The world is changing at a rapid pace, and today's students are changing with it. Current markets and world economy require students to learn and respond in a different manner. The workplace has become global, requiring constant collaboration and creative teaming among individuals. The design of **Cele Middle School** represents a new beginning for Pflugerville Independent School District (ISD) by providing a learning environment that is supported through a progressive hands-on curriculum, preparing students for today's world.

Cele Middle School
Pflugerville Independent School District
Pflugerville, Texas

PROJECT GOALS

The vision for Cele Middle School began with a simple challenge

"Do It Better"

For its five previous middle schools, Pflugerville ISD had utilized a prototype also designed by the Cele Middle School project team. For its sixth middle school, the district envisioned a facility that would respond to 21st century models of learning without compromising what was a proven and efficient design, all within the same budget that had been assigned for a basic re-site of the prototype.

The project team recognized that this was an opportunity to improve upon the previous design in virtually every measurable way. First, the new design had to create a great place for children to learn. Secondly, the design had to improve upon the efficiency of the previous prototype.

DESIGN TEAM

Stantec	Architect
Barry Nebhut	Principal in Charge
Sylvia Cancino	Project Manager
Christian Owens	Senior Design Architect
Joan Gallup	Senior Structural Designer
Project cost	*$ 24,359,885*

CONSULTANTS

Gil Engineering	Civil Engineering
CMTA Engineers	MEP Engineering
JMK Foodservice	Food Service
Armko Industries	Building Envelope
Balfour Beatty	Contractor

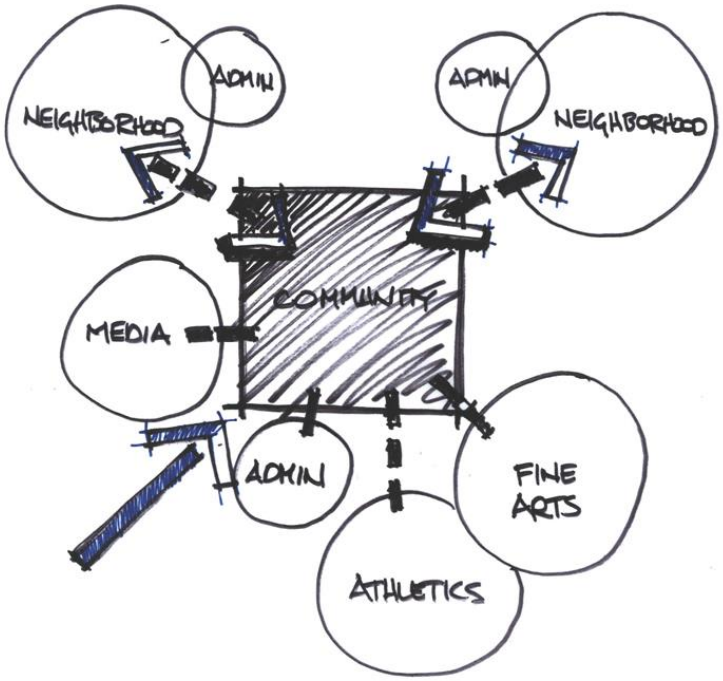
ARCHITECTURAL DESIGN

Cele Middle School is a 168,000-square-foot, 3-story facility housing 1,100 students in grades 6 through 8.

Responding to the desire for a **21st century educational environment**, the architecture helps to promote collaboration by providing spaces for learning—both within and outside of the instructional classroom—that allow for **teaming of different core classes**.

