MA 18P 21092900000000000024

NEW

#### **State of Maine**



#### **Master Agreement**

Effective Date: 09/30/21 Expiration Date: 09/30/22

Master Agreement Description: Meteorological Forecasting Services

**Buyer Information** 

William Allen 207-624-7871 ext. NULL WJE.Allen@maine.gov

**Issuer Information** 

Sharon Krechkin 207-624-3038 ext. sharon.krechkin@maine.gov

**Requestor Information** 

Sharon Krechkin 207-624-3038 ext. sharon.krechkin@maine.gov

#### **Agreement Reporting Categories**

#### **Authorized Departments**

ALL

#### **Vendor Information**

Vendor Line #: 1

Vendor ID Vendor Name

VS0000000080 WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

Alias/DBA

**Vendor Address Information** 

511 CONGRESS ST SUITE 200 PORTLAND, ME 04101 US

**Vendor Contact Information** 

JEROME WATTS
207-775-5401 ext. 2619
JEROME.WATTS@AMEC.COM

## **Commodity Information**

Vendor Line #: 1

Vendor Name: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC

Commodity Line #: 1

Commodity Code: 96188

**Commodity Description:** Weather Forecasting Services

**Commodity Specifications:** 

Commodity Extended Description: Meteorological Forecasting Services.

 Quantity
 UOM
 Unit Price

 0.00000
 0.000000

Delivery Days Free On Board

0

Contract Amount Service Start Date Service End Date

0.00 09/30/21 09/30/22

Catalog Name Discount

0.0000 %

Discount Start Date Discount End Date

Please see authorized signatures displayed on the next page

Each signatory below represents that the person has the requisite authority to enter into this Contract. The parties sign and cause this Contract to be executed.

State of Maine - Department of Administrative and Financial Services

DocuSigned by:

| fairs C. Schor: 9/29/2021
| Signature Date

Jaime C. Schorr, Chief Procurement Officer

and

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC

Eric Gionet, Senior Project Manager, Associate

# **RIDERS**

V	The following riders are hereby incorporated into this Contract and made part of it by reference: (check all that apply)
	Rider A – MA User Information and/or Specifications
	Rider B – Terms and Conditions
	Rider C - Exceptions
	Bid Cover Page and Debarment Form – Appendix A from RFQ
	Municipality Political Subdivision and School District Participation Certification – Appendix D from RFQ
	Other – Included at Department's Discretion
	Other – Included at Department's Discretion

#### RIDER A

# Master Agreement User Information and/or Specifications MA 210929-024

**Commodity:** Meteorological Forecasting Services

The State reserves the right to add other similar services or commodities to the Master Agreement (MA) if it's in the State's best interest but does not obligate the State to purchase similar noncontracted services or commodities from the vendor.

Master Agreement Competitive Bid RFQ: 17A 210914-058

**Contract Period:** Through September 30, 2022. The State of Maine with vendor approval can opt to issue up to four (4) one (1) year extensions.

**Vendor Contact Person:** The vendor contact person will help consumers place orders, inquire about orders that have not been delivered, all shipping issues, quality issues and any issues pertaining to the MA contract. All orders not submitted through a Delivery Order will be sent through the vendor contact person. The vendor contact person for this MA is:

Name: Eric Gionet Tel: 902-220-6580 Email: eric.gionet@woodplc.com

**Prices:** Prices are with shipping terms of "Free on Board (FOB) – Destination". The State intends for this to mean that all goods shall be priced to include shipping charges, if any, to the State's desired location. The "FOB – Destination" shipping term is also intended to mean that the State shall not bear any responsibility for the goods in question until the State takes possession of them at the destination point of delivery. Contracted pricing will remain firm for the duration of the contract period.

**Using Departments:** The expected primary using department will be the MaineDOT however the contracted services can be utilized by any State of Maine Department or Agency. The description in the specifications describes MaineDOT's current operational needs. References to MaineDOT and MaineDOT employees implies State of Maine and State employees.

# **Specifications**

#### **Purpose**

This is a contract for forecasting services for its maintenance operations. The services required are as follows:

- 24/7/365 Meteorologist Consultation and Support
- ESS/RWIS Polling
- Web Portal and Mobile App Access
- Forecasting Services

#### **Background**

MaineDOT is comprised of five geographic Regions across Maine, with its headquarters located in Augusta, Maine. Each Region has a regional office as well as several transportation maintenance facilities that are assigned to area-specific crews. There are nearly 50 crews statewide that address maintenance and operations on Maine's state and state-aid highways.

MaineDOT currently has seven (7) Road Weather Information Systems (RWIS), otherwise known as Environmental Sensor Stations (ESS). These RWIS are in various areas of the state and MaineDOT is actively working to expand its network. MaineDOT currently uses Vaisala Navigator to view our RWIS information, but a significant part of this RFQ is to have a meteorologist review this RWIS information and provide MaineDOT with road forecasts.

#### **Scope of Services**

#### General:

MaineDOT requires the following services in support of transportation management, covering all weather-related events throughout the winter season, from October 1<sup>st</sup> through April 30<sup>th</sup>.

### **Ad-Hoc Consulting**

MaineDOT may require on-call consulting services from the vendor to address meteorological support and system training on an as-needed basis. These services will be specifically requested of the vendor by MaineDOT and paid for on an hourly basis.

#### 24/7/365 Meteorologist Consultation and Support

The vendor shall provide MaineDOT operational staff with access to the same qualified meteorological consultants who developed the weather forecasts, 24 hours per day, 7 days per week, through a toll-free phone number, and through an email address that is monitored 24/7.

MaineDOT staff shall be able to reach a professional and knowledgeable forecaster with the road and weather conditions and forecasts for the region from which the user is calling and receive a timely response to their inquiries. This level of service is specifically important during adverse weather events.

#### **ESS/RWIS Polling**

Upon execution of the contract, the vendor shall establish electronic polling of the seven RWIS that are currently in use by MaineDOT. Such polling shall be in place to allow road forecasts by October 1, 2021. If contract award is less than three weeks prior to October 1st, a three-week time frame from the date of contract award shall govern as the service start date.

MaineDOT currently has two types of RWIS stations:

- 1 Vaisala station The Vaisala station can be polled using NTCIP
- 6 Campbell Scientific stations The Campbell stations can be polled using either NTCIP or LoggerNet

The vendor's system shall directly communicate with the sensors within the RWIS network stations and shall be polled at least once every 10 minutes. The data shall be made available via the weather website immediately.

The vendor shall monitor the sensors and notify MaineDOT if any sensors fail to provide reasonable data.

The Polling IP shall be provided to MaineDOT to be added to the state's comms whitelist for the sites.

Polled data and RWIS images shall be time stamped and stored for at least 12 months.

ESS/RWIS Polling Setup will be paid for on a one-time, fixed price basis, for each station.

Ongoing ESS/RWIS Polling for each station that is properly setup will be paid for on a monthly, per station, basis.

