

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. Contract ID Code	Page 1 of Pages 21
2. Amendment/Modification No. Amendment #0006	3. Effective Date Jul 14, 2008	4. Requisition/Purchase Req. No. NWWW000-8-36141	5. Project No. (if applicable)	
6. Issued By WESTERN REGIONAL ACQUISITION DIVISION 7600 SAND POINT WAY NE/WC3 SEATTLE, WA 98115-6349		7. Administered By (If other than Item 6) Code SEE BLOCK 6		
8. Name and Address of Contractor (No., Street, County, and Zip Code)			(X)	9A. Amendment of Solicitation No. AB133W-08-RP-0129
			X	9B. Date (See Item 11) May 28, 2008
				10A. Modification of Contract/Order No.
				10B. Date (See Item 13)
Code	Facility Code			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended <input checked="" type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. Accounting and Appropriation Data (if required) \$				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACT/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
(x)	A. This change order is issued pursuant to: (Specify authority) The changes set forth in item 14 are made in the Contract Order No. in item 10A.			
	B. The above numbered Contract/Order is modified to reflect the administrative changes (such as changes in paying office, appropriation date, etc.) Set fourth item 14, pursuant to the authority of FAR 43.103 (b)			
	C. This supplemental agreement is entered into pursuant to authority of:			
	D. Other (Specify type of modification and authority)			
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.				
14. Description of Amendment/Modification (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)				

SOLICITATION NO. AB133W-08-RP-0129 - ACQUISITION AND INSTALLATION OF ALERT RAIN GAGES AND ALERT REPEATERS ON THE ISLANDS OF OAHU, MAUI AND HAWAII – CRE

Except as provided herein, all terms and conditions of the document referenced in item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. Name and Title of Signer (Type or Print)		16A. Name and title of Contracting Officer (Type or Print)	
15B. Contractor/Offeror		16B. United States of America	
15C. Date Signed		16C. Date Signed	
_____ (Signature of person authorized to sign)		_____ (Signature of Contracting Officer)	

A. Solicitation Number AB133W-08-RP-0129 is hereby amended to incorporate the following changes:

REMOVE

Section B, Bid Schedule, Pages 3 & 4
Amendment #0005

Section J.1, Statement of Work/Specifications,
Pages 7-22, Amendment #0005

Changes are indicated in red font and strike outs.

INSERT

Section B, Bid Schedule, Pages 3 & 4
Amendment #0006

Section J.1, Statement of Work/Specifications,
Pages 5-20, Amendment #0006

B. The solicitation closing date remains unchanged at July 22, 2008, at 12:00PM (PDT) local time, in Seattle, WA."

Supplies or Services and Prices/Costs

Item No.	Supplies/Services	Quantity	Unit	Unit Price	Amount
	<p align="center">ACQUISITION AND INSTALLATION OF ALERT RAIN GAGES AND ALERT REPEATERS ON THE ISLANDS OF OAHU, MAUI AND HAWAII</p> <p>The contractor shall furnish all necessary personnel, materials, equipment, services and facilities (except as otherwise specified), to perform the services required by the statement of work/specifications, and shall perform those services in accordance with the following schedule of prices.</p> <p><u>BASE PERIOD - 08/01/2008 – 07/01/2009</u></p>				
0001	<p>PROVIDE AND INSTALL 18 ALERT RAIN GAGES ON THE ISLANDS OF OAHU, MAUI AND HAWAII IN ACCORDANCE WITH THE STATEMENT OF WORK, LOCATED IN SECTION J.1 OF THIS SOLICITATION, EXCLUSIVE OF COSTS ASSOCIATED WITH LINE ITEM 0006.</p>	18	EA	\$ _____	\$ _____
0001A	<p>PROVIDE 3 READY-TO-INSTALL SPARE ALERT RAIN GAGES IN ACCORDANCE WITH THE STATEMENT OF WORK, LOCATED IN SECTION J.1 OF THIS SOLICITATION, DESTINATION FOR SPARE GAGES PER CLAUSE D.1, IN SECTION D OF THIS SOLICITATION.</p>	3	EA	\$ _____	\$ _____
0002	<p>PROVIDE AND INSTALL 6 ALERT REPEATERS ON THE ISLANDS OF OAHU, MAUI AND HAWAII IN ACCORDANCE WITH THE STATEMENT OF WORK, LOCATED IN SECTION J.1 OF THIS SOLICITATION, EXCLUSIVE OF COSTS ASSOCIATED WITH LINE ITEM 0006.</p>	6	EA	\$ _____	\$ _____
0002A	<p>PROVIDE 2 READY-TO-INSTALL SPARE ALERT REPEATERS IN ACCORDANCE WITH THE STATEMENT OF WORK, LOCATED IN SECTION J.1 OF THIS SOLICITATION, DESTINATION FOR SPARE GAGES PER CLAUSE D.1, IN SECTION D OF THIS SOLICITATION.</p>	2	EA	\$ _____	\$ _____
0003	<p>PROVIDE AND INSTALL A BASE STATION AND DATA MANAGEMENT WORKSTATION AT WFO HONOLULU ACCORDANCE WITH THE STATEMENT OF WORK, LOCATED IN SECTION J.1 OF THIS SOLICITATION, EXCLUSIVE OF COSTS ASSOCIATED WITH LINE ITEM 0006.</p>	1	JB		\$ _____

Supplies or Services and Prices/Costs

Item No.	Supplies/Services	Quantity	Unit	Unit Price	Amount
0004	PROVIDE TRAINING ON THE INSTALLATION AND MAINTENANCE OF THE AFWS EQUIPMENT AND SOFTWARE ACCORDANCE WITH THE STATEMENT OF WORK, LOCATED IN SECTION J.1 OF THIS SOLICITATION, EXCLUSIVE OF COSTS ASSOCIATED WITH LINE ITEM 0006.	1	JB		\$ _____
0005	PROVIDE RADIO PATH ANALYSIS AND TELEMETRY FEASIBILITY STUDY FOR THE REMAINING HYDRONET AFWS GAGES NOT REPLACED BY THIS PROJECT ACCORDANCE WITH THE STATEMENT OF WORK, LOCATED IN SECTION J.1 OF THIS SOLICITATION, EXCLUSIVE OF COSTS ASSOCIATED WITH LINE ITEM 0006.	1	JB		\$ _____
0006	ESTIMATED TRAVEL COSTS		EST LS		\$ _____
	TOTAL BASE PERIOD (CLINS 0001-0006)				\$ _____

NOTE: CLINS 0001-0005 should include shipping cost to the addresses outlined per clause D.1 1352.247-72 MARKING DELIVERABLES.

