BASIS OF DESIGN – ARCHITECTURAL
Dirksen Elementary School Annex

50% Schematic Design Submission
11.02.2018

Project Description

The Dirksen ES Annex project is a planned Annex (addition) to the existing Everett McKinley Dirksen Chicago Public Elementary School and original annex located at 8601 W. Foster Ave. Chicago, Illinois 60656.

This Annex (addition) to the existing building is conceived as a permanent solution to address overcrowding and to eliminate the use of temporary mobile classrooms (modular). The "Linked Annex" provides expanded program space with contiguous weather-protected connection to the existing building. The design of the new Annex and site improvements strive to provide spaces which can contribute to ensuring that every child is educated and prepared for success; the ultimate goal of CPS. In order to achieve this goal, the building and site design seeks to provide a non-institutional child-centered learning environment that can foster integration and cooperation among students, encourage learning through an array of spaces and visual connections, allow for interactive play and learning, and encourage independence of students. Importantly, the architecture should have an inherent and understandable order and offer visual cues and orientation aids for all students.

The building and site will be designed and constructed to achieve a LEED v4 for Schools Silver rating for the Annex components as defined by the U.S. Green Building Council. Requirements for green building items that are part of the LEED process will be incorporated into the drawings and specifications to provide direction to the construction team. Given that the project meets the mandated Planned Development thresholds, the project will also be required to meet the City of Chicago Department of Planning and Development Sustainability Matrix Requirements.

Furthermore the project shall comply, in all respects, with requirements of the CPS Design Guidelines including all amendments and memoranda. Deviations, where required, shall be requested in writing. Additional specifications, where required, shall be authored by the design team to support the objectives of the project. Additional specifications shall be presented to PBC & CPS representatives as the design is developed.

Programming: The specific spatial programming requirements are as follows:

New Annex:

- 4-hour fire-separation vestibule on first floor
- (18) New Academic Classrooms, approximately 760 GSF each
- (4) special needs (servicing 3 different age groups) 760 GSF each
- (2) science classrooms w/ storage 1080 GSF each
- (2) computer classrooms 1040 GSF each
- (4) Pre-K & K classrooms 1180 GSF each
- (2) Administrative offices remote from main school office, approximately 150 GSF each
- (1) student dining room 4,650 GSF
- (1) Kitchen prep. And servery 1,890 GSF
- (1) Dining storage and accessory spaces for kitchen staff 1,350 GSF
- (1) Library 2,280 GSF
- (1) MDF/IDF (CPS stated this can be storage if existing overhead service is not disrupted), approx. 280 GSF
- Student and Staff toilets at each floor to support code-calculated annex population
- Custodial rooms at each floor
- Exit stairs; number and design to meet requirements of egress and accessibility
- (1) elevator
- Trash compactor and enclosure
- Utility spaces as required (plumbing, sprinkler pump, electrical)

Site:

- Removal of the two existing modular units after annex completion.
- Review of existing playlot and future playlot needs.
- Re-route existing utilities that conflict with new work
- Temporary off-site staff and construction parking to be reviewed / resolved by PBC and CPS
- Replace existing parking to accommodate 90 FTE (per CPS) and a fire lane for emergency vehicle access.
- Provide trash and trash-compactor enclosure

Existing Building:

- Convert existing kitchen to teacher`s lounge
- Convert existing kindergarten classrooms into Music and Drama classrooms.
- Convert existing south classroom to new 'link' and conference room
- Provide accessible directional signage
- Low-voltage interconnections of public-address /intercom, security system, fire alarm, MDF/IDF
- Roof and roof perimeter replacement
- Face brick and stone veneer tuck-pointing
- Mechanical equipment replacement
- Painting of all classrooms and selective ceiling replacement
- Environmental remediation in areas affected by work

Schedule: The design and construction of the annex facility as well as renovation of existing building, removal of modulars, and completion of all site elements to be complete in Jan 2021.

