

# Project Profile

## School District Gives *Infinity* High Marks



Students attending school in Township District 214 are learning in comfortable and safe environments as taxpayers reap the savings being achieved with the installation of a district-wide Andover Controls *Infinity* building automation system.



Township School District 214 is a public school district located approximately 30 miles northwest of Chicago, in a prospering area known as the "Golden Corridor". It is the second largest high school district in Illinois, serving more than 250,000 residents in the communities of Arlington Heights, Buffalo Grove, Elk Grove, Mt. Prospect, Prospect Heights, Rolling Meadows, Wheeling, and Des Plaines. The district consists of six high schools totaling over 2.1 million square feet and an educational center. Total student enrollment in grades 9 through 12 is approximately 12,000 and growing. Prospect High School is the district's oldest school, built in 1957, with Buffalo Grove High School, the last to be built, in 1973.



### A Winning Contractor-Customer Partnership

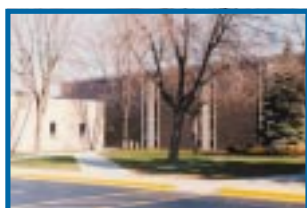
Local Andover Controls Representative, Hoekstra Building Automation (HBA) of Homewood, Illinois, and Township School District 214 have worked together in a unique partnership over the past five years to accomplish a set of goals: upgrade all temperature control systems, both retrofit and new construction; add access control at critical locations; and provide multiple operator workstations on the school district's existing LAN.



According to Marion "Doc" Kotecki, Account Executive for HBA, "Typical contractor-customer relationships in the construction industry are oftentimes similar to boxers fighting in the ring. However, the relationship between Township School District 214 and Hoekstra Building Automation has been a win-win partnership for both of us."



Seymour Schwartz, the district's Director of Buildings and Grounds, and John Morgan, Central Maintenance Supervisor, identified their facilities' needs and their specific concerns at each school building. HBA responded with technology solutions within the school district's budget. The result: Township District 214's aging facilities have been upgraded to meet their present building control requirements and energy management initiatives. At the same time, they now have in place an infrastructure for upcoming electric deregulation, which will provide even greater savings for taxpayers in the future.



## BAS Overview

Township District 214's BAS includes a total of eight *Infinity* SX 8000 graphic-based front-end workstations located in each school's maintenance office; a central SX 8000 workstation and file server in the Central Maintenance office at Forest View Educational Center; seven *Infinity* CX 9200 network controllers; and more than 1,250 field bus controllers. The entire building automation system resides on the school district's existing local area network.

District-wide, *Infinity* controls and monitors:

- Exterior and interior lighting
- Chilled water plants, including ice storage systems
- Central heating plants
- Domestic and kitchen water heating systems
- Bell systems for starting and ending class periods
- Occupancy scheduling *by classroom*
- Real-time monitoring of 17 electric meters
- DDC control of classroom unit ventilators and VAV boxes

In addition, card access at one high school is also integrated into the *Infinity* system.



*John Morgan and Doc Kotecki discuss District's "High Tech Team" TCX 870 installations*

## "High Tech Team" Saves Over a Quarter Million Dollars

Alongside the district-wide *Infinity* system installation by HBA, a challenging retrofit project to upgrade classroom ventilation control in Prospect High School, Elk Grove, and Wheeling High School was undertaken by the district's own maintenance staff. Dubbed District 214's "High Tech Team", this 20-member group worked on the weekends for two-and-one-half years to change out 330 pneumatic classroom unit ventilator controls to *Infinity* TCX 870 DDC terminal controllers. The High Tech Team was responsible for the field bus installation, control panel wiring, and controller installation and commissioning. HBA provided the engineering, programming, training, and technical assistance.

"Besides saving over a quarter million dollars by doing the installation work ourselves," says John Morgan, "the facilities personnel involved in the project today have a greater knowledge of (and appreciation for) the HVAC systems in their buildings."

## Buffalo Grove High School—From “Energy Hog” to a Model of Energy Savings

Jim Lemm, Building & Grounds Supervisor, does a lot less running around Buffalo Grove High School since the installation of the *Infinity* system three years ago. Even on a typical 0° F. Illinois winter day, his eight boilers and two circulating pumps are humming along under peak conditions without a glitch and still at only 65% capacity.

