on the present page. If any controller is having a problem, this box will turn RED and display the status of the controller.

Mode: If the equipment on the present page is capable of having multiple modes of operation, such as an air handler being in heating, cooling, etc., this field shall display the current mode, and also display an appropriate color to signify if the mode is good, bad, or an alternative such as Evaporative Cooling displayed in Blue.

Schedule: Shall display the current source of schedule for the equipment on the current graphical page, and the fields color shall show the occupied status.

Reset Schedule: Shall contain the reset schedule for the system displayed on this page. Reset schedules shall be fully user adjustable, and shall be provided for any system that will gain efficiencies from having a reset schedule.

OSA:56.6 °F ENGINEERING ADMIN BLDG

Alarm	Controller	Mode	Schedule
Ok	Ok	Normal	On (Local)

CONTROLLERS

Alarm	Controller
Ok	Ok

RUNTIME

	Annual	Lifetime	Cycle Count
EF	421 hr	421 hr	171

SETPOINTS: Shall display those set-points that do not intrinsically appear on the currently displayed graphic, as well as Limits.

Controlled by Zones

OSA:56.6 °F ENGINEERING ADMIN BLDG

Alarm	Controller	Mode	Schedule
Ok	Ok	Heating	N/A

CONTROLLERS

Alarm	Controller
Ok	Ok

RUNTIME

	Annual	Lifetime	Cycle Count
SF	1008 hr	1008 hr	225
RF	1008 hr	1008 hr	224

Setpoints

Economizer:	Lockout	Normal
Economizer:	Min Position	20 %
Heating:	Lockout	Normal
Outside Air Temp:	Lockout	78 °F
Supply Air Temp:	Max.	72 °F
Supply Air Temp:	Min.	55 °F
Supply Air Temp:	Low Limit	35 °F
Building Static Press		0.020 in/wc
Mixed Air Temp Minimum		45 °F

LEAD / LAG: Shall display the component (i.e.: Boiler) and shows which unit is currently in LEAD. Right-clicking on the corresponding unit in lead field shall allow the operator to change the unit in Lead. The Lead / Lag section shall allow user modification of the automatic rotation period.

RUN TIME: Displays runtimes for each piece of equipment for the displayed system, as well as cycle counts. These values may be reset by a supervisor using a right click.

SIB Status Area Values and Actions

Operation	ALARM		CONTROLLER		MODE		SCHEDULE	
	Log	Text/Color	Log	Text/Color	Log	Text/Color	Log	Text/Color
Normal	0	OK	0	OK	1	Normal	5	On (Base)
					3	Heating	3	On (Bldg.)
					2	Cooling	1	On (Local)
					8	Econ	4	Off (Base)
					9	Warm up	2	Off (Bldg.)
					10	Stand by	0	Off (Local)
					5	Max Air Flow		
					4	Min Air Flow		
					11	Evaporative		
					12	Off		
					6	No Air-Flow		
Abnormal					7	Manual		-Base
								Bldg
								Local
	1	Alarm	1	Down	13	Smoke Removal		
	2	Fire						

Mouse Functions:
Right Click: Change/Override Schedule Source Command
Left Click: Trend
Gray values are to be white if there is no manual right-click override option.

Values in the SIB Status Area may be trended with the a click, and for consistent trending purposes, the numbers in the "Log" column are the values that are assigned to each option in order to provide that consistent trending.

BASIC GRAPHIC STANDARDS

Alarm Incorporation

All Proof/Real-Time values shall be defined with both Alarms and Alarm Boundaries, and when in an Alarm condition shall display with a red background and generate an Alarm Log entry and Vykon Alarm Portal entry.

At a minimum, provide programming to initiate alarms/events any time a piece of equipment fails to operate, a control point is outside normal range or condition shown on schedules, communication to a device is lost, a device has failed, or a controller has lost its memory.

There are two different types of Alarm Boundaries in the UMCS, Static and Following. A *Static Alarm* Boundary monitors values that should always remain in a specific range. A *Following Boundary* monitors a value that is controlled to a varying set point.

All points capable of having an associated alarm shall be configured with the appropriate alarm boundary (Static where the point never has changing requirements and Following where the control or proof is variable). Alarm configuration for each device or point shall be listed on the respective Settings pages in the system, and shall be configured so that the Operator can specify a high/upper limit and low/lower limit value of an acceptable variance above and below the current set point, with the option for occupied and unoccupied ranges, additional differential above and below those max's and min's, and delay times until an alarm occurs, for each individual device and its individual alarm.

Alarm boundaries and ranges shall be configured and displayed in the System Information Block for the respective system or equipment

When a point enters an alarm state, the point data field displayed on the screen shall be configured to change from the standard background to a red background. If the point is binary, such as for a filter status on an air handler, the point value would change from "Normal" to "Dirty" and the field background shall turn Red.

Point Incorporation

All points identified in the approved Sequence of Operations and construction submittals (shop drawings) shall be displayed via the GUI.

Both the proof/real-time value and the set-point/command shall be displayed for every point available. The dimension of the data field these points shall be 70 pixels by 18 pixels (Unless a Command Proof association exists).

When both Proof/Real-Time and Set-Point/Command are available then they are associated by positioning the proof/real-time value to left of the set-point/command value with no space between them. The Proof/Real-Time value is dimensioned according to the standard, but the Set-Point/Command value is sized 35 pixels by 18 pixels and should contain the same unit data as the Proof/Real-Time value.

All Set-point/Command values are displayed in Gray boxes (unless they are Effective Set-Points).

When Set-Point/Commands values are derived via a Reset Schedule, based upon Occupancy Condition or other means, an Effective Set-point shall be displayed in Pale Blue boxes.

All Proof/Real-Time values are displayed in White boxes.

Left Clicking on any trended point on any page shall bring up a minimum 36 hour trend of that point. Trends may be associated into groups, and a trend report may be set up for each group.

Right Clicking on a Command value residing on any page shall provide the user the ability to temporarily override the command for a specified period of time, make a permanent override if that user has authority to do so, or permanently change Command value. When a Set-Point/Command value is in override, the value background shall turn yellow and the remaining time until the override returns to normal operations shall be displayed in "hours: minutes", also in Yellow.

Data shall be maintained in the Head-end servers in an archive of trend log information for all system values, both real, set points, and calculated, for an indefinite period, and this data shall also be stored on the SQL server.

Acceptable Units of Measurement

<u>Temperature</u>
Wet Bulb 73.4^0Fwb
Dry Bulb Specific 73.4^0Fdb

<u>Humidity</u>
General Display   73.4%

<u>Enthalpy</u>
General Display   17.4 btu/lb

Flow   2,134 CFM or 78 GPM

<u>Pressure</u>
Duct Static Pressure   1.75"wc
Head   25.2'
Relative   25.2 psi
Absolute   25.2 psia
Building Static   0.123"wc

<u>Time</u>
Minutes   5 min or 5"
Seconds   5 sec or 5'
Hours   5 hrs

Percentage   11% or 11.2%

Frequency   25 Hz or 25.007 Hz

<u>Common Main-Menu and Sub-Menu Items, & Related Graphical Page Content</u>

As stated in this Appendix, there are sixteen Main Menu buttons: Home, "Base" (Naval Base name) Page, Building, Ventilation, Cooling, Heating, Utilities, Compressed Air, Electricity, Natural Gas, Sewer, Steam, Network, Trending, Alarm, and About. The following describe the graphical content for each of these pages and the pages associated with Sub-Menu pages.

Home Page (Main Page): The home page is the first page a user views when accessing the head end server (HES). This page contains a graphic image for each base in the region supported by this Control & Monitoring system, as well as links to Admin, Trending and About pages for the system. From here the user can navigate to a specified Base by clicking on the appropriate map of the Navy Base. The base map images shall originate from the NAVFAC NW RSIMS base maps, have 3-deimensional borders, and shall be centered on the page.

"Base" Page (Main Page): The Base pages are located on the HES serving a particular base. This page contains a map of the Naval Base and provides links to each controlled building both by clicking on the building graphic or selecting the building number from the matrix of building numbers on the lower right corner of the page. In the case of larger or oddly proportioned bases, clicking on a location on the main page shall navigate the Operator to an enlarged view of a sub-section of the base which clearly shows each site on the base; Bangor for example is most effectively viewed in 8 sub-sections, each of which is on its own graphical page. Base pages already exist for NBK-Bangor, Naval Magazine Indian Island, Naval Hospital, NBK-Bremerton, and NBK-Keyport (including NUWC Hawthorne).

From the Base (or sub-section) page the user can navigate to the base utilities monitoring and energy management system, trending data, base-level Unit Summaries, administer the SC's , view the base master schedule or view information about the Control & Monitoring installation at that specific base. The user can also click on any facility on the base map to navigate to that facility/building. For each building in the project, the Contractor shall provide a link to the building on the Base or sub-section page, and enter the building number in the building matrix in numerical order and provide a link to the building.

