The design guidelines, which follow, are intended to supplement the Educational Specifications and State Requirements for Educational Facilities (SREF). ***All electrical service (temporary, new, disconnection of existing, upgrade of existing, energizing new and existing) shall be coordinated and reviewed by JEA (Jacksonville Electrical Authority). The Design Professional must submit plans and load calculation to JEA's Staff during the design process for review, since the district is exempt from pulling permits with JEA. The Districts Construction Pm will provide the standard letters for the referenced JEA activities to the construction team at the preconstruction conference for the construction contractor's to coordinate all JEA activities and task on the projects. JEA will supply all conduit and transformer pads leading from the street, point of existing electrical service to the transformer pad. The contractor is responsible for the installation of conduit, transformer pad , grounding of transformer pad and conduit, conductors (wire) from the new switch gear to the transformer pad. JEA with pull service from the street to the transformer pad and will make all terminations to the transformer***. Materials to /or types of equipment shall be as follows:

Wire shall be copper only.

Grounding:

All grounds connected to ground rods shall be cad welded regardless of system they are connected.

Conduit:

Above grade shall generally be electrical metallic tubing, flexible metallic tubing or liquid tight flexible conduit. Where exposed to weather, conduit above grade up to 48" AFF shall be galvanized rigid metal conduit. Where exposed to Abuse, conduit above 48" AFF shall be galvanized rigid metal conduit. Rigid Metal conduit shall be painted w/non-corrosion paint where enters the earth.

Underground electric service conductors (primary or secondary) shall be installed in accordance with JEA requirements and be encased in concrete with a minimum three-inch envelope when located outside of the building. Underground secondary feeders located outside of the building shall be installed in PVC encased in concrete or rigid galvanized metal conduit. Underground branch circuits shall be installed in either PVC or rigid metal conduit. All underground conduit located outside of the building, regardless of conduit material (metallic or non-metallic) shall have a stainless steel locator wire #12 gage installed. Locator wire shall be securely terminated at all ends where the piping rises above ground and phenolic nameplates shall be permanently secured beside terminations with a brief description of the wiring service and where it extends. (no conduit be attached to the underside of the metal roof deck or that the conduit be at least 3" below the deck).

All wiring and cables that are to be buried, shall be installed conduit regardless of code minimum requirements. (Irrigation sprinkler wires are the only exception)

At no time shall conduits be secured/supported by metal ties that are a part of or not part of the ceiling system. The conduit shall be attached directly to building structure or racked on "unistrut" and strapped accordingly. (Reference article 300.11 NEC)

Where conduit is required to be installed surface mounted in finished spaces, a wire mold type of raceway having a finished appearance shall be utilized. Exceptions may be granted in cases where installation of surface mounted EMT would not detract from the appearance of the space. All anchors shall be metal expansion type.

PVC is not acceptable..

Junction boxes shall be specification grade all metal. Fittings shall be compression type specification grade steel and not die- cast.

Over current protection shall be by means of circuit breakers. Electrical service capacity and unused space for future circuits in distribution panels shall include a minimum of 30% spare capacity with no reduction of neutral conductors. Recommended manufacturers are Cuttler Hammer, Siemens, GE, and Square D. Digital power meters shall be provided in the main switchgear on services 1600A or larger. Each sub-panel distribution type shall have a service entrance disconnect, can be the distribution panel or panelboard with a main circuit breaker.

Switches and receptacles shall be heavy-duty specification grade general purpose. Receptacles shall be rated 20A minimum. **Switch and receptacle cover plates shall be stainless steel**. Plastic or nylon cover plates are not acceptable. In the area of a cooling tower or where condenser water chemicals are stored, electric enclosures, disconnects, etc. shall be properly protected against corrosion and should be NEMA 4X.

NOTE: Panels and breakers must be pre-approved by DCPS Maintenance Electrical Foreman.

NOTE: When occupancy sensors are used, Acceptable Brands:

- **Hubbell DT2000**
- **Leviton 001-ODS10-IDI**
- **Watt-Stopper**

Floor electrical outlets are not allowed unless approved by the Owner. If approved, floor electric power and communication receptacles in dry floor areas shall be of the recessed electrical box type in which only electrical cords extend above the floor, similar to Steel City #664 Box with appropriate receptacle outlets. In computer room retrofit applications; utilize power poles with outlets installed within carousels in lieu of cutting slab on grade floors. Floor receptacles in a grid layout is not acceptable, use power poles.

