



ARCHITECTURE + ENGINEERING

Wired, Wireless and Infrastructure Cabling Bid  
Caledonia Community Schools  
c/o 2014 Network Technology Bid  
9757 Duncan Lake Road, MI 49316

Bid Release Date: October 28, 2014  
Bid Due Date: November 7, 2014, 10a

Attention: Mark Washington, GMB, 616-298-1607

## CCS Bid Summary

Caledonia Community Schools is seeking active bid responses for a Network installation project. This process will open on Tuesday, October 27, 2014 and will conclude with bid submission on November 7, 2014 at 10am in the Caledonia Community Schools Board of Education Room.

Bids will be opened and publicly read aloud on November 7, 2014 at 10am; all parties are invited to attend. Any bids that are received after the announced bid time, will not be accepted for future consideration. All bids should be sealed and delivered prior to November 7, 2014 10a:

Caledonia Community Schools  
c/o 2014 Network Technology Bid  
9757 Duncan Lake Road  
Caledonia, Michigan 49316

The bid security shall be in the penal amount of 5 percent (5%) of the total bid. Bid security shall be forfeited if bid is withdrawn after closing time on date for receiving bids.

All bids shall be accompanied by a sworn statement disclosing any familial relationship that exists between the owner(s) or any employee of the bidder and any member of the Caledonia Community Schools. CCS shall not accept a bid that does not include a sworn and notarized familial relationship disclosure statement.

Successful bidders are required to furnish a satisfactory Performance and Payment Bond from an acceptable surety in an amount equal to 100 percent of the full contract sum.

Bidders may obtain copies of the documents from CCS website or by contacting Mark Washington, GMB, at [markw@gmb.com](mailto:markw@gmb.com). In the subject line of the email write Tech Bid Request.

A required pre-bid walk-through will be held on October 29, 2014 at 1pm. This meeting will be held at the Caledonia Community Schools Board of Education Office at 9753 Duncan Lake Road, Caledonia, Michigan, 49316. This is a mandatory meeting in which potential bidders will have the opportunity to meet with district staff and review the facilities prior to bid submission on November 7, 2014 at 10a.

Interviews for post bid evaluation are scheduled for Monday, November 10, 2014 at 10a at the Caledonia Board of Education office. This is a mandatory date that you will be required to attend if your bid is selected to be reviewed for further vetting by the district. Please keep that date on your calendar clear in the event you are being considered as a company that may be awarded this project.

The Owner reserves the right to reject each and every bid, to waive informalities, irregularities, and errors in the bidding to the extent permitted by law. This includes the right to extend the date/time for receipt of bids.

Bids and their related equipment pricing/service offerings will be valid for no less than 60 days after the Bid Opening date.

Here is the projected schedule for completion.

1. Release for Bids: Monday, October 27, 2014
2. Required Pre-Bid Meeting/Walkthrough: November 3, 2014, 8am
4. Bid Opening: November 6, 2014, 10am
5. Contractor's Interviews: November 10, 2014, 8-10am
6. Board Approval: November 17, 2014
7. Written Authorization to start the work/PO received by vendor: November 19, 2014
8. First Project Planning Meeting: TBD

The full network installation should be scheduled for completion prior to April 1, 2015. Upon award of the bid, a mutually determined completion schedule will be established.

Should you have any questions, please contact Mark Washington, Director of Technology, GMB at [markw@gmb.com](mailto:markw@gmb.com), 616-298-1607

The Caledonia Community Schools network comprises the following buildings.