Base maps and subsections shall incorporate the following features:
- Size: 1889 x 1020 pixels

- Beveled border, providing a raised 3D effect

- Surrounding terrain is expanded to the full border

- Each building shall have a corresponding building number

- A matrix shall be created in the lower right hand corner to allow direct navigation to a specific building. On a base map page that has sub-sections, the matrix will display building series, and on a normal base map page or a sub-section page the matrix is composed of all buildings that are part of the UMCS that exist in that sub-section, and the user is able to click on a building number and jump directly to that building.
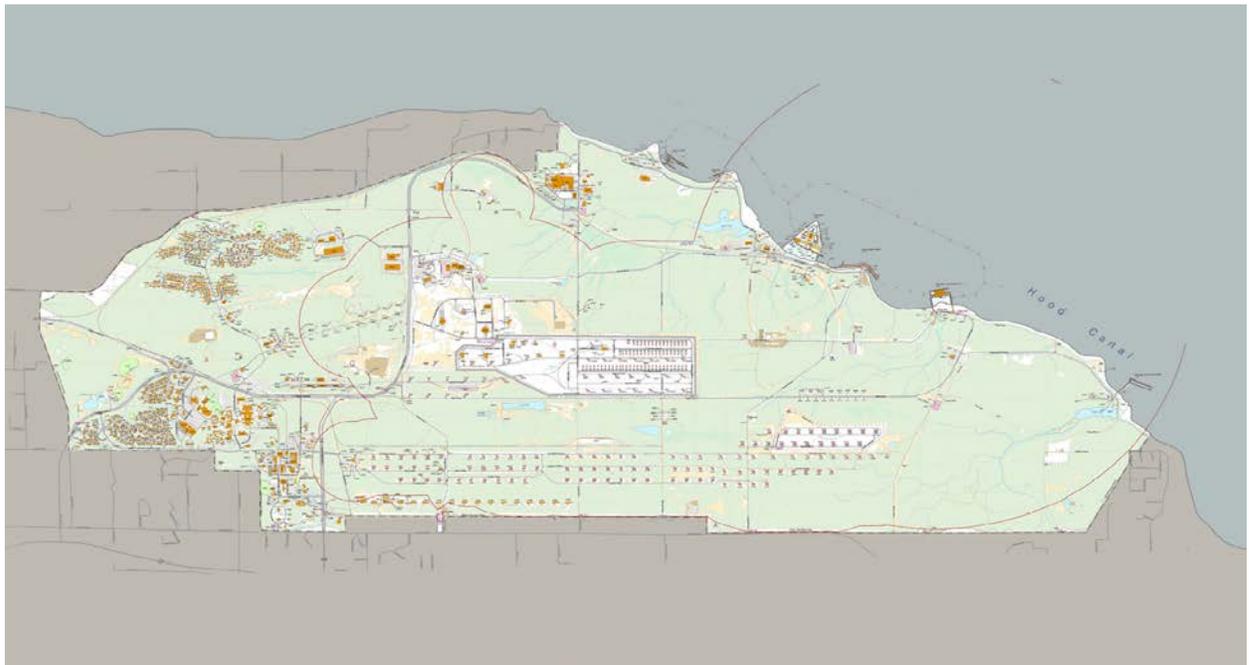
Building Page (Main Page): When the user enters a building's SC the initial page displayed is the floor plan of the Buildings first floor. The Building's Main Menu option contains a Sub-Menu of pages. These pages are the Floor plan pages, Ductwork pages, the Building Controller page, Unit Summary pages, and a Schedule page. All information here is displayed at a building level. The System Information Block displays an Alarm indicator which signifies if an alarm exists somewhere in the building. No other information is available since all other pieces of information are system specific.

Floor Plan or Site (Sub-Menu): Each Floor plan page contains a System Information block, Legend access, and a graphic of the area being considered. All available monitored points in the room are displayed to include, room temperature and occupancy indicator. The System Information block displays only the status indicator for the Alarm and indicates the Buildings overall alarm status.

Floor plans of buildings shall be displayed with as much of the building exterior walls parallel to the page edges. Floor plans should be sized so that the building uses the majority of the available screen area but retains enough unused screen area around the floor plan so as not to unbalance the graphic elements on the page.

Room layout within the building should be based on provided architectural backgrounds or (if backgrounds are unavailable) drawn by the Contractor to represent the floor plan. Interior dividing walls shall be shown as parallel lines of at least one pixel; exterior wall shall be shown as parallel lines of at least two pixels. Any unique features of the floor plan are shown, such as doors, amphitheater seating, stairs, etc.

Items to be Displayed within the Floor Plan Graphic

- Control Input Value: Displayed as a number with a 1 decimal point precision, relevant unit identifier (e.g.: 73.4 ^{0}F). Locate immediately adjacent to the device or sensor providing the value.

    Font Color: White text with no background
   Left Click Action: displays a 36 hour trend

- Device ID Block: Provide a block containing the name of the supporting device which can be an Air Handler ID such as "AHU-1," or VAV with the same ID as the room number, as shown above. Place this block in the device's actual physical location with a curved line connecting the device to the temperature sensor. If the device is not on the same floor plan area, then put the block adjacent to the temperature sensor. A left click on the mouse here navigates to the associated device page. The approved 3-D device ID block is shown below. Note that the bottom and right side are a single line of white pixels, not visible against the white background of this page.

    Size: 41 x 15 pixels
    Fill Color: Neutral Gray
    Fill Size: 39 x 13 pixels
    Left Click Action: Navigates to the Device page

Example for when HVAC equipment is physically located within the floor plan graphic:
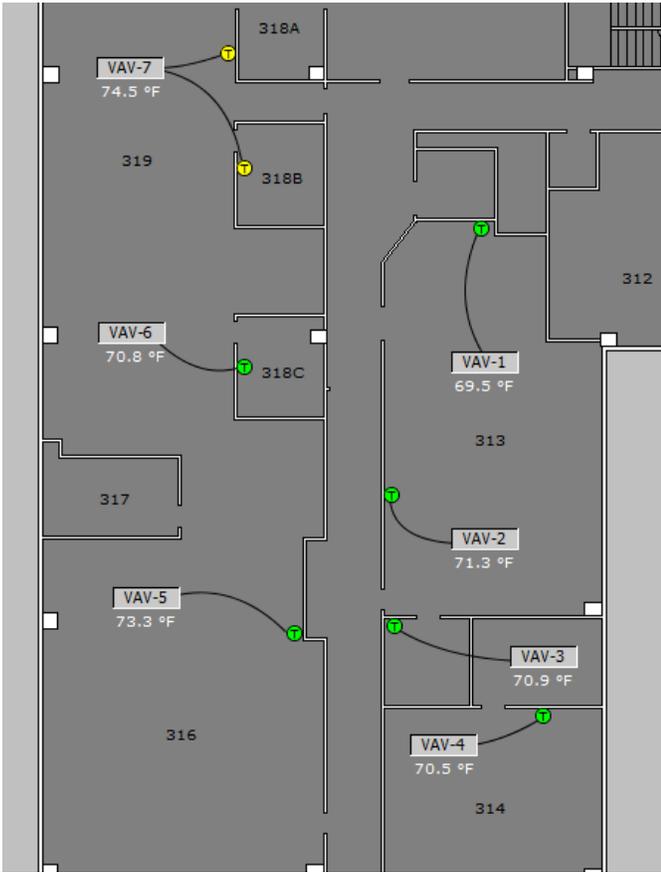
Example for when equipment is physically located beyond the floor plan graphic:
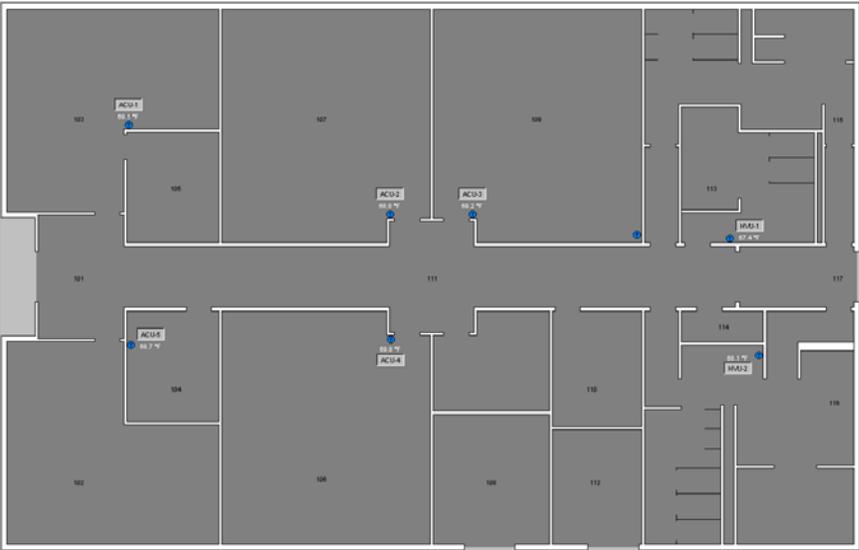
- Room Number: Provide all room numbers (not just device identification).

- Room Name (Optional): General name for the type of space shall be listed for each room.

- Occupancy**:** When occupancy sensors provide data input, they shall be indicated by the standard occupancy graphic of a person icon, which is invisible when the area is unoccupied. The Occupancy graphic is shown below.

- Sensors: All sensors (e.g.: temperature, humidity, steam trap, levels, etc.) applicable to the Floor Plan shall be listed on the floor plan using distinctive sensors. The graphical location of the sensor shall correspond directly to the physical location of each sensor. Example sensor graphics are shown below. Sensor graphic shall change color in correlation to its deviation from setpoint and shall be square (to differentiate from circular sensor icons that are colored but without animation).. For temperature sensors, use the following colors in the graphic:
  - o   Greater than 4 degrees above setpoint, change sensor to Red
  - o   Greater than 2 degrees above setpoint, but less than 4 degrees, change sensor to Yellow
  - o   Within 2 degrees of setpoint, sensor shall be Green
  - o   Greater than 2 degrees below setpoint, but less than 4 degrees, change sensor to Bright Blue
  - o   Greater than 4 degrees below setpoint, change sensor to Blue.

  Use a similar color animation for other sensors to show the severity of the deviation.

- Compass Rose: All floor plan pages shall have a compass rose on the lower right corner of the page, or as space permits, which shows the direction of North. Here is the standard Compass Rose graphic. The Contractor shall orient the North arrow to correctly correspond to the floor plan alignment:

Ductwork: Each floor that is serviced by ductwork or controlled equipment shall have provide ductwork information to the operator. If electronic (AutoCAD) files are available, the ductwork shall show on the floor plan. If electronic files are not available, make existing record drawings or shop drawings PDF's available by clicking on a hyperlink on the the "About" Main page.

Lighting (Sub-Menu): Each floor that has lighting controlled by the SC (Supervisory controller) shall have an associated Lighting page. These pages shall display a floor plan with the status of the lights (On, Off, or Dim %) in each controlled area and indicate if the area is occupied (Where the area is served by a motion detector.), using the appropriate graphics. Runtimes and cycle counts for each bank of monitored lighting shall be placed in the System Information Block in the same format as that used for other equipment such as motors. The operator shall have the capability of adjusting motion sensor delays, light levels, and schedules.

