Building Automation System (BAS) Services

1384 Spruce St.
Winnipeg, MB R3E 2V7
Tel: (204) 925-1450
Cell: (224) 441 4760
E-mail: appin@appin.com
Web site: www.appin.com

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To: John Joy, Project Manager, Lake County Facility and Construction Services
From: Grant Wichenko, Appin Associates

526.164.ROCB PROPOSAL FOR BAS SERVICES ON LAKE COUNTY ROC BUILDING

Review of Consultant Plans and Specifications for BACnet Interface Device Integration Opportunities

Appin's first task would be to review the consultant's plans and specifications, as they now stand, in order to determine a preliminary list of possible BACnet interface devices that could be provided following Appin's Networked Controls Model that has been used on many Lake County projects.

Once this preliminary inventory of BACnet Interface Devices is created, Appin would participate in a series of design review meetings with the consultants and LC staff to review the suitability of the BACnet Interface Devices identified in the draft BACnet device inventory.

A fundamental principle of Appin's Networked Controls Model is that design responsibility rests with the Designers of Record, not Appin nor Lake County. While any comments provided to the Designers of Record assist the consultants to produce an acceptable design, it is still up to the Designers of Record to resolve the comments and to incorporate them into the design as they see fit.

The other fundamental principle is that Appin's role is to ensure that whatever equipment or systems are chosen by the consultants will communicate on the BACnet network in the building.

Following this meeting, Appin will finalize the BACnet Interface Device inventory. During these meetings, Appin will explain the Network Controls Design Model to the consultants.

This is a component of and is consistent with the Integrative Process points per LEED 4.1.

Appin reviewed the preliminary drawings and came up with a list of BACnet Interface Device *plants* that could be provided. This list includes but is not limited to, the following:

Domestic Water Pumps (All Types)
Electric Domestic Water Heaters (All Types)
Hydronic/HVAC Pumps (All Types)
Constant Speed HVAC Fans not controlled with a BACnet MS/TP Enclosed Controller (All Types)
Constant Speed HVAC Power Ventilators not controlled with a BACnet MS/TP Enclosed Controller (All Types)
Air to Air Energy Recovery Equipment (All Types)
Convectors (All Types)
Unit Heaters (All Types)
Air Terminal Units (All Types)
Food Service Equipment (All Types)
Roller Window Shades (All Types)
Pre-Action Fire Panels (All Types)
Fire Pumps (All Types)

Domestic Water Booster Pumps (All Types)
Flow Meters including Utility Meters (All Types)
Refrigerant Monitors (All Types)
Hydronic Pumps with Variable Frequency Drives (All Types)
HVAC Water Treatment Systems (All Types)
HVAC Fans with Variable Frequency Drives (All Types)
HVAC Power Ventilators with Variable Frequency Drives (All Types)
Carbon Monoxide Detection Systems (All Types)
Ground Source Heat Pumps (All Types)
Indoor Central Station AHUs (All Types)
Computer Room Air Conditioners (All Types)
Air Flow Measuring Stations (All Types)
Lighting Control Devices (All Types)
Addressable Fixture Lighting Controls (All Types)
Switchboards (All Types)
Panelboards (All Types)
Molded Case Circuit Breakers (All Types)
Enclosed Controllers (All Types)
Variable Frequency Drives (All Types)
Power Generation – Diesel (All Types)
Uninterruptible Power Supplies (All Types)
Automatic Transfer Switches (All Types)
Emergency Lights Uninterruptible Power Supply (UPS) (All Types)
Exterior Lighting Controls (All Types)
Simplex Fire Detection and Alarm (All Types)
Hydrogen Detection Systems (All Types)
Fuel Tank leak Detection and Alarm (All Types)
Electronic Security System (All Types)
IP Camera (All Types)
Irrigation System (All Types)
Sewage Pumps (All Types)
Sump Pumps (All Types)
CRAC Unit System Glycol Tanks (All Types)
Sump/Condensate Pumps (All Types)
CRAC Unit Condensate Pumps (All Types)
Low Voltage Transformers – Dry Type (All Types)
SPD (TVSS) (All Types)
Solar Energy Electrical Power Generation Equipment (All Types)

It is Appin's opinion that there are five BACnet Interface Device *plants* that require detailed attention. These are:

- Solar power system and connections to the grid power, the PV array, the UPS and the generator,
- Cameras,
- Card readers,
- Roller shades and the interactions with the HVAC and Lighting systems to meet LEED.
- Audio visual.