Budget: $34,000,000 (refer to CPS New Annex and Roof Replacement programs)

Critical Considerations

The Dirksen Annex & Renovations project has identified the following critical considerations:

- Poor Soils / Deep Foundations – Project will require foundations in excess of 12' below grade, triggering OUC review and deep foundation design. The first floor slab may require a structural slab, this will be determined upon receipt of the final geotechnical report.
- New annex must be located within close proximity to the existing building. Delegated design of an earth retention system by Contractor (ERS) is anticipated.
- Settlement and Vibration monitoring by Contractor is anticipated.
- PBC's EC will evaluating whether project is required to be entered into the SRP.
- Temporary exiting from the existing building must be maintained while the existing building is occupied for the duration of work in a manner acceptable to the Authority Having Jurisdiction. Currently the southwest corridor exits egress to the outside in the area of new annex work, a path to the public way must be maintained throughout work.
- Two existing modular classroom units are located in front of the planned annex, pedestrian access to and egress from these structures must be maintained. The routing of electrical service to these modular units is not known and must be investigated. Re-routing of existing electrical service outside the area of new annex work is anticipated.
- Project fronts on two streets, the increase in population of the new annex will require additional fire apparatus frontage. A fire lane has been developed on the 50%SD drawings, and has been sent to John Javorka (Chief Engineer with the Bureau of Fire Prevention) for review. BFP has provided verbal approval for this configuration, and for shared use for student drop-off and pick-up, provided no vehicles are left parked / unattended. The DA has sent formal minutes of the discussion for confirmation from BFP which is forthcoming.
- Preliminary electrical load information has been shared with ComEd, however, discussions of capacity and routing of new service have not been finalized. PBC is pursuing a meeting and direction from the utility.
- Project is located in two separate zoning districts. A preliminary meeting with DPD has been conducted and it is confirmed that the project will require a Planned Development. DPD requests a traffic study and the possibility of locating some student pick-up and drop-off activities on the fire lane. Preliminary feedback from DPD is that they may allow relief from off-street parking for the duration of construction work.
- Roof and mechanical equipment replacement work is anticipated to require phased construction to maintain service to the existing building while occupied for the duration of the construction and renovation work period.
- Temporary occupancy and phased occupancy is anticipated to accommodate (1) construction and temporary occupancy of the annex, (2) work in the existing building, and (3) demolition of existing modular units and construction of the new parking lot/storm water management system and other site improvements.
- Project is located very close to O'Hare Airport and will require acoustical design evaluation and sound-control measures and systems. See additional comments below regarding impact on building envelope.

Acoustics

The AOR will engage an acoustical consultant for assistance in the design of appropriate assemblies to meet the CPS Facilities Performance Standards; http://cps.edu/About_CPS/Policies_and_guidelines/Pages/facilitystandards.aspx, LEED prerequisite acoustical design requirements, and requirements of the City of Chicago relating to sound levels in the public way. Note that the project is located within very close proximity to O'Hare International Airport. The existing facility was previously retrofit for acoustic improvements.

Prior to transfer of the project the Design Architect has not engaged an acoustical consultant. However, certain aspects of the design warrant specific review and input from an acoustical consultant in order to meet CPS and LEED prerequisite acoustic requirements. Partitions will, in many cases, require multiple layers of gypsum board that exceed the minimum fire-separation requirements of the Chicago Building Code. It is also assumed that the roof will require a normal-weight concrete-filled composite deck at all locations and laminated glazing at all exterior glazing. The design team should evaluate if additional acoustical mitigation measures are necessary at the building envelope.

Mechanical equipment shall be installed on acoustical / vibration isolators and all return ductwork shall be offset in a manner to reduce fan noise in the core learning areas. The design team should evaluate whether sound-control barriers at the roof will be required to mitigate sound at the lot line or whether this can be addressed via equipment specification.

LEED and Sustainability Requirements

A. This Section includes general requirements and procedures for compliance with U.S. Green Building Council's (USGBC) LEED prerequisites and credits needed for the project to obtain LEED for Schools **Silver** Certification.

B. In addition to the outlined LEED Requirements, the project shall comply with the Department of Planning and Development's Zoning Sustainability Matrix, meeting a minimum of 100 credits. The AOR shall coordinate with CPS to determine the most cost effective means to obtain these credits.

C. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

D. Products used on this project will have additional requirements which are required to comply with the USGBC LEEDv4 for BD+C: Schools rating system:

   1. Reduced Urban Heat island effect.
   2. Water use reduction.
   3. Optimize energy performance.
   4. Construction waste management.
   5. Environmental Product Declarations
   6. Low VOC-emitting materials.
   7. Zero use of CFC-based refrigerants.
   8. Low Ozone Depletion and Global Warming Potential refrigerants.