Building Controller (Sub-Menu): Each SC shall have a page that displays information about the status of the SC. The ability to reboot the SC is also available on this screen to those users with

Administrative rights, by right-clicking on the SC graphic image. Program options "Send Thread Dump to Console" and "Garbage Collect". Provide indicator on screen if door enclosure is open and in alarm. Alarm shall be able to be silenced (for a time duration) similar to other setpoint overrides.

Unit Summary (Sub-Menu): At the SC level, all monitored points and their associated commands are displayed on the Unit Summary Pages. All devices are grouped together by type in a component grid view and be at preferred size, not to exceed 25 components per page. The same points are displayed as they are on the graphics pages. When the user left clicks on any point on the Unit Summary Page, the device's graphics page is displayed. (See Appendix C for graphics standards for more details.)

Schedule (Sub-Menu): The Schedule page shall display the currents status of each schedule available to devices in the building. The Control & Monitoring system provides the option of using a Base Wide Schedule, Building Schedule or Local Schedule to each System that runs on a schedule. This page displays the currently followed schedules status and when the user left clicks on this column of data a trend of the Schedules Status is displayed. Just left of the Local Schedule Status is a button that navigates to the weekly schedule editor. The second column displays the Holiday Calendar Status associated with the local schedule, a right click on this value give the user the option to edit the calendar. The third column displays the Source schedule that the device is currently following; a right click provides an option to change the Schedules Source. The Schedule Status and Holiday Status turn green when they are occupied or on holiday.

Overrides (Sub-Menu): This page shall display a list of all current overrides with reference to the native point name or point name using the naming conventions in Appendix D, the initialization date of the override, and day/time the override expires.

Ventilation (Main Menu): When the Ventilation Main Menu button is pushed it displays the graphics page for the first major ventilation system. The Sub Menu options under Ventilation shall vary by building, but they usually consist of major systems such as Air Handler Units, Air Conditioning Units, Unit Heaters, Fan Coil Units and Exhaust Fans. If one or more Sub System, such a Variable Air Volume Box, serves a Major System then the Sub Menu shall provide a link to the first Sub System associated with the Major System.

Major Systems (Sub-Menu): Major Systems include the predominant air-handling systems serving the building. The Sub-Menu shall have a button for each individually unless there are too many to fit in one vertical column with the other required Sub-Menu buttons, then Major Systems ("AHU-01", "AHU-02") may be grouped by System Type ("AHU")**.** The Systems Name displayed in Bold indicates the link to a graphics page of a Major System on the Sub Menu (i.e. AHU-1, FCU-8). If the name of the System is displayed in plural, it indicates that there is not enough room on the Sub Menu to display all of the Major Systems of this type and there shall be graphics links available on the page of the first System displayed via a table or component grid view.

The graphics page of a Major System provides a visual representation of the System and allows the user the ability to change commands and set points. (See the Appendix C for more graphics details)

Cooling (Main Menu): When the Cooling Main Menu button is pushed it displays the Chilled Water System or other cooling system page.   If the controls provide a lot of information the display of additional information on a Sub System screen is appropriate.

Chilled Water System (Sub-Menu): The Chilled Water System is indicated on the Sub Menu as "ChW System" The Chilled Water System page includes Chillers, Cooling Towers and Cold Water Pumps and color coded piping.   The graphics page displays a graphic representation of the

System and provides the user the ability to change the set point values or current commands to different devices in the system.

Equipment Pages (Sub-Menu): If the complexity of the system warrants individual equipment screens then the larger devices shall be represented on the Sub Menu by name. An example of this would be a Chiller that has a systems interface, providing enough information that warrants its own page.

This page displays a representation of a specific piece of equipment and provides the user the ability to view additional pieces of information. The user shall also be able to make temporary changes to command and set points controlling the equipment. Information on this screen may be duplicated on the Chilled Water System Screen but only those points that provide a clear indication of status of the equipment.

Heating (Main Page): When the Heating Main Menu button is pushed it shall navigate the user to the "HW System" or other relevant page. The only exception to this is in the case where the only Heating Equipment in the building is stand alone, such as a Domestic Hot Water Heater. In that case the Heating Main Menu button shall open the "Dom Hot Water" page.

Hot Water System (Sub-Menu): The Hot Water System graphic link is indicated on the Sub Menu as "HW System" and opens the Hot Water Systems Graphics page.

This page displays a graphic representation of the Equipment included in the Hot Water System and color coded piping to assist with an understanding of the flow of water. The user can temporarily change the command and set points from this screen.

Equipment Pages (Sub-Menu): If the complexity of the system warrants individual equipment screens then the larger devices shall be represented on the Sub Menu by name. An example of this would be a Boiler that has a systems interface, providing enough information that warrants its own page.

This page displays a representation of a specific piece of equipment and provides the user the ability to view additional pieces of information. The user shall also be able to make temporary changes to command and set points controlling the equipment. Information on this screen may be duplicated on the Hot Water System Screen but only those points that provide a clear indication of status of the equipment.

Utilities (Main Page): Left clicking on the Utilities Main Menu button shall navigate you to the Utilities Overview page. This page displays the consumption, Low and Peak readings for all meters that are monitored in the building. The Submenu on this page includes links to the Utility One Line pages. Note on Utility One-Line diagrams: Utility one-line diagrams shall be designed so as to represent the displayed utility system in an ergonomic and user friendly fashion. This will include, but not be limited to, surrounding each single-pixel line with black pixels so that the lines are easier to follow.

Utility One Line (Sub-Menu)

Energy (Sub-Menu): Left clicking on the Energy Sub Menu option shall open the Energy analysis software.

Electricity (Main Page): Left clicking on the Utilities Main Menu button shall navigate you to the Electricity One Line detailed below. If navigating here from the Base Map page, the Base level electrical One Line page, which is a 27" version of the Situation Screen One Line diagram, is displayed. These pages shall also offer the user the ability to navigate to One Line pages at the SC Level.

Electricity (Sub-Menu): Left clicking on the Electricity Sub Menu option shall open the Electricity page. This page displays a 1-line diagram of the building electrical system from the substation to

the panel's one level below the metered point. The diagram shows the source of power to the building and displays the current power readings as well as the consumption readings at each point monitored.

Switchgear (Sub-Menu): High Voltage, Medium Voltage, and Low Voltage 1-line diagrams that allow full control of the switchgear shall be displayed.

Equipment Pages (Sub-Menu): If the system contains other significant equipment screens then they shall be represented on the Sub Menu by name. Examples of this would be emergency generators, monitored circuit breakers, transformers, etc.

This page displays a representation of a specific piece of equipment and provides the user the ability to view additional pieces of information. The user shall also be able to make temporary changes to command and set points controlling the equipment.

Meter (Main Page)

Electricity (Sub-Menu)

There may be one or more Electric Meter options on the Sub Menu, one for each Electrical Meter and electrical protective relay monitoring the building. Each Meter shall have a link to a Meter page indicated on the Sub Menu by name and a sub menu of its own as indicated below. This page displays most of the points monitored by the meter in an expanded table format.

- Volts/Amps: The Volts Amps page displays the Voltage and Amperage readings in a scaled bar graph format.

- THD/PF: The THD/PF page displays the Thermal Harmonic Distortion and Power Factor readings coming from the meter in a bar graph format.

- Waveforms: The Waveforms displays a graphical representation of waveform data captured by the meter. Available waveforms shall include a static waveform, an event waveform, a CBEMA chart, harmonic distortion bar graph and phasor diagrams

Steam (Sub-Menu): The Steam page displays a 1-line diagram of the steam system for the building and the consumption and/or flow readings coming from the meter.

Water (Sub-Menu): The Water page displays a line diagram of the water system for the building and the consumption and/or flow readings coming from the meter.
Natural Gas (Sub-Menu): The Natural Gas page displays a line diagram of the gas system for the building and the consumption and/or flow readings coming from the meter.

Network (Main Page): The Network page displays a one-line diagram created using the actual representation of the connected devices. The Network diagram at the base level shows all connected Ethernet network equipment and the Contractor shall update this diagram to reflect any changes to the UMCS network due to the addition or modification of Ethernet switches and network. At the building level, the Network One Line diagram shall show both Ethernet and Serial networks in the building. Both diagrams will display live status data from each device, providing an indication of device and network health.

Other Utility System (named as appropriate) (Main Page): any other utility system in a building, or utility distribution, generation, transmission, collection or similar function shall be added under its own main menu selection, with content similar to the utilities.

Trending (Main Page)
The Trending Main Menu option navigates the user to the Archived trends located on the Archive server for all data points at the system level the user clicked the trend button from, e.g.: if Trend is clicked from the Base section page, the user will see all trends for all bases, if the user clicks this button form the Bangor page, the user will see all trends for Bangor, if the user clicks Trend from ta building page, the user will see those trends for just that building. The trending functional shall allow the user to select and trend unlimited values simultaneously, over an indefinite period of time (as far back as data is available).

Alarm (Main Page)
The Alarm Main Menu option shall navigate to the Archived Alarm log entries located on the Server and enables the user to view and acknowledge alarms. The same hierarchical Home/Base/Building structure used above in Trending shall be incorporated in the Alarm structure.

About (Main Page)
The About Main Menu option shall navigate you to the appropriate About Overview page. This depends on the current page being displayed by the UMCS. This button is only active for those screens that have relevant data such as sequence of operations. If there is no relevant screen content, this button will be blank. i.e.: there shall be no text or link on the button.

Overview (Sub-Menu): The About Overview page displays a description of the current page displayed in the user interface. This page may also contain links to Equipment Manuals that are stored on the HES and a copy of the Sequence of Operation for the System being displayed, if there is room.

Equipment (Sub-Menu): If there is not enough room on the overview page to display Equipment specific information then an Equipment option is available on the Sub Menu. This page may display a picture of the equipment and have links to any Equipment Manual stored on line.