**Honolulu Forecast Office
National Weather Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce**

STATEMENT OF WORK

**Replacement Automated Flood Warning System for the Honolulu Forecast
Office – Phase I**

July 14, 2008

SECTION J.1
STATEMENT OF WORK/SPECIFICATIONS
List of Acronyms

- AFWS – Automated Flood Warning System
- AWIPS – Advanced Weather Interactive Processing System
- ALERT – Automated Local Evaluation in Real Time
- CD – Civil Defense
- DCO – Data Collection Office
- GUI – Graphical User Interface
- IOC – Initial Operational Capability
- LAN – Local Area Network
- LARC – Limited Automated Remote Collector
- MWT – Marine Weather Transmitter
- NOAA – National Oceanic and Atmospheric Administration
- NWS – National Weather Service
- SHEF – Standard Hydrometeorological Exchange Format
- SOW – Statement of Work
- WAN – Wide Area Network
- WFO – Weather Forecast Office

SECTION J.1
STATEMENT OF WORK/SPECIFICATIONS

1. Overview

This document provides the Statement of Work (SOW) developed by the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) to acquire and install a new automated flood warning system (AFWS) that will replace a portion of the existing Hydronet AFWS. Data from the AFWS will be used to help make decisions on the issuance of flash flood warnings and flood advisories for public safety purposes and the protection of property. This SOW covers Phase One of a three-phase project which will replace all existing Hydronet gages and data workstations and install several new gages in areas deemed vulnerable to flash flooding. The SOW will provide information needed by contractors to submit a proposal.

2. Background

The Hydronet AFWS consists of a network of 61 Limited Automated Remote Collector (LARC) tipping bucket rain gages and 7 Marine Weather Transmitter (MWT) wind and rain sensors across the State of Hawaii. In addition, data workstations at Weather Forecast Office (WFO) Honolulu and the Data Collection Offices (DCOs) in Hilo and Lihue handle data management and distribution tasks. Operation of the network commenced in 1993 as part of a joint venture between NOAA-NWS and the Hawaii State Civil Defense (CD). Hydronet has functioned well overall during its 15 years of operation and has played a major role in the WFO Honolulu hydrology program by helping forecasters issue flash flood warnings and flood advisories to the public with lead time to take action. Even with the advent of Doppler radar data in the Hawaiian Islands, the real-time rain data from Hydronet provides an important source of “ground truth” information and to determine bias adjustment factors for the radar estimates of rainfall. In more recent years, availability of the Hydronet data to the public via the Internet and the media has increased its value as a resource beyond the original protection of life and property function. Users from the agriculture and construction industries also utilize the data for their operations and planning.

Interrogation of each gage within the network takes place automatically every three hours using commercial telephone lines for communication. The three NOAA-NWS offices in Honolulu, Hilo, and Lihue handle separate sets of gages for routine interrogations to reduce the amount of time to complete the call sequence and reduce the amount of long distance charges for inter-island interrogations. Data from each gage are sent to the Hydronet workstation at WFO Honolulu for use by weather forecasters and dissemination to the public. Please refer to Figures 1 and 2 to view Hydronet gage locations and Figures 3 and 4 for a schematic of routine and heavy rain Hydronet operations, respectively.

During periods of heavy rain, the frequency of automatic interrogations can be increased to hourly by any of the Hydronet data workstations. Furthermore, rainfall rates exceeding preprogrammed thresholds will result in calls from the gage to WFO Honolulu. These thresholds are 0.25, 0.50, 0.75, and 1.00 inches in a 15-minute sampling period representing rates of 1.00, 2.00, 3.00, and 4.00 inches per hour, respectively. An alarm call from any gage triggers a strobe light and audible alarm in the forecast office operations area which must be manually acknowledged. The Hydronet workstation also automatically prints out a sheet summarizing the rainfall data for the alarming site and forwards an alarm message to the DCOs and county warning points if the gage recording heavy rain is within their respective area of responsibility (Figure 4).

While the Hydronet system has functioned well during its operational life span, it is an obsolete system. The tipping bucket rain gage uses the Handar 550 data logger as the basis for the LARC. MWT sites in Hydronet which provide either wind and rain or wind only utilize the Handar 540 data logger as its basis. Vaisala, which acquired Handar in 1999, does not support these models of data loggers. Reconditioned replacement units can still be obtained from the NOAA-NWS Logistics Support Center though this supply will eventually disappear. Modems used by the Handar 540 and 550 and Hydronet workstations communicate using commercial phone lines which results in recurring charges of approximately \$45,000 per year for the entire statewide network. Finally, the software used by Hydronet to handle communications, data management, and display needs to be replaced. It is a good program but utilizes unique code not used at other locations throughout NOAA-NWS. Thorough knowledge of the source code rests with one individual who will likely retire in a few years, making support a tenuous and critical issue.

