# SMarT PANEL SENSOR

SMT

Structure Monitoring Technology

# PRICING GUIDE

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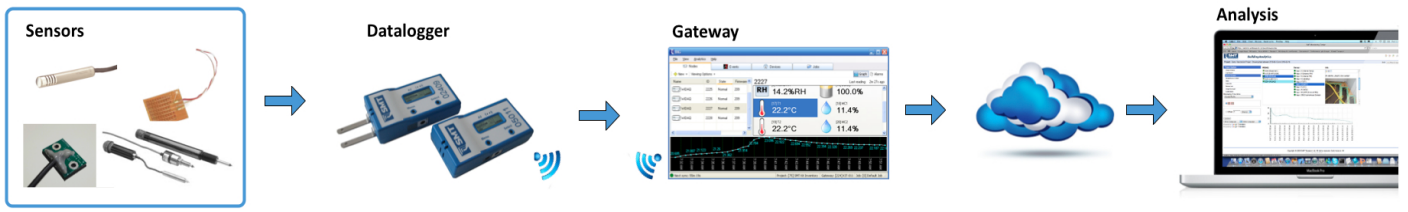
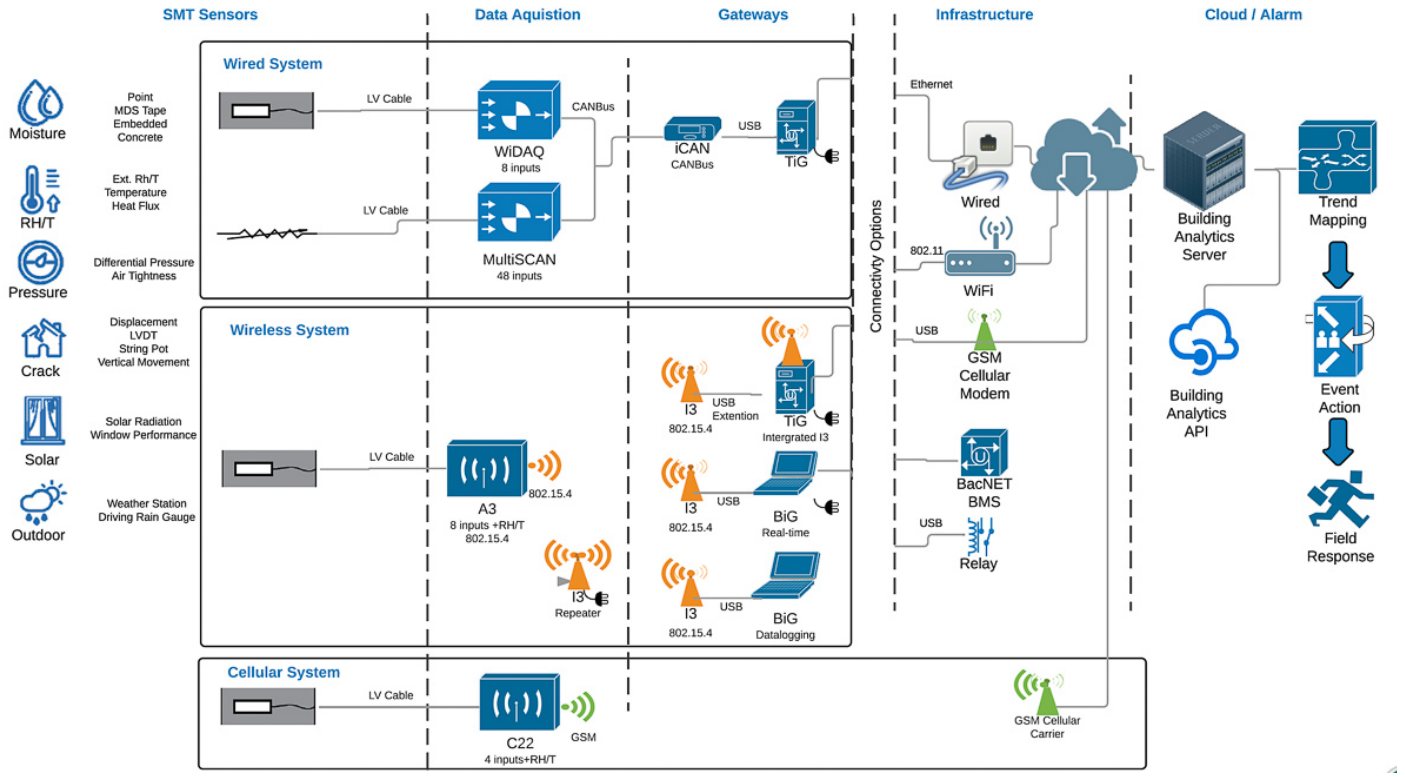
Date: 2018-04-09
Q01328V2