Sequence of Operation (Sub-Menu): If there is not enough room on the overview page to display the Sequence of Operation then the Sub Menu shall have a link to the Sequence of Operation page indicated by "SOO." This page displays the Sequence of Operation for the system.

Ductwork (Sub-Menu): For projects where electronic shop drawings are unavailable, existing HVAC floor plan PDF's shall be listed by individual sheet in table format on the ductwork page as hyperlinks. These PDF's shall be named in the hyperlink with reference to the floor number and area shown on the PDF and stored in a sub-folder ("FLOOR_PLANS") on the SC.

Situation Screens: Situation Screens are designed to be displayed on 65" television panels, and have a black background with no visible borders. If this project includes areas for which situation screens presently exist, those screens shall be modified to incorporate information consistent with the intent of that screen. If this project expands systems such that a new situation screen is required (e.g.: creation of a new switching station), the relevant new situation screen shall be created for this purpose. The following is a partial list of situation screens that exist today. The entire listing may be viewed in the Operations Center upon request: Electrical 1-Line, Base Map, Compressed Air 1-Line, Generation, Power Quality, Sewer, Steam, Mechanical System Emergency Backup Generators (Lift stations, pumps), Weather, Network, Critical Buildings, Bangor Lighting, Bangor Power Status, Bangor Shore Power Distribution, Keyport Utilities & Crit Systems, NBK Cooling Systems, NBK Critical Systems, NBK Heating Systems, Bangor Sectionalizing Screen (Base Map), Bangor CNG

APPENDIX C: Graphical Page Content Examples

The following pages show examples of the graphical page content that complexity shall be incorporated into all similar and new page creation. Contractor is responsible for integrating human factors and ergonomics into that design using the examples shown below. The pages listed in this section are EXAMPLES only; the Contractor is responsible for submitting relevant graphical pages, and incorporating all Government content.

Situation Screen Page Graphics

Situation Screen page graphics are displayed on the Situation Screen Wall in the Operations Centers. These screens display high-level information about monitored systems and are at a resolution of 1920x1080, which is HDTV resolution. Each situation screen page can be displayed on any of the situation screen monitors through a custom application that resides on the Operator Workstations. Where the Contractor has modified or added Situation Screen pages, the Contractor shall modify the custom application. The Contractor shall be responsible for modifying this custom application. Each Situation Screen page operates independently and can be displayed anywhere on the Situation Screen wall. Additionally there are unique sets of screens called Display Wall screens that are an enlarged version of single page screens, displayed across multiple screens with their resolution increased to match the screens they cross. All situation screens shall have a black background; use of other than a black background requires prior government approval. Here is a list of existing Situation and Display Wall screens:

Display Wall Situation Screens

    Bangor Electrical 1-Line

    Bangor Base Map

Single-Screen Situation Screens

Bangor Base Map

Bangor Compressed Air

Bangor Electricity

    Complete Base 1-Line

        Transmission System (115 Kv)

        1-line

            Substation 1

            Substation 2

            Substation 3

                EGB-1

                EGB-2

            Substation 4

                Service Pier Unit Substation #7

            Substation 5

                Delta Switchgear B. 7035

                Bldg 7207

                Bldg 7410

                Bldg 7418

Bldg 7421

Bldg 7422

Bldg 7423

Marginal Switchgear

Bldg 7057 - Sub A & B

Bldg 7176 - Marginal Shore Power

Substation 6

EGB-3

EGB-4

Bldg 7306 - EHW Switchgear

EHW Shore Power Substation

Power Generation

Power Quality

Bangor 12 KV Intertie

Bangor Lighting

Bangor Power Status

Bangor Shore Power Distribution

Delta Pier

Service Pier, Marginal Wharf and EHW

Bangor Sectionalizing Screen (Base Map)

Mech System Emergency Backup Generators

Bangor Natural Gas

Bangor Network

Bangor Sewer

Bangor Steam

Bangor Water

Bangor Weather

Keyport Utilities &Crit Systems

NBK Cooling Systems

NBK Critical Systems

NBK Heating Systems

SWFPAC Critical Buildings

Here are some examples of Situation and Display Wall screens:
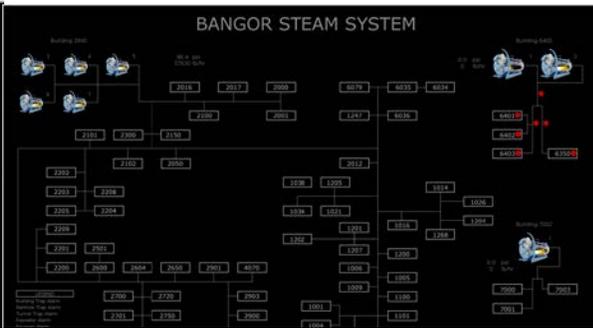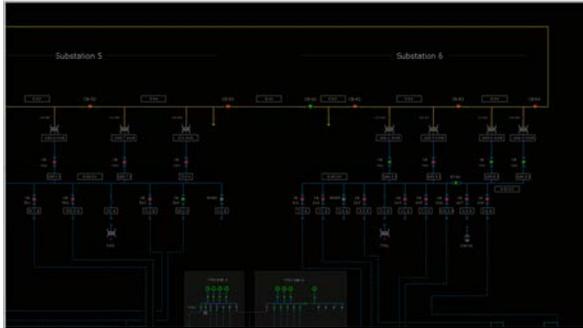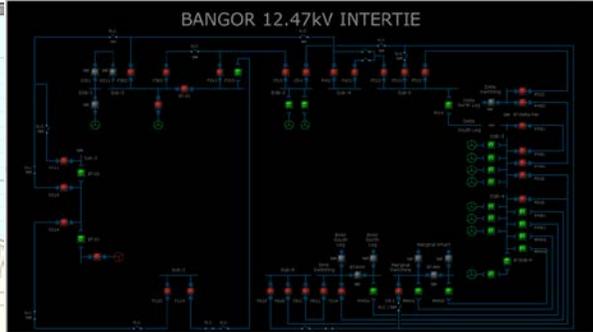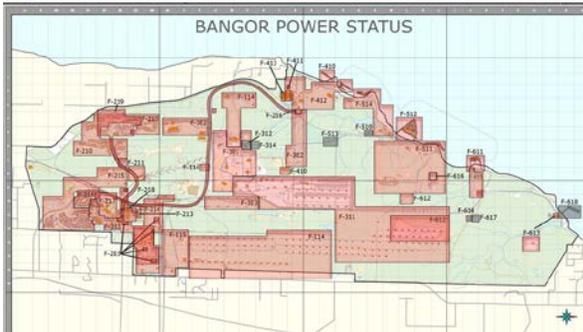
Main Page Graphics

The Main page provides navigation to each Base Page and displays the Temperature and Humidity Real Time values for each base. An Admin Button is available that navigates to the Head-end server Administrative Page, and a Bio-Hazard button leads the user to a page that allows the operator to shut down all air handlers and close all dampers..
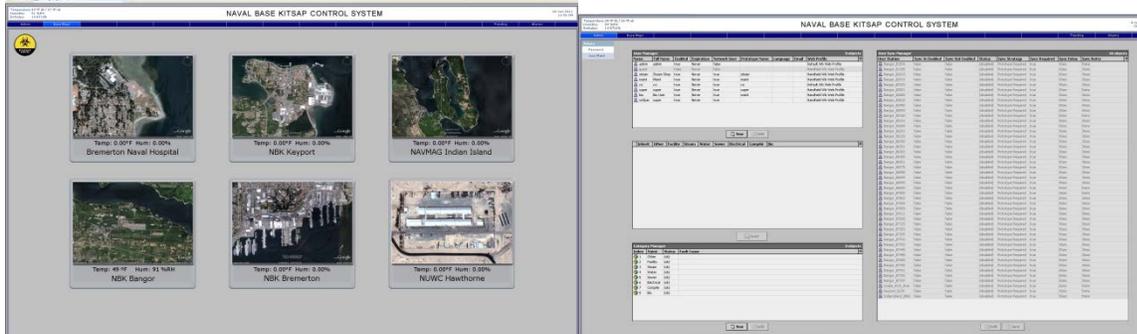

Base-Level Unit Summary Graphics

The Base Level Unit Summary page provides a view of all data by System Type. Below is a list of Base Unit Summary pages for Bangor:

    Air Handlers
    Building Controller
    Compressed Air
    Cooling Systems
    Critical Systems
    Electricity
        Distribution & breakers
        Generators - Primary
        Generators - Stand-by
        Relay Status
        Substation Battery systems
        Transformers - Primary
        Transmission & Power Circuit Breakers - 115 Kv
    Exterior Lighting Systems
    Freezers / Refrigerators
    Heating Systems
    Lift Stations
    Network Switches
    OSAT & Hum
    Refrigerators & Freezers
    Steam Eye
    Steam Systems (Boiler Plants)
    SWFPAC Critical Alarms
    Water

Unit Summary Graphics Examples:
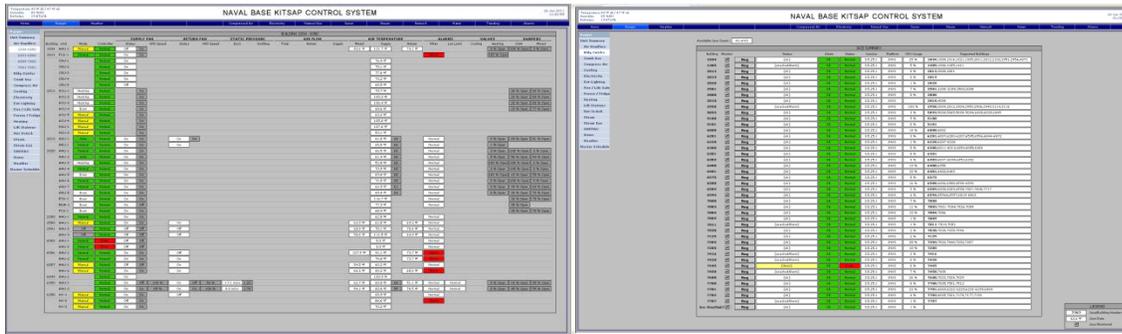
Base One-Line Graphics