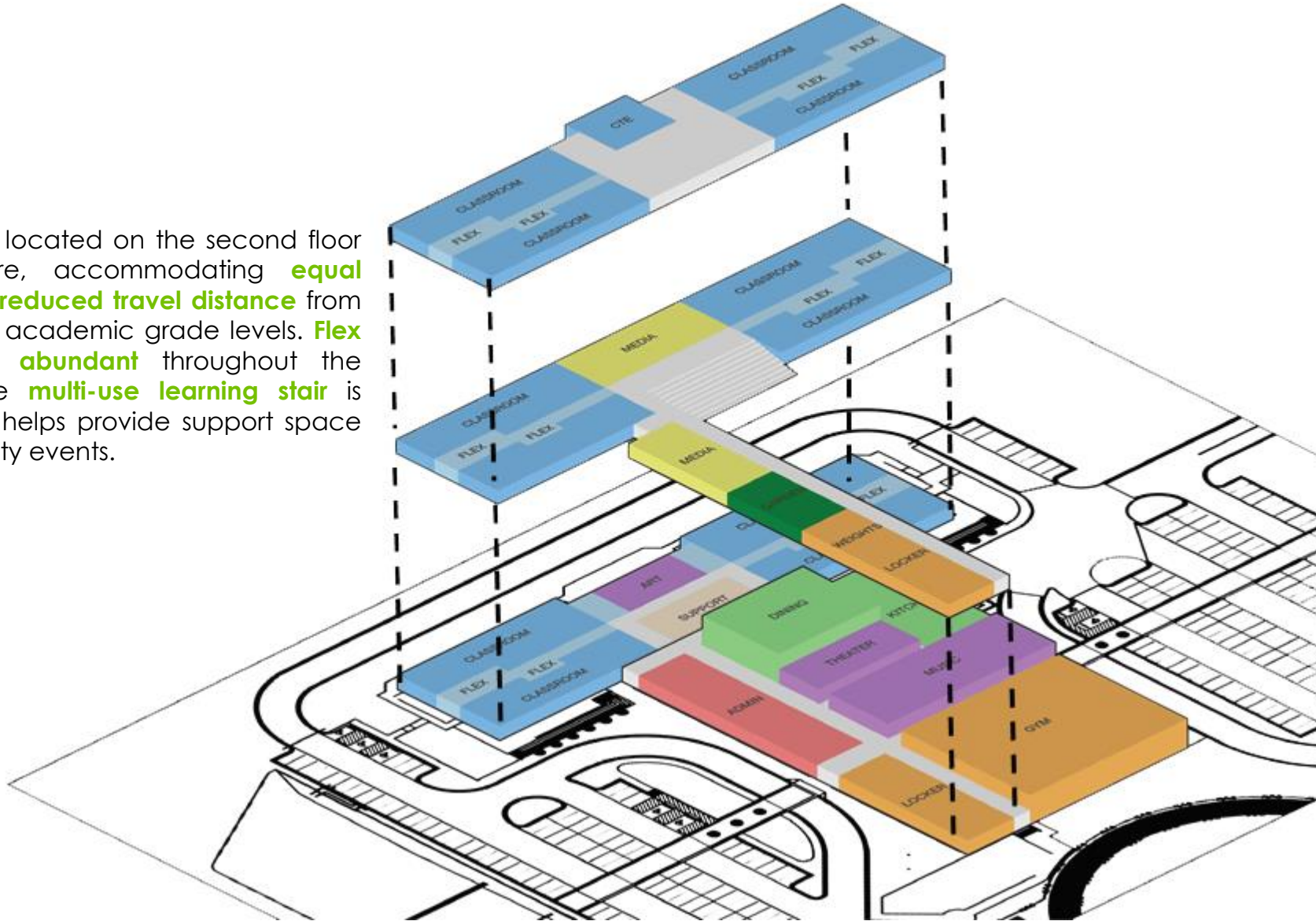
Classrooms are no longer isolated between the different curriculums; the core curriculums are clustered together within a 125-student community, each one organized around a common instructional breakout space, to encourage an **integrated curriculum approach**.

This closely models real world issues of **collaborative problem solving**.



The **three academic levels of the building are separated by a ½ level split from the core of the building**. This allows the two lower grade levels to be physically closer to the building core, while the highest academic floor is only separated from the core by one and a half levels. **Classrooms have full transparency** for added security and **sky boxes at central commons** give staff the opportunity for soft supervision of students and awareness of visitors or security concerns.

The library is located on the second floor of the core, accommodating **equal access and reduced travel distance** from each of the academic grade levels. **Flex spaces are abundant** throughout the building, the **multi-use learning stair** is flexible and helps provide support space for community events.



The large **'learning stair' that acts as a bridge between the academic wing and the building core** provides a flexible space that accommodates a wide variety of functions: **a social gathering space for students**, large group instruction and presentation, expanded seating area for stage productions and activities, and student performance and exhibition space. This space has become so popular with the students that it could be **described as the heart of the school**.