Switchboards: Refer to Paragraph 3.4 above for requirements for spare switchboard electrical service capacity and unused circuit breaker spaces for future circuits, and acceptable switchboard manufacturers. Install spare circuit breakers in the spaces as directed by the DCPS maintenance electrical foreman. New switchgear and/or generators

for facilities located east of the intercostals waterway shall be inside existing building. New construction to house switchgear/generators shall be inside the building in dedicated rooms. Switchboards shall have copper bussing.

Panelboards refer to paragraph 3.4 above for requirements for space capacity and unused circuit breaker spaces. Panelboard shall have copper bussing. Provide (6) six spare ¾" C. from recessed Panelboards to (6") six inches above accessible ceiling. Panelboards dedicated for computer circuits shall have a 200% rated neutral bus.

End Use 3-Phase Monitors – Should be used on all HVAC components with 3 phase motors rated at 5 HP and above

Lighting shall be in accordance with the following:

Special attention shall be given to the placement of light fixtures, such that accessibility to the fixtures for maintenance and repair may be accomplished without the use of specialized equipment (motor lifts, scaffolding, ladders in excess of 8', etc.). When fluorescent Light Fixtures in sports areas, such as gyms or garages, equipment rooms and storage areas are used, fixtures required Lexan lens and metal cage protection to contain light bulbs, to protect the students/staff from equipment/materials impacting bulbs and bulb particles raining down on occupants or participants. Classroom and other interior lighting shall be 25-Watt, T-8 energy efficient flush-mounted fluorescent fixtures. Fixtures should be selected to use standard four feet lamps, "U" lamps and PL compact fluorescent lamps shall not be used. Computer classrooms shall have parabolic light fixtures with switching to provide two light levels to reduce glare on display screens. Incandescent light sources may only be used on the stage and other locations where the lighting system is required to be incandescent due to dimming or theatrical floodlight requirements. Classrooms and other spaces, which may utilize audio-visual equipment, shall have one or two fluorescent light fixtures on a separate switch for use when low light levels are required. However, all areas including the stage area shall be provided with efficient general purpose fluorescent or H.I.D. lighting systems, which may be used when the incandescent lighting effect is not required. Where incandescent lighting is provided, its switches and controls shall be separate and relatively inaccessible as compared to general-purpose light switches in order that they will not be switched on except when actually required. Design Professional shall exercise care in the design, layout and installation of lighting fixtures in suspended ceilings to ensure proper fixture support. Lighting fixtures in suspended inverted T-bar grid systems shall be supported from main runners only.

Fluorescent light fixtures in projects that are to have a large number of new light fixtures shall be equipped with T-8 lamps and matching high efficiency electronic ballasts. Ballasts shall be the passive type with a harmonic distortion less than 20%, have a 5-year warranty and be manufactured by a large stable company equal to Magnetek or EBT. Fixtures may be tandem wired to a single ballast but lamps shall be parallel wired so that only one lamp will go out at a time.

Emergency lights installed in classroom, corridors and office areas shall be provided with high quality relay interlocks in order that they will not operate 24 hours per day. Lighting

fixtures that are dedicated for emergency lighting duty only are not desired. If emergency light fixtures provide general-purpose lighting, they should be interlocked so as to turn on and off with the general-purpose lights. The only exception to this is that a single 24-hour night-light shall be provided just inside each entrance to the school and just inside each large space as required in order that staff may see to enter and turn on lights. Where no generator is installed emergency lights shall be of the wall/ceiling battery type. Emergency battery packs in fluorescent light fixtures is not acceptable.

Exit lights shall be Direct View LED Letters (not back lit single tube)type as manufactured by Exitronics 500 or 600 series and/or approved equal. Housing shall be heavy-duty steel construction and not plastic. Care shall be taken in the mounting of exit lights, particularly in spaces with high ceilings, to ensure compliance with code requirements.

Exterior lighting should be provided for security and safety. Each exterior door shall have a security light located above the entry. Landscape and/or architectural accent lighting should not be provided. High pressure sodium floodlights are preferred. Exterior lighting should be shielded when adjacent to residential areas to keep the light within the boundaries of the site. Exterior lighting shall be provided with series photocell and seven-day time clock (with backup power) control (photocell on, time clock off).