The Base Level One-Line page provides a one line diagram for a given utility at a base. Below are example One-Line pages:
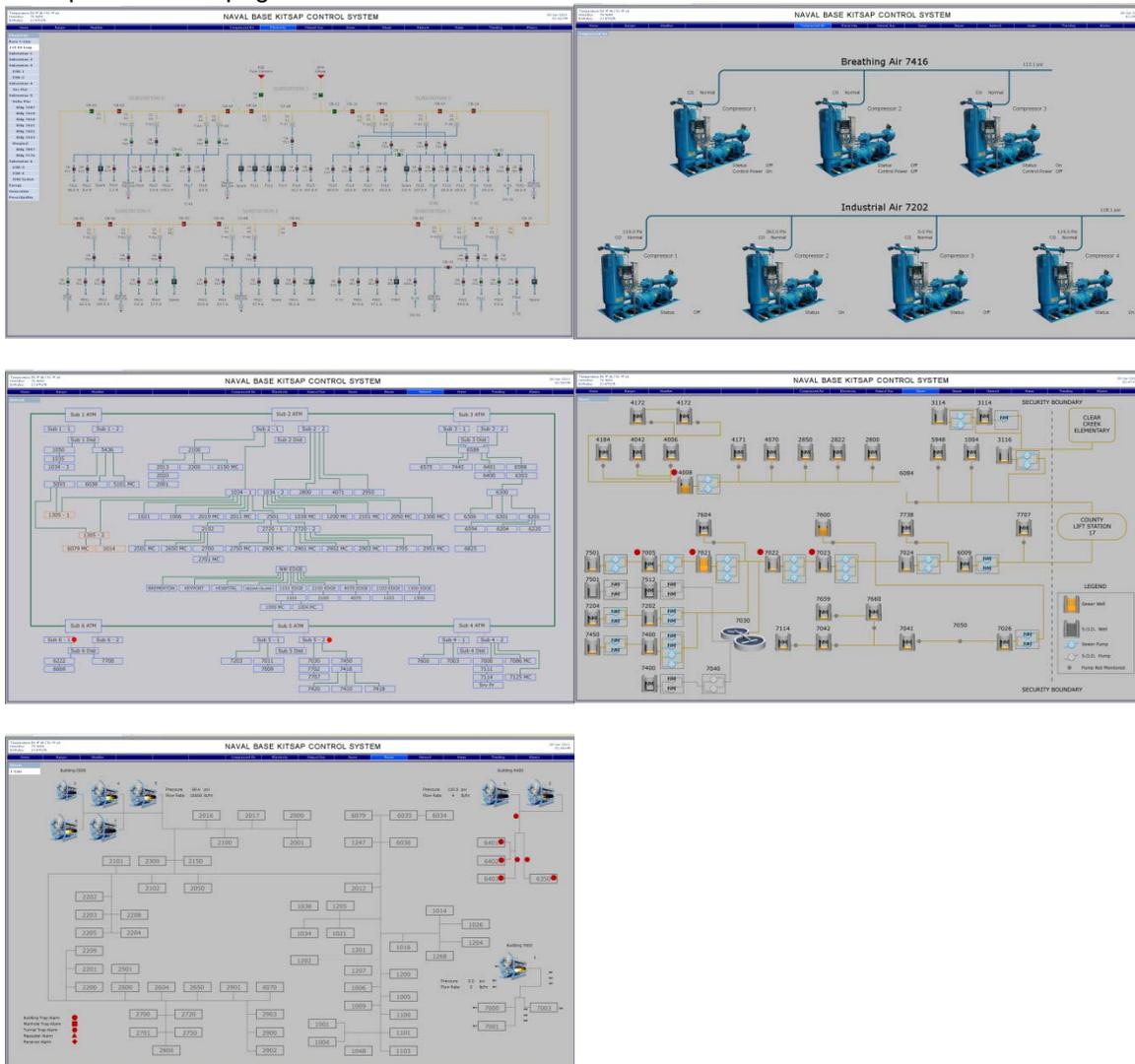
Weather

The Weather page provides a view of weather station data for a given base. This page also includes forecast data provided by the National Weather Bureau, and a trend of wind speed versus voltage.
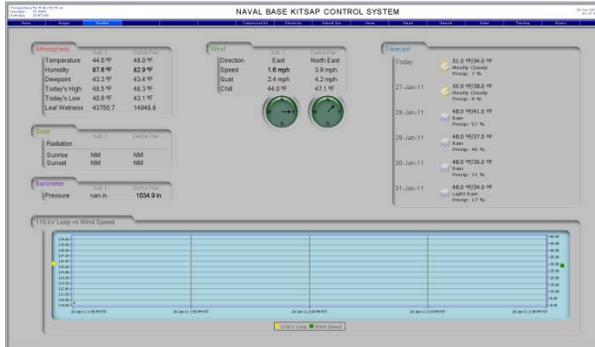

Base Page Graphics

A Base Web page provides navigation to each building on base through left click on the building graphics or the Building Number listed on the left of the page. The user can also navigate to the Master Schedule page, Base Wide Utilities page or the Base Unit Summary Page.

Building Graphics

Floor Plan
The, Ground Level, Floor Plan page is the first to be displayed when the user navigates to a building. Where other floors and functions exist, they shall be created graphically. There shall be a simple floor plan showing equipment locations (with labels), and sensor devices. Include ductwork in the floor plan if the project is new construction or a renovation in which new ductwork and equipment was installed and electronic shop drawings are available for use in creating the screen graphic. Otherwise ductwork and equipment floor plans PDF files shall be available via a hyperlink on the "About" page.
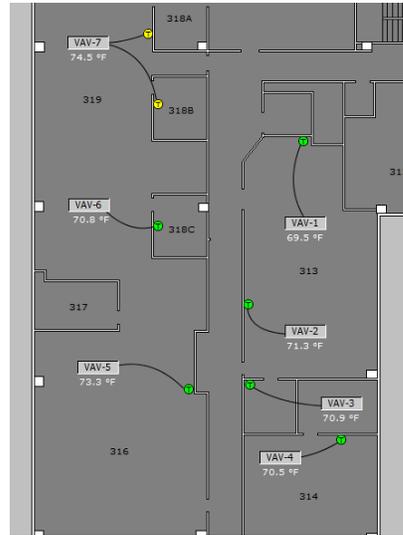
Building Controller

Each Building shall contain one or more Building Controller pages that display statistics for each Supervisory controller.

Unit Summary Pages

Each Building shall contain at least one Unit Summary Page.

Schedule
The building shall contain a Schedule Page.

Ventilation Graphics

Major Systems

Each Major Ventilation System shall be supported by a Graphics Page.

Sub Systems
If Sub Systems exist then Navigation to each Major Systems' first Sub System is available on the Sub Menu and from there navigation to each Sub System or "Links" in the lower right corner of either the Graphics Page.

Cooling Graphics
Chilled Water System (CHW)
A Chilled Water System overview page shall be provided for each chilled water system. This is the first page displayed when the Cooling Menu is used. Individual Device pages may be an option when the device interface provides enough detail to warrant the display. An example of this here is the Chiller 1 and 2 interfaces. A details page shall be typical for all equipment with multiple components.

