Business Case Analysis
for
E3/TASB's Efficient Buildings Program

Bellville ISD

September 2020

WE FOCUS OUR ENERGY
ON SAVING YOURS.

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The E3/TASB Team

Experienced

- 20+ Years Experience. We know your business.

Effective.

- Best Practices

Efficient.

- Yield the Best Value

We Work For You

- Peer driven program
- TASB & E3 align:
  - Serving TX ISDs
  - Experience, philosophy, & quality
- TASB commitment and impact to BISD

What is the Efficient Buildings Program? "Make the Most of Your Money"

- Identify – efficiency or deferred maintenance opportunities that if upgraded directly impact the learning environment

- Maximize – leverage already utilized Function 51 expenditures (M&O – utilities) into a funding source for current and/or future needs
  - Does not compete with classroom funding
  - Opportunity to re-invest in facilities when funding is scarce
  - District-wide impact

Program Process

- Understand the District's current energy profile and deferred maintenance needs
- Work with the District to prioritize:
  - Existing comfort issues
  - Maintenance challenges/deferred maintenance items
  - Energy savings potential
- Study District buildings for other needs and energy efficiency opportunities
- Clearly communicate results, ideas, and opportunities to staff, administration, and Board

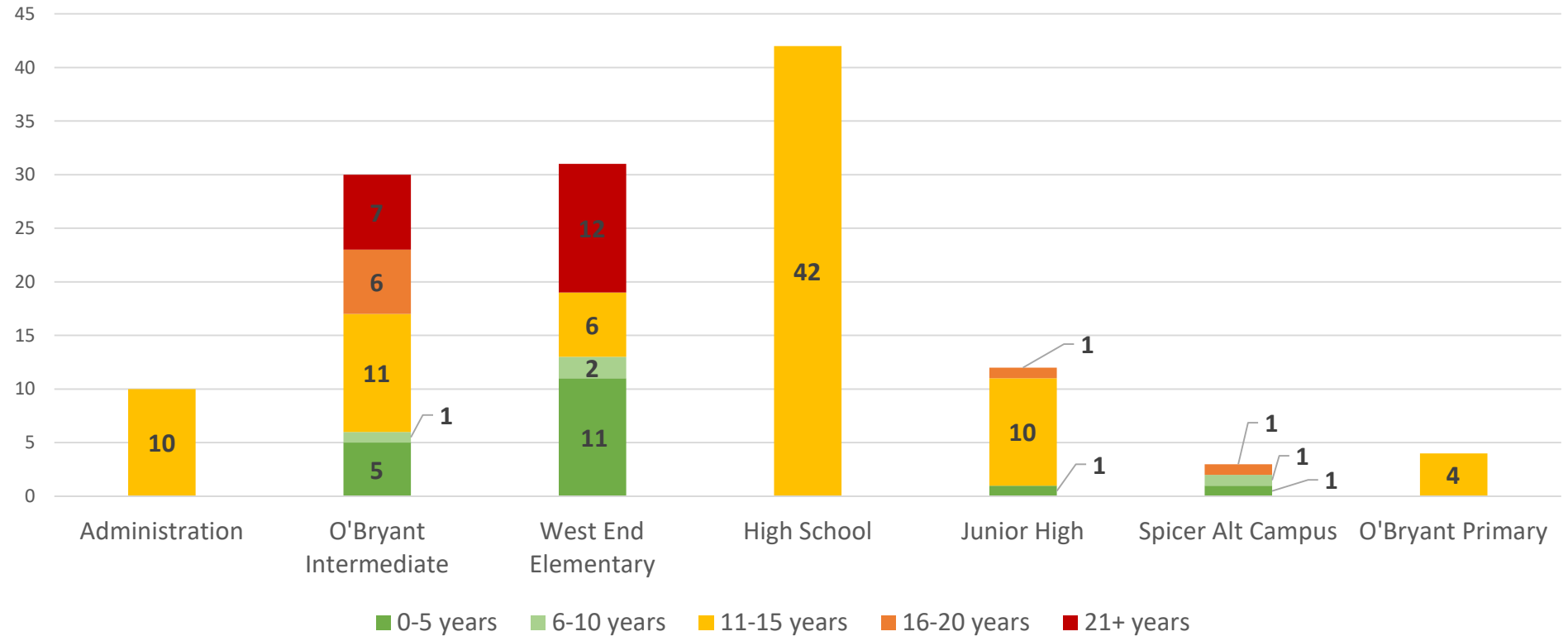
Comprehensive Approach- Our Expertise

Deferred Maintenance	Efficiency Opportunities
Things you have to do to maintain your buildings, and will save some energy when you do them	Things that you could do that would bring a return on investment over time by reduced energy costs
Pay for themselves over a long period of time	Pay for themselves over a shorter period of time