1. Glenmor High School, 8948 Kraft Avenue, Caledonia, MI 49316
2. Caledonia High School, Kraft Avenue, Caledonia, MI 49316
3. Kraft Meadows Middle School, 9230 Kraft Avenue, Caledonia, MI 49316
4. Duncan Lake Middle School, 9757 Duncan Lake Road, MI 49316
5. Caledonia Elementary, 9770 Duncan Lake Road, Caledonia, MI 49316
6. Dutton Elementary, 3820 68th Street, Caledonia, MI 49316
7. Emmons Lake Elementary, 8950 Kraft Avenue, Caledonia, MI 49316
8. Kettle Lake Elementary, 8451 Duncan Lake Road, Caledonia, MI 49316
9. Paris Ridge Elementary, 4690 Paris Ridge Dr SE, Caledonia, MI 49316
10. Operations and Transportation Center, Kraft Avenue, Caledonia, Michigan 49316

The network core is to be installed at the CCS Technology Department at Duncan Lake Middle School. Each connection to the core is supplied via (1) single-mode fiber connecting each building. The core of the network will need a minimum of 14 single mode, 10G fiber connections connecting each of the buildings back to Duncan Lake. Patch cords connecting the current patch bays to the new network should be replaced and will need to be provided by the Contractor. The contractor will be responsible for providing patch bays if needed.

Connecting each MDF and IDF is a single 10G multimode fiber. Listed below are the district's MDF/IDFs.

	MDF	IDF	Top of Stack	Edge Switches	# of 10G MDF to IDF MM fiber
Glenmor High School	1	0	1	1	0
Caledonia High School	1	8	8	20	8
Kraft Meadows MS	1	4	5	5	4
Duncan Lake MS	1	8	9	3	8
Caledonia Elementary	1	2	3	3	2
Dutton Elementary	1	3	4	3	3
Emmons Lake Elementary	1	3	4	4	3
Kettle Lake Elementary	1	1	2	2	1
Paris Ridge Elementary	1	2	3	4	2
Ops/Transportation Ctr	1	0	1	1	0

As part of the network core the following 10G connections will need to be provided. Total (36) 10G links

1. (10) 10G connections to VM Server 1-3
2. (4) 10G connections to SAN (future)
3. (4) 10G connections to future services

The network installation will include the installation of 600 a/b/g/n/ac indoor access points and the related redundant/high availability controllers. 500 of the access points are to be installed in the traditional hallway and classroom environment. 500 of these access points will be installed by the Contractor repurposing existing data cables in the environment. These should be priced on a per access point installation basis. 100 of the access point are located in large open areas such as auditoriums, gymnasiums, cafeterias, etc. Pricing should be provided based on four new cabling runs being made to each of these 100 access point locations. All locations (repurposed or new) should be tested and labeled. In general, each classroom will be receiving an access point. To accurately measure coverage, a post installation survey including heat maps and access point placements will be needed.

A total Network Access Control and IPS should be provided. Features to be included are 1:1/BYOD support, Layer 7 visibility and application control on the network. Dashboard reporting, registration portal for wireless authentication as well as deep packet inspection, categorization and the ability to analyze and manage the data are required. Managed guest access control with sponsorship, SMS verification, pre-registration, and other options should be included.

It is expected that the Contractor will make the effort to document and include all items necessary to make the bid complete using their product portfolio. Any voluntary alternatives should be presented to the owner on a separate bid response form. It is the district's preference to work with a Contractor completing the installation with an established support office and staff within a 1 hour service area of Caledonia Community Schools.

## Appendix A

The network core is to be installed at the CCS Technology Department at Duncan Lake Middle School. Each connection to the core is supplied via (1) single-mode fiber connecting each building. The core of the network will need a minimum of 14 single mode, 10G fiber connections connecting each of the buildings back to Duncan Lake. Patch cords connecting the current patch bays to the new network should be replaced and will need to be provided by the Contractor. The contractor will be responsible for providing patch bays if needed.

Connecting each MDF and IDF is a single 10G multimode fiber. Listed below are the district's MDF/IDFs.

	MDF	IDF	Top of Stack	Edge Switches	# of 10G MDF to IDF MM fiber
Glenmor High School	1	0	1	1	0
Caledonia High School	1	8	8	20	8
Kraft Meadows MS	1	4	5	5	4
Duncan Lake MS	1	8	9	3	8
Caledonia Elementary	1	2	3	3	2
Dutton Elementary	1	3	4	3	3
Emmons Lake Elementary	1	3	4	4	3
Kettle Lake Elementary	1	1	2	2	1
Paris Ridge Elementary	1	2	3	4	2
Ops/Transportation Ctr	1	0	1	1	0

As part of the network core the following 10G connections will need to be provided with the necessary optics and cabling to complete the connections. A total of (36) 10G links, including the (14) as part of the core installation.