#### Web Portal and Mobile App

A map-based weather website and mobile app shall be provided and shall:

- 1) Function properly in Google Chrome, Internet Explorer and Microsoft Edge web browsers (website)
- 2) Function properly in both Android and IOS (mobile app)
- 3) Provide access accounts for up to 300 users. Such access may include users from other state agencies or contractors hired by MaineDOT for winter services. Access to the general public is not part of this contract.
- 4) Display and archive the data and use the data in the forecasting process.
- 5) Display the data on the web portal and mobile app.
- 6) Include a user-configurable web portal.
- 7) Display data on a GIS-based map showing typical level functionality (highways, rivers, town names, satellite views, etc).
- 8) Display the different observational parameters on the map. The data will be color-coded based on the severity of the observed data.
- 9) Display the following types of data and formats:
  - a. Display camera images, atmospheric data, surface, and subsurface data when available.
  - b. Color-coded temperatures (air, dewpoint, surface, subsurface) when around freezing.
  - c. Color-coded surface status.
  - d. Display precipitation accumulation intervals (1, 3, 6, 12, 24h)
  - e. Display precipitation rate and snowfall rate.
  - f. Display the latest 20 camera images
  - g. Display the observation superimposed on the forecast graphically with the ability to display certain parameters.
  - h. Display the observation and forecast in a tabular format.
  - i. Display monthly observation trend analysis.
  - j. Provide sites metadata.
  - k. Radar display (precipitation intensity and precipitation type).
  - 1. Display NWS alerts geographically on the web portal with warning details.
  - m. Display of data from nearby weather stations.
  - n. Display all the camera images on one page.
- 10) Provide hourly snowfall accumulation forecast images for the State of Maine in 12-h, 24-h, and 48-h and displaying the department's plowing route on the image.
- 11) Provide graphical trend analysis charts.
- 12) Retrieve archive data (observation, camera images, forecast) from the web portal based on the user's desired date and time.

- 13) Display the data on the web portal and mobile app on a dynamic map.
- 14) Provide concise weather reports for transportation impactable events. The reports shall be issued 24-48 hours before the event and be comprised of text description and weather risk map
- 15) Be capable of issuing user-defined alerts based on:
  - a. Single or multiple parameters.
  - b. RWIS observation parameters
  - c. Nearby weather station parameters
  - d. Forecasts
  - e. Alerts to be issued when criteria or multiple criteria are met and when ended

Web Portal and Mobile App services, including snow maps, will be paid for on a monthly, fixed price, basis.

#### **Forecasting Services**

The vendor shall have qualified meteorologists provide the following forecasting services:

- 1) 8 Local Area Forecasts (LAF). The forecasts shall be comprised of:
  - a. Issued at least four times a day (e.g. 0300, 0900, 1500, 2100 ET).
  - b. 48-hr detailed forecast in increments of 3-hours or less
  - c. Day 3-5 outlook in 6-hour increments
  - d. Tabular and graphical format.
  - e. Emailed to the client in addition to being available on the web portal and mobile app.
  - f. Temperatures are color-coded near freezing.
  - g. Color-coded precipitation types and precipitation mixtures.
  - h. Liquid, Freezing rain, and Snow Rates
  - i. Liquid, Freezing rain, and snow accumulation
  - j. Probability of precipitation (%)
  - k. Visibility (mi)
  - 1. Air temperature, dewpoint, RH, wind chill, cloud cover, wind direction, wind speed, and gust.
- 2) ESS/RWIS Road Forecasts shall be provided at each of the 7 RWIS locations and shall meet the following requirements:
  - a. Issued at least four times a day (e.g. 0300, 0900, 1500, 2100 ET).
  - b. 24-hr detailed forecast in hourly increments.
  - c. Tabular and graphical format.
  - d. Emailed to the client in addition to being available on the web portal and mobile app.
  - e. Color-coded pavement temperature near freezing, road condition, precipitation types, and precipitation mixtures.
  - f. Liquid, Freezing rain, and Snow Rates
  - g. Liquid, Freezing rain, and snow accumulation
  - h. Visibility (mi)

i. Air temperature, dewpoint, RH, wind chill, cloud cover, wind direction, wind speed, and gust.

Local Area Forecasting Services will be paid for on a monthly, per area, basis. ESS/RWIS Forecasts will be paid for on a monthly, per station, basis.

#### **Severe Weather Reports**

The vendor shall provide Severe Weather Reports, consisting of a cover page and no more than one or two pages of details and graphics, whenever the on-duty meteorologist identifies approaching severe weather. The determination of severe weather shall be consistent with the NWS criteria for the Gray and Caribou office areas. Severe Weather Reports shall be sent out to the list of recipients provided by MaineDOT and shall consist of a storm summary, timing, weather hazards, precipitation types, amounts and intensity rates. Maps shall also be included to convey areas of precipitation amounts and types. Severe Weather Reports will be paid for on a fixed price, per month, basis.

#### **Pre-Storm Weather Briefings**

MaineDOT shall be contacted to discuss the need for a Pre-Storm Weather Briefing. Upon agreement to proceed, the vendor shall send out a webinar invitation, 1 hour in length, to the same list of recipients provided by MaineDOT. This meeting request will typically be sent 15-36 hours before the event. Presentations will typically require 20 to 30 minutes of storm overview covering detailed weather descriptions, weather types, arrival times, accumulation, and impact durations across Maine and shall utilize a map of Maine, showing the forecast conditions, to clearly convey each message. A question and answer session shall be accommodated for the remainder of the webinar to allow attendees to get additional information and clarification. MaineDOT may also initiate a Pre-Storm Weather Briefing by contacting the vendor 24 hours in advance. Pre-Storm Weather Briefings will be paid for on a fixed price per authorized or requested briefing.



# RFQ # 17A 210914-058 Meteorological Forecasting Services

**Vendor Requirement Documents** 

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# 1.0 Vendor Requirements

Wood has a full-time team of professional meteorologists who have graduated from accredited colleges and universities in atmospheric science and meteorology. The team is working on a 27/4/365 rotational shifts to serve our clients. Wood has been in the weather business for over 20 years serving clients in different sectors, and our transportation sector is the strongest. Our knowledge and service level in the Road Weather Information System (RWIS) forecast and instrumentation stretched over 20 years. Wood has been using web based and mobile app to service real-time observation, camera images, and weather forecast for over 10 years. We service numerous government transportation agencies with forecast tailored products and services, such as Local Area Forecasts (LAF), site specific pavement forecasts, Maintenance Decision Support System (MDSS), Night Icing Potential (NIP), thermal mapping, phone consultation, severe weather reports, and severe weather briefings.

Wood is the is the current service provider to MaineDOT. Further to utilizing MaineDOT as a reference, the additional two references can be found below:

Organization	Name	Position	Email	Phone
Ontario Ministry of Transportation	Michelle McGrath	Head of Construction and Engineering	Michelle.McGrath@ontario.ca	+1(289) 783-3187
Albert Transportation	Beata Bielkiewicz	ITS Engineer, Highway Operations	Beata.bielkiewicz@ gov.ab.ca	+1(780) 415-4877

# 2.0 Scope of Services

#### 2.1 General

Wood can provide all services, covering all weather-related events through the winter season, from October 1<sup>st</sup> through April 30<sup>th</sup>.

## 2.2 Ad-Hoc Consulting

Wood employs a team of certified consultant meteorologists, professional meteorologists, sensor specialists, scientists, and engineers. Wood can provide MaineDOT with ad-hoc consultation in the following fields:

- 1) On-demand weather consultation for severe weather events affecting MaineDOT operations. This can be initiated by MaineDOT contacting the project management team and the weather office. The team can also provide training to MaineDOT winter maintenance crew as Wood has a well-established training course the covers RWIS forecast overview and Meteorology 101, web portal and mobile app registration and utilization, and case studies. The course can be provided virtually on an agreed upon date and time. In-person training is also available and must adhere to MaineDOT and Wood health and safety code.
- 2) Meteorological consultation to studies such as thermal mapping, trends and analysis, microclimates, new locations for RWIS sites and/or forecasting areas.
- 3) Measurement and control specialists can provide MaineDOT with insights to new sensing technologies in the field of ESS/RWIS and IoT.



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- 4) Our team of engineers and scientists can utilize currently available imagery from the ESS sites to provide insights into traffic density and classification through computer vision technologies.
- 5) Our team of engineers can provide MaineDOT with infrastructure studies and designs for ESS, DMS, advisory systems, and other ITS related elements.