Dual Approach – Efficient Buildings Program

Deferred Maintenance

DX HVAC Equipment Age By Campus



The chart indicates the number of HVAC RTUs and Split System units in each age group at locations in the District.

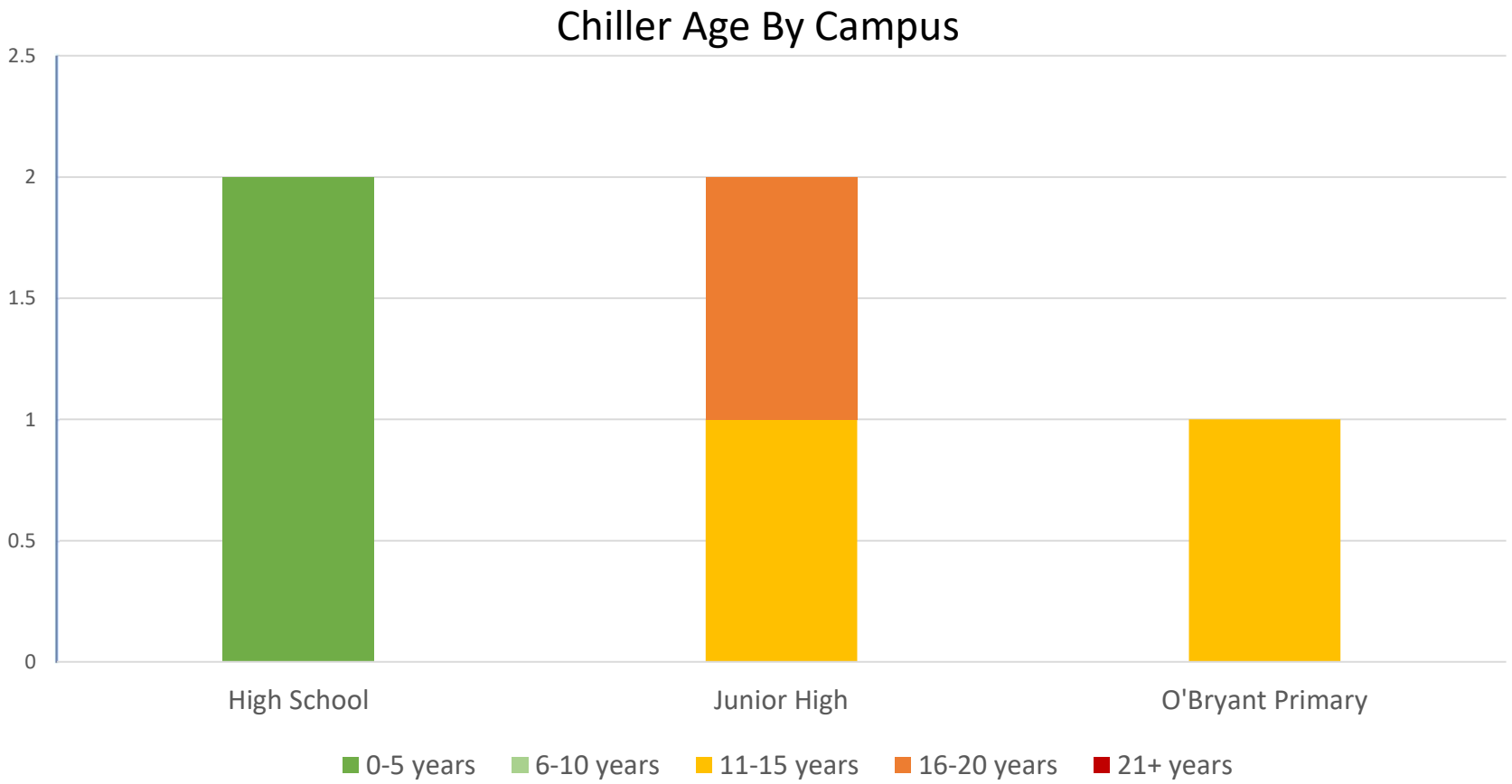
Dual Approach – Efficient Buildings Program