Heating Graphics
Hot Water System (HW)
The first page displayed on the Heating Menu is the Hot Water System Overview page when applicable.
Individual Device may be an option when the device interface provides enough detail to warrant the
display.
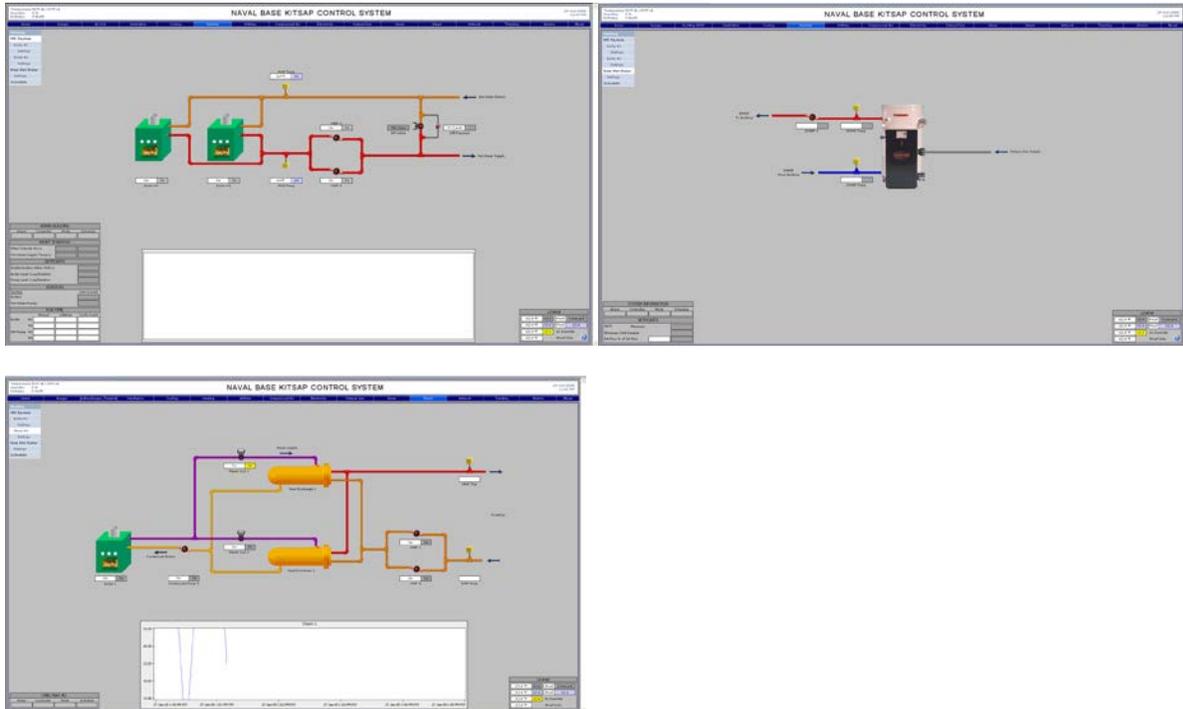
Utilities Graphics
Overview
The first page displayed on the Utilities Menu.
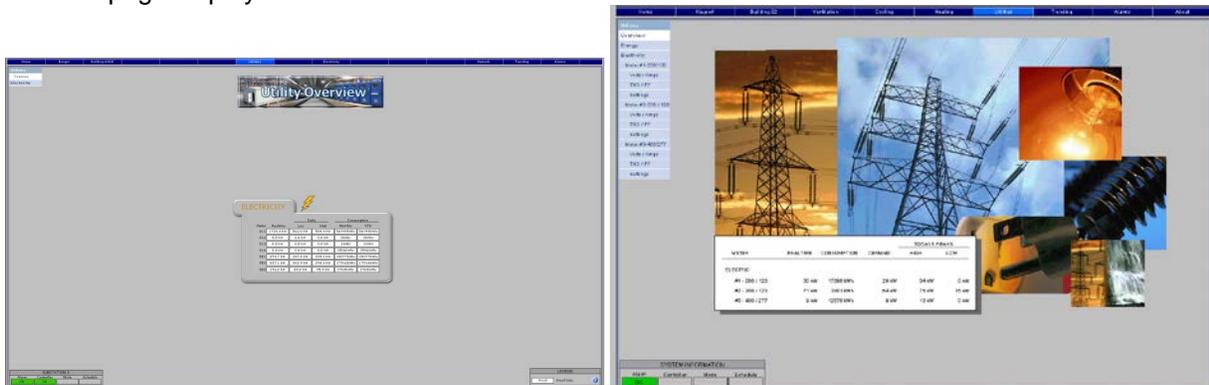
Electricity –
Provide a one-line diagram representation of the building's electric systems.
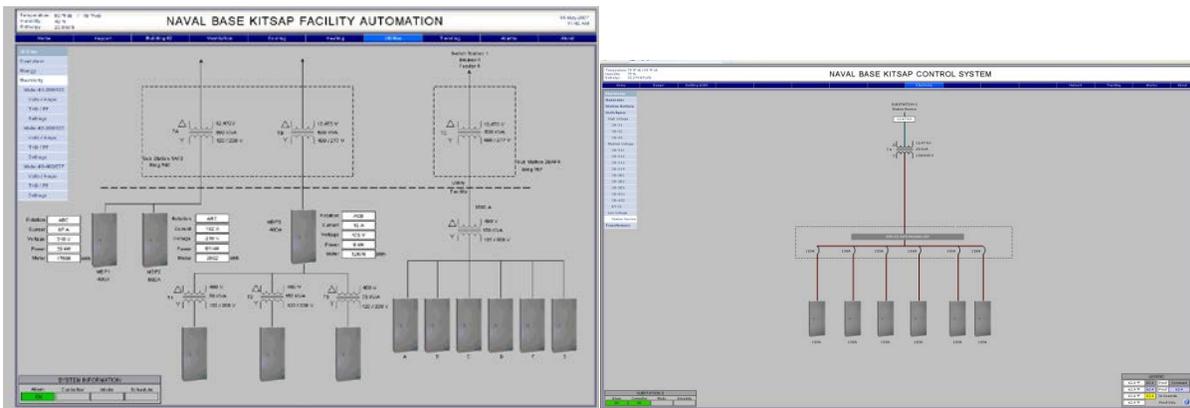
Substation Switchgear page example. The highest level One-Line drawing page in a substation.
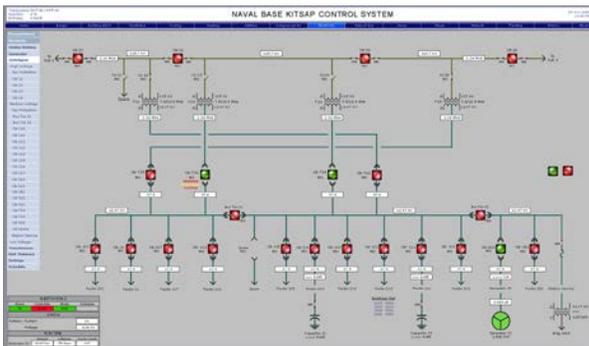
Below are *placeholders* for a High Voltage and Medium Voltage Circuit Breaker pages. The Contractor shall submit screen content consistent with other standard graphical pages, specifications, drawings and capability of the protective relaying equipment associated with the circuit breaker:
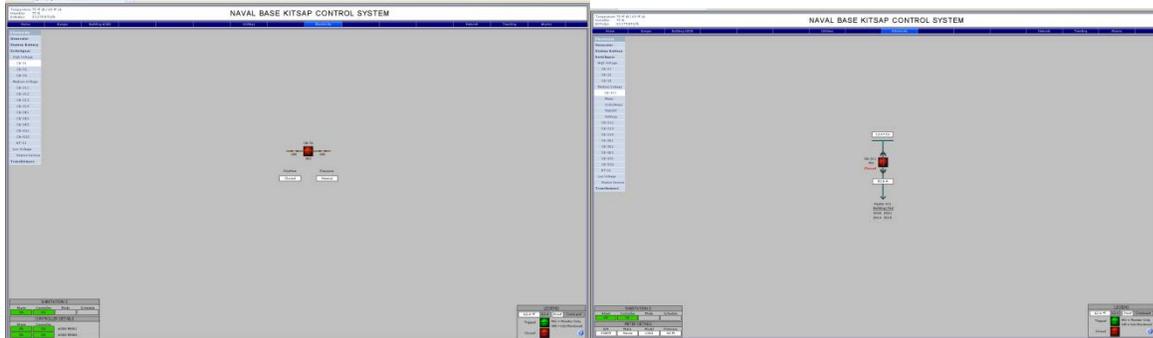
Transformer page:
The Transformer shown below is a *placeholder*; the Contractor shall submit screen content in line with the data available from the transformers, and in a format similar to that developed for the circuit breaker page.
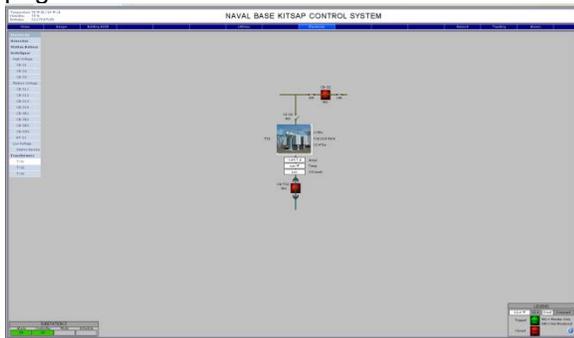
Meter –

There shall be a Meter page, Volts / Amps page, THD / PF page and Settings page for each electric meter monitored containing the page content shown below.
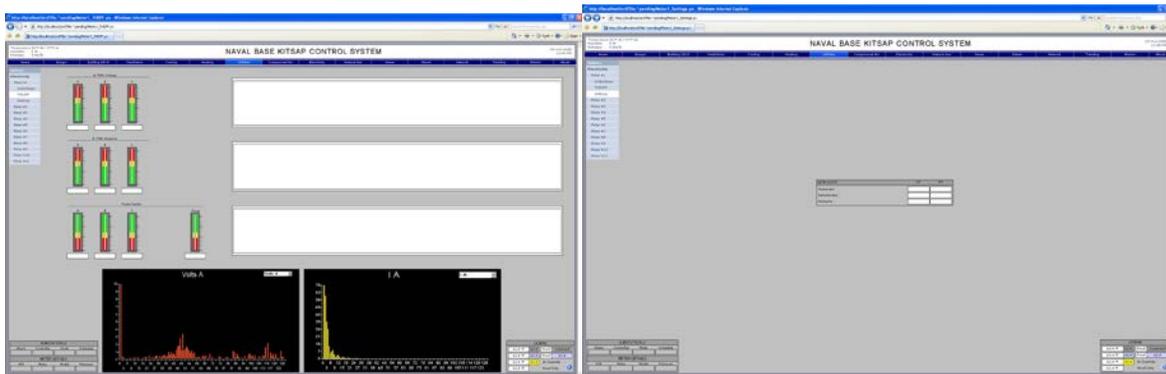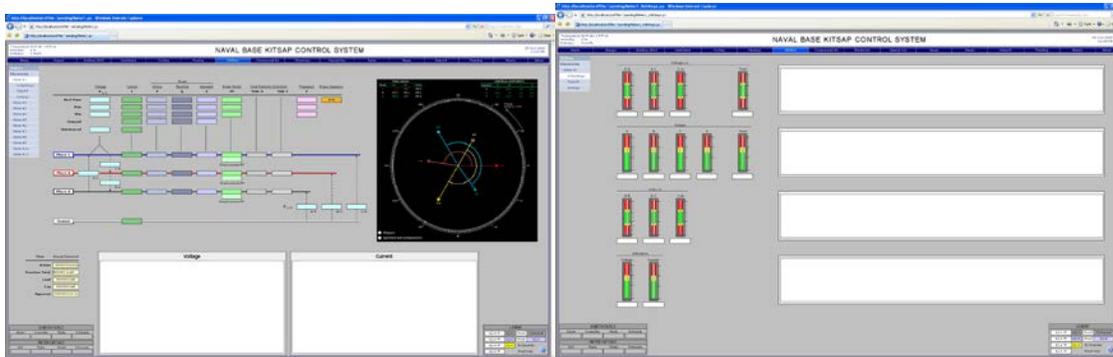
Gas

The Metered Gas data is displayed on a line diagram.

Water –
The building's Water Data is displayed on a one-line diagram.