#### 2.3 24/7/365 Meteorologist Consultation and Support

We will provide a 24/7 meteorological phone consultation support service through a toll-free number during the winter season. The phone consultation is directly connected to the Wood meteorologist dedicated to MaineDOT. Wood maintains up to six meteorologists on duty at any time during the winter season. The MaineDOT-dedicated meteorologists will assist with any district(s) or sub-district(s) questions. The phone consultation is expected to provide further forecast insight by discussing confidence levels and potential alternative scenarios.

Wood has a 24/7/365 dedicated Technical Support Desk to address any technical issues with the web portal and mobile apps, RWIS data polling, and observation and forecast flow. To streamflow the process, all issues must be reported to the meteorologist team via the toll-free number and, and the meteorologist will issue a ticket determining the severity/priority of the situation, and the ticket will be assigned to the Wood Technical Support Desk ESS/RWIS Polling.

#### 2.4 ESS/RWIS Polling

Wood polls over 500 devices ranging from ESS, DMS, Mobile ESS, Mini-ESS, SLA, Road Advisory Systems, and Traffic Camera Stations (TCS) to climate stations. Wood is hardware and sensor agnostic and can communicate and support multi-protocol systems. In most cases, deployed devices operate within a private telecommunications network that is designed and implemented by Wood for enhanced security to mitigate exposing devices to the internet. We are experienced in collecting data from several ESS manufacturers through wired and wireless IP based networks. We have an independent polling service in the cloud environment that provides greater data security and redundancy mechanisms, should outages occur even on a large geographical scale (**Figure 1**).

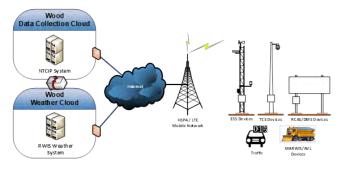


Figure 1: Wood data collection process

Wood can poll both types of stations deployed throughout the state using NTCIP and we are experienced with both Campbell Scientific and Vaisala Remote Processing Units (RPU). To poll the stations, Wood will require the following information for each station, at least 2-3 weeks in advance of the season startup: end-point device IP, camera configuration information (i.e., integration details, credentials, port number, etc.), SNMP community string and port number, and or, any other information needed to configure each station.

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Wood's polling services assume MaineDOT is operating the stations (i.e., power, telecommunications, and preventative maintenance) and responsible to resolve site level systematic issues. Wood can assist with site level systematic issues (i.e., remote diagnostics of the RPU and interfaced sensors) on an ad-hoc basis if MaineDOT desires such services.

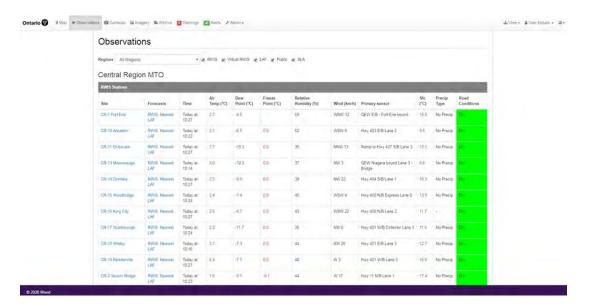
Wood will poll each station at a 10-minute interval and the data will be available on the web portal and mobile apps. Wood will provide firsthand remote troubleshooting of the sensors and will notify MaineDOT if any of the stations report erroneous or suspect data.

A gateway IP (i.e. Polling IP) will be provided to MaineDOT to be whitelisted in each of the cellular gateways. All the polled observations and images will be timestamped and archived for at least 24 months. The most recent two months can be provided over the web portal while older archive can be provided on a secured SharePoint site. Polled observation and image files will be stamped with the site name and UTC timestamp of the observation.

#### 2.5 Web Portal and Mobile App

The web portal is intuitive and easy to use. A MaineDOT administrator will be identified (i.e. by the department) and assigned to the web portal and will manage user access. Each user must register using their own credentials and the administrator must approve them before they can access the web portal. The user can configure the web portal and the mobile app to their preferences. The web portal and mobile app can account for 300 users. Public users are not allowed to register and use the web portal or mobile app.

The real-time RWIS data are displayed on the web portal in different formats (i.e., tabular and graphical) to make it easy to obtain the necessary information by each end-user. **Figure 2** shows the RWIS network being displayed geographically on a dynamic map (top figure) and tabular format (bottom figure), showing the color-coded pavement conditions with the legend depicting the meaning of each condition. When each station is moused-over, a popup window will display the observation time, the essential weather and pavement parameters, in addition to the camera image (**Figure 2**). The air and pavement temperatures are color-coded: green for above freezing (>33°F), red for near freezing (30°F≤Temperature≤33°F), and blue for below freezing (<32°F).



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Figure 2: The geographical display on the RWIS network on a dynamical map (top) and tabular format (bottom) with color-coded pavement status and mouse-over essential observations.

When clicking on any station, a window will popup showing the entire suite of observations (all available camera views, atmospheric observations, surface observations, and subsurface observations), as seen in **Figure 3**. The observations are color-coded for ease of reading. The list of all the nearby stations will also appear on the left list, as seen in the figure. The user can click on the sites on that list to display the current observations. Furthermore, when clicking on any of the camera images, all the available camera views will be displayed on a larger scale with the site ID and the observation timestamp (local) displayed on the top. The user can then choose to enlarge the image in full screen, and play/stop each frame in the past few hours. The MaineDOT users can view the list of stations and view the suite of information from each station (**Figure 3**). The figure also shows that the precipitation accumulation is being displayed in 1, 2, 6, 12, and 24-hour intervals.

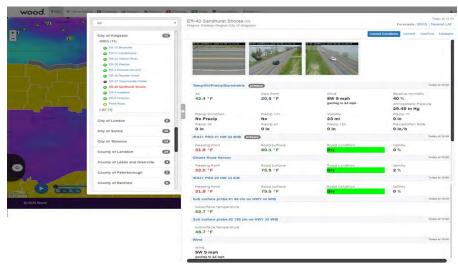


Figure 3: Display the entire suite of observations (camera, atmospheric, surface, and subsurface) by clicking on a station. The list of the Districts' RWIS stations is displayed on the left.

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The user can display the observation and the forecast on a single chart (**Figure 4**). The user can control the displayed parameters by clicking each parameter on/off using the legend at the bottom of the graph. The red vertical line shows the current time, and the forecast carries out into the future to the right of the red vertical line. A mouse-hover over the graph will display the data at that time. The user can also zoomin/out to narrow the timeframes on the x-axis.

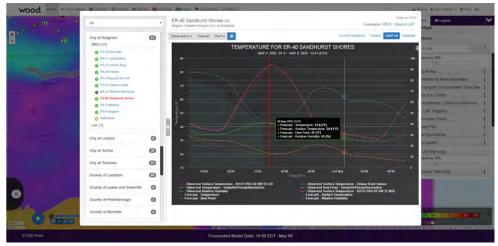


Figure 4: ESS data trends and analysis through superimposing the observational data over the forecast. The user can turn on/off the data using the legend at the bottom and zoom-in/out on shorter timeframes.

The users can also perform trend analysis for using the graphical chart for observation and forecast (**Figure 5**). The user can zoom in and out, hoover mouse across the graph to show data, highlight or turn on/off the weather parameters from the legend at the bottom.

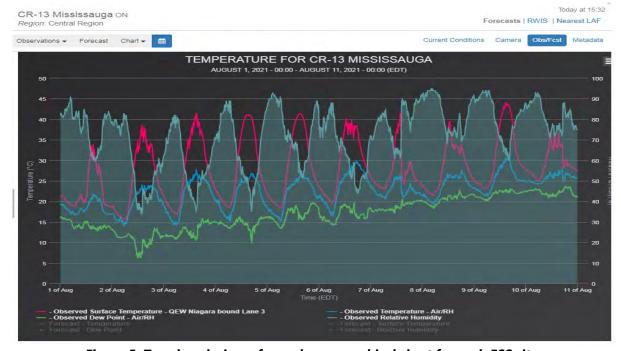


Figure 5. Trend analysis performed on a graphical chart for each ESS site.