It is assumed that Lake County Fac Ops will have maintenance responsibilities for these systems, even though the control of the systems will be by others.

Control for the day to day operations of some of these systems will likely fall to the Sheriff's Department or the ROC Governing Council but Fac Ops will need to know the health and status of the equipment as Fac Ops is responsible for the health and maintenance of these systems.

The systems will be set up so that for the most part read-only access is granted for this monitoring task.

Preparation of Appin Construction Documents

Once the BACnet Interface Device inventory list is finalized and agreed to by all parties, Appin will provide three items as part of the Scope of this proposal. These are;

- Drawing Notes: Appin will provide information to the consultants that can be incorporated into the drawings in a consistent manner to summarize the BACnet information. This is now standard on all Appin's jobs as it summarizes the BACnet work that is outlined in detail in Appin's Division 25 specification.
- The drawing notes have been accepted by consultants on previous Lake County projects as they do not impose on or reduce the design responsibilities of the Designers of Record.

- *Language Adders* that need to be inserted in the relevant consultant's specification. This is now standard on all Appin's jobs.

  The Language Adders simply act as pointers from the equipment specification to the corresponding Division 25 section so an equipment supplier or the major trade knows that there are BACnet requirements and that they are detailed in a clear and concise manner in a Division 25 section.

  The Language Adders have been accepted by consultants on previous Lake County projects as they do not impose on or reduce the design responsibilities of the Designers of Record.

- Appin's Division 25 specification. The Drawing Notes and the Language Adders provide pointers for the major trades and equipment suppliers to the Division 25 specification.

  This simplifies the work for the consultants as they do not have to incorporate Appin's material into their specifications.

  The pointer requirement is common as often there are pointers in MEP sections to Submittals, O&M manuals and other requirements found in Division 01.

  Appin assumes that the design consultant will likely have a 23 09 HVAC Controls specification that will cover items such as sensors, valves and dampers, etc. Appin will delete those items from its Division 25 Specification.

  Appin will not provide any Sequences of Operation in its Division 25 specification. If requested, Appin will give guidance on how to write the VAV box and lighting controls integration sequence to meet CA Title 24 standby ventilation requirements that will likely be a requirement on this project.

Appin will also provide a Division 01 specification that makes it a requirement for the General Contractor to have their subs provide detailed equipment information, such as serial numbers, on an Appin provided Excel template.

It is then used by Appin to create the IP Device Inventory so Appin can assign IP addresses, LC standard names and device instance numbers.

Appin will also provide its Fire Alarm Mass Notification specification that has been used on various Lake County jobs by design consultants as appropriate.

Appin will also provide its BIM model specification.

Appin's Design Reviews are limited to BACnet Interface Device Integration Opportunities and Obtaining LEED Credits

Apart from participating in the design meetings referred to above, Appin will devote limited time to the review of the design.

Appin's design comments will focus on maximizing the BACnet interface device potential by ensuring that equipment selected by the consultant will support BACnet integration.

Appin will help Lake County and the LEED Consultant as required to obtain LEED credits for the following items:

- Integrative Process
- Water metering
- Fundamental Commissioning and Verification
- Building-Level Energy Metering
- Fundamental Refrigerant Management
- Optimize Energy Performance
- Advanced Energy Management
- Renewable Energy
- Enhanced Refrigerant Management
- Grid Harmonization
- Thermal Comfort
- Interior Lighting
- Design for Enhanced Resilience
- Passive Survivability and Back-up Power During Disruptions
- Learning controls for thermal comfort

Appin's responsibilities with respect to these LEED point categories are limited to the provision of the BACnet Interface Device metering and other data in a manner that allows the LEED Consultant to claim credit for these points.

The LEED Consultant will set out the requirements for monitoring to obtain the credit. Appin will ensure that the Contract Documents cover these requirements before the job is out for Bid.