About Pages –
An example of a typical About page with Sequence of Operation is as follows:
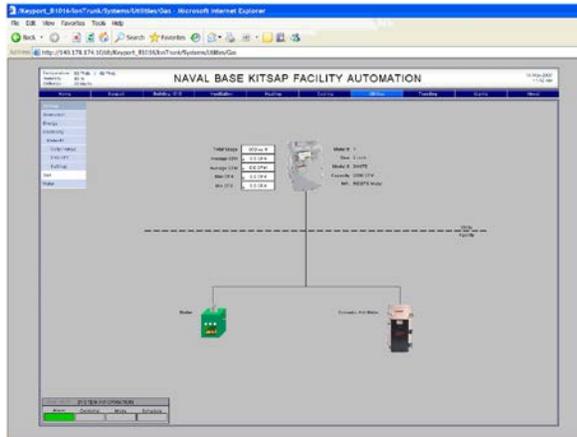
APPENDIX D: Point Naming Conventions

USE OF THIS APPENDIX
The Contractor shall use this appendix as a requirement for development of naming conventions. Each unique naming convention not already listed shall be submitted for approval prior to use.

IMPORTANT NOTE: Consistency of point naming convention by all persons working in the UMCS is of paramount significance as the licensed energy analysis software in use at NAVFAC NW "reads" the archive point data by running analytic routines looking at the trended point names' approved acronyms and underline spacers to find the needed data. Contractors who are found at any time during the contract and into the warranty period to have named points that are in conflict with this convention will correct any and all deviations.

This point naming convention shall be used instead of any local or historical terms used to identify equipment such as "AH" or "RTU" instead of "AHU".

SUPERVISORY CONTROLLER NAMING CONVENTION & EXAMPLES

All Supervisory Controllers are required to be named according to the convention used for points, except that a version of the installation name is placed in front of the code.

Supervisory Controller naming examples include:

Smokey Point Building 13914 would be: SPoint_S_13914
Jim Creek Building 3 would be: JCreek_C_3
Naval Station Everett Building 2000 would be: Everett_E_2000
Naval Air Station Whidbey Island Building 117 would be: Whidbey_W_117
Naval Magazine Indian Island Building 16 would be: Indian_I_16
NBK-Bangor building 1101 would be: Bangor_B_1101
NBK-Keyport building 352 would be: Keyport_K_352
NBK-Bremerton building 467 would be: Brem_N_467
Bremerton PSNS & IMF building 850A would be: PSNS_P_850A
Naval Hospital Bremerton building 1:   Hosp_H_1
Jackson Park building 120 would be: JPark_J_120

POINT NAMING CONVENTION & EXAMPLES

Note: Do not use dashes, always use underlines within named points.

Points shall be named utilizing each of the following codes in order separated by underlines:
Activity_
Building # _
Infrastructure Type_
System_
Sub-System_ (not used on "EC" system air-side equipment)
Equipment_#_
Device_#_
Value_
Sub-Value_

Point Naming Examples Include:

B_7205_F_EC_**AHU_8_**MAT
B_7205_F_EC_**AHU_8_ZN_5_** SAT
B_7205_F_EC_**CHWP_2_**STS
B_7205_F_EC_**CHLR_1_**CHWST
B_7205_F_EC_CHWS_DP
B_7205_F_EC_**CT_1_**EWT
K_1003_F_EC_**CWP_1_**STS
K_1003_F_EC_CWS_DP
B_7205_U_EL_MV_**GEN_3_RLY_PR**I_VOLTS_**PH_A**
B_0074_U_WW_SS_**PMP_2_**AMPS
B_6301_F_CL_IC_**CT_2_**LWT
B_0074_F_EL_LV_MTR_KW
B_7205_F_EC_OAT
B_7205_F_EC_**AHU_8_**ECON_CMD
B_7205_F_WT_MTR_FLOW
B_7205_F_NG_MTR_FLOW
B_8205_F_CA_BA_PRS
B_8205_F_CA_**BA_CMPR_2_**STS
B_2810_U_EL_MV_**FDR_211_**MTR_VOLTS_**A_B**
B_2810_U_EL_MV_**FDR_211_**MTR_VOLTS_**PH_C**
B_2810_U_EL_MV_**FDR_211_**MTR_AMPS_**PH_A**
B_2810_U_EL_MV_**FDR_211_**MTR_AMPS_**N**
B_2810_U_EL_MV_**FDR_211_RLY_PRI_**AMPS_**PH_A**
B_2810_U_EL_MV_**FDR_211_**CB_STS
B_2810_U_EL_MV_**FDR_211_**RLY_**CB_WEAR**
B_2810_F_EC_**RM_101_**TMP
K_0234_U_CA_**IA_CMPR_HP_1_**KW (If Integrated Meter)
K_0234_U_CA_**IA_CMPR_HP_1_**MTR_KW (If Separate Meter)

	ACTIVITY		Location		Infrastructure Type
B	NBK-Subase Bangor	###	Building Number (no leading zeros required)	U	Utility (Supports more than 1 bldg)
C	Naval Radio Station Jim Creek				
E	Naval Station Everett			F	Facility (only supports 1 bldg)
H	Bremerton Naval Hospital				
I	Naval Magazine Indian Island				
J	NBK -Jackson Park				
K	NBK-Keyport				
N	NBK-Bremerton (outside the CIA)				
P	PSNS & IMF (within the CIA)				
S	Smokey Point				
W	Naval Air Station Whidbey Island				

	SYSTEMS		SUB-SYSTEMS (as applicable)
EL	Electricity	LV	Low Voltage < 1,000 Volts
		MV	Medium Voltage 1000 - 69,000
		HV	High Voltage >69,000 Volts
WW	Wastewater	SOD	Ship XX XX
		SS	Sanitary Sewer
		OW	Oily Waste Water / Waste Oil
		IW	Industrial Wastewater
		ST	Storm
ST	Steam	PS	Process Steam
WT	Water	ART	Artesian
		DHW	Domestic Hot Water [System]
		PTW	Potable Water [System]
		NPW	Non-Potable Water [System]
		PUW	Pure Water [System]
		SW	Salt Water [System]
NG	Natural Gas		
CA	Compressed Air	BA	Air, Breathing [System]
		CA	Air, Control [System]
		AS	Air, Starting [System]
		IA	Air, Industrial [System]
CL	Cooling (Other Than Bldg HVAC Cooling)	REF	Refrigeration
		IC	Industrial Cooling (Generator)
		PW	Process Water
EC	Environmental Controls	CHWS	Chilled Water
		CW	Condenser Water System
		HW	Hot Water
FO	Fuel Oil		
LT	Lighting	DD	Drydock
		PK	Parking
		PR	Pier
		ST	Street
		EX	Exterior
		IN	Interior
WX	Weather		
FA	Fire Alarm		
OT	Other Facility System, JACE, etc.		

EQUIPMENT		DEVICE	
AHU	Air Handling Unit	**AD**	Air Dryer
BLR	Boiler	**B**	Building
CH	Chiller	**BSTR**	Booster
CMPR	Compressor	**BT**	Battery
CT	Cooling Tower	**CHRGR**	Charger
FDR	Feeder	**CB**	Circuit Breaker
GEN	Generator	**CI**	Circuit Interrupter
VAV	Variable Air Volume	**CKT**	Circuit
WEL	Well	**CNVTR**	Converter
PREFIX		**COIL**	Coil
BYP	Bypass	**CLR**	Sample Cooler
C	Cold	**CTRLR**	Controller, Such As On A Generator
CON	Condenser	**CYL**	Cylinder
		DDMB	Dual Duct Mixing Box
CH	Chilled	**DK**	[Hot, Cold, Bypass]Deck
CLG	Cooling	**DT**	Duct
D	Discharge	**DMPR**	Damper
DAY	Day	**DET**	Detector
DX	DX [COOLING]	**DW**	Dry Well
EXH	Exhaust	**ECON**	Economizer
E	Entering	**F**	Fan
EL	Electric	**FACP**	Fire Alarm Control Panel
H	Hot	**FLTR**	Filter
HR	Heat Recovery	**FOD**	Fiber Optic Device
HTG	Heating	**HP**	Heat Pump[_Number]
L	Leaving	**HTWHL**	Heat Wheel
M	Mixed	**HX**	Heat Exchanger
MECH	Mechanical	**MTR**	Meter[_ID1_ID2]
MU	Make-Up	**PB**	Pushbutton
OS	Outside	**PC**	Photo Cell
P	Power [CB] (115 kv)	**PMP**	Pump
R	Return	**PRV**	Pressure Reducing Valve
REV	Reversing	**PT**	[High] Potential Transformer
		RHC	Reheat Coil
SPLY	Supply	**RLY**	Digital Numerical Relay [_PRI Or _ SEC Or _Xxx]
FLUID / MEDIUM		**RM**	Room
A	Air	**SPC**	Space. Use Rm [_#] Where Possible
CHLOR	Chlorine	**SMP**	Sump
CHM	Chemical	**TIE**	Tie Breaker
CO	Carbon Monoxide	**TNK**	Tank
CO2	Carbon Dioxide	**UH**	Unit Heater
COND	Condensate	**VFD**	Variable Frequency Drive
FO	Fuel Oil	**VLV**	Valve
HT	Heat	**XFMR**	Transformer
NG	GAS	**ZN**	Zone
SMK	Smoke		
STM	Steam		
WTR	Water		
WND	Wind		

VALUES			
Analog		**Binary, Status & Commands**	
AMPS	Current In AMPS	**ALM**	Alarm
CBWEAR	Circuit Breaker Wear	**CLS**	Close
DIR	Direction	**CMD**	Command
DP	Differential Pressure	**COOL**	Cool
DPF	Differential Power Factor	**DIS**	Disable
EFF	Efficiency	**ENABLE**	Enable
ENTH	Enthalpy	**FAST**	Fast Speed
FLOW	Volumetric Flow Rate	**FLOT**	Float
HUM	Humidity	**HEAT**	Heat
HZ	Hertz	**LEAK**	Leak
KVA	Kilo Volt Amps	**LO**	Lock Out
KVAH	Kilo Volt Amps Hours	**OCC**	Occupied
KVAR	Kilo Volt Amps Reactive	**OPEN**	Open
KVARH	Kilo Volt Amps Reactive Hours	**OVRD**	Override
KW	Kilowatts	**PWR**	Power
KWH	Kilowatt Hours	**RSET**	Reset
LVL	Level	**SLOW**	Slow Speed
MHO	Conductivity In Mhos		
PH	Alkalinity Or Acidity	**STPT**	Setpoint
PF	Power Factor	**STS**	Status
POS	Position	**TRBL**	Trouble
PRS	Pressure	**TRIP**	Trip
ROT	Rotation (Phasors)		
SPD	Speed (RPM Or %)		
THD	Total Harmonic Distortion		
TIM	Time		
TMP	Temperature		
TWB	Wet Bulb Temp		
UNOCC	Un-Occupied		
VOLTS	VOLTAGE In Volts		