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To maximize data analysis, Wood can display the data spatially. A user can spatially display certain parameters from the stations. **Figures 6 to 9** show the pavement status/condition, air temperature, pavement temperature, and wind speed and direction being display from all the stations, and the user can view the entire RWIS network and/or zoom-in/out to certain Districts and sub-Districts. For ease of reading, the air, dewpoint, and pavement temperatures are color-coded: green for above freezing (>33°F), red for near freezing (30°F≤Temperature≤33°F), and blue for below freezing(<30°F). The surface status is also color-coded, and the legend is provided within the web portal. This functionality will enable any user to have a comprehensive view of areas above, near, and below freezing with a single view.

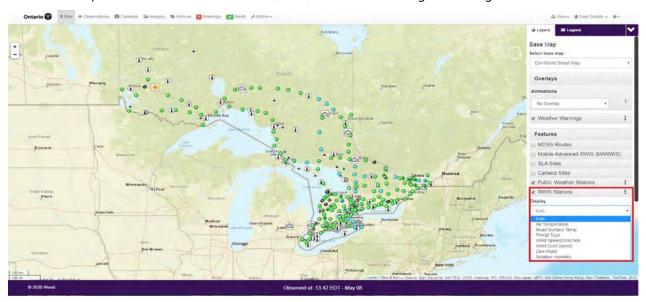


Figure 6: Comprehensive RWIS network view showing color-coded pavement status/condition.



Figure 7: Comprehensive RWIS network view showing pavement conditions on the map and color-coded data during mouseover.

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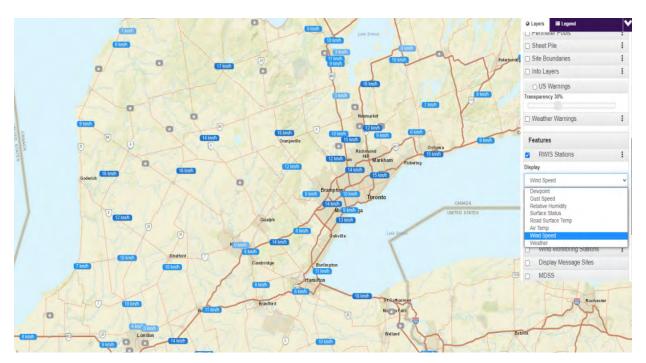


Figure 8: Comprehensive RWIS network view showing wind speeds and directions.

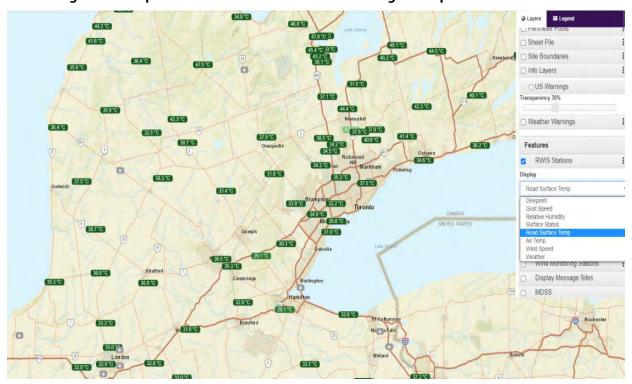


Figure 9: Comprehensive RWIS network view showing color-coded pavement temperatures.

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The sites metadata can be obtained by clicking on a particular ESS site then click on the Metadata link on the top right corner (**Figure 10**).

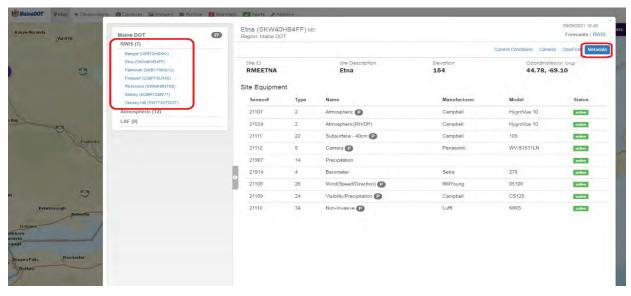


Figure 10. Metadata from each ESS site.

The observation and Forecast can be displayed in tabular format as seen in **Figure 11**. The user can choose between atmospheric or pavement observation or the forecast to display in tabular format. Furthermore, each table can be exported and saved as CSV.

The web portal can also display nearby public weather stations. Observation for such stations is usually posted on an hourly basis and the data can be viewed on the web portal using a mouseover or click. These observations can be displayed spatially on the map and the user can choose to display the available parameter (i.e., weather icon, air temperature, RH, etc).

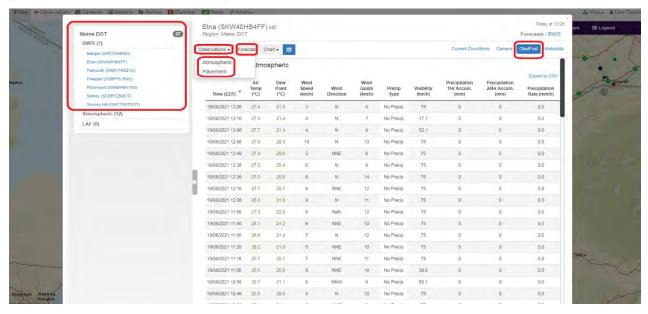


Figure 11. Observation and forecast can be displayed in tabular format.

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The user can also display all the available camera images in one view as seen in Figure 12.

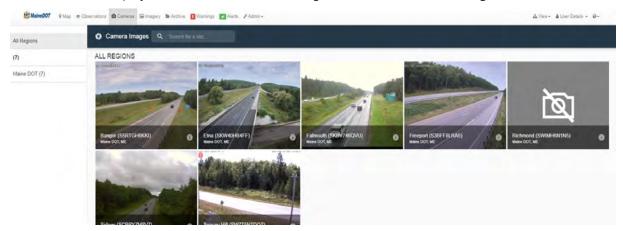


Figure 12. All the available camera images view.

#### **Snowfall Maps**

The user can also view hourly snowfall accumulation at different intervals (12, 24, and 48 hour) on the web portal. **Figure 13** shows a 24-hour snowfall accumulation for the State of Maine. The user can play the hourly frames or render each frame on its own.

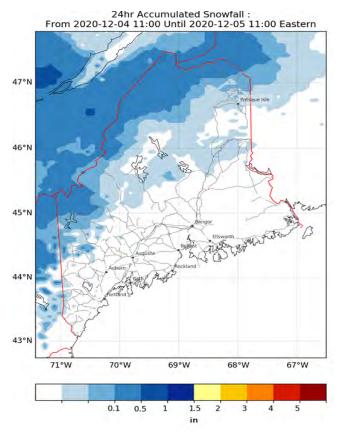


Figure 13. Hourly snowfall accumulation (24-hour interval).

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#### **Archive Data**

The user can also download the archived ESS and forecast data based on their desired datetime range. **Figure 14** shows the method of obtaining the archive data. The user needs to specify the type of archive required, the desired datetime range, the district, and the ESS site. The data can be downloaded as CSV files or the actual forecast products can be downloaded as PDF files.

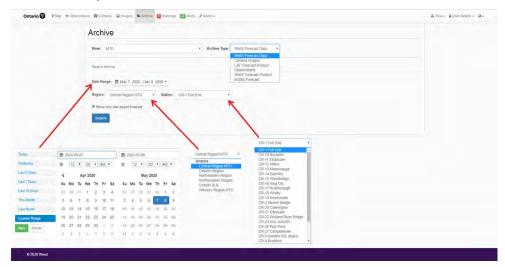


Figure 14. The method to obtain the archive observations and forecast data.