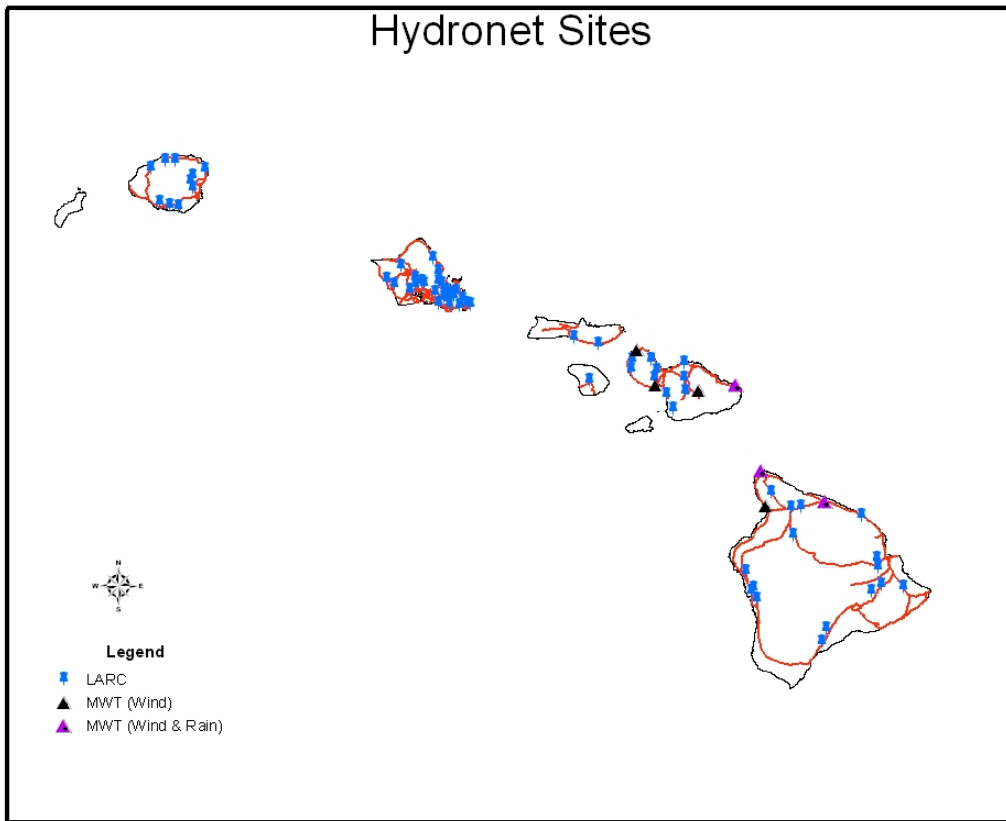


Figure 1. Map of Hydronet locations statewide. Oahu sites are also depicted in Figure 2 due to the high density of locations.

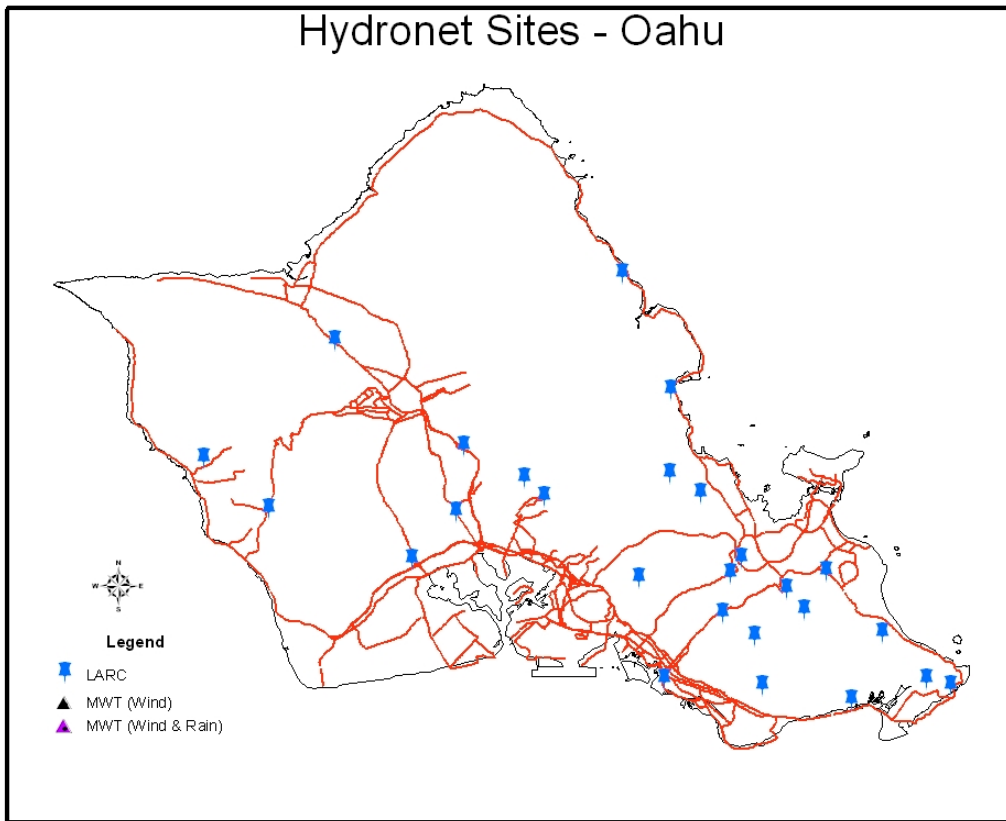


Figure 2. Hydronet sites on Oahu. There are no MWT data loggers on Oahu.

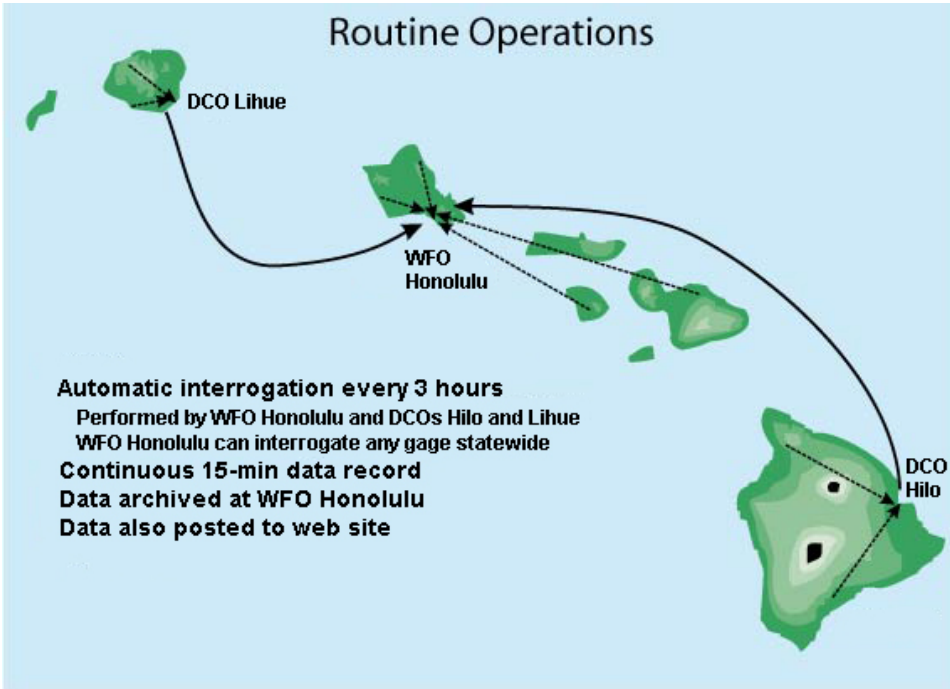


Figure 3. Schematic depicting routine Hydronet operations.