1. (10) 10G connections to VM Server 1-3
2. (4) 10G connections to SAN (future)
3. (4) 10G connections to future services

The network installation will include the installation of 600 a/b/g/n/ac indoor access points and the related redundant/high availability controllers.

## DATA COMMUNICATIONS SWITCHES

### 1 GENERAL

#### A. SECTION INCLUDES

This section includes general requirements for new Switches to replace the existing Ethernet network platform including features, testing, commissioning, training, installation, and as-built documentation.

#### B. SCOPE

Provide a new 10/100/1000Base-T Ethernet network with PoE/PoE+ ports to support all access layer Ethernet needs and fiber optic connections to support inter-building connectivity and connections for telecommunications closet locations as specified.

#### C. REFERENCE STANDARDS

- A. Federal Communications Commission (FCC)
- B. Electronic Industries Association (EIA)
- C. Telecommunications Industry Association (TIA)
- D. American National Standards Institute (ANSI)
- E. BICSI Telecommunications Distribution Standards
- F. National Electrical Code, NFPA 70

#### D. SUBMITTALS

- G. Drawings indicating system configuration and physical layout.
- H. Drawings shall indicate the functional relationship of various equipment and shall include weights, dimensions and heat dissipation of each unit.
- I. Detailed description of equipment to be furnished.
- J. Complete details and drawings showing all materials, which must be furnished in the field.
- K. Manufacturing schedule from receipt of order, including all shop drawing approvals, production span, factory tests, delivery, normal installation time and on-site acceptance test.

#### E. WARRANTY

- L. Original completed installation shall be free from defect and/or failure for a period of five (5) years. Any replacement, upgrade, or fix, including labor, for any non-conforming or non-operational part of the system shall be repaired and/or replaced at no cost to the Owner.
- M. Manufacturer's warranty shall be provided for all components of the system.
- N. Contractor shall be authorized and certified to supply and install the specified systems per the terms of the manufacturer's warranty agreement.
- O. Any documentation and/or submittals required by individual manufacturers for compliance with the standard and/or applicable extended warranty programs shall be prepared and submitted for approval by the Contractor.
- P. Contractor shall submit all documentation of installation and testing, apply for warranty certification, and provide a Certificate of Warranty as may be applicable from the manufacturer prior to project closeout.
- Q. All switches shall be covered with software and hardware support with replacement hardware to be shipped "Next Business Day" at no cost to the owner.

## F. QUALITY ASSURANCE

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install system and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed. Certification of such training shall promptly be provided if requested by Architect/Engineer.
- D. The Contractor shall have a proven track record in Data Communication Switch and Hub configuration and installation. This must be shown by the inclusion of references of at least three (3) projects involving the installation of similar systems completed by the Contractor in the prior two (2) years on unaltered forms with the sealed Bid Proposal as provided herein.

## 2 PRODUCTS

### G. CORE NETWORK SWITCH

- A. Switch must be fully manageable (SNMP, GUI, Telnet/SSH/Console, CLI interface)
- B. Must provide at least 24 ports of 10G, SFP+ ports
- C. Switch must be able to support Quality of Service (QoS) in a IP Telephony/Voice over Internet Protocol (VoIP) environment
- D. Switch must have "port mirroring" or "analyzer port" support
- E. Switch must have support for 802.1q Vlan Tagging
- F. All SFPs or GBICs must be manufacturer supplied/branded. No third-party SFPs or GBICs will be accepted
- G. All switch uplinks/stacking and connections shall be 10G or higher
- H. All switch ports shall be 10/100/1000BASE-T. POE/POE+ ports shall be per IEEE 802.3at/af
- I. Chassis or Stackable Based Solution; including all cables and connectors to connect and uplink all switches.
- J. Full Layer 2/3/4 switching capabilities
- K. Core switches shall have Redundant Management Modules and Redundant Power Supplies.
- L. Access Layer switches (2 or 4) SFP+ uplink ports via integrated or optional switch expansion module. Each stack should have at least two SFP+ available for uplink to the core or building core switches
- M. Must support hot-swappable power supplies.
- N. Must support SNMPv1, SNMPv2c, and SNMPv3.
- O. Must support RMON (Statistics, History, Alarms, Events, Host, HostTopN, Matrix, Capture and Filter).
- P. Must support routing protocols including: static routes, OSPF v1/v2/v3, RIPv1/RIPv2, RIPng, IS-IS, VRRP, BGP.
- Q. Must support multicast protocols including: DVMRP, IGMP v1/v2/v3, MLD v1/v2, PIM-SM and PIM-SSM.
- R. Must support VRF (Virtual Routing and Forwarding).
- S. Schedule – See Appendix A