#### **National Weather Service (NWS) Alerts and Warnings**

The system can also display the active National Weather Service (NWS) Warnings and Watches on the map. When clicking on any issued warning, a popup box shows the details of that warning. These warnings are also provided on the mobile app. **Figure 15** depicts an example of the NWS warnings. The user will be able to see the warnings issued for the neighboring states when zooming out. The user can control the transparency of the warning layer that appears on the map.



Figure 15: The National Weather Service warnings, alerts, and watches.

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#### **User-Defined Alerts**

Wood has designed a user-defined alert system that can provide alerts based on essential parameters within the ESS observations and forecast. The user can select the parameter of interest and specify the numerical threshold. The user will receive an automatic email when the threshold is met or there is a drop below the threshold, meeting and exceeding MaineDOT's requirements. **Figure 16** shows a detailed example of the alert parameters and their settings from the dropdown menus. The alerts can be modified or deleted at any time by the user for any ESS site.

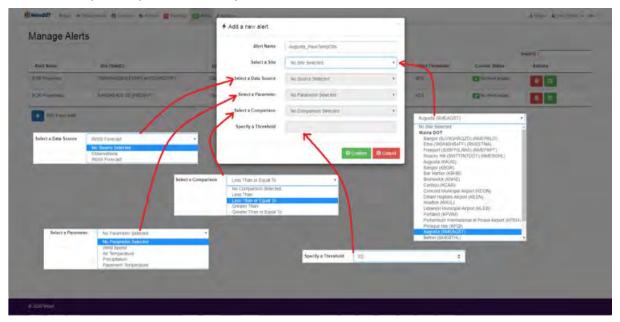


Figure 16: Web portal user-defined alerts based on the observations and forecast. The user can define and modify the thresholds for any ESS site observation or forecast.

#### **Web Portal Customization**

MaineDOT users will be able to control the display of the data. The User Details Change Preferences is at the top right corner of the web portal (**Figure 17**). Please note that the mobile app has more user-controlled features (Section 4.4). This will enable the user to control:

- Modify user details;
- Starting page automatic District zoom-in on the web portal and mobile app;
- Clock format;
- Change basemap;
- Display map mouseover;
- Default map overlay: on/off radar when starting up. The user can override this setting while
  using the web portal;
- Overlay transparency: decide the transparency of the radar, alerts, and warning that are superimposed on the map. The user can also override this setting while using the web portal; and
- Default table rows: the user can decide to display 25, 50, or 100 rows of the tabular data.

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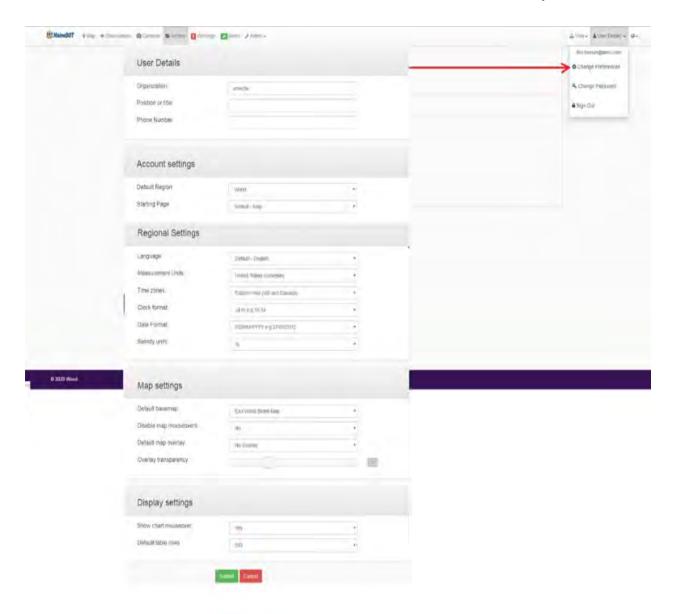


Figure 17: User Change Preference options. The user can control multiple settings to their preference. Most of the settings can still be overridden while using the web portal.

#### Radar

Wood download and process radar imagery from all radar stations in the US and Canada and merge them into seamless North American high-quality mosaic. The radar is available as a map layer showing intensity (in/hr) and precipitation type (rain, snow, ice, mixed) and can be animated (play/stop) with superimposed local DateTime. Animation speed and time range (up to four hours) can be controlled by the user. We provide two hours of futuristic radar depicting precipitation intensity, as seen in **Figure 18**.

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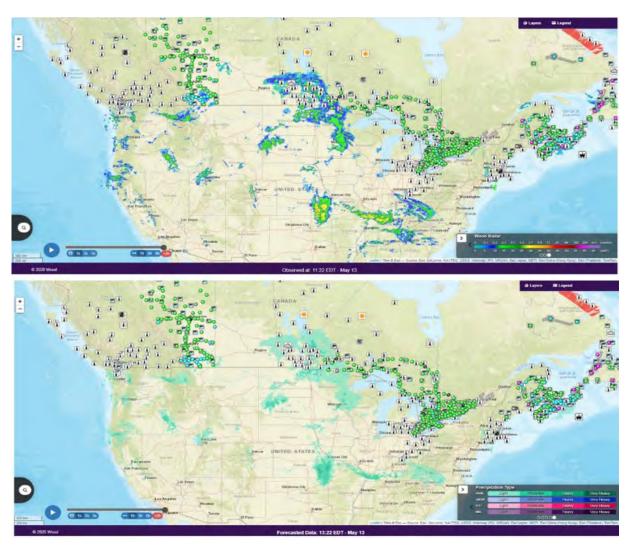


Figure 18: The radar precipitation intensity (top) and precipitation type (bottom) with control functions (play, stop, speed, time), nowcasting button (red +2h), datetime (bottom center), and legends (bottom right).

#### **Web Portal Administrators**

The MaineDOT web portal administrator(s) will have full control over the user's privileges and approval. The administrator(s) will be able to approve/remove users and/or modify existing users' privileges.

#### **Mobile App**

Wood's free mobile app will be available for all smartphones (iPhones and Androids), and the data will be displayed in an easy-to-use, convenient format (**Figure 19**). This service will include, the Local Area Forecasts (LAFs), the ESS locations, and the current weather conditions (all ESS observations and camera images). Every MaineDOT user registered to the web portal will be able to use the free mobile app. Furthermore, each user will be able to further customize their mobile app settings by including favorite ESS locations.

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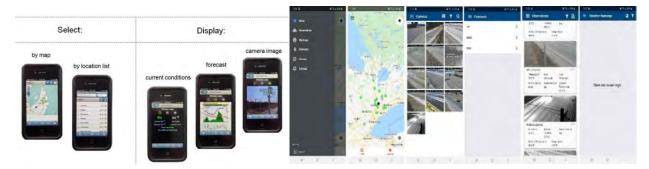


Figure 19. Mobile App Sample.

#### 2.6 Forecasting Services

Wood uses a high spatial and temporal resolution customized forecasting engine, called the **Wood Forecasting Engine (WFE)**, which simultaneously ingests numerous high-resolution weather models and ground observations, which are skillfully blended within the tool by Wood's meteorologists to create the Wood forecasts. The WFE enables our meteorologists to visualize, verify, and modify the forecast at a higher resolution spatially and temporally. Wood scientists have developed several meteorological "smart tools" within the WFE to aid in the efficient computations and production of all forecasts.

These smart tools are sophisticated algorithms that enable meteorologists to perform complex four-dimensional (4D) scientific calculations and adjustments to the meteorological model data. Such tools enable the meteorologists to provide accurate forecasts by incorporating surface and upper-air parameters in addition to performing real-time verifications and adjustments based on current observations.