The cafeteria is located at the center of the building core and serves as both the dining hall and **performance seating area for the stage**, which is located directly opposite the learning stair. **Performing arts instruction and rehearsal spaces** wrap around the stage to provide direct access during performances, as well as **direct access outdoors**.

SUSTAINABLE DESIGN

As previously mentioned, creating a great place for learning was only half of the projects objectives. The District also envisioned Cele Middle School to be a **living example of stewardship**, whose sustainable practices would allow the building to become **a teaching tool for the students** as well as the community it supports. The design also had to be **more efficient than the previous prototype**.

To ensure this objective, the team **utilized life cycle cost analysis** to drive decisions for everything from mechanical and electrical systems to building finishes. Utilizing these lifecycle cost models demonstrated to the Owner that choosing the lowest initial price for these systems could cost the district significantly more than other options over the life of the building.

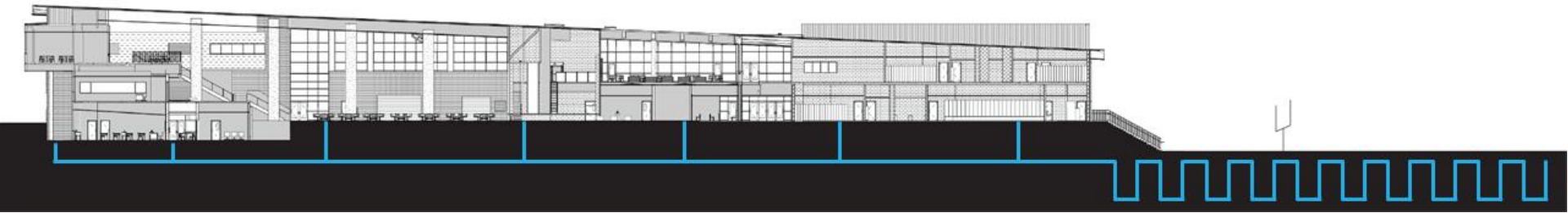
One of the design team's major objectives was to provide **natural daylight to every classroom** within the building, representing a **67% improvement over the previous prototype** design. The facility was designed so that core classrooms were **oriented along a north/south exposure** to take full advantage of natural daylight. All south facing classrooms utilize **high windows and louvers to control glare** and enhance daylighting.

The design incorporates just three lamp types to ensure that **only high efficient lamps are used** to meet the building's artificial lighting needs. This results in a **lighting energy use of only .75 watts per square foot**, which is almost 38% better than the code required lighting power density. All areas utilize **occupancy sensors**, which are kept on a tight schedule to **conserve energy when the space is not in use**.

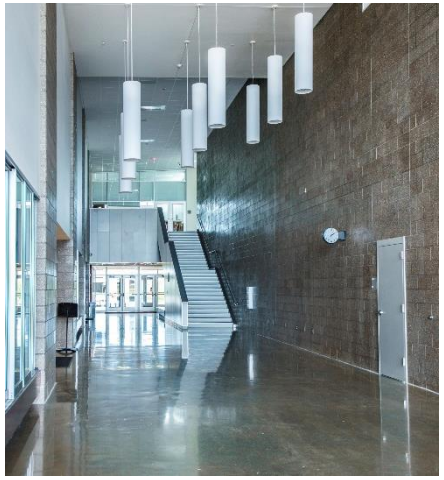
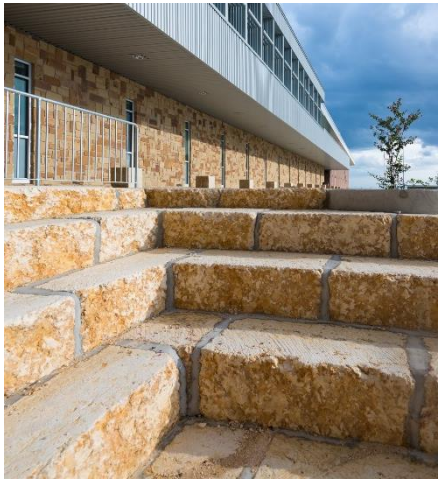
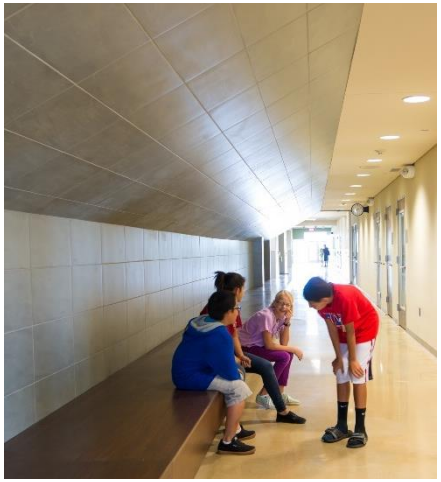
The combined use of natural daylighting and daylight control systems **significantly reduces the overall amount of energy consumed** without compromising the quality of the learning environment – in fact it improves it.