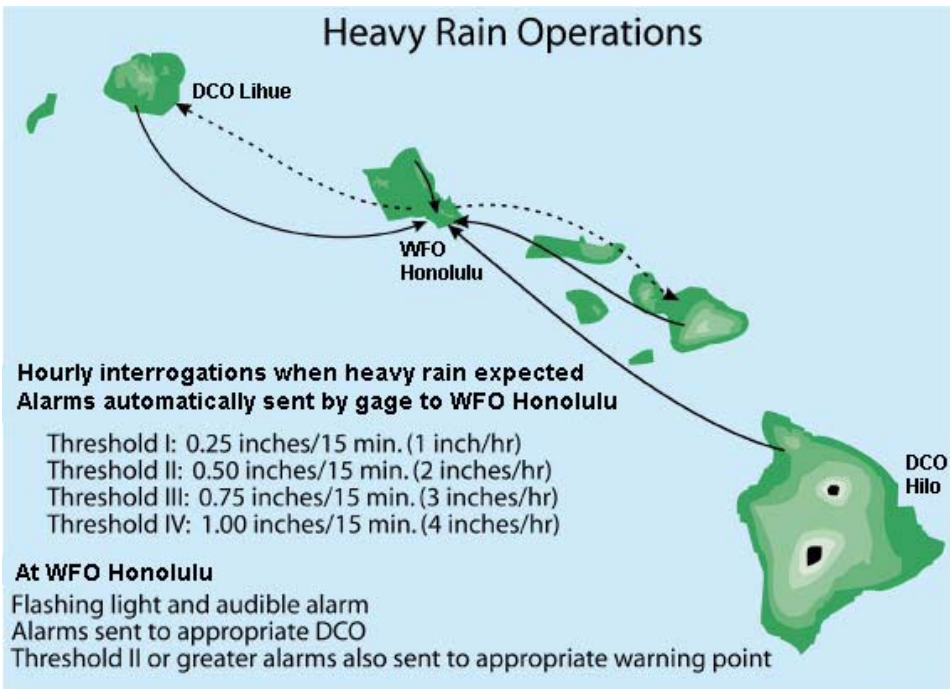


Figure 4. Schematic depicting Hydronet data flow during heavy rain operations.

3. Project Requirements

NOAA-NWS requires the acquisition and installation of 18 ALERT rain gages and 6 ALERT repeaters to replace a subset of existing Hydronet sites on the islands of Oahu, Maui, and Hawaii. In addition, NOAA-NWS requires 2 ready to install spare ALERT repeaters and 3 ready to install ALERT rain gages to minimize outage times in the event of a serious repeater or gage failure that cannot be easily corrected in the field. ~~Spare, ready to install rain gages and repeaters shall include: standpipe, rangage, transmitter, and telemetry hardware.~~ Spare, ready-to-install rain gages and repeaters shall include: standpipe, rangage, transmitter, and telemetry hardware. NOAA-NWS also requires the acquisition and installation of a base station with data communication and management hardware and software at WFO Honolulu located at the University of Hawaii at Manoa. Prior to initial operational capability (IOC), the vendor will provide initial training to NOAA-NWS technicians and staff on the maintenance of hardware and software components of the AFWS. System specifications and other contract requirements will be detailed in the following sections of this SOW.

Since this SOW covers only a portion of the Hydronet network, NOAA-NWS requires a radio path analysis and telemetry feasibility study covering the remaining sites not replaced in Phase I and a set of proposed sites that cover gaps in the existing Hydronet coverage.

Figures 5 through 7 depict locations of ALERT rain gages and repeaters to be installed under this SOW. With the exception of the Kulani Cone and Round Top repeaters, all other repeaters will be connected to microwave relay sites which are part of the State of Hawaii’s Anuenue Digital Microwave communications system. This will facilitate interisland transfer of data to WFO Honolulu. All rain gage and repeater locations are accessible by vehicle, though a truck or SUV is highly recommended for some locations.

ALERT data collected by the AFWS network will be routed to WFO Honolulu using Internet Protocol via the Anuenue microwave path. NOAA-NWS requires that repeaters connected to the Anuenue backbone sites (Mount Kaala, Mauna Kapu, Haleakala, and DCO Hilo) be capable of both retransmitting ALERT data via radio and converting data to a format compatible with Internet transmission. NOAA-NWS will be responsible for arranging for the transmission of data from the Anuenue sites to WFO Honolulu. For redundancy, gages on Oahu covered by this SOW will also send data to WFO Honolulu via the normal ALERT line-of-sight radio path utilizing the 3 repeaters on island and the base station at WFO Honolulu.

Sections 3.1 through 3.9 cover additional details of NOAA-NWS requirements for this SOW.

3.1. Rain Gage Locations

The following table provides a listing of existing Hydronet sites that will be replaced under this SOW. Most of these sites have good line of sight to proposed repeater sites listed in Section 3.2. The rest may need to be moved slightly within the same property from their existing locations to improve line of sight exposure. All locations will need to use a short standpipe (top rim approximately 4 feet above ground) to mitigate possible complaints based on aesthetic reasons. The Aloha Tower (ALOH1) site is located on the top of a building and will use the existing Hydronet enclosure.

			Location (dec. deg.)		
NWS ID	Name	Hydronet ID	Lat (N)	Lon (W)	Elevation (ft)
ALOH1	Aloha Tower (existing encl.)	HI-26	21.3039	157.8625	50
GLNH1	Glenwood	HI-94	19.5105	155.1722	2620
KBSH1	Kula Branch Station	HI-65	20.7616	156.3241	3050
KHIH1	Kihei 2	HI-75	20.7388	156.4469	140
KUNH1	Kunia	HI-12	21.4000	158.0333	320
MITH1	Mililani	HI-14	21.4667	158.0000	760
MNLH1	Manoa Lyon Arboretum	HI-18	21.3333	157.8000	500
MTVH1	Mountain View	HI-81	19.5525	155.1128	530

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PACH1	Palisades	HI-11	21.4333	157.9500	860
PECH1	Waipio	HI-08	21.4197	158.0058	410
PHAH1	Pahoa	HI-83	19.5439	154.9756	490
PIIH1	Piihonua	HI-91	19.7174	155.1372	860
POAH1	Poamoho	HI-07	21.5500	158.1000	680
PUKH1	Pukalani	HI-70	20.8389	156.3333	1620
WAWH1	Waiawa Corr. Facility	HI-29	21.4500	157.9667	770
WCCH1	Waikapu Country Club	HI-76	20.8380	156.5163	480
WKAH1	Waiakea Uka	HI-92	19.6614	155.1303	1000
WUKH1	Wailuku	HI-66	20.8902	156.5055	330

3.2. ALERT Repeater Sites

The following table provides a list of repeater sites to be installed under the Phase 1 SOW.