Ensuring that the BACnet Interface Devices comply with NetZero and LEED monitoring requirements

Appin will coordinate BACnet Interface Devices requirements with Wold Architects and Engineers and their subconsultants to determine appropriate LEED, Net Zero Energy, International Living Future Institute and Illinois Clean Energy Communities Foundation requirements that pertain to certifications and grant funding for the ROC project.

Both programs have on-going monitoring requirements that are critical to attaining LEED and Net Zero certification. Appin will propose a list of metering points and a strategy that can be implemented through the existing Lake County eSight energy monitoring system to ensure that the required data is available.

This will enable Lake County to take the necessary steps to ensure compliance with these items using existing tools so as to reduce the learning requirements.

Construction Administration Services by Appin

Appin will provide construction administration services as required. This includes responding to RFIs, reviewing the BACnet Interface Device Submittals and site reviews.

Appin will serve as Lake County's primary agent in coordination and integration of all pieces of equipment to Lake County's BAS system during the construction process.

Appin assumes that there is a 3rd party Commissioning Authority (CxA) as required by LEED. Normally Appin has commissioned the equipment hardware as well as the BACnet components but for this project, Appin's commissioning responsibility will cover only the BACnet component. Commissioning of the BACnet components will be done once the Commissioning Authority (CxA) has verified that the various pieces of equipment are operational for the design intent.

Appin will modify its 25 08 03 LEED Enhanced Commissioning specification to suit the Owner's Project Requirements.

Providing the IP infrastructure for BACnet Interface Devices

Appin will oversee the IP infrastructure and assignment of IP names and instance numbers to comply with the existing Lake County requirements and ensure effective integration.

Appin will work with the Division 27 consultant and LAKE COUNTY IT to ensure that proper IT protocols and security requirements are followed.

Appin will mark up the communication drawings to show where BACnet Interface Device and client IP drops are required.

This approach ensures that there are clear lines of responsibility among Lake County IT, the design consultants and Appin.

Estimated Fees and Expenses

Staff Position	Design Review (incl. LEED Reqd.)	Inventory Cliff Notes and Lang. Adders	Spec Writing	Document Review and Mark-up	Construction Admin. & Submittal Review	Cx Work	Net Zero Monitoring Data Collection	Total Hours
Grant Wichenko	75	50	250	125	300	200	250	1250
Associates and Admin Staff	0	25	50	50	100	50	25	300

Grant Wichenko – 1250 hrs @ $100 per hour	$125,000.00
Associates and Admin Staff – hrs @ $70 per hour	$21,000.00
Total Fees	**$146,000.00**

Appin has allowed for 4 trips to complete this project by June 30, 2025.

These estimates are based on checking actual booking costs for a two week trip in late 2022. There are no direct flights for any of the dates checked. Flights with stop overs increase the possibility for delays and additional costs. No allowance has been made for the possibility of these additional costs.

It should be noted that the cost of flights and car rentals have more than doubled since Appin last travelled to Waukegan.

Proposal Travel expenses:

Return flight – Winnipeg to Chicago (no direct flights available for dates checked)	$2,200.00
Extended stay hotel	$800.00
Car rental – lowest cost available	$1,500.00
Meals – 14 days @ $95.00 a day, based on government travel rates for USA	$1,300.00
Incidentals (gas, tolls, etc.) 14 days @ $17.30 a day, based on government travel rates for USA	$242.20
Total estimated cost per 14 day site visit	$6,042.20

Appin estimates the need for 4 x 14 day trips to complete the work outlined in this proposal.

Estimated travel costs: 4 x 14 day trips @ $6,042.20 $24,168.80

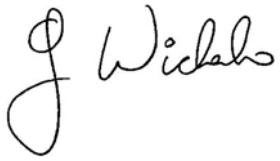
TOTAL COST FOR THIS PROPOSAL: US$170,168.80

Appin's invoices will be issued based on itemized staff time records and actual receipts for reimbursable expenses.

All costs are in US dollars.

Please call me if you have questions regarding this proposal.

Grant Wichenko



Appin Associates

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