The school is conditioned via a **high efficient geothermal HVAC system** which uses the earth as a heat exchanger. The geothermal well field consists of **300 closed loop wells, 300ft deep**, each located below the school's football field. Utilizing a geothermal HVAC system was not only cost effective on the initial investment but will **reduce energy consumption and cost for the life of the building**.

The **outdoor air system** uses an **energy recovery unit** that is connected to a demand control ventilation system, which **monitors the space's CO_2 level** and only supplies the minimum amount of outdoor air required.



The selected building f**inishes reduce maintenance requirements and costs without compromising the durability and length of life** demanded by their use. **Polished concrete** is used in lieu of VCT for flooring throughout the building, dramatically reducing cleaning and maintenance time and cost. Likewise, interior walls utilize materials such as **native stone, burnished CMU, and plastic laminate panel systems** to eliminate the need for painting throughout the life of the building.


The building design also **directly contributes to the efficiency of the building**. Stacking the academic areas of the building on three levels significantly reduces the length of circulation corridors. Some of this captured space was utilized to create the learning community breakout spaces and the learning stair, but the remainder of the saved space contributes to the **condensed building footprint**, which **furthers reduce energy use** and maintenance cost for the school.

All rainwater runoff from part of the roof is collected in an **above ground cistern** and **supplies water to the building's green roof** and outdoor learning patio. The **outdoor roof lab**, located adjacent to the library, allows students to experiment with **planter beds** and the **rainwater collection system**.

Throughout the planning and design process, the project team **followed sustainability principles** outlined by the Leadership in Energy and Environmental Design **(LEED)** and Collaborative for High Performing Schools **(CHPS)**. Cele Middle School is also **designed to Energy Star standards**, which means it performs among the **top 25% of similar facilities nationwide**.