# SMarT PANEL OVERVIEW & PRICING WORK SHEET




## SMT MONITORING SYSTEM FLOWCHART




## PRICING WORK SHEET

### Part 1 - Sensors Per Panel

| | Price |
|---|---|
| Panel Type A | |
| Panel Type B | |
| Panel Type C | |

### Part 2 - Panel Layout

| | | |
|---|---|---|
| Panel Type A | | number of panels |
| Panel Type B | | number of panels |
| Panel Type C | | number of panels |

### Part 3 - Data Acquisition

| | |
|---|---|
| Wired | |
| Wireless | |
| GSM | |

### Part 4 - Monitoring and Analytics

### Part 5 - Additional On-site Services

# PART 1 : SENSORS PER PANEL

SMT recommends that the following locations be monitored on-site and the proposed sensor selection. Individual buildings or wall profiles may have specific benefits from monitoring only certain areas of the panel. (Note: Please contact SMT for guidance and recommendations.)

## Sample Panel A

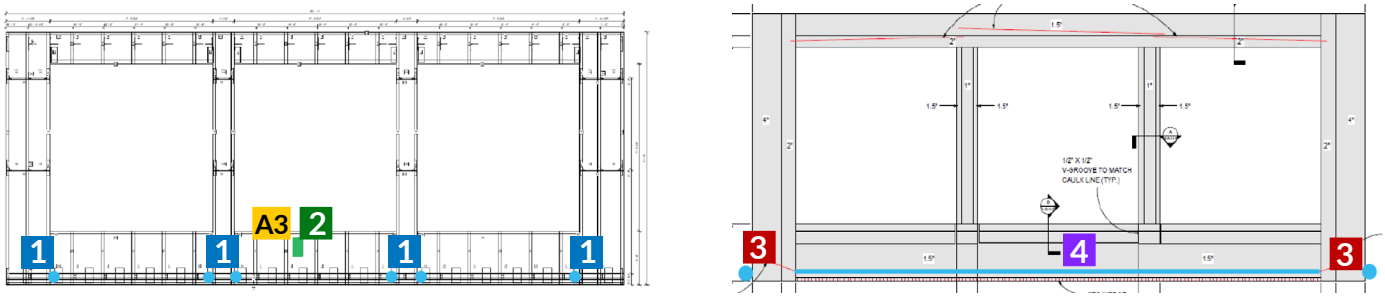



**Figure 1:** Proposed Sensor Locations in Panel System.

| | Location | Building Parameter | SMT Sensor | Qty | Price | Total |
|---|---|---|---|---|---|---|
| 1 | Stud Track Under Windows | Moisture Level | MDS | | $29.00 | $ |
| 2 | Cavity Space | Relative Humidity/Temperature | HTM2500 | | $120.00 | $ |
| 3 | Panel Joint | Point Moisture | PMM | | $36.00 | $ |
| 4 | External Insulation | Moisture Level behind finish | MDS | | $29.00 | $ |
| A3 | Interior Conditions | Temperature/Rh | Internal Rh/T | 1 | (Included) | / |
| **Total** | ---------- | | | | | **$** |

**Estimate Installation (0.5 hour): $60.00**

## Sample Panel B

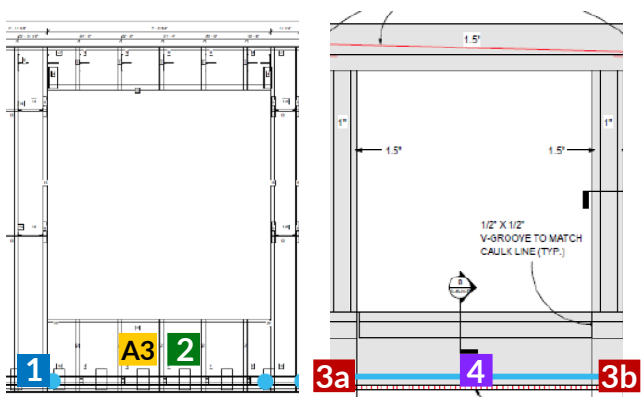



**Figure 2:** Proposed Sensor Locations in Panel System.

| | Location | Building Parameter | SMT Sensor | Qty | Price | Total |
|---|---|---|---|---|---|---|
| 1 | Stud Track Under Windows | Moisture Level | MDS | | $29.00 | $ |
| 2 | Cavity Space | Relative Humidity/Temperature | HTM2500 | | $120.00 | $ |
| 3 | Panel Joint | Point Moisture | PMM | | $36.00 | $ |
| 4 | External Insulation | Moisture Level behind finish | MDS | | $29.00 | $ |
| A3 | Interior Conditions | Temperature/Rh | Internal Rh/T | 1 | (Included) | / |
| **Total** | ---------- | | | | | **$** |