E. General Commissioning (Cx) Requirements

   1. This Section includes general and USGBC LEED for Schools requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned. Project specific MEP requirements will be identified in individual specification sections.
   2. Commissioning Plan: A document, prepared by the Commissioning Authority (CxA), that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall

include, but is not limited to the following:

a. Overview of the Cx Plan describing the purpose, scope, abbreviations and list of applicable forms.

b. General description of the project and salient design features related to successful commissioning of the project.

c. Commissioning team information including communication matrix identifying members appointed by the Owner including Owner's representative, CxA and Architect/Engineer and Contractor including representatives of the prime and sub-contractors, construction superintendant and specialists deemed appropriate by the CxA..

d. Description of roles, responsibilities and authority of commissioning team members.

e. Commissioning process requirements including, but not limited to:

1) Commissioning kick-off meeting guideline and requirements.

2) Site observation guidelines and requirements.

3) Miscellaneous meeting guidelines and requirements.

4) Miscellaneous management protocols for the Cx team.

5) Progress reporting issue log guidelines and requirements.

6) Guidelines for initial submittals and documentation including equipment shop drawing submittals, operations and maintenance manuals, certifications and warrantees and guidelines for special submittals, notifications and clarifications.

7) Verification and testing overview including development and completion of construction checklists and completion of functional performance tests.

8) Construction checkout procedures and guidelines for contractor review and completion of checklists, verification of information by the CxA and correction of deficiencies.

9) Procedures for development, coordination and completion of all applicable functional performance forms and tests including correction of deficiencies.

10) Guidelines and procedures for preparation of Operation and Maintenance Manuals and Commissioning Record.

11) Detailed guidelines and procedures for training of Owner's personnel.

12) All extended warranty period activities typically provided for successful completion and credit for enhanced commissioning activities.

f. Detailed matrix of written work products including Cx Plan, schedule, submittals, checklists, testing, adjusting and balancing (TAB) documents and procedures, issue logs and corrective action reports. The matrix describes the author, product description, due dates, and who receives/ approves the products.

g. Schedule of Cx activities with specific dates coordinated with overall construction schedule.

h. Appendices including Owners Design Criteria and MEP Engineer's basis of design

Architectural – New Annex

In addition to the descriptions provided below, please also reference the Basis of Design narratives for all disciplines, including Civil, Landscape, Structural and Mechanical, Electrical, Plumbing, and Fire Protection, as well as the List of Alternates for Incorporation into the Cost Estimate.

Building Envelope - Annex

New construction will include a modified three-story Annex prototype with a four-hour vestibule connection to the existing building and a double-loaded corridor enclosing a total gross area of approximately 65,000 square feet of floor area.

The three-story structure will be a steel frame with steel beams joists with composite metal deck at elevated slabs. Exterior walls will be constructed of brick veneer with 6" cold-formed framing back-up. The typical masonry veneer assembly will include 4" nominal exterior masonry veneer, 2" air cavity, insulation, continuous air-and water barrier, exterior gypsum sheathing, cold-formed framing, and interior gypsum board. Masonry anchors will exceed 4.5", exceeding the empirical design criteria, requiring structural design of the anchor size and spacing. Glazing systems will be a combination of thermally broken aluminum frame windows and storefront systems with both fixed and operable lites of insulated, low-E, and clear glazing. Given the project's proximity to O'Hare International Airport, all storefront and aluminum window assemblies are anticipated to require an interior laminated glazing lite.

The first floor will be constructed as a reinforced concrete slab on grade over a continuous vapor retarder. Pending additional input from the geotechnical engineering investigation there are at present two potential approached to the foundation design. Please refer to the Structural Basis of Design. The second and third floors of the Annex will be constructed of 6-1/2" normal weight concrete and composite metal deck. Spray-applied fireproofing material will be provided to all second and third floor supporting steel as required by the building code. Due to the building height exceeding 30' shelf angles will be required to support brick veneer at mid-height, and a second shelf angle will be required at the roof deck to permit roof scupper flashings to be accommodated without differential movement at mid-span.

The Annex entry vestibules will consist of aluminum storefront and insulated, low-E glazing with a laminated inboard glazing lite. Glazing at corridor nodes will be of storefront and low-e laminated glazing assembly. All windows shall receive limestone or precast concrete sills with drip-edges secured with appropriate anchorage to prevent overturn. Walls shall be fully flashed and weeped at all terminations (base of wall, shelf angles, below sills, above lintels, wall offsets, etc.) Cell vents will be provided to convey water from the cavity to the exterior. Where spacing of cell vents exceeds recommended distances cotton sash rope weeps shall be specified.