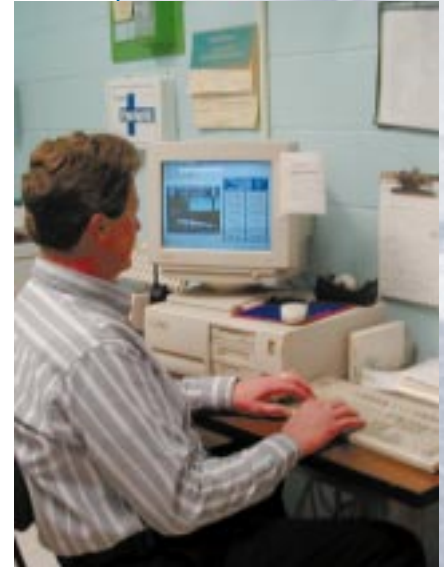
Jim can monitor his entire school building from the SX 8000 workstation in his office outside the school’s central chiller plant—adjusting individual classroom temperatures, modifying the school bell schedule, acknowledging alarms, and troubleshooting potential problems with the RTUs, boilers, VAV units, pumps, fans, etc.—with just the click of the mouse.

Buffalo Grove, considered by school district personnel to be a real “energy hog,” was renovated first. In the initial *Infinity* installation in 1996, multi-zone rooftop HVAC units were removed and replaced with rooftop VAV air handlers and VAV boxes. Construction of the central chiller plant, which includes an ice storage system and hot water heating plant, was done over two summers.

Occupancy sensors installed in each classroom at Buffalo Grove integrate lighting and VAV control. When a classroom becomes unoccupied, the lights shut off after a predetermined time period, heating/cooling returns to its unoccupied setpoint, and VAV dampers are positioned to minimum setting.

“Additional energy savings are realized during the summer school session,” says Lemm. “We only use about one-fifth of the school building for summer classes so I can cut energy by turning on only the RTUs needed in this one area.”

Buffalo Grove is one of five schools in District 214 that utilizes an ice storage system to produce chilled water for air conditioning. This type of system was chosen for its potential to reduce the impact of demand charges through utilization of lower off-peak energy rates. During eight months out of the year, the system makes ice at night when electricity cost is only two cents per kilowatt hour (kwh) with no demand charge. The following day, the system melts the ice to make chilled water, in lieu of running chillers when electricity cost is at 5.2 cents per kwh and demand charge is in effect. According to Seymour Schwartz, the school district’s ice system is probably their greatest money-saving device. The air conditioning at Buffalo Grove runs approximately \$10,000 less per month than air conditioning at a school in the district without an ice system.



*Jim Lemm monitors his entire school from the SX 8000 workstation*



*A District 214 ice storage system*

EXIT

## Installations Continued

Along with *Infinity* installation at Buffalo Grove, six other buildings in the district were retrofitted:

### Elk Grove High School

Along with the pneumatic classroom unit ventilator upgrade to DDC control by the High Tech Team, existing mechanical systems were either rebuilt or replaced with *Infinity* controllers and electronic damper and valve actuation added as required. In addition, *Access Systems, Inc. (ASI)*, HBA's security partner, installed a CCTV camera system in the school's common areas. Video recording has decreased the number of student "incidents" during passing periods.

### Prospect High School

Similar to Elk Grove High School, pneumatic classroom unit ventilators were upgraded to DDC control by the High Tech Team and existing mechanical systems were rebuilt or replaced. When a new music area and fitness center were constructed, *Infinity* DDC control of the VAV and classroom unit ventilation systems in these new areas was included.

According to Tony Rossi, Building and Grounds Supervisor at Prospect High, "With the old pneumatic control system, 30-40 freezestats a day would trip! Now, not only do we have much tighter control, but with this system, I can print out the 'Space Temp Trend Log' and a graphic for a particular classroom and actually *show* a teacher what is happening in their classroom. Overall, teacher complaints have dropped 80% since the installation of the *Infinity* system in our school."

### John Hersey High School

Pneumatic controls for radiation and constant volume reheat air handlers were replaced with TCX terminal control units. Existing mechanical systems were either rebuilt or replaced with *Infinity* controllers and electronic damper and valve actuation added as required.