		Location (dec. deg.)		Elevation (ft)
Name	Island	Lat (N)	Lon (W)	
Mauna Kapu	Oahu	21.3967	158.1013	2510
Mount Kaala	Oahu	21.5084	158.1481	3960
Round Top	Oahu	21.3150	157.8208	1080
Haleakala	Maui	20.7076	156.2588	9930
Kulani Cone	Hawaii	19.5205	155.2995	5490
DCO Hilo	Hawaii	19.7174	155.0494	30

Spare, ready-to-install ALERT rain gages and repeaters shall be delivered to the address in Section D.1 of this solicitation in accordance with specified packaging and marking instructions, per clause 1352.247-72. All costs associated with shipping to the specified destinations shall be included in the appropriate line item (0001 through 0005) of the Schedule (Section B).

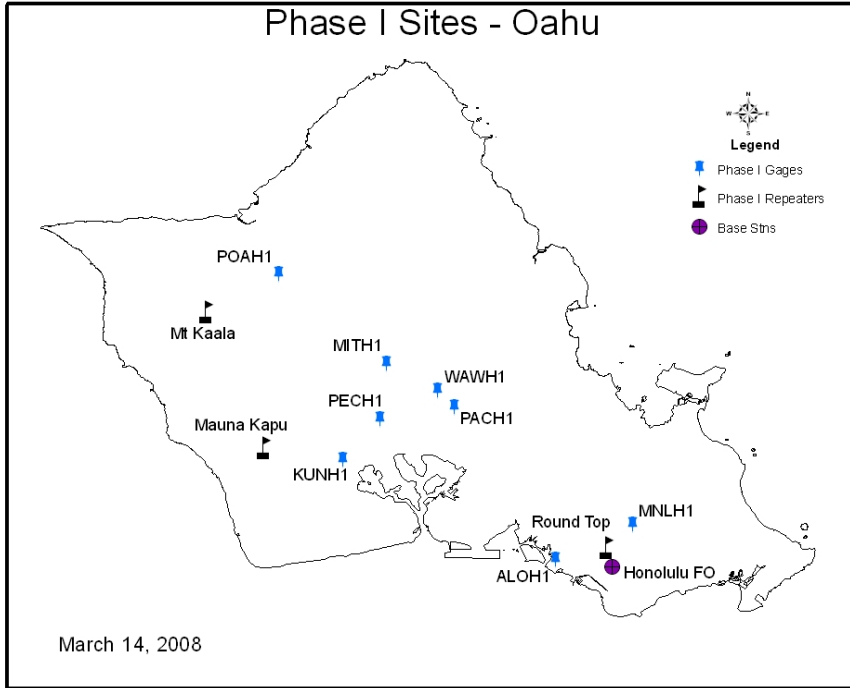


Figure 5. Map depicting Phase I ALERT sites to be installed on Oahu.

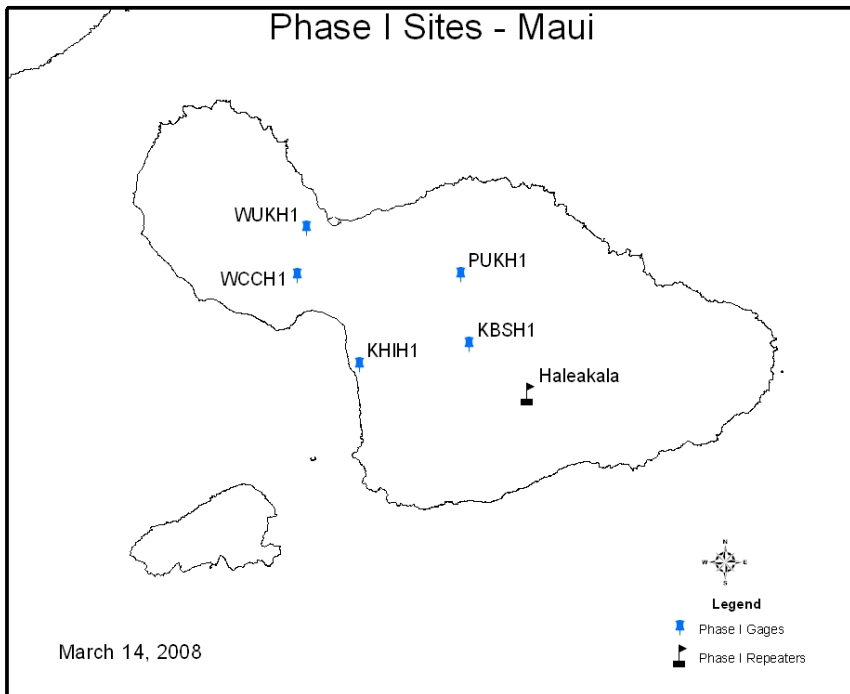


Figure 6. Map depicting Phase I ALERT sites to be installed on Maui.