Dev Suffix / Val Prefix		Value Suffix	
A	Air	**AVG**	Average
E	Entering	**DMD**	Electrical Demand
L	Leaving	**HIGH**	High
RN	Run	**I**	Current
S	Static	**LOW**	Low
WTR	Water	**LAG**	Lag
		LEAD	Lead
		LIM	Limit
		MAX	Peak Or Maximum
		MIN	Minimum
		N	Neutral
		PH_A	Phase A
		PH_B	Phase B
		PH_C	Phase C
		PRI	Primary
		SEC	Secondary Or Backup
		UNBAL	Unbalanced
		V	Voltage

Approved Prefix/Fluid		Approved Equipment Acronyms	
EA	Exhaust Air	BD	Bypass Deck
SA	Supply Air	CD	Cold Deck
EW	Entering Water	CHM_TNK	Chemical Tank
LW	Leaving Water	CHLOR_BSTR	Chlorine Booster
		CHWP	Chilled Water Pump
		CLG_VLV	Cooling Valve
		COND_PMP	Condensate Pump
		CWP	Condenser Water Pump
		DAY_TNK	Day Tank
		EAD	Exhaust Air Damper
		EF	Exhaust Fan
		EL_HT	Electric Heat
		FBD	Face/Bypass Damper
		HD	Hot Deck
		HR	Heat Recovery
		HTG_COIL	Heat Coil
		HTG_VLV	Heat Valve
		HW_CNVTR	Hot Water Converter
		HWP	Hot Water Pump
		MAD	Mixed Air Damper
		MECH_RM	Mechanical Room
		MUF	Make-Up Air Fan
		OAD	Outside Air Damper
		RAD	Return Air Damper
		REV_VLV	Reversing Valve
		RF	Return Fan
		SF	Supply Fan
		SMKDET	Smoke Detector
		STM_VLV	Steam Valve
		VAD	Volume Air Damper
		WO_TNK	Waste Oil Tank
		WP	Water Pump
		ZD	Zone Damper
		ZN_[number]	Zone [number] on multizone unit

Approved Acronyms	
SAF	Supply Air Flow
AMPS_PH_C	Phase C Amps
AMPS_UNBAL	Unbalanced Current
BDT	Bypass Deck Temp
BSP	Building Static Pressure
CDT	Cold Deck Temp
CHWRT	Chilled Water Return Temp.
CHWST	Chilled Water Supply Temp.
DAT	Discharge Air Temp
DSP	Duct Static Pressure
EAT	Exhaust Air Temp

Approved Acronyms	
EWT	Entering Water Temp
FLTR_STS	Filter Status
HDT	Hot Deck Temp
HRT	Heat Recovery Temp
HUM_STS	Humidity Status
HWRT	Hot Water Return Temp
HWST	Hot Water Supply Temp
KVAR_LAG	Lagging KVAR
KVAR_LEAD	Leading KVAR
KVAR_DMD	Kvar Demand
KW_DMD	Kilowatt Demand
LLT	Low Temp Limit Detector
LWT	Leaving Water Temp
MAT	Mixed Air Temp
OATWB	OA Wet Bulb Temp
OAH	Outside Air Humidity
OAT	Outside Air Temp
PB_OVRD	Pushbutton Override
PRI_LVL	Primary Level
RAT	Return Air Temp
RF_SPD	Return Fan Speed
RM_107_TMP	Room 107 Temperature
RM_14_HUM	Room 14 Humidity
RM_14_SP	Room 14 Static Pressure
RT	Run Time
SAT	Supply Air Temp
SEC_LVL	Secondary Level
SF_SPD	Supply Fan Speed
SPC_HUM	Space Humidity Use "Rm_#_Hum"
SPC_TMP	Space Temp. Use "Rm_#_Tmp"
THD_I	Total Harmonic Distortion - Current
THD_V	Total Harmonic Distortion - Volts
TMP_STS	Temperature Status, Or As In "OSAT_STS"
VOLTS_A_B	Line-To-Line Voltage, Phases A-B
VOLTS_AVG	Average Voltage On All Phases
VOLTS_MAX	Max Or Peak Voltage
VOLTS_N	Neutral Voltage
VOLTS_PH_B	Phase B Voltage
VOLTS_UNBAL	Unbalanced Voltage
WDIR	Wind Direction
WSPD	Wind Speed
ZN_3_TMP	Zone 3 Temperature

CLARIFICATIONS / DEFINITIONS
Supply Air Temp (SAT) - Measured at the Air Handler
Discharge Air Temp (DAT) - Measure where the terminal device discharges air into the space.
CONVRTR -HX should generally be used

SPACE (SPC) - There are very few instances that RM_[num] will not work; use SPC only where absolutely necessary

ROOM (RM) - When the room is a specific location with a Room Number, use RM_[num]

ZONE (ZN) - Used to specify the zone on the multi-zone AHU being referred to. In the event that room temperatures need to be linked back to zones, the appropriate low-level naming would be:

ZN_4_RM_102_TMP. There will be no time that "ZN_102_TMP" shall be ued to refer to a room. In the case of SAT for a zone at the AHU the naming would be "ZN_4_SAT."

APPENDIX E: Trending & Alarm Requirements

Trending Requirements

Point	Trend Type	Trend Interval
Fan Status	COV (note 1)	n/a
Temperature (air or fluid) [Space, return air, mixed air, outside air]	Interval	15 minutes
Discharge Air Temperature	Interval	15 minutes
CO2	Interval	15 minutes
Relative Humidity (%)	Interval	15 minutes
Discharge Duct Static Pressure	Interval	15 minutes
Building Static Pressure	Interval	15 minutes
Differential pressure (air or fluid)	Interval	15 minutes
Fan Speed	Interval	15 minutes
Equipment Status (on/off)	COV (note 1)	n/a
Flow (cfm or gpm) rate	Interval	15 minutes
Valve or damper position	COV (note 1)	n/a
Metering	Interval	1 hour
RTAC Synchrophasors – all phases	Interval	1 hour
RTAC Synchrophasors – frequency	Interval	1 hour
RTAC Synchrophasors – power factor	Interval	1 hour
I/O Synchrophasors – circuit breaker status	COV (note 1)	n/a
I/O Synchrophasors – circuit breaker truck-operated	COV (note 1)	n/a

Legend:

- Cfm: cubic feet per minute
- CO2: Carbon Dioxide
- COV: Change of Value
- Gpm: gallons per minute
- n/a: Not applicable

Notes:

1. Record value at least once every 24 hours even if no change of value.

Alarm Requirements

Point	Type	Condition	Delay	Priority
Equipment Status (fan, boiler, pump, single unit)	COV	Status and Command Differ	30 seconds	Urgent
Valve or Damper Status	COV	Status and Command Differ	30 seconds	Routine
Space Temperature (normal spaces)	Floating	Greater than 2 deg F above or below setpoint.	30 minutes	Routine
Space Temperature (critical spaces for temperature control)	Floating	Greater than 2 deg F above or below setpoint.	5 minutes	Critical
Discharge Air Temperature (DAT) for DAT-controlled equipment	Floating	Greater than 2 deg F above or below setpoint.	15 minutes	Routine
Discharge Air Temperature for space temperature controlled equipment	Fixed	Greater than 100 deg F or less than 50 deg F	5 minutes	Urgent
Mixed Air Temperature	Fixed	Less than 45 deg F	5 minutes	Urgent
CO2	Fixed	Greater than 1200 parts per million	15 minutes	Routine
Relative Humidity (%)	Fixed	Greater than 65% or less than 30%	30 minutes	Routine
Discharge Duct Static Pressure	Floating	Greater or less than 0.2 in. w.g. from setpoint	5 minutes	Routine
Building Static Pressure	Floating	Greater or less than 0.02 in. w.g. from setpoint	5 minutes	Routine
Differential pressure (fluid)	Floating	Greater or less than 5 psi from setpoint	10 minutes	Routine
Filter Status (pressure switch)		Pressure Switch active	30 seconds	Routine
Smoke Detector/Fire Alarm Control Panel	COV	Detector Active	0 seconds	Critical
Electrical substation relays	COV	Alarm contact active	0 seconds	Critical
Locked Enclosure	COV (to open)	Alarm activation	0 seconds	Critical

NAVFAC NW UMCS IA Addendum

In addition to the mandated annual DISA Information Assurance training, the following regulations will apply to all NAVFAC NW Utility Monitoring and Control Systems (UMCS) Users.

1. The use of USB thumb drives, memory sticks and camera flash memory is prohibited from being connected to any government system.

2. Non-government computers are prohibited from being connected to the NAVFAC NW UMCS network.

3. All users shall log in to an UMCS government network with a domain account; with the exception of the system administrator who may use a local administrator account to perform duties as needed.

4. Government laptops may be moved between Navy government installations in the Northwest region but may not be taken to any other location.

5. Government UMCS computers may not be connected to any other network except for NAVFAC NW UMCS.

6. No UMCS government computer is to be connected to the internet.

7. No UMCS government computer may be modified without written consent of NAVFAC NW CIO. This includes installation of software.

8. No security measures may be bypassed or deactivated.

Note: Violation of this agreement will result in user account being deactivated.

_____
User Printed Name

_____   _____
User Signature   Date