**Estimate Installation (0.5 hour): $60.00**

# ADDITIONAL MONITORING FOR:


Moisture


RH-Value


Differential Pressure


Crack Movement


Window Performance


External Conditions

## PRICING CHART

| MONITORED PARAMETERS | SENSOR | BUDGET PRICE |
|---|---|---|
| MOISTURE | Point Moisture Measurement (PMM) | $36.00 - $71.00 |
| | Moisture Detection Sensor (MDS Tape) | $35.95 - $60.95 |
| | Embedded Moisture Sensor (EMS) | $95.00 -$290.00 |
| | Concrete Moisture Sensor | $350.00 - $375.00 |
| RH-VALUE (Thermo Performance) | Ext. Temperature | $25.00 - $60.00 |
| | Heat Flux Sensor | $640.00 |
| DIFFERENTIAL PRESSURE | Differential Pressure Sensor (-0.25" to +0.25" H2O) | $250.00 - $285.00 |
| | Differential Pressure Sensor (-1" to +1" H2O) | $250.00 - $285.00 |
| CRACK MOVEMENT | Linear Displacement Sensor | $250.00 - $285.00 |
| | LVDT (Crack Monitoring) | $975.00 - $1010.00 |
| | String Pot (Vertical Monitoring) | $450.00 |
| WINDOW PERFORMANCE | Solar Radiation | $285.00 - $320.00 |
| | MDS Tape Under Window | $35.95 - $60.95 |
| EXTERNAL CONDITIONS | Driving Rain Gauge | $995.00 |
| | Weather Station* | |
| CO2 IAQ (Indoor Air Quality) | CO2 Sensor | $155.00 - $190.00 |

*See Page 12 for details on Weather Station.

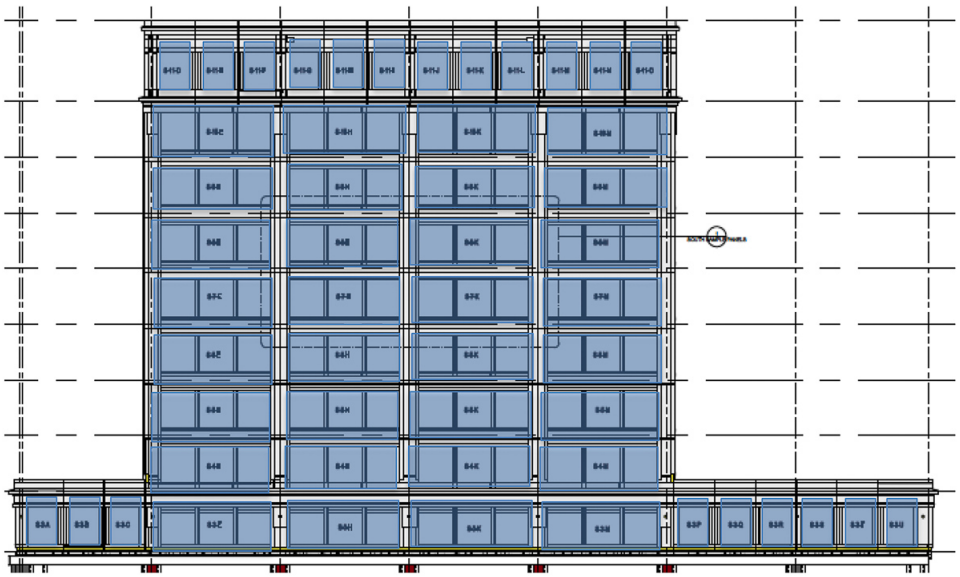
**NOTES:**
Contact SMT for information on application and configuration of electronics.

Budget Price includes sensor and cable assembly. Extra data aquisition channels may be required for full workable system.

# PART 2 : PANEL LAYOUT

**Number of Panels to be monitoring the building can be varied to change the coverage pattern.**

## 100% COVERAGE



**Each panel has similar sensor set and standard locations for 100% coverage.**

## 50% COVERAGE

**Each panel joint can be monitored from 50% coverage.**

**Number of Panels**

**Panel Type A**

**Panel Type B**

**Panel Type C**

**NOTE:**
Other layouts of panels may be available.

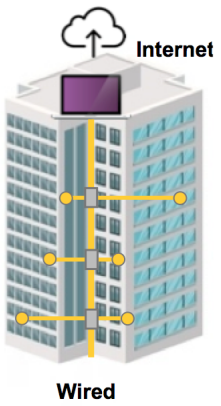
# PART 3 : DATA ACQUISITION HARDWARE OPTIONS