Parking lot, site and athletic field light poles shall be concrete. Athletic field light poles may be galvanized steel if construction is equal to Musco Sports Lighting. Parking lot lights shall be provided on separate time clock circuits from building security lights. Where concrete poles are used a lighting arrestor shall be mounted at the top of the pole with a dedicated down conductor to a ground rod. Ground rods shall be installed at all poles. The service connection to the pole shall be made on or in the pole. A junction box at ground level or below is not acceptable. All ground rod connections, regardless of system (FA-CTV-Phone) shall be CAD-Welded. **NOTE: The support poles mounted to Electrical Distribution Panels should be concrete. Prefabricated poles are acceptable.**

Exterior lighting and interior lighting in spaces such as showers shall be vandal proof and weatherproof. Locker room lighting shall be vandal proof.

Athletic field lighting systems with accessible ballasts and multi-level lighting in, equal to Musco Sports Lighting, are preferred. Gymnasium lighting ballasts shall be wall mounted and accessible without a ladder and athletic field lighting ballasts shall be accessible using a twelve-foot ladder.

Gymnasium lighting shall be T-5 type fixtures to be approved by the DCPS before installation. Fixtures shall be rigidly mounted/supported to building structure or a support system constructed approved by the DCPS before installation. Lighting should provide minimum 80 foot candles at floor. T-5 fixtures to be energy efficient flush-mounted fluorescent fixtures with UV Lexan lens over T-5 bulbs and metal light fixture cage to protect from fixtures from impact.

All wiring and cable shall be installed in conduit regardless of whether the conduit is required by code or not. This includes all wiring and cable installed for communication systems including fire alarm, intercom, CCTV, telephone, data, security, energy management, etc. Communication system panels should be located in chase walls with access panels on the back side to facilitate service and future modifications. In additions and in separate buildings on a school campus, separate communication cabinets shall be provided which home run to head end equipment (phone, intercom, TV, computer LAN, etc.).

An insulated "green" ground conductor shall be installed in all raceways. Metallic raceway shall not be used as the ground even though use of the raceway may be allowed by code.
Note: Electric Hand Dryers shall only be used in the "Sandalwood Style or Fort Caroline Middle school Style" bathrooms unless DCPS approved.

Emergency power

Shall be from an LP gas-fired emergency generator system. Battery-inverter back-up power shall not be provided for emergency lighting systems. Emergency generators shall be provided with their own above-grade storage tank and both the generator and tank shall be located within a fenced or brick screen enclosure with locking gate. Generators shall have a stainless steel muffler and exhaust system. Generators located outside shall have a stainless steel cover. Generators located between the beaches and the intercoastal waterways, shall be enclosed completely in stainless steel. In the event the generator does not function properly when required by its exercise timer, a flashing light shall be energized which clearly brings attention to the need for service. The service light may be located in the administrative area or mounted on a pole beside the generator. In any event, a sign shall be provided beside the trouble light indicating emergency power malfunction and the appropriate Duval County School Board Maintenance telephone number to be called. The emergency lighting system shall include emergency lights at the emergency generator, emergency panel and at the main switchgear. In addition to emergency lights, the emergency power system shall power any telephone systems not powered by the telephone company, two receptacles in the kitchen for disaster/shelter use, and system control panels for public address systems. Fire alarm, energy management and security systems should not be installed on emergency power if they have their own back-up battery system since emergency power is typically poor quality and creates operational problems for electronic equipment. These systems should be provided with their own dedicated power branch circuit. Emergency generators shall be Kohler, or Onan. Design Professional shall exercise care in the location of the emergency generator and LP gas storage tank to ensure compliance with SREF and NFPA requirements but in no case shall they be separated by less than ten feet. Provide a 110 VAC convenience outlet in the enclosure for service. Enclosure shall be a wall of permanent construction (not a fence).

NOTE - GENERATORS: Normal power feed to transfer switch shall be connected to the load side of building main disconnect. Feeder circuit breaker with mounting hardware shall be provided at main switchboard. Do not install circuit breaker or disconnect switch ahead of building main (line side of circuit breaker).

Lightning/surge suppression equipment shall be provided at the service entrance and on branch circuits serving electronic equipment such as fire alarm, security and energy management systems,

telephone systems powered by building power and computer room outlets.

The surge suppression equipment shall meet or exceed the minimum performance criteria as follows:

EQUIPMENT TYPE	MINIMUM TOTAL SURGE CURRENT (Amps/Phase)	CAT	SYSTEM MAXIMUM RESPONSE TIME IN NANOSECS	COMPONENT MAXIMUM RESPONSE TIME IN NANOSECS	
SERVICE ENTRANCE 1600 amps and larger	300,000	C3	6	1	
SERVICE ENTRANCE under 1600 amps	150,000	C3	6	1	
DISTRIBUTION 800 amps to 1600 amps	150,000	B3	6	1	
DISTRIBUTION 200 TO 700 amps	120,000	B3	6	1	
PANELBOARDS less than 200 amps	60,000	B3	6	1	

Lighting/surge suppression shall be provided for all low voltage systems that leave or enter a building.