Deferred Maintenance

- 27 of 132 units are over 15 years old
  - Almost all at O'Bryant Intermediate and West End Elementary
- 57 of 83 units that are 11-15 years old are 14+ years old and should be considered for immediate replacement
- 110 out of 132 units are over 10 years old, District-wide

Dual Approach – Efficient Buildings Program

Deferred Maintenance



The chart indicates the number of Chillers in each age group at locations in the District.

Dual Approach – Efficient Buildings Program

Deferred Maintenance

West End ES Split System Units

Junior High RTU

Junior High Chiller

High School RTU

Junior High Boiler

O'Bryant Intermediate Split System

Dual Approach – Efficient Buildings Program

Deferred Maintenance

~$3M in HVAC Deferred Maintenance Needs

- Replace all HVAC equipment aged beyond useful life (15+ years old)
  - Junior High Carrier Chiller and Junior High Boilers; Convert Constant Volume to Variable Volume Pumping- ~$475K
  - RTUs and Split System Units at Junior High (1 unit) West End Elementary, O'Bryant Intermediate, and Spicer Alternative Campus- ~$400K
- Replace all HVAC equipment nearing end of useful life (14 years old)
  - Junior High Trane Chiller- ~$175K
  - RTUs and Split System Units at High School, Junior High, O'Bryant Intermediate, West End Elementary, and Administration Building- ~$1,950,000
- Bellville ISD should generate a priority list of HVAC replacements

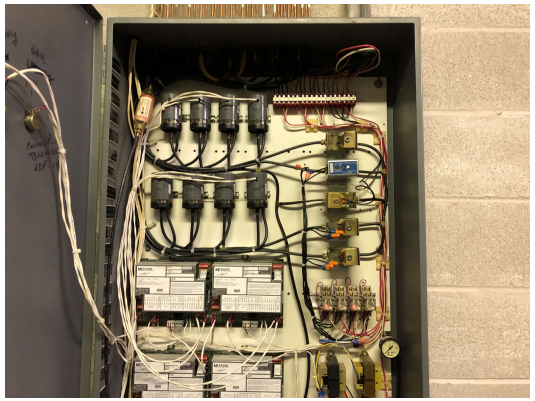
Dual Approach – Efficient Buildings Program

Efficiency Opportunities

Retrofit Fluorescent Lamps

Retrofit Compact & Incandescent Lamps

Retrofit Fluorescent Lamps



Replace Junior High Controls

RCx Existing JCI Controls

Update Carrier i-Vu

Dual Approach – Efficient Buildings Program

Efficiency Opportunities	
Annual Utility Savings	**% $ Savings**
$88,000-$118,000	**15%-20%**

- High Return on Investment (ROI)
  - LED Lighting
- Additional Savings Opportunities
  - HVAC Controls (Sequences, RCx, DDC)
- Further Consideration
  - Bipolar Ionization (OA reduction, Improved IAQ)

Additional Operational and Maintenance (O&M) savings are attainable due to material savings related to LED implementation (lamps and ballasts) but are not quantified in this projection.

Executive Summary-LED

Key Performance Metrics for LED lighting

$700K-$750K District-wide project

1. Eliminates ballasts in many applications-***substantial M&O savings*** through reduced maintenance labor and cost
2. 20-year warranty on tube lamps
3. Color quality closer to natural light spectrum
4. Far greater lumens per watt
5. Tube lamps are shatter resistant
6. Reduced flicker (learning and health benefits)