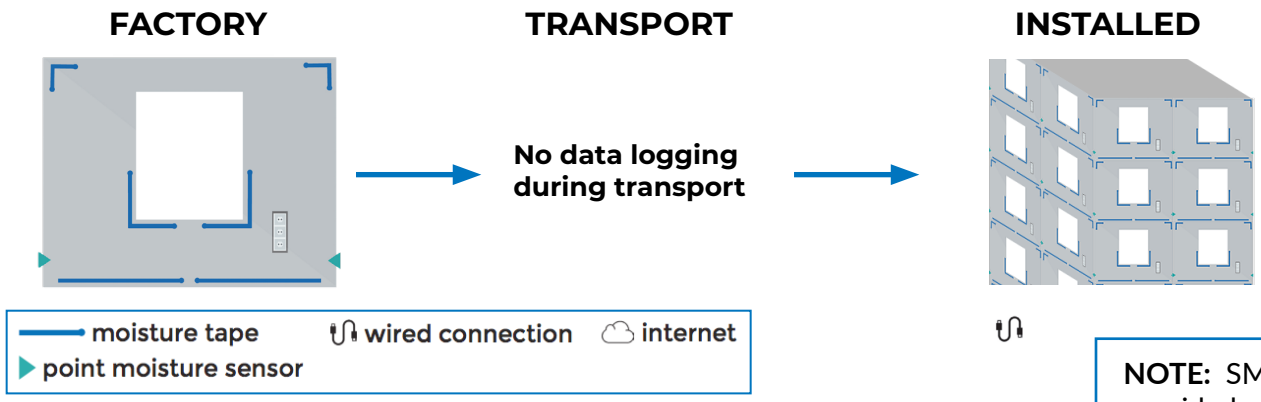
While the factory installation of the SMT Sensors for panels at the time of construction in a controlled environment is the most convenient – the application of electronics at which stage of construction electronics warrants further discussion.

SMT has various options for monitoring electronics for when the final sensors are installed within a building. See figure below:

## WIRED

Wired real-time communications within a building are typically completed with low-voltage cabling, and route back to a final central location for Internet connectivity. SMT can supply the labor for the cabling or have an on-site low-voltage installer complete the work. The SMT electronics minimize cabling runs by utilizing 8 channel or 48 channel WiDAQs for the measurement of sensors. Wired sensors are best for long term monitoring.




**System Components**

- WiDAQ – 8r ch
- WiDAQ – MultiSCAN – 48r ch
- CANkey wired Interface
- Tactical Intelligence Gateway (TiG)

**Wired System (As for Sample Panel A)**

| | |
|---|---|
| Sensor Suite from Part 1 | $ |
| Each Panel - WiDAQ 8r Faceplate | $544.00 |
| Installation WiDAQ Node (0.5 to 1 hour) | $65.00 |
| **Per Panel Total** | $ |

**Basic Building Infrastructure (5,000 to 50,000 sq.ft) BUDGET ONLY**

| | |
|---|---|
| LV Cable to each panel ($150/panel) | $2500.00 to $30000.00 |
| CanKey & TiG Gateway | $1000.00 |
| Labor for install of TiG & Internet | $500.00 to $2500.00 |
| System Programming | $1000.00 to $5000.00 |
| **Building Infrastructure Total** | **$5000.00 to $38500.00** |

**NOTE:** SMT has provided pricing based on 10 to 100 unit quantities. We shall provide volume pricing, exact price based on building plans.

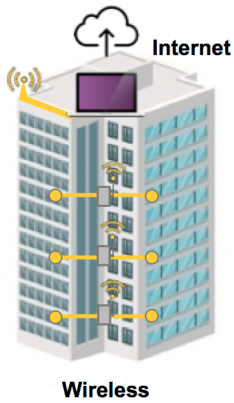
The wired system can be installed by local low voltage, electrical, controls or alarm contractors.

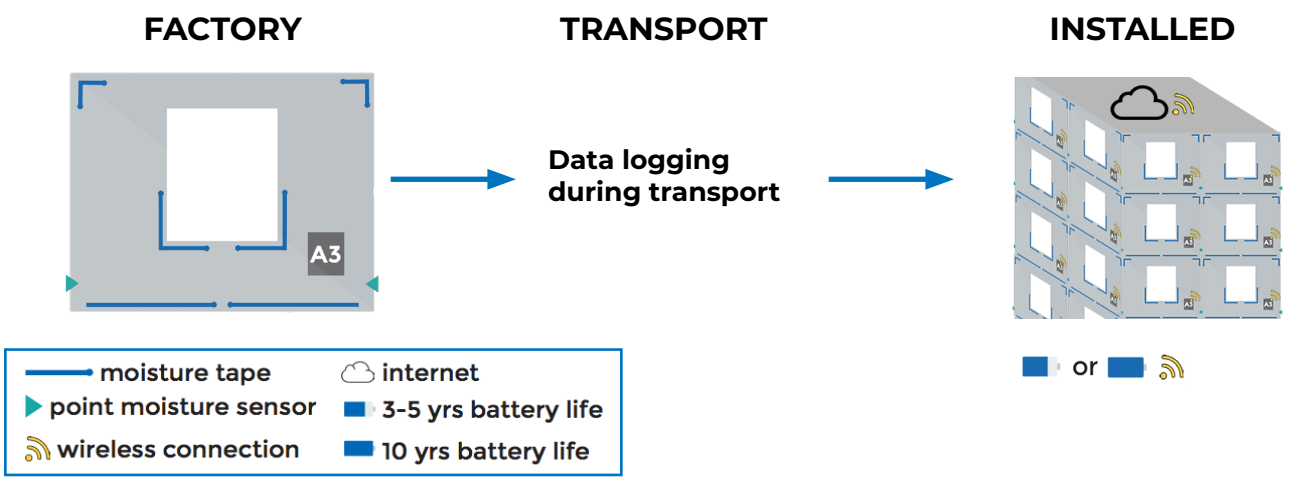
We can assist with shop drawings for contractors to price our system. These budget numbers are for further consultation.