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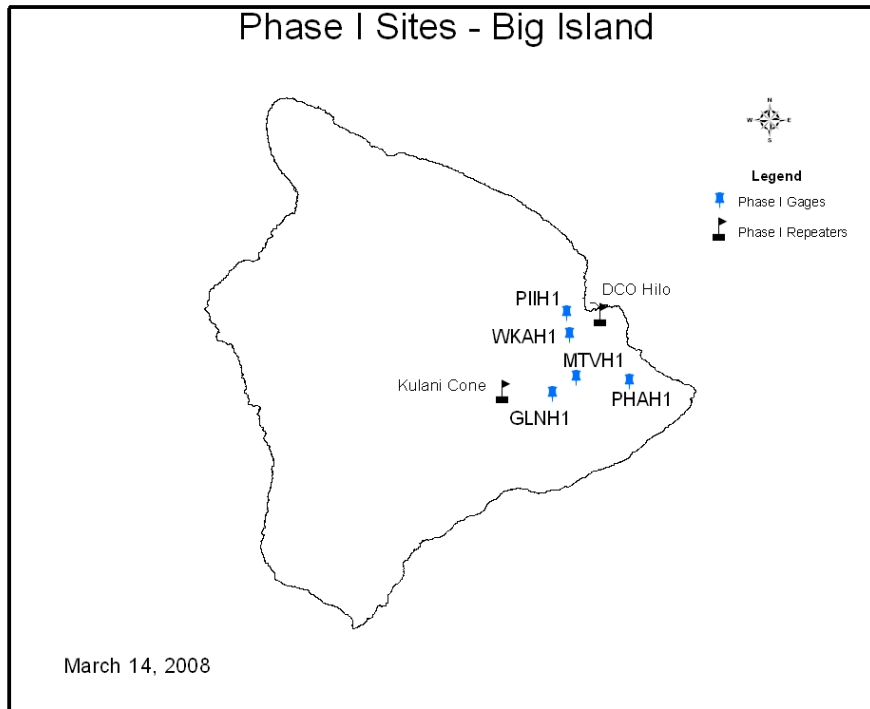


Figure 7. Map depicting Phase I ALERT sites to be installed on the Big Island.

3.3. Sites for Radio Path Analysis and Telemetry Feasibility Study

The following table provides a list of the remaining Hydronet sites not replaced under this SOW. These sites have marginal or very poor line of sight to proposed repeaters listed in Section 3.2. The sites listed in the table below will be investigated by the vendor for an ALERT radio path to proposed repeaters listed in Section 3.2. If an ALERT radio path is not available to Section 3.2 repeaters, the vendor will provide suggestions for additional repeater locations in consultation with NOAA-NWS and will provide options for other possible telemetry methods available for use in the Hawaiian Islands. The listing includes the remaining LARCs not covered under Phase I and proposed sites that will fill gaps in existing Hydronet gage coverage. Hydronet MWTs will be replaced under a separate program.

NWS ID	Name	Hydronet ID	Location (dec. deg.) Lat (N)	Lon (W)	Elevation (ft)
Oahu Sites					
AHUH1	Ahuimanu Loop	HI-16	21.4320	157.8373	240
HAJH1	Hawaii Kai Golf Course	HI-21	21.2992	157.6647	21
HAKH1	Hakipuu Mauka	HI-10	21.5036	157.8575	130
KMHH1	Kamehame	HI-28	21.3039	157.6814	817
LUAH1	Lualualei	HI-05	21.4214	158.1353	113
LULH1	Luluku	HI-15	21.3875	157.8094	280
MAUH1	Maunawili	HI-22	21.3519	157.7661	395
MOAH1	Moanalua Stream	HI-19	21.3739	157.8797	230

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NIUH1	Niu Valley	HI-06	21.2898	157.7330	140
NUUH1	Nuuanu Upper	HI-20	21.3492	157.8222	780
OFSH1	Olomana Fire Station	HI-24	21.3781	157.7508	20
PFSH1	Palolo Fire Station	HI-25	21.2994	157.7944	380
PUNH1	Punaluu Pump	HI-03	21.5844	157.8915	20
STVH1	St. Stephens Seminary	HI-23	21.3664	157.7781	448
WAIH1	Waianae Kawiwi	HI-17	21.4569	158.1803	40
WITH1	Wilson Tunnel	HI-27	21.3772	157.8164	1050
WMLH1	Waimanalo Nonokio	HI-13	21.3356	157.7114	120
WPPH1	Waihee Pump	HI-30	21.4461	157.8581	196
XXXH1	Hauula (proposed)	n/a	21.6083	157.9133	40
XXXH1	Kapolei (proposed)	n/a	21.3297	158.0811	50
Kauai Sites					
ANHH1	Anahola	HI-48	22.1374	159.3119	240
HNIH1	Hanalei	HI-45	22.1956	159.4936	5
HNPB1	Hanapepe	HI-49	21.9364	159.5886	370
KHEH1	Kalaheo	HI-43	21.9178	159.5269	800
KOKH1	Kokee	HI-46	22.1486	159.6447	4200
KPIH1	Kapahi	HI-50	22.1022	159.3861	530
LIHH1	Lihue Variety Station	HI-47	22.0236	159.3872	380
OMAH1	Omao	HI-51	21.9075	159.4767	240
WNHH1	PH Wainiha	HI-41	22.1961	159.5562	101
WUHH1	Wailua UH Exp Station	HI-40	22.0658	159.3961	550
XXXH1	Kilauea (proposed)	n/a	22.2117	159.4097	325
XXXH1	Waimea (proposed)	n/a	21.9675	159.6644	520
Maui Cnty Sites					
AIKH1	Haiku	HI-69	20.9333	156.3333	350
KACH1	Kaunakakai Mauka	HI-71	21.0950	157.0178	70
KHKH1	Kahakuloa	HI-74	20.9572	156.5369	1100

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KMLH1	Kamalo	HI-73	21.0519	156.8706	20
LAHH1	Lahainaluna	HI-60	20.8922	156.6616	570
LANH1	Lanai City	HI-72	20.8291	156.9202	1620
MABH1	Mahinahina	HI-62	20.9583	156.6588	720
ULUH1	Ulupalakua Ranch	HI-64	20.6519	156.4008	1900
XXXH1	Hana Town (proposed)	n/a	20.7508	155.9931	315
XXXH1	Kailua (proposed)	n/a	20.8836	156.2067	800
Hawaii Sites					
HAUH1	Honaunau	HI-95	19.4658	155.8850	1306
KASH1	Kahua Ranch	HI-96	20.1275	155.7913	3240
KLEH1	Kealakekua	HI-84	19.5167	155.9167	1760
KAYH1	Kapapala Ranch	HI-99	19.2786	155.4538	2140
KMUH1	Kamuela 1	HI-86	20.0427	155.6111	2880
KUUH1	Kamuela Upper	HI-97	20.0350	155.6697	3040
LPHH1	Laupahoehoe	HI-80	19.9861	155.2356	410
PPLH1	Pahala	HI-85	19.2014	155.4803	840
WHIH1	Waikii	HI-90	19.8642	155.6539	4640
WIHH1	Waiaha Stream	HI-82	19.6358	155.9511	1540
XXXH1	Honomu (proposed)	n/a	19.8639	155.1200	520
XXXH1	Kawa Flats (proposed)	n/a	19.1114	155.5353	50
XXXH1	Palani Road (proposed)	n/a	19.6722	155.9786	910
XXXH1	Waikoloa (proposed)	n/a	19.9269	155.7825	1040