Electrical outlets shall be provided as follows:

Weatherproof duplex 110V electrical outlets shall be located on exterior walls at approximately 150 feet apart, adjacent to major mechanical equipment and adjacent to the kitchen service entrance.

Convenience outlets for servicing equipment shall be located in an area adjacent to or accessible from exterior air conditioning units and in mechanical equipment rooms.

Duplex 110V electrical outlets with G.F.I. shall be provided at water coolers; within 3'-0" of sinks and in all restrooms. All GFI outlets shall be labeled “GFI protected”.

Electrical outlets shall be provided above all work counters.

Duplex 110V convenience outlets shall be provided along each wall of instructional areas per SREF and as specifically required by room equipment layouts. Provide at least two (2) circuits per classroom with 3/4" conduit to panel board.

Electrical outlets shall be provided every 50 feet in all corridors.

Provide special outlets and dedicated circuits for copy machines and other unique equipment, (i.e. soda, candy machines).

Provide at least six (6) circuits to any Teacher's Lounge.

Provide additional dedicated circuits for microwaves, refrigerators and coffee machine whether shown or not on architectural drawings in teacher lounge.

Receptacles shall be ivory in color unless noted otherwise.

Provide dedicated circuits (with a maximum of three (3) computers per circuits. Minimum conductor size for computers shall be #10 AWG.

Computer receptacles shall be of a different color than all other receptacles.

Fire alarm

Systems shall be provided in accordance with the following.

Code Enforcement requires that all new Fire Alarm System installations have a backup line for monitoring fire. All new security panels are rated to monitor fire and they are capable of accepting a 2nd phone line. We are requiring that there is adequate pairs of phone lines to the new fire alarm system to accommodate both phone lines and are going to supply the backup line and we need the A/E to specify tying the line into the security alarm panel and with the required programming.

Heat detectors shall be provided where code (SREF) will allow use of either a smoke or heat detector.

An exception to the preference for heat detectors is in areas critical to the operation of the school such as administrative office space, media center, cafeteria and all other critical spaces. Ceiling-mounted smoke detectors in critical, unoccupied spaces shall be provided for early alarm detection. These smoke detectors shall be provided regardless of code requirements. Use Heat tape at in accessible areas

Be an "addressable" system, whereby the device in alarm may be determined from the system panel in those applications. Addressable systems should have a display that reads English rather than codes. Furthermore, an "addressable"

system must be such that the individual devices communicate with the control panel via a digital protocol.

Detectors located in relatively inaccessible remote locations (such as above ceilings) must have an alarm light visible from a walk-through inspection.

A framed miniature floor plan of the school shall be provided adjacent to the fire alarm panel, which shall indicate zone and/or device locations and be coordinated with the fire alarm display panel.

Have single action type pull stations with a “Stopper II” alarmed within cover.

Fire alarm system wiring shall be installed in conduit.

All fire alarm circuits entering and/or leaving the building shall be protected by surge suppression. Surge suppression manufacturer shall be DYTEC.

All fire alarm panels and terminal cabinets shall be provided with a #6 AWG copper ground wire and a ground busbar.

The following wire gauges and color codes shall be followed:

Addressable circuits – 16 gauge	Red + Black –
Signal Horn – 12 gauge	Red + Black –
Power – 14 gauge	Red/Black + Black/Red –
Strobe – 12 gauge	White + Purple –
Fan Shutdown – 14 gauge	Brown + Orange –
Door Holder – 14 gauge	Pink + Gray –
Zones – 14 gauge	Blue + Yellow-

Portable classrooms shall be provided with addressable type fire alarm devices.

Exterior mounted notification appliances shall not be permissible.

The fire alarm panels point or zone capacity as well as the horn power circuit shall include the capability for 20% expansion. Having two separate fire alarm panels “cross-connected” is not an acceptable method of accomplishing this goal.

Fire alarm manufacturer shall provide on site, unlimited program changes and technical support for the system at the owner's request at no additional charge. Technician shall be NICET certified .

Acceptable fire alarm system manufacturers: SIMPLEX TIME RECORDER COMPANY. Substitutes will not be considered, unless approved on a project by project bases by the district Maintenance and Facilities departments.

An intercommunication system with integrated Bell system shall be provided in accordance with the following:

All areas shall be served by a two-way intercommunication system, unless otherwise specified.