# PART 3 : DATA ACQUISITION- CONTINUED

## WIRELESS

Wireless real-time communication from each panel can be achieved to communicate to receiving devices placed internal to the building, such as in hallways or common areas, or on external locations such as roof tops and plaza decks. The location selections of wireless receiving devices are very specific to the building construction type, layout, and final sensor locations. SMT has wired and wireless repeaters to extend the range from sensors to a single point for internet connectivity. Wireless sensors are best for flexibility of selection of installed location.




**System Components**

- A3 – 8r ch
- I3 Interface
- Tactical Intelligence Gateway (TiG)

**Wireless System (As for Sample Panel A)**

| | |
|---|---|
| Sensor Suite from Part 1 | $ |
| Each Panel - A3 Node: 8r Faceplate | $544.00 |
| Installation A3 Node (0.5 to 1 hour) | $65.00 |
| Extended Battery Life option | $50.00 |
| **Per Panel Total** | **$** |

**Basic Building Infrastructure (5000 sqft to 50,000 sqft) BUDGET ONLY**

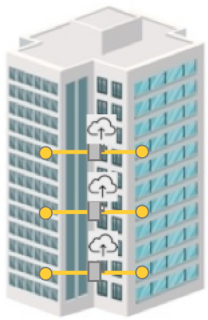
| | |
|---|---|
| I3 (number dependent on floor layout) | $250.00 to $2500.00 |
| TiG Gateway to Internet Connection | $750.00 |
| Cabling and labor for install of I3 | $500.00 to $3500.00 |
| System programming | $1000.00 to $5000.00 |
| **Building Infrastructure Total** | **$2500.00 to $11750.00** |

**NOTE:** SMT has provided pricing based on 10 to 100 unit quantities. We shall provide volume pricing, exact price based on building plans. These budget numbers are for further consultation.

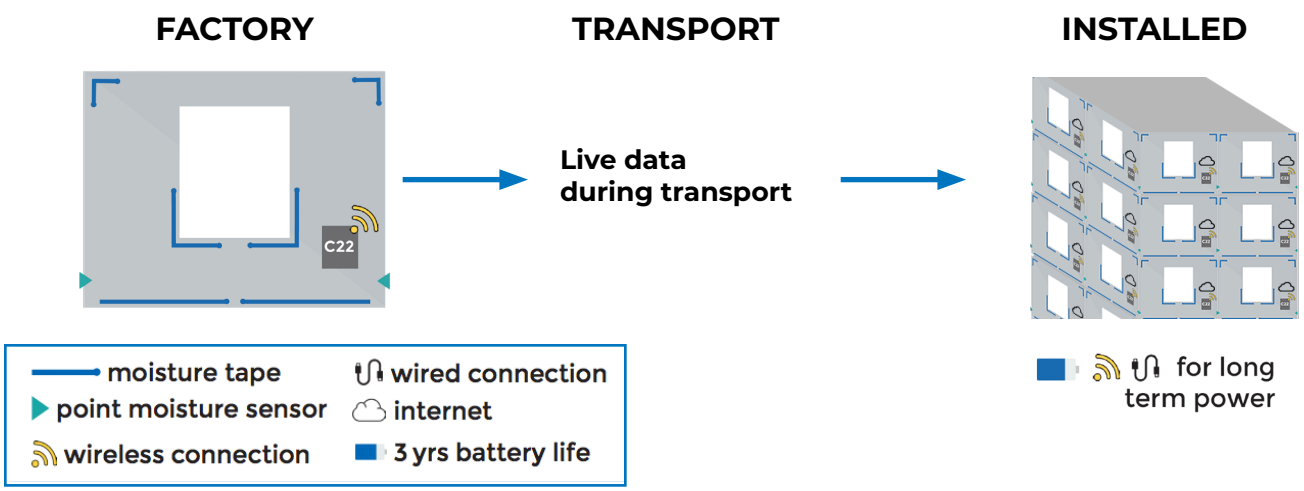
# PART 3 : DATA ACQUISITION- CONTINUED

## GSM - CELLULAR

SMT has the ability to transmit data directly to the cloud based from each panel location by use of the GSM Cellular network. The continued development of lower powered GSM technology makes this option viable for building monitoring technologies. Data will be received directly from the C22 sensors to SMT's cloud based Building Analytics on-line software. Each C22 sensor has a GSM Sim card and data charge for internet connection. The GSM cellular communication is best for real-time data during transportation and immediately during construction. Each C22 Sensor Node shall have monthly internet connection and a related fee.