3.4. Requirements for ALERT rain gages, data loggers, and transmitters

- 3.4.1. All AFWS gages will be 8-inch diameter tipping buckets with an accuracy of +/- 3% or better up to intensities of 10 inches per hour.
- 3.4.2. Each bucket will measure in 0.01 inch increments.
- 3.4.3. Rain gage must be compatible with ALERT data transmitters.
- 3.4.4. Rain gage will initiate a signal using a magnetic switch.
- 3.4.5. Rain gage will not require power.
- 3.4.6. Rain gage housing will include top sections and must be compatible with ALERT standpipe specifications and will have a vent to drain water.
- 3.4.7. Rain gage will include stainless steel mesh on all openings to prevent insects and other pests from entering the housing.
- 3.4.8. Rain gage will include sufficient cable to facilitate easy removal from the gage housing during routine maintenance.
- 3.4.9. Rain gage housing will be constructed of a corrosion resistant metal.
- 3.4.10. Rain gage will have non-corrosive bearings

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STATEMENT OF WORK/SPECIFICATIONS

- 3.4.11. Rain gage will incorporate a leveling system with adjustments for easy field setting.
- 3.4.12. Transmitters will be narrow band, transmit in ALERT format by radio telemetry, and transmit on both an event basis and/or a programmable timed interval.
- 3.4.13. Transmitters will utilize the VHF band, have multiple user-selectable frequencies within the authorized range for hydrology purposes, and meet FCC approval.
- 3.4.14. Transmitters will be able to send both rain data and battery voltage.
- 3.4.15. Transmitters will have low standby power consumption, powered by a 12 volt DC, 18 Amp-hour, sealed gel-cell battery rechargeable by a solar panel.
- 3.4.16. Each transmitter will have a standard ALERT height, omni-directional, 3 dB gain, wire whip antenna and will come equipped with sufficient antenna cables to connect the transmitter to the antenna.
- 3.4.17. Assignment of sensor identification number and other transmission parameters will be switch selectable or computer programmable.
- 3.4.18. Transmitters, supporting electronics, and battery will be housed in a weatherproof enclosure with a removable, water-resistant lid or access panel.
- 3.4.19. Transmitters will include a data logger that can be reset by the user in the field.
- 3.4.20. Transmitters will be capable of logging all data in battery backed up memory which can be downloaded in the field to a computer in the event of a radio failure.
- 3.4.21. Transmitters will have a lightning arrestor/protection system.
- 3.4.22. Transmitters will have a solar panel (minimum 350 mA) with voltage regulator, mounting bracket, and sufficient cable to connect the panel to the transmitter.
- 3.4.23. NOAA-NWS will be responsible for licensing the radio frequency for the rain gage ALERT transmitters.

3.5. Requirements for ALERT data repeaters

- 3.5.1. The repeater will be a “store and forward” radio telemetry repeater compatible with narrow band ALERT transmitters.
- 3.5.2. Repeaters will have the capability to be fully programmable to include all operational parameters and settings and allowable sensor IDs or groups of IDs.
- 3.5.3. Repeaters will use 5 watt radios with 20 watt amplifiers and omni-directional receive and transmit antennas.
- 3.5.4. Repeaters will be equipped with a 12 volt, 18 Amp-hour, sealed gel cell battery rechargeable by a 3 Amp solar panel.
- 3.5.5. Repeaters will check data format validity. Invalid data will not be forwarded.
- 3.5.6. Repeaters will be housed in a weatherproof standpipe or structure.
- 3.5.7. Repeaters will have low standby power requirements.
- 3.5.8. Repeaters will have a solar panel with voltage regulator, mounting bracket, and sufficient cable to connect the panel to the repeater.
- 3.5.9. Capability to upgrade repeater to ALERT-2 protocol with just a software change is desirable.
- 3.5.10. Repeaters connected to Anuenue backbone sites (Mount Kaala, Mauna Kapu, Haleakala, and DCO Hilo) will be capable of both retransmitting ALERT data via radio and converting ALERT data to a format compatible with Internet transmission. NOAA-NWS is in the process of working with the planned ALERT repeater site property owners on site configuration. It is not yet known if the installation of repeater electronics and antennas will occur in an existing shelter and tower. If it is not possible to use an existing facility, a separate ALERT repeater standpipe adjacent to the Anuenue facility will be required.
- 3.5.11. NOAA-NWS will be responsible for licensing the radio frequency for the ALERT data repeaters.

3.6. Requirements for gage and repeater enclosures and standpipes

- 3.6.1. Most rain gages will be installed in standpipes. The sole exception is the Aloha Tower gage (NWS ID: ALOH1) which will use the existing enclosure. These standpipes will be ALERT compatible. All rain gage standpipes will be the short version (top rim of combined standpipe and rain gage approximately 5 to 6 ft above ground).
- 3.6.2. Enclosures/standpipes will be equipped with an earth-grounding system. Standpipes must have grounding lugs, with lugs heliarc welded onto the standpipe 3 ft above the base. A #6 copper grounding wire will connect the grounding lugs to an 8 ft copper grounding rod driven to refusal. A standard ALERT standpipe grounding block installation meets this specification.
- 3.6.3. Standpipes will be made of a corrosion resistant metal.
- 3.6.4. Repeater standpipes will have a weather proof locking access door or panel for maintenance purposes. The short rain gage standpipes do not require an access door.
- 3.6.5. ALERT standpipes will have a side mounted antenna mast that is hollow to facilitate channeling of cables from the antenna, solar panel, and other devices mounted on the mast.
- 3.6.6. Repeater standpipes will be standard ALERT height using a standard height antenna mast.

3.7. Requirements for the ALERT base station

- 3.7.1. An ALERT base station will be installed at WFO Honolulu (elevation 70 ft; latitude 21.2981N, longitude 157.8164W).

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- 3.7.2. The ALERT base station will have an omni-directional receive antenna with sufficient cables and a cable lightning arrestor/protection system. Cable will include appropriate connectors to match the lightning arrestor/protection system and the radio receiver. The ALERT base station receive antenna will be located on the roof of the 3rd floor of the WFO Honolulu building. The computers utilizing the hydrologic software will be on the 2nd floor of the same building. While the direct distance between the antenna and the computers is approximately 80 to 100 ft, the cable path factoring conduit routing may require a cable run of up to 200 ft.
- 3.7.3. Base station will have a weather resistant antenna mast and mounting system (height of mast dependent upon installation location). Mast will also have an earth grounding system.
- 3.7.4. Base station will include an ALERT radio data receiver and decoder.