Executive Summary-Controls Upgrades

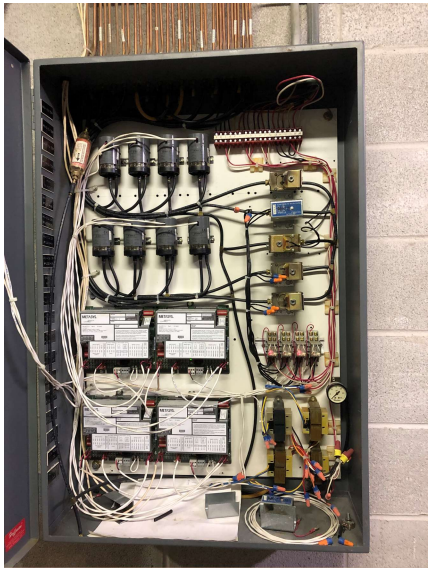
Approach for Controls Upgrades

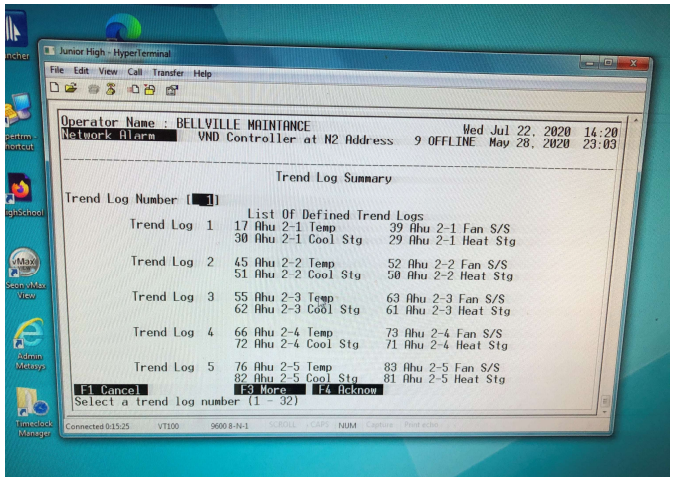
$1.1M-$1.2M District-wide project

- New DDC Controls at Bellville Junior High on Central Plant, AHU equipment, and DX Split System and Rooftop units- ~$325K
- Upgrade existing JCI controllers at O'Bryant Primary. Expand JCI control system to DX units currently operating with programmable thermostats at this campus- ~$250K
- Upgrade existing Carrier i-Vu system with new Carrier controllers at Bellville High School- ~$425K
- Optimize/Retro-commission existing Johnson Controls at High School, O'Bryant Intermediate, West End ES, and Admin Building. Networkable Thermostat solution for units at Spicer Alternative, or expand existing Carrier or JCI Controls to these units- ~$175K
- Annual energy savings- $25K-$30K

Executive Summary-Controls Upgrades

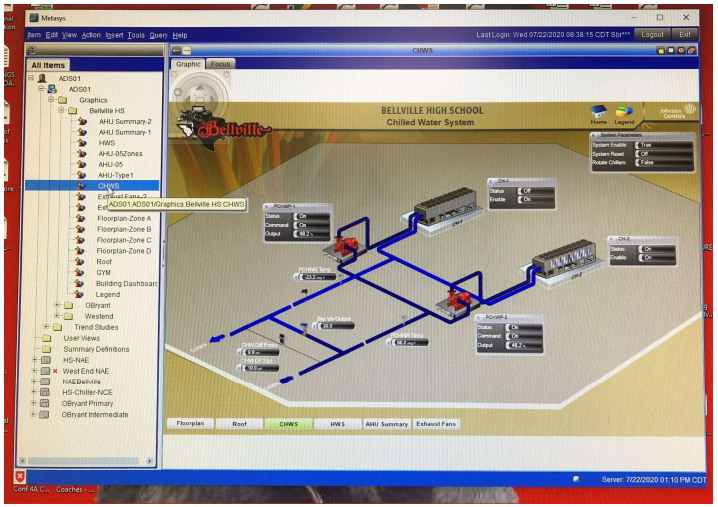
Replace Junior High pneumatic controls and JCI overlay to new DDC Controls





Executive Summary-Controls Upgrades

Candidates for Optimization/Retro-commissioning



Executive Summary – Strategy

"Not a one-size fits all approach"

Here's what we know…

- HVAC and controls needs exist and need to be prioritized by the District
- Energy savings can be achieved and leveraged
- The efficiency opportunities can bring additional benefits
  - Operational and educational