GSM/Cellular




**GSM Cellular System (As for Sample Panel A)**

| | |
|---|---|
| Sensor Suite from Part 1 | $ |
| Each Panel C22 Node: 8r Faceplate | $750.00 |
| Installation C22 Node in Factory (0.5 hour) | $65.00 |
| System Programming | $50.00 |
| **Per Panel Total** | **$** |

**GSM Internet Connector for each C22:**

Monthly $4.00 to $12.00 / per panel / month

**Total Yearly 200 Panels** **$9,600.00 to $28,800.00**

(Pricing dependent on GSM carrier & geographic location)

## INTERNET CONNECTIONS

The monitoring solutions for real-time monitoring is dependent on an Internet connection to send the data back to the monitoring center for presentation and analysis.
The pricing does not include the cost of an internet connection.

# PART 4 : BUILDING ANALYTICS / MONITORING

**SMT Building Analytics** is the web based user interface that allows anyone associated with your project to have access to data and to perform data analysis from any web browser or smartphone. Different users can be setup with different permissions to allow some users to have configuration privileges and others view only access.

For manufacturers, researchers, building science practitioners, the most value added portion of our system is our cloud based Building Analytics.

**Please compare and select a package.**

| SMT FEATURES | STANDARD Package ☐ | SILVER Package ☐ | GOLD Package ☐ |
|---|---|---|---|
| | $49 / Month | $99 / Month | $199 / Month |
| Number of A3 / C22 / WIDAQ Nodes Per Project | 50 | 100 | 200 |
| Building Analytics Online Data Access | √ | √ | √ |
| Dashboard | √ | √ | √ |
| Sensor Browser | √ | √ | √ |
| Sensor/Node Edit | √ | √ | √ |
| Data Export | √ | √ | √ |
| Graphing | √ | √ | √ |
| SMT Email/Phone Support | √ | √ | √ |
| Report Generation | | √ | √ |
| Alarm/Event Notifications | | √ | √ |
| Image Manager | | √ | √ |
| Sensor Drawing Overlays | | √ | √ |
| Integrated Weather Station Data | | √ | √ |

## KEY FEATURES OF BUILDING ANALYTICS ONLINE SOFTWARE

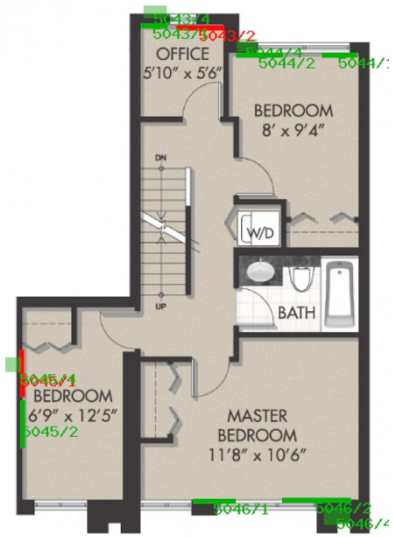
### DASHBOARD

At a glance, you can see the current status of all sensors in the system including the **Last Reading Time** so you know that everything is up-to-date, and so you can identify the sensors that may not be reporting correctly.

# PART 4 : BUILDING ANALYTICS - CONTINUED

## GRAPHICAL OVERLAYS (DRAWINGS)

The location of sensors can be populated on an as-built drawing or schematic making it easy to locate and understand the impact of said sensors.