### H. EDGE SWITCH REQUIREMENTS

- A. Switch must be fully manageable (SNMP, GUI, Telnet/SSH/Console, CLI interface)
- B. Must provide at least 24 ports of 10G, SFP+ ports
- C. Switch must be able to support Quality of Service (QoS) in a IP Telephony/Voice over Internet Protocol (VoIP) environment
- D. Switch must have "port mirroring" or "analyzer port" support

- E. Switch must have support for 802.1q VLAN Tagging
- F. All SFPs or GBICs must be manufacturer supplied/branded. No third-party SFPs or GBICs will be accepted
- G. All switch uplinks/stacking and connections shall be 10G or higher
- H. All switch ports shall be 10/100/1000BASE-T. POE/POE+ ports shall be per IEEE 802.3at.
- I. Chassis or Stackable Based Solution; including all cables and connectors to connect and uplink all switches.
- J. Layer 2/3/4 switching capabilities
- K. Switches should be (48) port 10/100/1000 ports and 4 combination 1000Base-X SFP ports or two combination 1000Base-X ports SFP and two 10GbE ports.
- L. Must support a switch option that supports 802.3af and 802.3at PoE that can be added into the same stack group as non-PoE switches; support for up to 375 watts for PoE power should be provided.
- M. Must provide line-rate switching
- N. Must support IP Multicast
- O. Must support per port static and dynamic policy
- P. Must support IEEE 802.1s Multiple Spanning Tree
- Q. Must support IGMP Snooping (v1, v2, v3)
- R. Must support +4000 VLAN IDs, +1000 VLANs, 320000 MAC address in a single switch stack
- S. Must support up to 32,000 MAC Addresses
- T. Must support IEEE 802.1Q VLANs with full support for the GARP and GVRP protocols
- U. Must support basic IP Routing (static routes and RIP v1/v2)
- V. Must support a Lifetime Warranty that includes firmware upgrade, bug fixes, phone support and advanced hardware return. Please describe the warranty that is provided.
- W. Schedule – See Appendix A

**I. PREFERRED MANUFACTURERS**

- R. Cisco
- S. Extreme
- T. HP

**3 EXECUTION**

**J. INSTALLATION**

- U. Install all system components for a complete and functioning system. Install in accordance with manufacturer's installation instructions. All networking equipment will be bench configured and burned in for at least 24 hours prior to installation at the building locations. Should an item fail this bench test, it is the responsibility of the Contractor to provide a replacement switch onsite within 48 hours
- V. Include configuration and installation of new switches. Configuration shall include assigning a IP addresses to each stack, configure up to 15 vLANs per building, inter-building routing, and QoS settings needed for a fully operational system.
- W. Coordinate building installation schedule with other trades and Owner. Document and present to Owner cutover methods and work schedule.
- X. The Contractor shall provide a recommended training schedule and an outline for the training program to be evaluated and approved by the Owner at least two weeks prior to beginning training. All trainers shall be certified to instruct on the equipment being installed and shall have at least one year of field training experience. The Contractor shall train using live system equipment and provide all training materials required at no additional expense to the Owner. Training shall be scheduled for, but not limited to, a minimum of sixteen (16) hours.