## 2.6.1 Local Area Forecast (LAF)

Wood will provide LAFs for 8 regions that provide weather synopses describing the weather systems affecting each region. We could also provide a higher density of LAFs for MaineDOT at an extra cost if required.

The LAFs includes multiple weather parameters that can aid MaineDOT in assessing any approaching weather threats or hazards. Wood's LAFs consist of a 48-hour detailed forecast in three-hour intervals, followed by Day 3 to 5 weather forecast outlook provided in six-hour intervals (**Figure 20**). The LAF is color-coded for precipitation types and near freezing air temperature for ease of reading. The LAF comes in a tabular and graphical format with legends.

The outlook forecast will enable MaineDOT users to view precipitation types and amounts several days ahead and logistically prepare or upcoming events. The forecast also displays mix of precipitation in the short-range and outlook when present during weather events (e.g. mix of freezing rain and snow, rain-snow mix). The LAF can be issued at 0300, 0900, 1500, and 2100 ET for the period between October to end of April.

This forecast is fully controlled and supervised by our meteorologists, and they can mandate that it convey any update when the forecast deviates from the current weather situation. As seen in Figure 20, the forecast satisfies all the parameters listed in the FRQ.

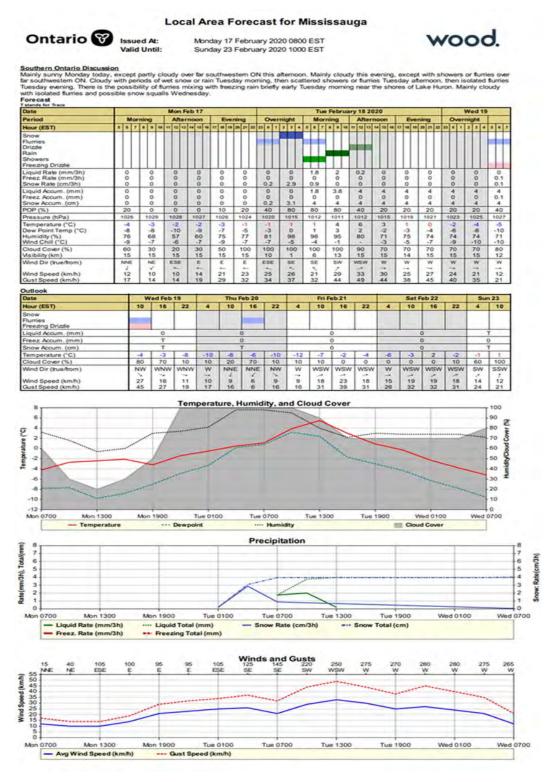


Figure 20. Local Area Forecast (LAF) sample showing the different weather parameters for the short-range and the outlook. The weather parameters unite will be in the Imperial System.

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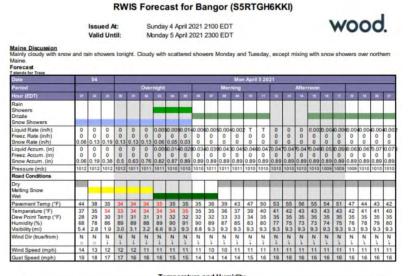
#### 2.6.2 ESS/RWIS Road Forecast

The Road Weather Information System (RWIS) forecast is a special forecast that couples the ESS site observation data with the weather forecast being generated from the WFE. The coupling process occurs with our Metro Model (METRO3) to generate the road weather conditions and temperatures.

The RWIS forecast is a 24-hours detailed forecast in an hourly temporal resolution. Further to the atmospheric forecast, the RWIS forecast also provides the road temperature and conditions forecast in a graphical and tabular format as seen in **Figure 21**.

The RWIS forecast is color-coded for precipitation types, pavement conditions, near freezing pavement temperature, and near freezing air temperature for ease of reading. The forecast also displays mix of precipitation when present during weather events (i.e., mix of freezing rain and snow, rain-snow mix). The RWIS forecast can be issued at 0300, 0900, 1500, and 2100 ET for the period between October to end of May.

This forecast is fully controlled and supervised by our meteorologists, and they can mandate that it convey any update when the forecast deviates from the current weather situation. As seen in Figure 21, the forecast satisfies all the parameters listed in the RFQ.



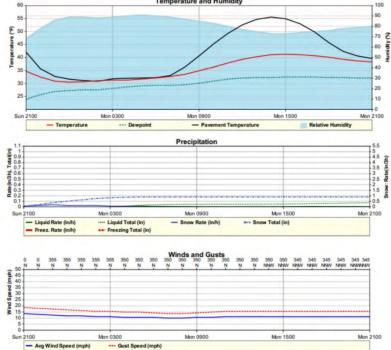


Figure 21. RWIS forecast sample in graphical and tabular format. The forecast shows color-coded atmospheric parameters and pavement temperature and conditions.

## 2.7 Severe Weather Reports

Wood meteorologists are constantly analyzing weather conditions from coast to coast to notify our clients of severe weather events that can affect their operations and logistic planning in the short- and long-range period. They also track weather system evolution as it approaches.

The meteorologists utilize different sources of information such as, multiple global, regional, and local

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weather models at different spatiotemporal resolution. The team also using a large based of ground observation from public and private weather networks in additional to upper air soundings. The team also utilized radar and satellite data and images in addition to social media to densify the observation level.

Once a severe weather event meets the preset severity thresholds, the weather system analysis and tracking will commence. Our meteorologists will issue a severe weather report. The report will consist of a concise storm summary, timing, weather hazards, and a risk map(s) depicting the precipitation types and amounts spatially (**Figure 22**). The report all also be emailed to a specific distribution list provided by MaineDOT.

MaineDOT will be contacted to discuss the need for a pre-storm weather briefing. Once approved, a webinar invite will be initiated by sending an email to a distribution list provided by MaineDOT to invite all stakeholders.

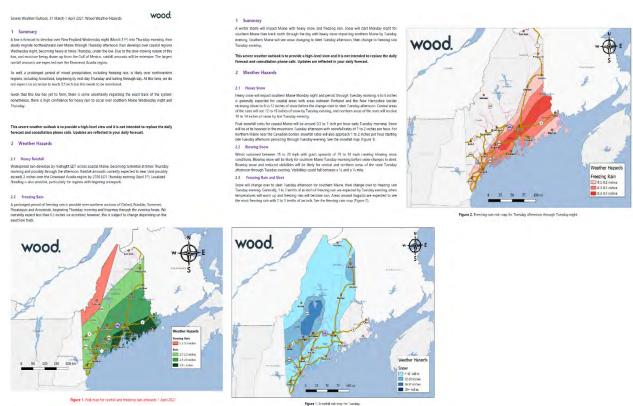


Figure 22. Severe Weather Report Example.

### 2.8 Pre-Storm Weather Briefings

Once a severe weather event meets the preset severity thresholds and weather analysis is complete, MaineDOT will be contacted to discuss the need for a pre-storm weather briefing. Once approved, Wood will send a meeting invitation via MS Teams to a distribution list provided by MaineDOT 15 to 36 hours before the event. The briefing will consist of the meteorologist providing an overview with details to localized effect using maps and weather data describing the precipitation types, precipitation amounts, precipitation phase transition, and timings and can take up to 30 minutes. Up to 30 minutes Q/A session will follow the briefing allowing each region the chance to infer on their region-specific event. MaineDOT may also invite a pre-storm weather briefing by contacting Wood 24 hour in advance.