- This program makes sense for Bellville ISD if _____?
  - Self-funding – get what the project pays for
  - "Budget Certain" – minimize risk, budget over term
  - Combo – Fund Balance, M&O, I&S, state financing options; the options are endless

Financial Analysis –

What are Bellville ISD's Options

- *Energy* Only
  - Self-funding/positive
  - Enhance environment
- Budget Certain
  - Addresses oldest/worst condition HVAC
  - Upgrade older operational systems
- Comprehensive
  - Requires potentially large budget infusion annually; could utilize multiple funding mechanisms/multiple phases
  - Maximizes energy savings

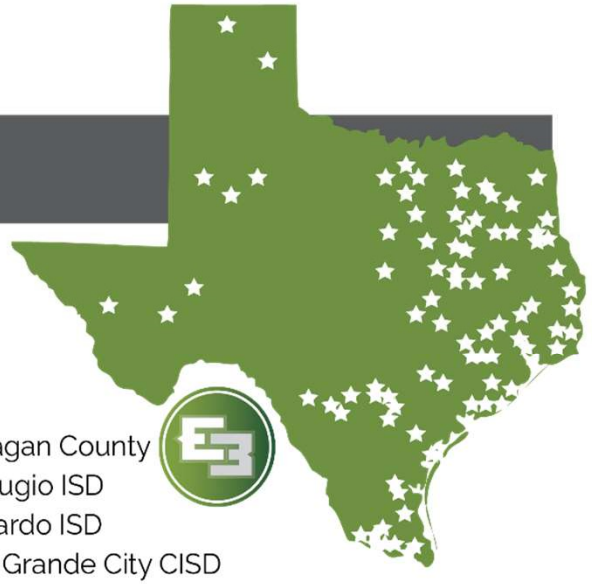
Executive Summary – Business Case

- Funding
  - Unlock already budgeted and annually spent dollars
  - Does not compete with classroom dollars for repayment
- Impact
  - Reduce the “debt” and “risk” of deferred maintenance
  - Potential to impact every student
  - BISD is in control of entire process
- Accountability
  - Single point for Design and Construction
    - No finger pointing
    - Speed
    - Product independent evaluation of effective solutions
  - TASB
  - Performance History of E3/TASB

Moving Forward

- Procurement- Issue a Request for Qualifications for a design-build firm capable of running program
    a) GC 2269 Subchapter G – Design Build Procurement
    b) Negotiate Project Development Agreement (PDA) with most qualified firm that represents best value – cents/sqft. contingent agreement to assess facilities and establish criteria to be met in final project
- Program Development – prioritize and develop scope and funding strategy for project that fits BISD's criteria
- Program Implementation – construct identified Deferred Maintenance & Energy Conservation strategies
- Performance Management -
    a) E3 - Develop ongoing performance management to track metrics and ensure success to BISD's desire – energy savings **Guarantee** can be provided at District's request