47%

building footprint and roof reduction from similar schools in the district

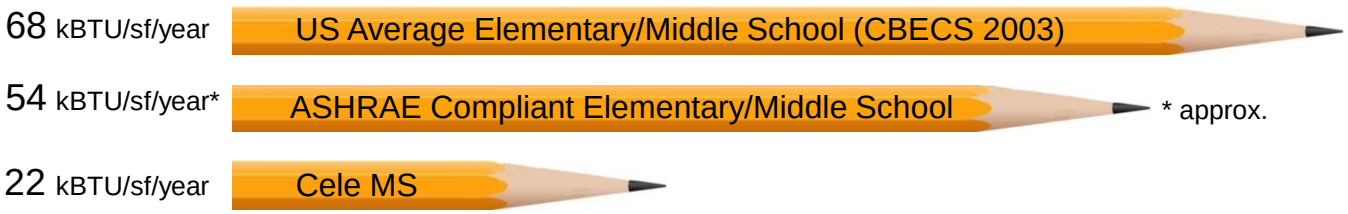
100%

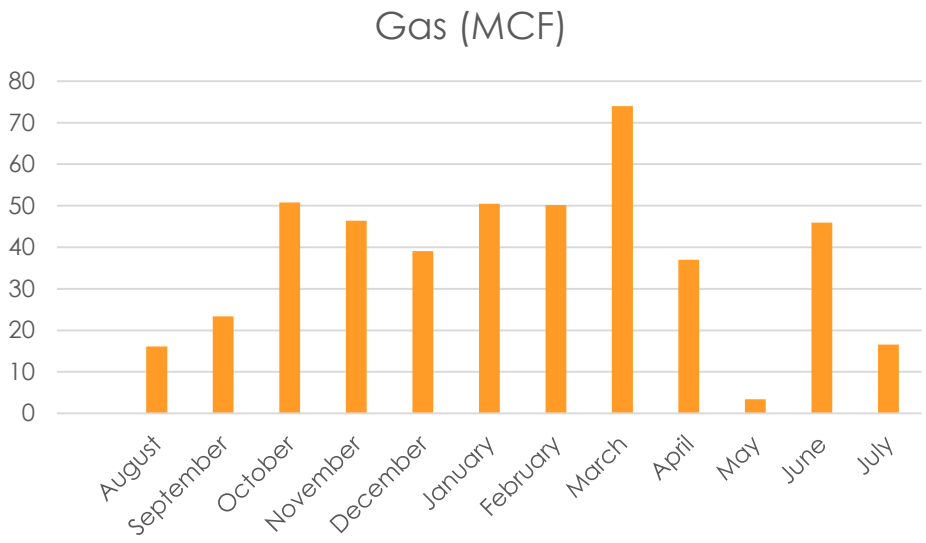
daylight in all academic spaces

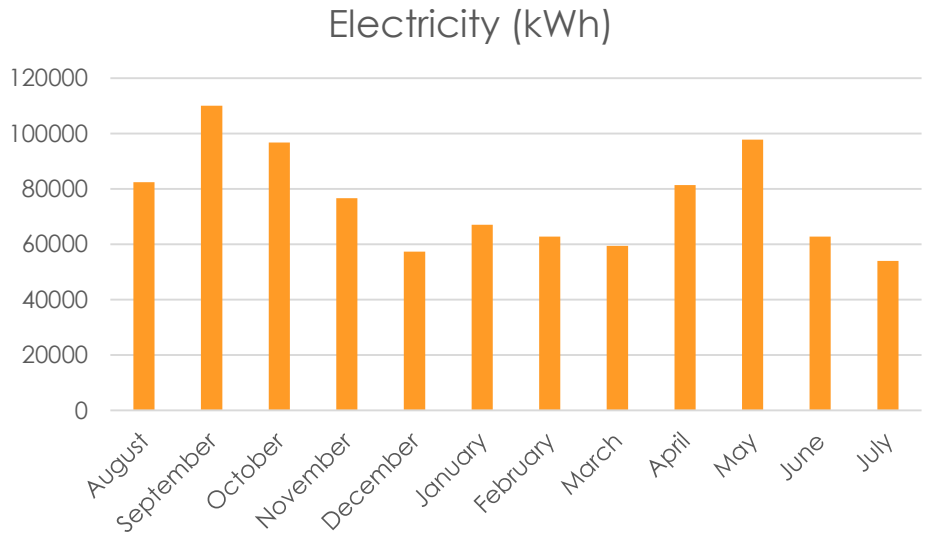
45%

energy savings over a typical Energy Star qualified middle school

Actual EUI is 22.5 kbtu/ft²*yr with total utility cost of $0.60/ft²*yr.