# RIDER B TERMS AND CONDITIONS

- **1. DEFINITIONS**: The following definitions are applicable to these standard terms and conditions:
  - a. The term "Buyer" or "State" shall refer to the Government of the State of Maine or a person representing the Government of the State of Maine.
  - b. The term "Department" or "DAFS" shall refer to the State of Maine Department of Administrative and Financial Services.
  - c. The term "Bureau" or "BGS" shall refer to the State of Maine Bureau of General Services.
  - d. The term "Division" shall refer to the State of Maine Division of Purchases.
  - e. The term "Contractor", "Vendor", or "Provider" shall refer to the organization that is providing goods and/or services through the contract to which these standard terms and conditions have been attached and incorporated.
  - f. The term "Contract" or "Agreement" shall refer to the contract document to which these standard terms and conditions apply, taking the format of a Buyer Purchase Order (BPO) or Master Agreement (MA) or other contractual document that is mutually agreed upon between the State and the Contractor.
- **2. WARRANTY**: The Contractor warrants the following:
  - a. That all goods and services to be supplied by it under this Contract are fit and sufficient for the purpose intended, and
  - b. That all goods and services covered by this Contract will conform to the specifications, drawing samples, symbols or other description specified by the Division, and
  - c. That such articles are merchantable, good quality, and free from defects whether patent or latent in material and workmanship, and
  - d. That all workmanship, materials, and articles to be provided are of the best grade and quality, and
  - e. That it has good and clear title to all articles to be supplied by it and the same are free and clear from all liens, encumbrances and security interest.

Neither the final certificate of payment nor any provision herein, nor partial nor entire use of the articles provided shall constitute an acceptance of work not done in accordance with this agreement or relieve the Contractor liability in respect of any warranties or responsibility for faulty material or workmanship. The Contractor shall remedy any defects in the work and pay any damage to other work resulting therefrom, which shall appear within one year from the date of final acceptance of the work provided hereunder. The Division of Purchases shall give written notice of observed defects with reasonable promptness.

- **3. TAXES**: Contractor agrees that, unless otherwise indicated in the order, the prices herein do not include federal, state, or local sales or use tax from which an exemption is available for purposes of this order. Contractor agrees to accept and use tax exemption certificates when supplied by the Division as applicable. In case it shall ever be determined that any tax included in the prices herein was not required to be paid by Contractor, Contractor agrees to notify the Division and to make prompt application for the refund thereof, to take all proper steps to procure the same and when received to pay the same to the Division.
- **4. PACKING AND SHIPMENT**: Deliveries shall be made as specified without charge for boxing, carting, or storage, unless otherwise specified. Articles shall be suitably packed to secure lowest transportation cost and to conform to the requirements of common carriers and any applicable specifications. Order numbers and symbols must be plainly marked on all invoices,

packages, bills of lading, and shipping orders. Bill of lading should accompany each invoice. Count or weight shall be final and conclusive on shipments not accompanied by packing lists.

- **5. DELIVERY**: Delivery should be strictly in accordance with delivery schedule. If Contractor's deliveries fail to meet such schedule, the Division, without limiting its other remedies, may direct expedited routing and the difference between the expedited routing and the order routing costs shall be paid by the Contractor. Articles fabricated beyond the Division's releases are at Contractor's risk. Contractor shall not make material commitments or production arrangements in excess of the amount or in advance of the time necessary to meet delivery schedule, and, unless otherwise specified herein, no deliveries shall be made in advance of the Division's delivery schedule. Neither party shall be liable for excess costs of deliveries or defaults due to the causes beyond its control and without its fault or negligence, provided, however, that when the Contractor has reason to believe that the deliveries will not be made as scheduled, written notice setting forth the cause of the anticipated delay will be given immediately to the Division. If the Contractor's delay or default is caused by the delay or default of a subcontractor, such delay or default shall be excusable only if it arose out of causes beyond the control of both Contractor and subcontractor and without fault of negligence or either of them and the articles or services to be furnished were not obtainable from other sources in sufficient time to permit Contractor to meet the required delivery schedule.
- **6. FORCE MAJEURE**: The State may, at its discretion, excuse the performance of an obligation by a party under this Agreement in the event that performance of that obligation by that party is prevented by an act of God, act of war, riot, fire, explosion, flood or other catastrophe, sabotage, severe shortage of fuel, power or raw materials, change in law, court order, national defense requirement, or strike or labor dispute, provided that any such event and the delay caused thereby is beyond the control of, and could not reasonably be avoided by, that party. The State may, at its discretion, extend the time period for performance of the obligation excused under this section by the period of the excused delay together with a reasonable period to reinstate compliance with the terms of this Agreement.
- 7. INSPECTION: All articles and work will be subject to final inspection and approval after delivery, notwithstanding prior payment, it being expressly agreed that payment will not constitute final acceptance. The Division of Purchases, at its option, may either reject any article or work not in conformity with the requirements and terms of this order, or re-work the same at Contractor's expense. The Division may reject the entire shipment where it consists of a quantity of similar articles and sample inspection discloses that ten (10%) percent of the articles inspected are defective, unless Contractor agrees to reimburse the Division for the cost of a complete inspection of the articles included in such shipment. Rejected material may be returned at Contractor's risk and expense at the full invoice price plus applicable incoming transportation charges, if any. No replacement of defective articles of work shall be made unless specified by the Division.
- **8. INVOICE**: The original and duplicate invoices covering each and every shipment made against this order showing Contract number, Vendor number, and other essential particulars, must be forwarded promptly to the ordering agency concerned by the Vendor to whom the order is issued. Delays in receiving invoice and also errors and omissions on statements will be considered just cause for withholding settlement without losing discount privileges. All accounts are to be carried in the name of the agency or institution receiving the goods, and not in the name of the Division of Purchases.
- **9. ALTERATIONS**: The Division reserves the right to increase or decrease all or any portion of the work and the articles required by the bidding documents or this agreement, or to eliminate

all or any portion of such work or articles or to change delivery date hereon without invalidating this Agreement. All such alterations shall be in writing. If any such alterations are made, the contract amount or amounts shall be adjusted accordingly. In no event shall Contractor fail or refuse to continue the performance of the work in providing of articles under this Agreement because of the inability of the parties to agree on an adjustment or adjustments.

- **10. TERMINATION**: The Division may terminate the whole or any part of this Agreement in any one of the following circumstances:
  - a. The Contractor fails to make delivery of articles, or to perform services within the time or times specified herein, or
  - b. If Contractor fails to deliver specified materials or services, or
  - c. If Contractor fails to perform any of the provisions of this Agreement, or
  - d. If Contractor so fails to make progress as to endanger the performance of this Agreement in accordance with its terms, or
  - e. If Contractor is adjudged bankrupt, or if it makes a general assignment for the benefit of its creditors or if a receiver is appointed because of its insolvency, or
  - f. Whenever for any reason the State shall determine that such termination is in the best interest of the State to do so.

In the event that the Division terminates this Agreement in whole or in part, pursuant to this paragraph with the exception of 8(f), the Division may procure (articles and services similar to those so terminated) upon such terms and in such manner as the Division deems appropriate, and Contractor shall be liable to the Division for any excess cost of such similar articles or services.

- 11. NON-APPROPRIATION: Notwithstanding any other provision of this Agreement, if the State does not receive sufficient funds to fund this Agreement and other obligations of the State, if funds are de-appropriated, or if the State does not receive legal authority to expend funds from the Maine State Legislature or Maine courts, then the State is not obligated to make payment under this Agreement.
- 12. COMPLIANCE WITH APPLICABLE LAWS: Contractor agrees that, in the performance hereof, it will comply with applicable laws, including, but not limited to statutes, rules, regulations or orders of the United States Government or of any state or political subdivision(s) thereof, and the same shall be deemed incorporated herein by reference. Awarding agency requirements and regulations pertaining to copyrights and rights in data. Access by the grantee, the subgrantee, the Federal grantor agency, the Comptroller General of the United States, or any of their duly authorized representatives to any books, documents, papers and records of the Contractor which are directly pertinent to that specific contract for the purpose of making audit, examination, excerpts, and transcriptions. Retention of all required records for three years after grantees or subgrantees make final payments and all other pending matters are closed. Compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h), section 508 of the Clean Water Act, (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15). (Contracts, subcontracts, and subgrants of amounts in excess of \$100,000). Mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with Energy Policy and Conservation Act (Pub. L. 94-163, 89 Stat. 871).
- **13. INTERPRETATION**: This Agreement shall be governed by the laws of the State of Maine as to interpretation and performance.