1.  
**K. FINAL INSPECTION**

- Y. Once the installation has been completed, acceptance testing shall be performed upon the system following its cutover. This test and verification period, if successful, shall consist of thirty consecutive days of normal traffic load with no major component failures and no major alarms, defined as: 1) electronics failure; 2) main power supply failure; 3) a failure of the remote electronics; 4) console failure; or 5) 10% or more stations inoperable.
- Z. Owner shall accept the installed system after a signed letter of official system certification with successful acceptance test results is received and accepted, accompanied by two sets of as-built documentation provided by the Contractor.
- AA. As-Built documentation to contain final interconnection details, including station number, equipment type, equipment location (port) number, and jack number. All equipment terminations will be clearly marked.

**END OF SECTION**

## DATA COMMUNICATIONS WIRELESS ACCESS POINTS

### **1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. This section includes general requirements for new wireless access point system including features, testing, commissioning, training, installation, and as-built documentation.

#### **1.2 REFERENCE STANDARDS**

- A. Federal Communications Commission (FCC)
- B. Electronic Industries Association (EIA)
- C. Telecommunications Industry Association (TIA)
- D. American National Standards Institute (ANSI)
- E. BICSI Telecommunications Distribution Standards
- F. National Electrical Code, NFPA 70

#### **1.3 SUBMITTALS**

- A. Drawings indicating system configuration and physical layout.
- B. Drawings shall indicate the functional relationship of various equipment and shall include weights, dimensions and heat dissipation of each unit.
- C. Detailed description of equipment to be furnished.
- D. Complete details and drawings showing all materials, which must be furnished in the field.
- E. Manufacturing schedule from receipt of order, including all shop drawing approvals, production span, factory tests, delivery, normal installation time and on-site acceptance test.
- F. Radio Frequency study as required by the manufacturer's implementation process

#### **1.4 WARRANTY**

- A. Original completed installation shall be free from defect and/or failure for a period of five (5) years. Any replacement, upgrade, or fix, including labor, for any non-conforming or non-operational part of the system shall be repaired and/or replaced at no cost to the Owner.
- B. Manufacturer's warranty shall be provided for all components of the system.
  - 1. Contractor shall be authorized and certified to supply and install the specified systems per the terms of the manufacturer's warranty agreement.
  - 2. Any documentation and/or submittals required by individual manufacturers for compliance with the standard and/or applicable extended warranty programs shall be prepared and submitted for approval by the Contractor.
  - 3. Contractor shall submit all documentation of installation and testing, apply for warranty certification, and provide a Certificate of Warranty as may be applicable from the manufacturer prior to project closeout.

## **1.5 QUALITY ASSURANCE**

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install system and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed. Certification of such training shall promptly be provided if requested by Architect/Engineer.
- D. The Contractor shall have a proven track record in Data Communication Wireless Access System configuration and installation. This must be shown by the inclusion of references of at least three (3) projects involving the installation of similar systems completed by the Contractor in the prior two (2) years on unaltered forms with the sealed Bid Proposal as provided herein.

## **2 PRODUCTS**

### **2.1 WIRELESS ACCESS POINTS MINIMUM SPECIFICATIONS**

- A. MDF Core Controller
  - 1. Centralized Wireless Controller Appliance
  - 2. Minimum of (2) SFP+ Ports
  - 3. Minimum of 20Gbps Throughput
  - 4. Dual Power Supplies able to operate multiple controllers in a subsecond failover for High Availability/Redundancy
  - 5. Support for up to (1000) APs per controller
  - 6. Designed to support 11n and 11ac standards, including
  - 7. Real-time embedded operating system
  - 8. Dedicated packet-processing
  - 9. Full Routing/Switching
  - 10. Policy based firewall engine
  - 11. Full packet encryption from client to controller
  - 12. Automatic Radio Management
  - 13. Automatic interference awareness / avoidance
  - 14. Integrated WIPS (Wireless Intrusion Prevent System)
  - 15. Integrated Spectrum Analysis (no additional software or licenses required)
  - 16. Able to be bridged at controller or bridged at access point or bridged at edge switch
  - 17. Support for meshed access point deployment, management, and control
  - 18. Authentication Types – 802.1x (EAP, LEAP, PEAP, EAP-TLS, EAP-TTLS, EAP-FAST, EAP-SIM, EAP-POTP, EAP-GTC, EAP-TLV, EAP-AKA, EAP-MD5),