Envelope enclosing roofs will be constructed of steel beams, joists, and insulated concrete deck with a modified-bituminous membrane system and reflective coating meeting LEED criteria. The envelope will be designed in accordance with the City of Chicago Energy Conservation Code, Section 18-13, *Table 13*, or the ASHRAE 90.1-2004, *TABLE 5.5-5 Building Envelope Requirements for Climate Zone 5A*, whichever is stricter.

The following outlines key envelope systems and recent directives from CPS regarding envelope systems:

Typical (class A) roof assembly:

- Two-ply SBS modified bituminous roofing system: membrane and cap sheet with flashing and auxiliary materials as required. Cap sheet shall have Solar Reflectance Index (SRI) of 78 minimum.
- Continuous 1/2" cover board set in hot asphalt
- (2) layers 2-1/2" polyisocyanurate insulation with staggered joints, first layer set in asphalt (min. R-30)
- Tapered insulation saddles (as required) to provide min. 1/4" per foot positive slope to drains
- Temporary roof/ roofing vapor retarder
- Substrate: Composite concrete roof deck, 6-1/2" total thickness of normal weight concrete over metal roof deck at all locations. Concrete roof deck provided for acoustical mitigation.

- Steel roof framing
- Where roof beams abut exterior walls that rest on foundations, and where mid-span deflection is anticipated, an insulated deflection curb will be provided to mitigate stress on the roof membrane. However, proposed SD wall sections include parapet framing configurations which should eliminate the need for such deflection curbs at typical parapet locations.
- Parapets will be detailed with rigid board insulation and spray-polyurethane insulation to mitigate thermal transfer and bridging from exterior of building to exterior.
- Additionally, per CPS standard guidelines, perimeter roof drains are preferred where roof top mechanical units are employed. As such, RTU locations will be proposed in the central portion of the roofs and drainage directed away from these units.

Typical masonry veneer assembly on cast-in-place concrete where used for lateral bracing systems):

- 4" nominal utility face brick w/ties @16" o.c. max.
- **2**" air-space
- Mortar net drainage material at all flashing locations (above all thru-wall flashing).
- 2-1/2" polystyrene, min. R-12.5
- Continuous fluid-applied air and water barrier detailed for integration with all fenestration systems
- Reinforced concrete with veneer plaster, painted, interior
- Flashings as required, including thru-wall & cell-vents w/s.s. drip-edge, vapor-barrier transitions, and end-dams at all breaks
- Sills shall receive cast stone copings with sloped top and drip edge
- Shelf angles and lintels where required for brick veneer

Typical masonry veneer assembly on cold-formed framing:

- 4" nominal utility face brick w/ties @16" o.c. max.
- **2"** air-space
- Mortar net drainage material at all flashing locations (above all thru-wall flashing).
- 2-1/2" polyisocyanurate, min. R-12.5
- Continuous sheet-applied air and vapor barrier (including all compatible transition flashings for continuity)
- 5/8" exterior glass-mat sheathing at new annex east and south elevations; (2) layers 5/8" gypsum sheathing at new annex west and north elevations
- 6" nominal cold-formed framing (delegated design), including all lintels, etc., for fully engineered system
- (2) layers 5/8" type "X" fire-resistive gypsum board (direct applied to cold-formed framing), staggered each layer, inside face painted.
- Sills shall receive cast stone copings with sloped top and drip edge, windows shall provide prefinished aluminum sill, head, and jamb extensions as required to conceal gypsum board from damage.
- Shelf angles and lintels where required for brick veneer, shelf angles supported from perimeter beams and/or slab edges. Detailed to mitigate thermal bridging and/or thermal transfer.
- Fire-treated wood blocking as required.
- Mineral wool insulation at perimeter tracks of door and window openings

Exterior Fenestration and Glazing:

All classrooms and study rooms shall be provided with natural light (glazed area) of not less than 8% of the floor area in accordance with the Chicago Building Code. Natural ventilation is not required by code in schools provided with mechanical ventilation. Operable windows shall be provided with a 4" limiter and 5% or a minimum of one opening in compliance with accessibility clearances and operating forces. A minimum of one operable window, barrier-free (projecting type) requiring no pinching, twisting and less than 5lbs of operational force, shall be provided in each standard classroom.

The project shall incorporate thermally broken high-performance windows and storefront with 1" insulated glazing with low-e coating and a laminated inboard glazing lite. Glazing adjacent to doors or the floor shall be insulated and safety rated against breakage in accordance with ANSI Z97.1, the Safety Standard for Architectural Glazing Material Standard for Architectural Glazing Materials (16 CFR 1201). Storefront glazing in common areas (not protected by window guards) located within 8'-0" of finished grade / floor shall be safety rated / laminated per ASTM C 1172 complying with testing requirements in 16 CFR 1201 for Category II materials.