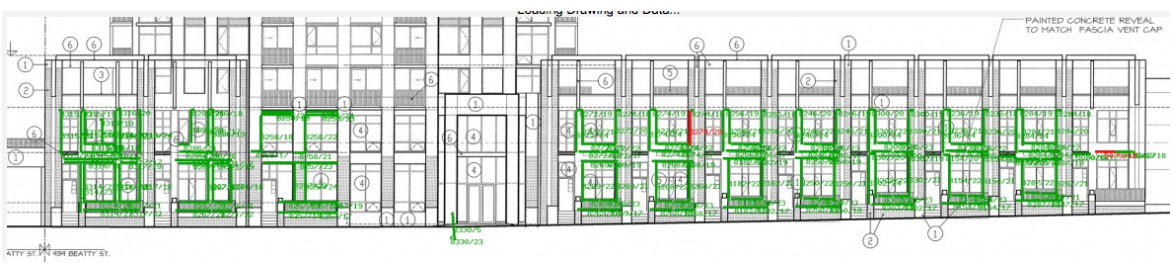



## SENSOR BROWSER

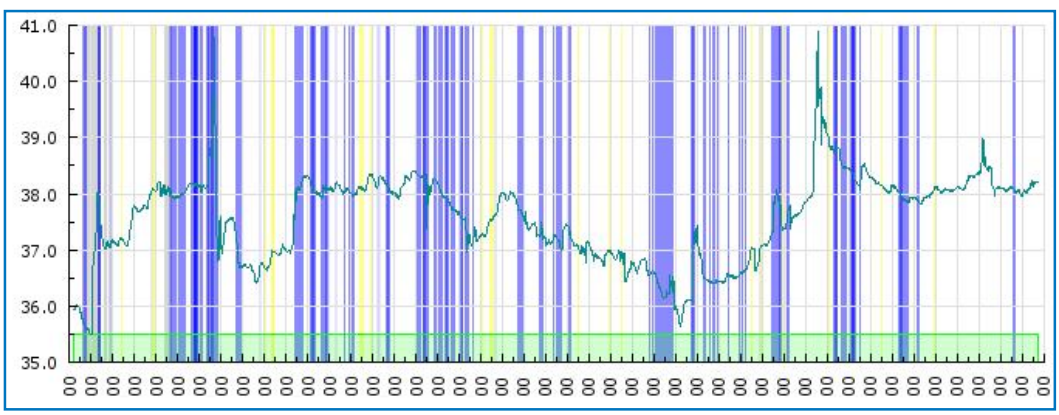
The sensor browser allows you to browse individual details of each sensor and perform configuration. In addition, there are configuration forms that allow you to configure groups of sensors quickly.

## SENSOR GROUPS AND GRAPHING FOR GROUPS

Any number of groups can be made with any number of sensors. These groups can then be graphed or have their data downloaded for further processing. One of the most important features is that this tool allows for data normalization. Data from different sensors may have a different timestamp, making graph comparisons very difficult. However, the graphing software will perform averaging so that data can be grouped to a single time, allowing for easy graph comparisons.



For example, at a glance you can see what areas have taken on moisture. You can then select triggered sensors to further troubleshoot them.