TEXAS REFERENCES



Allen ISD
Alvin Community College
Anderson–Shiro CISD
Aransas Pass ISD
Argyle ISD
Austin ISD
Axtell ISD
Balmorhea ISD
Bay City ISD
Bellevue ISD
Ben Bolt-Palito Blanco ISD
Big Sandy ISD
Bishop CISD
Blanco ISD
Bowie ISD
Brackett ISD
Brenham ISD
Broaddus ISD
Brooks Development Authority
Brownsville ISD
Bryan ISD
Bryson ISD
Buna ISD
Caddo Mills ISD
Caldwell ISD
Cedar Hill ISD
Celeste ISD
Center ISD
Charlotte ISD
Chico ISD
Charlotte ISD
Chico ISD
City Drug Store
City View ISD
Cleveland ISD
Columbia-Brazoria ISD
Community ISD
Cooke County
Corsicana ISD
Crossroads ISD
Cumby ISD
D'Hanis ISD
Dallas (City of)
DeSoto ISD
Donna ISD
East Bernard ISD
Eastland ISD
Edcouch/Elsa ISD
Edgewood ISD – East Texas
Edgewood ISD – San Antonio
Fayetteville ISD
Ferris ISD
Gainesville ISD
Galena Park ISD
Georgetown ISD
Goliad ISD
Gonzales County
Goodrich ISD
Granbury ISD
Granger ISD
Greenville ISD
Gruver ISD
Hallettsville ISD
Harts Bluff ISD
Hawkins ISD
Hearne ISD
Hemphill ISD
Hondo ISD
Houston Community College
Huffman ISD
Hull-Daisetta ISD
Ingram ISD
Iola ISD
Italy ISD
Jasper ISD
Jim Hogg County ISD
Jonesboro ISD
Katy ISD
Killeen ISD
Knippa ISD
Kountze ISD
Lake Worth ISD
Latexo ISD
LeTourneau University
Liberty ISD
Lipan ISD
Llano ISD
Lubbock ISD
Lyford ISD
Manor ISD
Marble Falls ISD
Marion ISD
McLeod ISD
Medina ISD
Memphis ISD
Mercedes ISD
Moulton ISD
Nacogdoches ISD
Needville ISD
New Boston ISD
New Diana ISD
Newcastle ISD
Newton ISD
Nocona ISD
Normangee ISD
Palo Pinto ISD
Pecos/Barstow/Toyah
Perryton ISD
Pilot Point ISD
Poolville ISD
Poteet ISD
Poth ISD
Quinlan ISD
Ralls ISD
Raymondville ISD
Reagan County
Refugio ISD
Ricardo ISD
Rio Grande City CISD
Robstown ISD
Rosebud-Lott ISD
Royal ISD
Rusk ISD
Sabine ISD
Saint Jo ISD
San Angelo ISD
San Antonio ISD
San Benito CISD
San Jacinto College
Sanger ISD
Santa Fe ISD
Seguin ISD
Shepherd ISD
Sierra Blanca ISD
Silsbee ISD
Skidmore-Tynan ISD
Snook ISD
Splendora ISD
Sudan ISD
Sundown ISD
Sweeny ISD
Texas Facilities Commission
Texas Southmost College
Tom Bean ISD
Trenton ISD
University of Texas HSC - San Antonio
Valley Mills ISD
Valley View ISD
Venus ISD
Vernon ISD
Vidor ISD
Warren ISD
Waxahachie ISD
Weslaco ISD
West Hardin CCISD
Westphalia ISD
Woodville ISD

Program History & References

The Efficient Buildings Program launched by the joint partnership of TASB and E3 in 2009 has completed projects with well over 100 Districts that addressed Deferred Maintenance and Energy Efficiency needs in Texas schools.

Experienced. Effective. Efficient.

The Efficient Buildings Program made it easy to place a complicated task in the hands of people I knew had the experience to see it through. – Dr. A'lann Truelock, Hondo ISD

E3/TASB Key Differentiators

TASB Efficient Buildings Program *(Exclusive Provider)*

Different Business Model vs. other Companies *(Unique, local, and focused)*

Solution Independent *(Best Products & Competitive Pricing)*

Personnel Qualifications *(Company & People)*

Marketing and Educational Opportunities

Texas K-12 Project Experience *(Unmatched)*

Campus Observations

Bellville High School

Area (S.F.)	**198,080**
Elec, Gas, Water	**$250,368**
Cost / SF (ECI)	**$1.26**
Use/SF (EUI)	**38,413**

- HVAC
  - Campus is served by air cooled chillers and DX package rooftop units. The entire chilled water system, piping, and air handlers at this campus were renovated in 2017.
  - The DX rooftop units were manufactured in 2006 and nearing the end of useful life expectancy (15 years). Consider replacing rooftop units with new, energy efficient units.
  - No mechanical recommendations for the chilled water system are included in this report.
- Controls
  - The chilled water mechanical system is controlled by Johnson Controls system. The DX rooftop units are controlled by the Carrier i-Vu control system. Consider upgrading Carrier i-Vu with new controllers and retro-commissioning existing Johnson Controls system.
- Lighting
  - Linear fluorescent T8 lighting technology in classrooms and linear fluorescent T5 lighting technology in gyms.
  - This campus could benefit greatly from an LED lighting retrofit.