The design team's acoustical consultant shall confirm whether it is recommended for some or all exterior glazing assemblies be provided with laminated glazing to increase sound mitigation.

First floor windows to classrooms and classroom windows that are accessible via a one-story roof shall receive exterior window guards in accordance with Chicago Public Schools New Construction Design Guidelines.

- Windows shall be aluminum architectural windows (AW-60 performance grade) with insulated glazing. Operable units shall be project-out (awning) type meeting accessibility force requirements.
- Public entrances shall be storefront framing assemblies with wide-stile aluminum entrance doors. Aluminum entrance doors are permitted to have glass vision lites and glazed transoms.
- Exterior service doors shall be insulated core, fiber-reinforced polymer (FRP) sheathed and shop finished. Frames shall be aluminum and thermally broken. All exterior doors shall be equipped with sweeps.

An energy model will be developed to review compliance with LEED and code required energy performance. Typical exterior glazing (unless noted or required otherwise) has been assumed to be: 1-inch thick insulated exterior glass assembly. The unit shall consist of a 1/4" thick low-E outboard lite with PPG Solarban 70XL or Viracon VNE 63 on the #2 surface, 1/2" airspace and an inboard laminated lite of 1/8" clear glazing, 0.30 PVB layer, and 1/8" clear glazing. Other manufacturer's products will be considered subject to meeting the performance criteria specified herein. Units shall have the following performance characteristics:

- Visible light transmittance: 65% minimum
- Solar energy transmittance: 25% maximum
- Ultraviolet transmittance: 6% maximum
- Exterior visible light reflectance: 11%
- Interior visible light reflectance: 12%
- Solar energy reflectance: 52%
- U-value (winter nighttime): 0.29 Btu/(hr x sq.ft. x deg-F) maximum
- U-value (summer daytime): 0.27 Btu/(hr x sq.ft. x deg-F) maximum
- Shading Coefficient: 0.31
- Relative heat gain: 66 Btu/hr x sq.ft.
- Solar heat gain coefficient: 0.27 maximum

Foundation Perimeter:

The perimeter foundation walls and/or grade beams shall receive 2" of polystyrene board insulation from top of footing to top of wall; the top of the insulation shall be protected against delamination, damage and UV degradation. All foundation wall penetrations shall be sealed to prevent groundwater intrusion. All cold joints shall be water-stopped in areas subject to migration of groundwater.

The design team will be reviewing the forthcoming geotechnical recommendations with respect to the environmental remediation requirements and modifying the foundation design, if recommended by CPS Environmental Consultant to minimize off-site spoils and material import.

Building Design

Configuration:
The new annex is intended to relieve over-crowding at the school. The conceptual plan configuration locates the annex along the west property line. This is to allow the continuous operation of the existing school and (2) modular units during construction. This continuous operation is imperative and addressed in the 'Critical Considerations' paragraph above.

The building program has been stacked such that the Kitchen/ Dining, Kindergarten spaces, and one Special Needs classroom are fully accommodated on the First Floor. Additional typical and specialty classrooms, Library, and building services are located on the Second and Third Floors. Those areas that do not require natural light have been located at the building interior. Student spaces have been located along the exterior envelope.

Due to the site and phasing constraints, the chiller as well as the two air-handling units are located on the roof.

Floors:
The first floor will be constructed as a reinforced concrete slab on grade over a continuous 15-mil. vapor retarder set on engineered fill, which for purposes of the conceptual estimate should assume that engineered fill will be required to extend 36" below the finished slab.

Elevated floors and roof deck will be constructed of composite assemblies, 4-1/2" normal weight concrete on 2" composite metal deck (6-1/2" overall).

Egress Stairs:
The design includes enclosed egress stairs, all of which will be provided with a weather vestibule. Vestibules are provided to mitigate heat loss due to egressing occupants and are not intended as primary entrances. The design team will review all appropriate measures to locate all water and water-containing elements, including sprinkler system piping, away from exterior doors and protect against potential freezing. Heat shall be provided in all vestibules in the form of cabinet unit heaters. Vestibules will be constructed of aluminum glazed storefront with low-E glazing, see envelope section above. Glazing to the exterior shall be provided in all stairs to provide visual connection between the interior and exterior of the building and to facilitate security monitoring from the public way.