- **14. DISPUTES**: The Division will decide any and all questions which may arise as to the quality and acceptability of articles provided and installation of such articles, and as to the manner of performance and rate of progress under this Contract. The Division will decide all questions, which may arise as to the interpretation of the terms of this Agreement and the fulfillment of this Agreement on the part of the Contractor.
- **15. ASSIGNMENT**: None of the sums due or to become due nor any of the work to be performed under this order shall be assigned nor shall Contractor subcontract for completed or substantially completed articles called for by this order without the Division's prior written consent. No subcontract or transfer of agreement shall in any case release the Contractor of its obligations and liabilities under this Agreement.
- 16. STATE HELD HARMLESS: The Contractor agrees to indemnify, defend, and save harmless the State, its officers, agents, and employees from any and all claims and losses accruing or resulting to any and all contractors, subcontractors, material men, laborers and other persons, firm or corporation furnishing or supplying work, services, articles, or supplies in connection with the performance of this Agreement, and from any and all claims and losses accruing or resulting to any person, firm or corporation who may be injured or damaged by the Contractor in the performance of this Agreement.
- 17. SOLICITATION: The Contractor warrants that it has not employed or written any company or person, other than a bona fide employee working solely for the Contractor to solicit or secure this Agreement, and it has not paid, or agreed to pay any company, or person, other than a bona fide employee working solely for the Contractor any fee, commission, percentage, brokerage fee, gifts, or any other consideration, contingent upon, or resulting from the award for making this Agreement. For breach or violation or this warranty, the Division shall have the absolute right to annul this agreement or, in its discretion, to deduct from the Agreement price or consideration, or otherwise recover the full amount of such fee, commission, percentage, brokerage fee, gifts, or contingent fee.
- **18. WAIVER**: The failure of the Division to insist, in any one or more instances, upon the performance of any of the terms, covenants, or conditions of this order or to exercise any right hereunder, shall not be construed as a waiver or relinquishment of the future performance of any such term, covenant, or condition or the future exercise of such right, but the obligation of Contractor with respect to such future performance shall continue in full force and effect.
- 19. MATERIAL SAFETY: All manufacturers, importers, suppliers, or distributors of hazardous chemicals doing business in this State must provide a copy of the current Material Safety Data Sheet (MSDS) for any hazardous chemical to their direct purchasers of that chemical.
- **20. COMPETITION**: By accepting this Contract, Contractor agrees that no collusion or other restraint of free competitive bidding, either directly or indirectly, has occurred in connection with this award by the Division of Purchases.
- **21. INTEGRATION**: All terms of this Contract are to be interpreted in such a way as to be consistent at all times with this Standard Terms and Conditions document, and this document shall take precedence over any other terms, conditions, or provisions incorporated into the Contract.

#### Appendix A

# STATE OF MAINE DEPARTMENT OF ADMINISTRATIVE AND FINANCIAL SERVICES DIVISION OF PROCUREMENT SERVICES

#### BID COVER PAGE and DEBARMENT FORM

Bidder's Organization	Name: Wood Environ	ment & Infrastructure Solutions, Inc.
Chief Executive - Nam	ne/Title:	
Tel: 770-360-0600	Fax:	E-mail:
Headquarters Street Ac	ddress: 1105 Lakewood	d Parkway, Suite 300
Headquarters City/Stat	e/Zip: Alpharetta, GA	30009
(provide information r	equested below if differ	ent from above)
Lead Point of Contact	for Bid - Name/Title: I	Eric Gionet, Senior Project Manager, Associate
Tel: 902-220-6580	Fax:	E-mail: eric.gionet@woodplc.com
Street Address: 511	Congress, Suite 200	
City/State/Zip: Portl	and, ME 04101	

By signing below Bidder affirms:

- · Their bid complies with all requirements of this RFQ;
- This bid and the pricing structure contained herein will remain firm for a period of 180 days from the date and time of the bid opening;
- That no personnel currently employed by the Department or any other State agency participated, either directly or indirectly, in any activities relating to the preparation of the Bidder's proposal;
- That no attempt has been made or will be made by the Bidder to induce any other person or firm to submit or not to submit a proposal; and
- The undersigned is authorized to enter into contractual obligations on behalf of the above-named organization.

Name: Eric Gionet	Title: Senior Project Manager, Associate
To have your bid accepted, this Appendix M Adobe Sign forms of electronic signature.	UST have an actual wet signature or utilize DocuSign or
Authorized Signature:	Date:

#### Debarment, Performance, and Non-Collusion Certification

By signing this document, I certify to the best of my knowledge and belief that the aforementioned organization, its principals, and any subcontractors named in this proposal:

- a. Are not presently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from bidding or working on contracts issued by any governmental agency.
- b. Have not within three years of submitting the proposal for this contract been convicted of or had a civil judgment rendered against them for:
  - i. fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a federal, state or local government transaction or contract.
  - violating Federal or State antitrust statutes or committing embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - iii. are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or Local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and
  - iv. have not within a three (3) year period preceding this proposal had one or more federal, state or local government transactions terminated for cause or default.
- c. Have not entered into a prior understanding, agreement, or connection with any corporation, firm, or person submitting a response for the same materials, supplies, equipment, or services and this proposal is in all respects fair and without collusion or fraud. The above mentioned entities understand and agree that collusive bidding is a violation of state and federal law and can result in fines, prison sentences, and civil damage awards.
- Failure to provide this certification may result in the disqualification of the Bidder's proposal, at the discretion of the Department.

To the best of my knowledge all information provided in the enclosed proposal, both programmatic and financial, is complete and accurate at the time of submission.

Name: Eric Gionet	Title: Senior Project Manager, Associate
Adobe Sign forms of electronic Signature.	MUST have an actual wet signature or utilize Docu Sign or
Authorized Jignature:	Date:  Sep 27, 2021

#### Appendix D

# STATE OF MAINE DEPARTMENT OF ADMINISTRATIVE AND FINANCIAL SERVICES DIVISION OF PROCUREMENT SERVICES

# MUNICIPALITY POLITICAL SUBDIVISION and SCHOOL DISTRICT PARTICIPATION CERTIFICATION

# RFQ # 17A 210914-058 Meteorological Forecasting Services

The Division of Procurement Services is committed to providing purchasing opportunities for **municipalities**, **political subdivisions and school districts** in Maine by allowing them access, through our vendors, to our contract pricing. A bidder's willingness to extend contract pricing to these entities will be taken into consideration in making awards.

Orders from Municipality, Political Subdivisions and School Districts (Appendix D): If the bidder elects to permit Municipality, Political Subdivisions and School Districts to utilize the resulting Master Agreement Contract, The State of Maine will not be responsible for any order placed by these groups. All orders will originate from these groups and they will be liable for all payments.

Will you accept orders from political sub	divisions and school districts in Maine at the prices quoted?
Yes	
XYes, with conditions as follows:	Forecasts and web portal access cannot be distributed to groups or to public or private entities without authorization from Wood. Any changes requested to the forecast, services, or web portal, would be
No	subjected to a change fee.
Name of Company:	
Wood Environment & Infrastructure	e Solutions, Inc.
Address:	
511 Congress, Unit 200, Portland, N	ME 04101
Signature:	
Date: Sep 27, 2021	