3.8. Requirements for data management system and software

- 3.8.1. Data management software must be able to run on a personal desktop computer running either the Windows or a UNIX-like operating system (e.g. Linux) at WFO Honolulu. **Note: Two personal desktop computers (Dell Optiplex 755) have already been procured by WFO Honolulu for this purpose. The vendor will provide a list of system requirements in the initial work plan to enable NOAA-NWS to procure any additional system hardware or software as necessary.**
- 3.8.2. Data management software will provide displays using a mouse or keyboard controlled window-type GUI with pop-up/pull-down menus and scrollable displays. The menus will be fully customizable.
- 3.8.3. Data management software must be user-configurable and have a proven track record of use in managing and displaying hydrometeorological data.
- 3.8.4. Data management software must be able to ingest data from a range of sources and formats, including ALERT rain gage data, ASCII text, and other user-defined formats.
- 3.8.5. Data management software must be able to perform validity and quality control checks to eliminate obvious bad data. Parameter ranges for these checks must be user-defined and changeable through the GUI.
- 3.8.6. Data management software must be able to display data in a range of graphical formats including but not limited to line and/or bar graphs and plotted maps in common file formats such as GIF, JPEG, and PNG.
- 3.8.7. Users at WFO Honolulu must be able to view data plots from remote terminals over the office LAN.
- 3.8.8. Data management software must have the ability to create user-defined reports in ASCII format. Capability for output in XML format is desired but not required.
- 3.8.9. Data management software must have the capability to call rain gages telemetered by commercial land line and cellular telephone service.
- 3.8.10. Data management software must be able to pass all collected data to WFO Honolulu's AWIPS system via local area network. The ability to pass these data as Standard Hydrometeorological Exchange Format (SHEF) text files is highly desirable.
- 3.8.11. Data management software will include a database for long-term archiving. The capability to save data to a CD or DVD from the main GUI must also be included. The database record must be fully editable.
- 3.8.12. Data management software must provide the capability for DCOs at Hilo and Lihue to access the full rainfall database via web browser or some other type of PC based GUI application.
- 3.8.13. Data management software must have the capability to provide other users access to the rainfall database. Access rights must be through user accounts with password protection. Access rights must be easily configurable by the software system manager at WFO Honolulu.
- 3.8.14. Data management software must support multiple alarm criteria for different rainfall intensities. Criteria must be user-configurable for each site.
- 3.8.15. Data management software must support different types of alarm actions including but not limited to playing digital audio files to alert weather forecasters or sending email alerts to users.
- 3.8.16. Data management software must be able to print reports to a variety of printer types including but not limited to dot-matrix, laser, ink jet, and Postscript printers. Both automated and manual report printing capability must be provided.
- 3.8.17. A backup system for failover operation must be provided. This system must allow for easy and rapid switch to a backup system in case the primary data collection software system fails. The copying of the rainfall database to the backup system must be automated.
- 3.8.18. A basic set of statistical analysis tools is desirable.
- 3.8.19. Full documentation for the data management software must be provided.
- 3.8.20. Vendor must include technical support options as part of the bid package.

3.9. Training on the installation, configuration, and maintenance procedures

Follow-on maintenance will be the responsibility of NOAA-NWS and it is imperative that NOAA-NWS technicians and other staff members receive training on the proper procedures to keep the AFWS working in a satisfactory manner. Thus, this SOW requires training be conducted by the vendor on the following areas. The training will be hands-on as much as possible.

- 3.9.1. Site installation. The vendor will provide site installation procedures training to cover the possibility that NOAA-NWS will need to install additional sites beyond the scope of the SOW or NOAA-NWS will need to move existing sites on the request of

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the property owner(s). At a minimum, installation training will cover rain gages, data loggers, ALERT transmitters, and ALERT repeaters and will involve at least one on-site session with NOAA-NWS technicians in the field. NOAA-NWS will be responsible for the cost of travel of its technicians to the training location. Training topics will include but not be limited to hardware installation, communications configuration, antenna setup, data logger settings, transmitter settings, and receiver settings.

- 3.9.2. Site maintenance. The vendor will provide site maintenance procedures training. The training will include at least one on-site training session with NOAA-NWS technicians in the field. It is preferred that site maintenance training be concurrent with the installation training required in paragraph 3.9.1 above. At a minimum, training session(s) will cover routine and troubleshooting procedures for the rain gages, data loggers, ALERT transmitters, and ALERT repeaters. Topics will include but not be limited to the calibration and configuration of radio transmitters and receivers/decoders, set up of the antennae, and the calibration of rain gages.
- 3.9.3. Data management software maintenance and configuration. The vendor will provide training to NOAA-NWS staff on the maintenance and configuration of the data management software. The training will include but not be limited to procedures on how to change settings from the installed configuration, how to change user access to the database, and methods to program the system to accept new types of data formats. Training on the data management software will occur during or immediately following the initial installation and configuration of the system at WFO Honolulu.

4. Deliverables

This AFWS project will be split into a radio path analysis/telemetry feasibility stage, an equipment procurement and installation stage, and a user training stage.

Following contract award, a work plan will be submitted by the contractor within 14 days to the COTR, and reviewed and approved within 14 days. In some cases, the technical proposal may be used as the work plan if it contains sufficient detail to verify that the contractor has a thorough understanding of the requirements in this project.

A radio path analysis and telemetry feasibility study on the sites listed in Section 3.3 above must be completed by November 30, 2008.

Due to gage site agreements which must be individually renegotiated with property owners, it may not be possible to start gage installations immediately following contract award. New property agreements are expected to be in place within 6 to 12 months of contract award. Therefore, **NOAA-NWS requires all gages, repeaters, base station receiver/decoder, and data management software to be installed and fully operational by July 1, 2009.**

The user training phase for NOAA-NWS field technicians and staff, as detailed in Section 3.9, will also be completed no later than July 1, 2009.

A monthly progress report will be required no later than the 7th of each month.

A final project report will be required within 30 days of the completion of the installation and training phases.

--END OF AMENDMENT--