Campus Observations

Bellville Junior High

Area (S.F.)	**88,436**
Elec, Gas, Water	**$104,116**
Cost / SF (ECI)	**$1.18**
Use/SF (EUI)	**40,865**

- HVAC
  - Campus is served by air-cooled chilled water system and gas boiler hot water system.
  - The chillers are 14 years old and 16 years old and should be considered for replacement.
  - Consider replacing the three-way valves with 2-way valves and installing VFDs on chilled water pumps to convert from constant flow pumping to variable flow pumping.
- Controls
  - This campus is controlled by pneumatic controls with an electronic “overlay” by Johnson Controls. The system is only accessible from one computer workstation using a dial-up modem and HyperTerminal interface. Consider replacing this control system with a new, open protocol (BACnet) DDC control system.
- Lighting
  - Linear fluorescent T12 lighting technology in classrooms and offices. Linear fluorescent T5 lighting technology in gyms.
  - This campus could benefit greatly from an LED lighting retrofit.

Campus Observations

O'Bryant Intermediate School

Area (S.F.)	**36,846**
Elec, Gas, Water	**$57,491**
Cost / SF (ECI)	**$1.56**
Use/SF (EUI)	**43,534**

- HVAC
  - The Intermediate campus is served by DX split system units and DX package rooftop units for the cafeteria building.
  - Nearly half of the units have aged beyond useful life (15 - 30 years old) and should be replace with new, energy efficient units.
- Controls
  - Equipment at this campus is controlled by the Johnson Controls system.
  - Retro-commission existing system to optimize the controller programming and correct communication issues.
- Lighting
  - Linear fluorescent T8 and T12 lighting technology.
  - Campus could benefit greatly from an LED lighting retrofit.

Campus Observations

O'Bryant Primary School

Area (S.F.)	**65,596**
Elec, Gas, Water	**$88,378**
Cost / SF (ECI)	**$1.35**
Use/SF (EUI)	**39,118**

- HVAC
  - Campus is served by air-cooled chilled water system and DX packaged rooftop units.
  - Packaged rooftop units and chilled water mechanical equipment were manufactured in 2008 and still within the useful life expectancy. No HVAC recommendations for this campus are included in this report.
- Controls
  - Chilled water system controlled by JCI controls. Consider upgrading the system with new controllers and expanding the existing control system to DX units currently operating with programmable thermostats.
- Lighting
  - Linear fluorescent lighting technology.
  - Campus could benefit greatly from an LED lighting retrofit.

Campus Observations

West End Elementary School

Area (S.F.)	**35,584**
Elec, Gas, Water	**$36,376**
Cost / SF (ECI)	**$1.02**
Use/SF (EUI)	**32,886**

- HVAC
  - Campus is served by DX split system units and packaged rooftop units. New packaged rooftop units were installed at the time of this study.
  - Twelve of the HVAC units have aged beyond useful life (20+ years old) and should be replaced with new, energy efficient units.
- Controls
  - Units controlled by the Johnson Controls system. Consider including this campus in retro-commissioning for optimized unit operation.
- Lighting
  - Linear fluorescent lighting technology.
  - Campus could benefit greatly from an LED lighting retrofit.

Campus Observations

Spicer Alternative Campus

Area (S.F.)	**7,860**
Elec, Water	**$5,543**
Cost / SF (ECI)	**$0.71**
Use/SF (EUI)	**19,299**

- HVAC
  - Campus served by DX split system units. Two of the split system units are still with useful life expectancy, aged 4 and 7 years.
  - One unit has aged beyond useful life (19 years old) and should be considered for replacement with a new, energy efficient unit.
- Controls
  - Equipment is controlled by programmable thermostats. Consider a networkable thermostat solution for remote control of occupied schedules and more efficient unit operation.
- Lighting
  - Linear fluorescent lighting technology.
  - Campus could benefit greatly from an LED lighting retrofit.