Intercom system shall be microprocessor controlled without utilizing switch banks.

Provide a sound console, with a minimum 20% spare capacity for future expansion.

Inter connected to phone system for each classroom.

Provide a Phone jack with tamper proof box (interconnected to intercom) for announcing buses at the bus loading zone.

Provide Exterior mounted speakers.

The system shall provide class change bell tones throughout the intercom speakers.

All intercom circuits entering and leaving the building shall be protected by surge suppression. Surge suppression manufacturer shall be Dytec.

Intercom shall be DuKane, Bogen or Rauland.

Consult Data, Voice, and Video Structured Wiring Standard. All Trunk feed must be multi pair installation.

Television distribution system shall be provided where required in accordance with the following: Shall be interconnected with intercom system.

A central cable television system shall be installed with an outlet in each instructional area. Outlet shall be mounted at 18" to 84" AFF, depending upon the environment; no wall-mounted televisions will be allowed in classrooms.

Multiple system outlets shall be provided in the media center and other gathering areas Including the auditorium, cafeteria, gymnasium, faculty workroom/lounge, and administrative Office area. A television bracket, able to support a 25" receiver shall be provided in all none

classroom spaces with system outlet installed adjacent to bracket.

Provide for a least two in-house closed circuit television channels with a primary input Located in the media center, and secondary inputs located in other potential origination areas including the auditorium, cafeteria, and gymnasium.

On new schools and on additions, single channel modulators shall be provided for channels 2,3,4,5,6,14,15, two in-house channel and distribution of local cable spectrum.

Underground conduit shall be provided from the property line (with approval from the cable provider) to an area such as a mechanical or electrical room identified as the systems head-end location with conduit continuing to the media center. This conduit is for future cable television connection with control from the media center. The head-end area, preferably adjacent to the media center, should be of sufficient size to house the necessary equipment.

12.6 Demo all abandoned television antennas, towers, distribution equipment, cabling, outlet boxes, etc.

12.7 Contractor shall provide a minimum of four (4) commercial grade VHS VCR's and two (2) DVD players.

12.8 Consult Data, Voice, and Video Structured Wiring Standard and TV bracket mounting standards.

Provision for telephone service shall be in accordance with the Data, Voice, and Video Structured Wiring Standard

Security systems shall be in accordance with the following:

A complete and operational security system shall be provided for new schools and additions as a scope of the construction contract. Prior to the design of the security system and empty conduit system, the design professional shall determine system requirements through consultation with the DCSB Director of Security.

All security system wiring shall be installed in conduit.

Contact points shall be provided on every exterior door and doors to computer labs, administrative offices, food service areas, exterior storage and audio-visual storage rooms. Dual technology motion detectors shall be provided in corridors and in critical areas such as administrative offices, media center, kitchen, computer labs, etc. Additional security devices shall be provided in locations containing high value equipment and as required by the school principal and DCPS director of security.

Door frames in new construction, which are to have security contact points, shall be factory prepped to accept concealed devices. Preparation shall include the

fabrication of an integral junction box to which concealed conduit and wiring may be terminated and which will accept the concealed contact device.

Security systems shall be designed with zones, which will enable portions of the school to be armed and disarmed independently of one another. Security system keypads shall be provided in administrative offices, in the kitchen and in other strategic locations for arming and disarming the system or individual zones. Security system keypads, which are located in areas accessible by students, shall have keypads located in flush-mounted stainless steel enclosures. Enclosures shall have a hinged door, which will accept a standard lock cylinder in order that the same keys which open doors may be used to open the enclosures. Enclosures shall be equal to Pilla Electrical Products Model PIL6.5122FLSS HCRB.

The Security Control Panel shall be Ademco Vista 127FB (12 volt version), no substitute allowed.

Consult DCPS Security System Retrofit Standards.

Approved alarm installation contractors for DCPS security systems are: ADT Security, Certified Security, Securitylink, Systems Technologies and Access Limited.

Door frames in new construction or door/frame replacements, which are to have security contact points, shall be factory prepped to accept concealed devices. Preparation shall include the fabrication of an integrated junction box to which concealed conduit and wiring may be terminated and which will accept the concealed contact device. Further details are included in the security specifications. Details shall be noted on the door schedule.

Data, Voice and Video Structured Wiring, A Data, Voice and Video Structured Wiring System shall be provided. All requirements for the Data, Voice and Video Structured Wiring System shall be coordinated with DCPS Data, Voice and Video Structured Wiring Standard. Coordinate with Intercom System, Television Distribution System and Telephone System requirements.

END OF SECTION 16000