- Microsoft Vendor-Specific RADIUS Attributes, Extensible Authentication Protocol, MAC Address, and Web-based captive portal
19. Authentication Servers – Internal database, LDAP/SSL Secure LDAP, RADIUS, TACACS+, Various third party interoperability with manufacturer testing
  20. Encryption Protocols – CCMP/AES, WEP: 64 and 128 bit, TKIP, Secure Sockets Layer (SSL) and TLS, L2TP/IPsec, XAUTH/IPsec, and PPTP
  21. Client Band Steering
  22. Single Management interface with preference to systems that connect to wired mgmt.
  23. The ability to specify the level of airtime performance via connected client or group
  24. Timer-Based AP Access Control
  25. Remote Wireless Packet Capture
  26. Rogue AP Detection and Containment
- B. Access Points
1. Dual Band/Dual Radio (2.4Ghz and 5Ghz simultaneously). 802.11 a/b/g/n/ac
  2. At least (1) 10/100/1000Base-T PoE Powered Ethernet connection
  3. Must support Rate Limiting as well as providing a custom captive portal for guests and authenticated users.
  4. Access Points must support a hybrid mode of operation being able to support security scanning/spectrum analysis and serving clients on the same radio
  5. Limited lifetime warranty including software/firmware upgrades
  6. Integrated Antennas with down-lit design for each ceiling/wall mount attachment
  7. 3x3 MIMO w/ 3-Spatial Stream support
  8. WiFi Client Optimization
  9. Able to use 802.3af PoE with an optional wired power adapter if needed.
  10. Spectrum Analysis and Client Load Balancing
  11. WIPS (Wireless Intrusion Prevention) and NAC (Network Access Control) support
  12. Integrated Trusted Platform Module for secure storage of credentials and keys
  13. Must fully support QoS
  14. Visual indicators (LEDs) – Power/System, Ethernet Link, Radio Status
- C. Protective Housing Option
1. Protect Enclosure for “high impact areas” such as Gymnasium locations
  2. Appropriate mounting plate for secure AP within the enclosure
- D. Provide all necessary services and mounting hardware to properly attached Access Points to the appropriate mounting surface.

## **2.2 PREFERRED MANUFACTURERS**

- A. Extreme
- B. Cisco
- C. Aruba
- D. HP
- E. Ruckus
- F. Aerohive
- G. Or District approved voluntary alternative

## **3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install all system components for a complete and functioning system. Install in accordance with manufacturer's installation instructions. Include configuration and installation of core controller and access points for a fully operational system.
- B. Coordinate building installation schedule with other trades and Owner. Document and present to Owner cutover methods and work schedule.
- C. The Contractor shall provide a recommended training schedule and an outline for the training program to be evaluated and approved by the Owner at least two weeks prior to beginning training. All trainers shall be certified to instruct on the equipment being installed and shall have at least one year of field training experience. The Contractor shall train using live system equipment and provide all training materials required at no additional expense to the Owner. Training shall be scheduled for, but not limited to, a minimum of sixteen (16) hours.

### **3.2 FINAL INSPECTION**

- A. Once the installation has been completed, acceptance testing shall be performed upon the system following its cutover. This test and verification period, if successful, shall consist of thirty consecutive days of normal traffic load with no major component failures and no major alarms, defined as: 1) electronics failure; 2) main power supply failure; 3) a failure of the remote electronics; 4) console failure; or 5) 10% or more stations inoperable.
- B. Owner shall accept the installed system after a signed letter of official system certification with successful acceptance test results is received and accepted, accompanied by two sets of as-built documentation provided by the Contractor. As-Built documentation to contain:
  - 1. Final interconnection details, including station number, equipment type, equipment location (port) number, and jack number. All equipment terminations will be clearly marked.
  - 2. On-site RF post-installation verification to insure all coverage / capacity needs are met per the approved pre-deployment study. The study should also include a hard copy of verification results documented in CAD on Owner provided floor plans.

**END OF SECTION**