Campus Observations

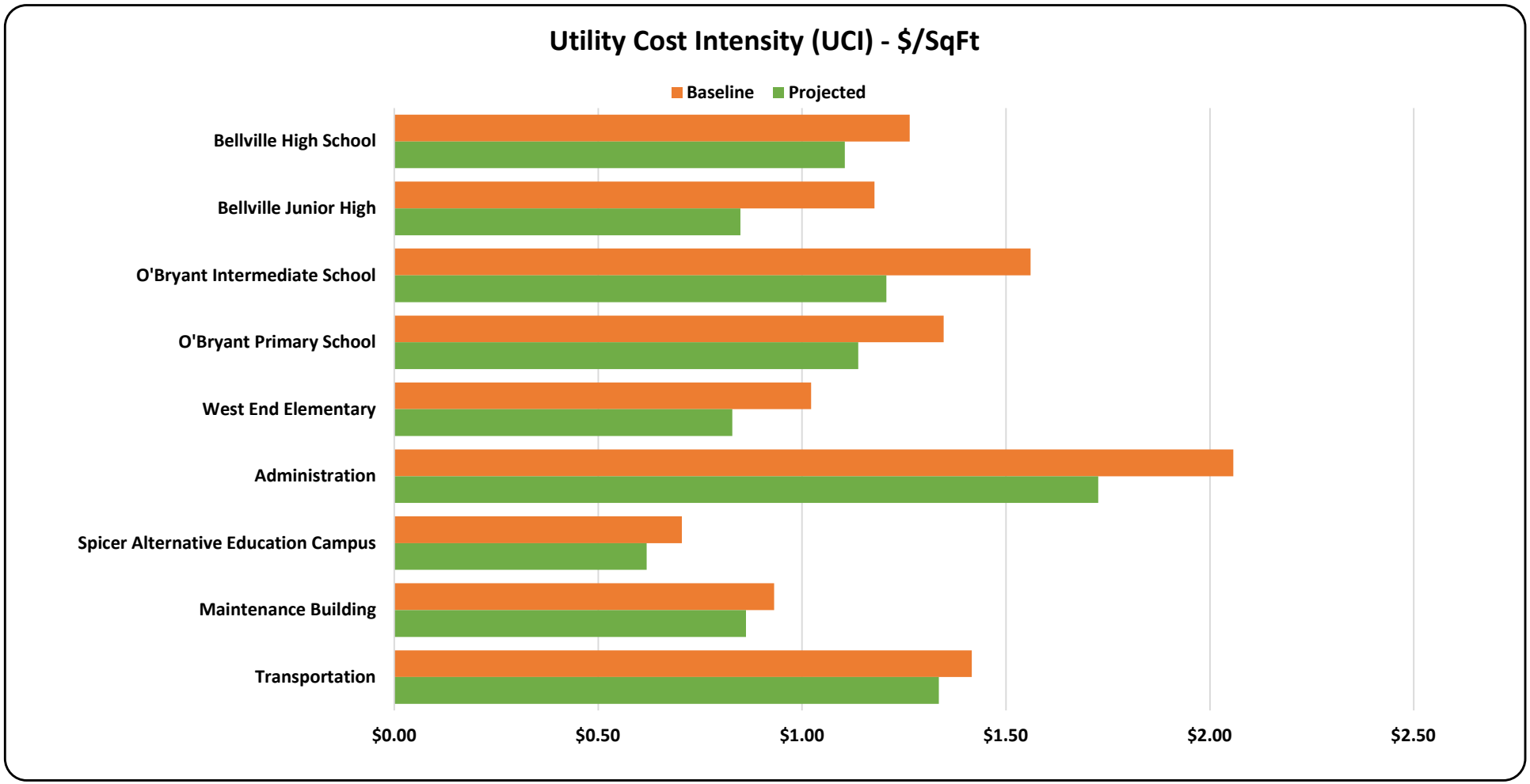
Administration Building

Area (S.F.)	**14,754**
Elec, Gas, Water	**$30,351**
Cost / SF (ECI)	**$2.06**
Use/SF (EUI)	**49,594**

- HVAC
  - Administration building is served by DX packaged rooftop units. Units are nearing the end of useful life expectancy (14 years old) and should be considered for replacement.
- Controls
  - Units at this building are controlled by the Johnson Controls system. Consider including this campus in retro-commissioning for optimized unit operation.
- Lighting
  - Linear and compact fluorescent lighting technology.
  - Building could benefit greatly from an LED lighting retrofit.

Campus Observations

Cost / SF (UCI) Summary



Campus Observations

Use / SF (EUI) Summary