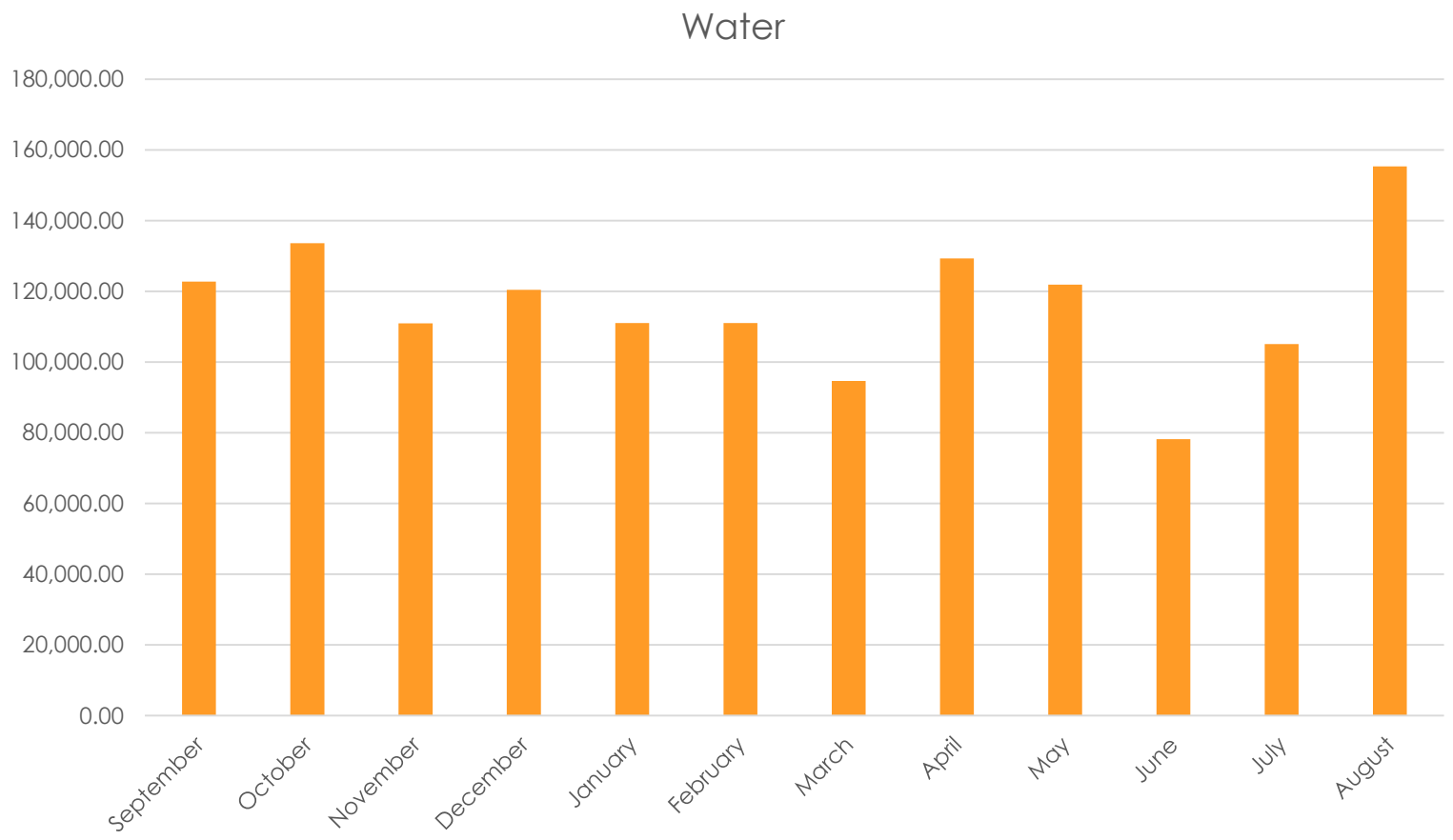




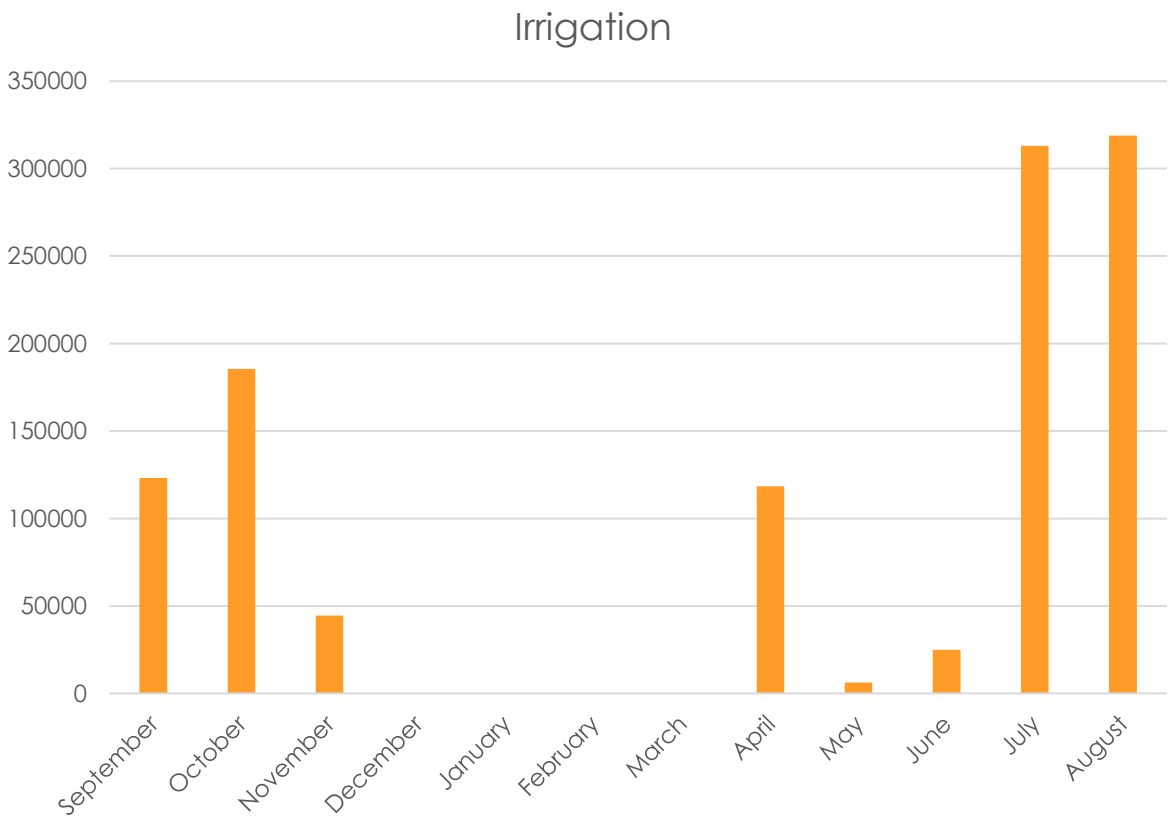


Cele Middle School | 2016 data

22 kBTU/ft²/year



Cele Middle School | 2016 data



Cele Middle School | 2016 data