### Rolling Meadows High School

Constant volume fans with hot water reheats were modified to VAV boxes with TCX controllers. In addition, an existing perimeter door electric lock system at Rolling Meadows was upgraded to full card access. According to Jerry Lanfear, an Account Executive with *ASI*, after 8AM each day, all perimeter doors are locked except the three main entrances. Restricted areas in the school, such as the "Locker Commons", are locked after 4PM each school day. Teachers and staff must use access cards to enter after these hours. In total, five *Infinity* ACX 780 access control units control 26 doors via card access and monitor 16 others. The *Infinity* security system is integrated into a Motorola two-way radio system for remote alarm notification to facilities personnel.

Using the *Infinity* SX 8000 front-end software, the facilities staff can schedule special events in advance, providing HVAC, lighting, and access to only the areas needed.



The Locker Commons and several perimeter doors are controlled by card access at Rolling Meadows High School





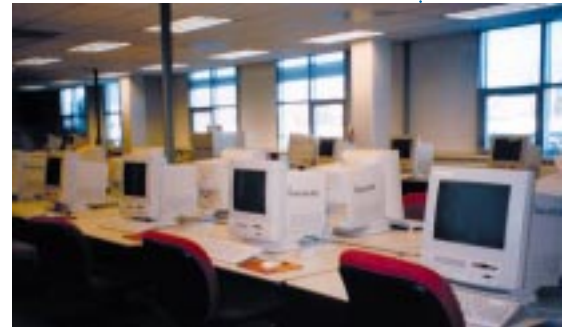
## Wheeling High School

In addition to the pneumatic classroom unit ventilator control upgrade by the High Tech Team, all mechanical systems were upgraded to Andover DDC. During this same time period, Township District 214 purchased an adjacent indoor swimming pool from Wheeling Park District. As the District upgraded all mechanical systems in this facility, Andover *Infinity* equipment was added to control the pool area, locker rooms, two multi-purpose rooms, and a fitness room.

## Forest View Educational Center

Once a full service high school, the Forest View Educational Center now houses the school district administrative offices, Central Maintenance office, three alternative schools, and numerous community activities. In 1990, Forest View was one of 20 area schools that qualified under a Noise Abatement Project sponsored by the FAA and the City of Chicago for extensive HVAC upgrades because of its location in the flight pattern of O'Hare Airport. Pneumatic radiation heat and in-window air conditioning were replaced with central air handling units and VAV boxes with reheat. In addition, the existing temperature controls have now been upgraded to Andover DDC.

Ed Rubio, Facility Manager at Forest View, loves the new system. "*Infinity* is very user-friendly. Training on it has been so simple—everyone on my staff knows how to respond to alarms. And with the information we receive from *Infinity's* alarms, we know what to expect when we walk into a situation. It's like having a second set of eyes for the whole building!"



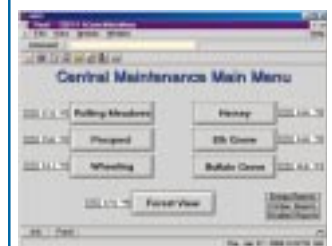
Ed Rubio, Facility Manager, investigates an alarm at Forest View

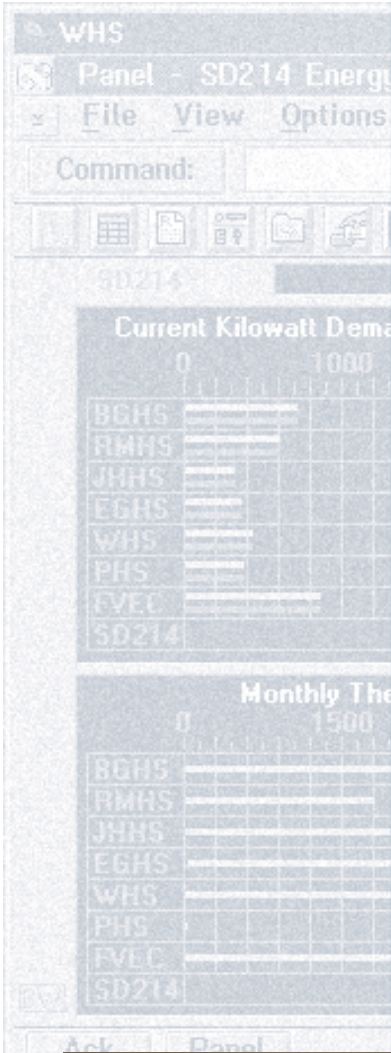
## Township District 214 Central Maintenance— The Eyes and Ears of the Entire System