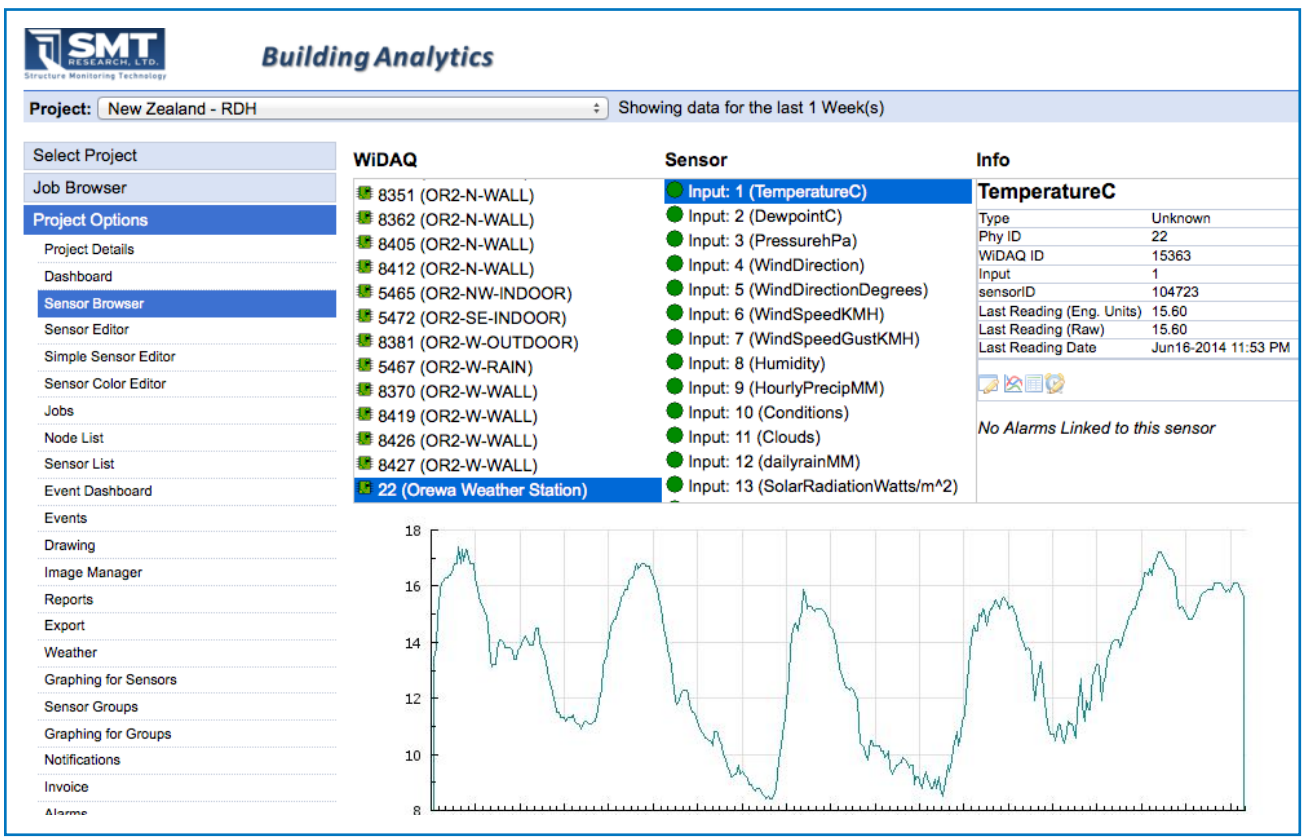

In this graph, moisture bands are populated on the graph to help determine if the water is due to external rain events:

# PART 4 : BUILDING ANALYTICS - CONTINUED

## WEATHER STATION

SMT can integrate any weather station with Analytics as long as it synchronizes its data with *Weatherunderground*. This feature allows us to incorporate the local weather conditions at a low cost by using existing weather stations. Weather data shows up in Analytics and can be graphed and/or normalized with all of the other heat flux data, temperature data, etc.
SMT can also provide a weather station for your project.

Below is a screenshot of the Sensor Brower. Data from the Davis Weather Station displays in Analytics as if it were any other sensor.




An example of a weather station installed with a Pan/Tilt/Zoom camera.

Davis Vantage Pro2 Weather station reports via wireless to a gateway located next to the Building Intelligence Gateway.

# PART 4 : BUILDING ANALYTICS - CONTINUED

## ACCESSORIES AND ADVANCED TOOLS

API's are available to extract data from the SMT database into your own data management stream if you wish to perform your own processing.

The Building Intelligence Gateway has the ability to create custom Monitors and Filters that you can program as plugins to the system.

SMT has a Building Management System BACnet module available should you wish to communicate data to a BACnet server.

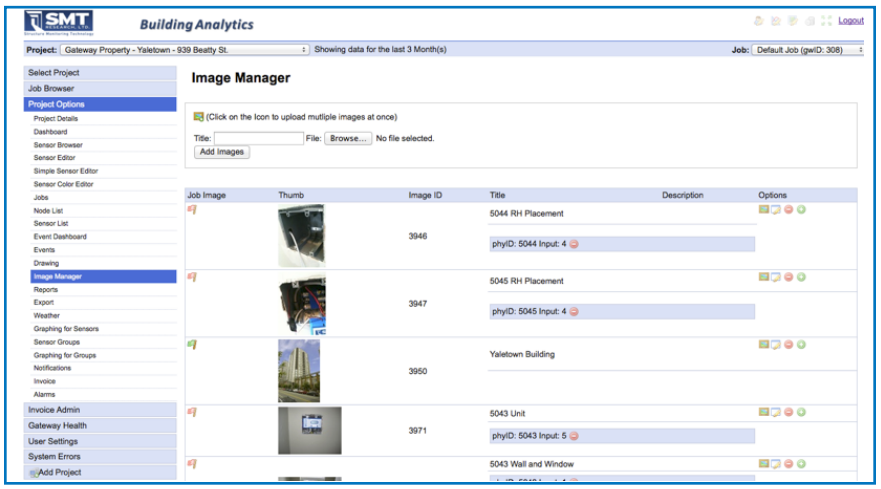



Image repositories, alarm handling, and other features are provided through Analytics.

## MORE INFORMATION

If you would like to login to see the various tools and links you can access a dormant account at analytics.smtresearch.ca

**Username: multi**
**Password: access**

This site was tracking movement of insulation panels as well interior heat flux.

# PART 5 : ADDITIONAL ON-SITE SERVICES

Technicians are available to come on site to investigate the design or explain subsequent monitoring results.  Typical Technician Rate:  $175.00 per hour. This includes the use of all electrical equipment and site report summary.  All travel expenses shall be covered for site trips.

**NOTES**

- 1 year warranty on all electronics and software/firmware upgrades
- Pricing in USD Funds
- Equipment Delivery: 2-4 weeks ARO
- Shipping FOB Vancouver, BC
- Power and Internet to be provided on-site for real-time monitoring solutions. SMT can provide a cell modem at $35/month during initial activation, allowing you to receive data and have remote access immediately after the equipment is installed.