OCCUPANT SURVEY RESULTS

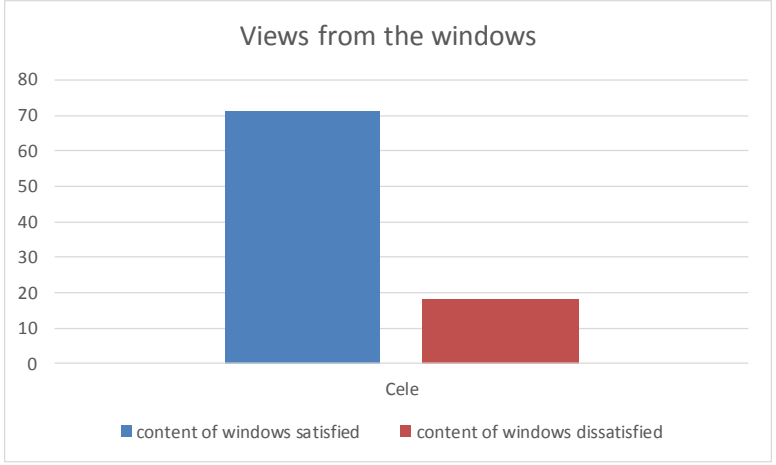
Cele Middle School had **100% participation** in their POE survey and **scored highly** in the following areas:

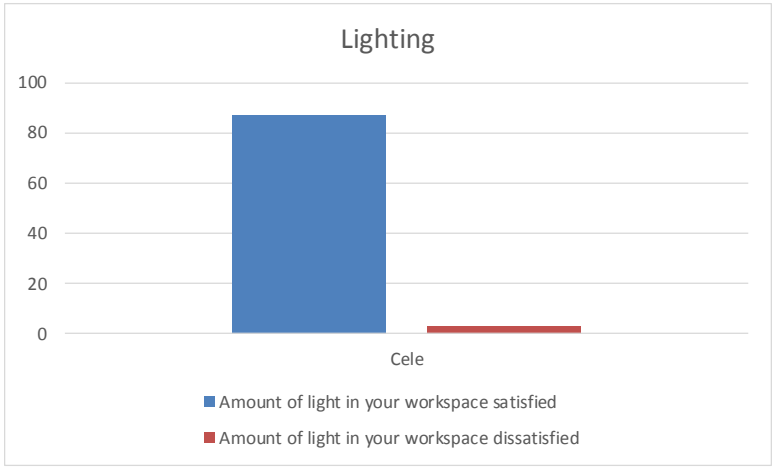
- Acoustic quality
- Office layout and furnishing
- General workspace satisfaction
- Lighting
- General building satisfaction

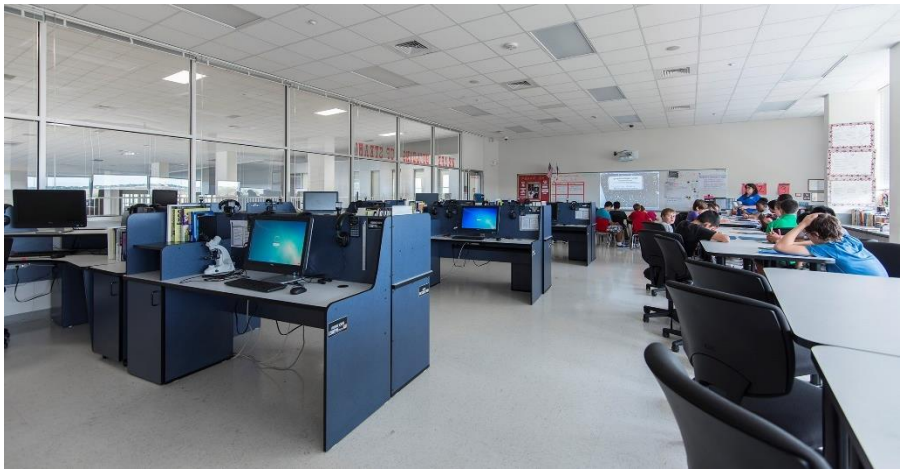
The most common issues identified in the POE by users' comments were visual privacy and thermal comfort.

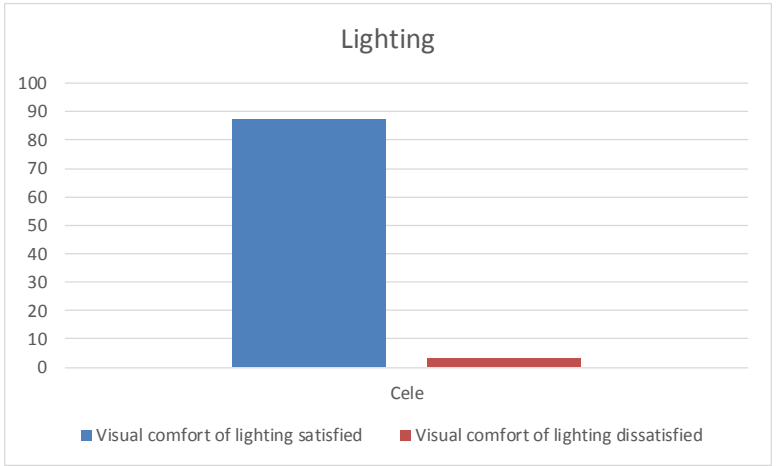
We heard quite a bit about visual privacy in both the classrooms and the offices. The classrooms were concerned about safety of the students during an active shooter scenario with the amount of glass into the corridors. The offices were concerned about visual privacy and confidentiality while conducting meetings.

In regard to thermal comfort, much of this is controlled by district driven decisions, such as how much thermal control the users have and when the units are operational.


Views from the windows
80
70
60
50
40
30
20
10
0
Cele
content of windows satisfied
content of windows dissatisfied


Lighting
100
80
60
40
20
0
Cele
Amount of light in your workspace satisfied
Amount of light in your workspace dissatisfied




Lighting
100
90
80
70
60
50
40
30
20
10
0
Cele
Visual comfort of lighting satisfied
Visual comfort of lighting dissatisfied