The hub of the district's BAS is the Central Maintenance (CM) office, located at Forest View. Here the CM staff can help diagnose problems and assist the high school building managers with alarms. All alarms for the entire district, i.e., critical, non-critical, and maintenance alarms, are re-patched to CM simultaneously with their annunciation at the individual schools. In addition to alarm monitoring, the CM uses the SX 8000 in an overseeing role to monitor energy usage of equipment throughout the district. Software programming for the entire *Infinity* network, when needed, is done at CM.

The graphic screens on the Forest View SX 8000 workstation are consistent with those used throughout the entire school district. Seymour Schwartz feels they are a valuable troubleshooting tool:

"HBA designed our graphics so that every school's front-end has the same 'look-and-feel'. These screens provide us with troubleshooting information *before* our maintenance people even grab their tool pouches! Our staff can focus in on an alarm and localize the problem in advance of the imminent phone call. Is it a problem with a sensor? A damper? The SX 8000 provides us a constant, dynamic look at the system. We get the data all at once and presented in such a way that every HVAC technician can handle it and understand it. And one quick glance at a graphical control schematic with no blinking red alarms gives you that added confidence that that building is 'ok'."





## Substantial Energy Savings Even Before Deregulation

Energy savings since the installation of the *Infinity* system at Township District 214 have been impressive, to say the least. According to Schwartz, at Buffalo Grove High School alone, electricity costs went from an average yearly cost of \$400,000 to \$318,000 in the first year of Andover control; despite the fact that with the renovation of this entire facility, lighting levels *doubled* and fresh air requirements *tripled*.

Using the reporting capabilities of the *Infinity* system, the district can create “profiles” of energy usage over time. This information will be especially useful when electric deregulation begins and the district seeks to get the lowest electric rates possible on the wholesale market based on their usage patterns. Currently, ComEd, their present electricity supplier, pays the district to reduce electrical usage on the hottest days of the years. The district receives \$35.00 for every kw under the customary demand level. The district, in turn, returns the savings, which amounts to \$50,000 per year, back to the schools. To help in curtailing energy usage during these peak demand hours, CM can make quick adjustments in equipment operation remotely via the SX 8000 front-end.

“Utility money is wasted money,” comments Schwartz. “We have a 2 ½ million dollar gas and electricity budget. Our goal is to reduce this amount without affecting comfort and health.”

The effective use of their building automation system has played a major role in meeting this goal. Building ice and shutting off chillers; turning equipment off to reduce demand; lowering lighting levels; adjusting occupancy schedules; and modifying temperature setpoints, are just some of the ways *Infinity's* control and monitoring capabilities have played an important role in this effort.

Schwartz reports that his overall plant operations provided the district, and ultimately its taxpayers, with nearly \$700,000 in utility cost avoidance in 1999.



## PROJECT AT A GLANCE:

### Project Type:

Integrated (HVAC, Security, Lighting)

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### Project Name:

Township District 214 Schools

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### Location:

Arlington Heights, Illinois

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### Market Segment:

Education

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### Number of Buildings:

7

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### Total Square Feet:

2.5 million +

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### Infinity Equipment Installed:

7- CX 9200 Network Controllers

9 - SX 8000 Workstations

1,257+ Infinet controllers, including 5 ACX 780 access controllers

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### Network:

Fiber Optic LAN

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### Applications:

Temperature and humidity control

Access control

Lighting control

Chilled water plant control, including ice storage systems

Central heating plant control

Domestic and kitchen water heating systems control

Bell system control (for starting and ending class periods)

Occupancy scheduling *by* classroom

Real-time monitoring of 17 electric meters

DDC control of classroom unit ventilators

CCTV

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### Number of Controlled Doors:

26 (16 additional doors monitored)

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### Total System Points:

9,500

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### Andover Controls Representatives:

Hoekstra Building Automation

Access Systems, Inc.

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