The conceptual scheme has identified locations for lateral bracing systems comprised of cast-in-place concrete shear walls, minimum 12" thick.

Interior Finishes:
The project shall comply with all requirements of the CPS Design Guidelines and Guideline Specifications, unless approved in writing by CPS in advance, the following finishes are some of the recent changes to these guidelines that will be employed:

Floor Finishes:

- Primary Flooring Material: high vinyl content, homogenous resilient tile and rubber tile flooring. Examples include:
  A. Gerflor Mipolam Accord 300 and Elegance 290
  B. Johnsonite Optima/Granit IQ
  C. Mondo Hamoni and Terranova
  D. Nora Systems Noraplan and Norament
- Other flooring materials shall be installed in specific program areas:
  A. Modular Carpet Tile: individual offices and conference rooms
  B. Quarry Tile: kitchens and Servery
  C. Ceramic Tile: Toilet rooms and Janitor Rooms (floors and walls); back-up wall construction shall be metal framing with one layer moisture-resistant gypsum core board inner layer and one layer ½" cement board outer layer. Walls shall be typically one-sided with limited amount of two-sided walls. Cement board will extend to top of tile with equivalent thickness gypsum board above extending to the top of wall (painted). For conceptual estimate the height of tile shall be assumed to extend 8' AFF.
  D. Resinous Flooring: Mechanical & electrical spaces, elevator machine rooms, service areas.

Interior Walls and Wall Finishes:

Typical wall construction throughout the school will be of metal framing with multiple layers of gypsum board each side and acoustic insulation (as required) to achieve the required STC (sound transmission coefficient) outlined in the Chicago Public Schools New Construction Design Guidelines.

- Walls shall generally have inner layers of Type "X" fire-resistive gypsum board and outer layers with Very High Impact board up to 8'-0" AFF. Provide standard or fire-rated gypsum board as required above 8'-0" AFF to meet required fire and acoustical rating required.
- In areas of limited use by students or areas not prone to damage abuse-resistant gypsum board shall be limited to reduce cost.
- Exposed cast-in-place shear concrete walls shall receive veneer plaster painted finish.
- CMU walls at the 4-hr vestibule shall receive painted finish.
- Gypsum board clad shaft walls shall be utilized at locations where double-sided gypsum board assemblies is not feasible; i.e. mechanical shafts. The exposed (outer) layer of gypsum board shall be moisture and abuse-resistant type. Fire rated layers shall be employed as required to meet hourly fire rating and UL test requirements.
- At entry areas and corridors and gymnasium, where wall is not protected by lockers, walls shall be protected by solid-surface wainscot and trim over gypsum board assemblies extended to approximately 6' AFF. All first floor corridor walls shall receive solid surface cladding over gypsum board (all corridor locations), however, solid surface cladding shall be limited in second andthird floor public areas due to cost and a reduction in traffic / exposure to damage.
- At all locations with vinyl floor tile, vinyl base (coved profile where appropriate) shall be provided.
- All walls shall be sealed at the perimeter and all penetrations by a fire-stopping system or sealant that meets or exceeds the required fire-rating of the wall. Partitions that are not required to be fire-rated shall receive a 1-hour equivalent perimeter and penetration sealant as a precaution to mitigate sound transfer and to help meet all IDPH and CDPH requirements. Stairwell walls, mechanical room walls, and storage room walls in excess of 100 net square feet shall receive 2-hour equivalent perimeter and penetration assemblies.

Interior Ceilings and Ceiling Finishes:

Throughout the school ceilings will primarily consist of suspended acoustical panel ceilings. The panels will be 2'x2' acoustical panels with exposed 15/16" wide suspension framing.

- High NRC panels shall be installed in core learning spaces, private offices, and Dining Room; 0.70 NRC min.
- Abuse-resistant panels shall be installed in corridors, administrative spaces, and other public areas.
- Abuse-resistant acoustical panel ceilings shall be employed in spaces that require control of indoor air temperature and/or humidity.
- Hard ceilings shall be installed in toilet rooms. Group toilet room ceilings shall be suspended moisture-resistant gypsum board with painted finish.
- Mechanical and electrical rooms, and other support and service spaces shall not receive ceiling finishes unless a part of kitchen/servery delivery sequence to meet licensure requirements.
- CPS requires that a minimum 10'-0" ceiling height be maintained in all classrooms. The floor-to floor dimension is planned as 14'-8" and attention will be taken in the sizing of structural members to maximize ceiling heights and accommodate MEP/FP systems. The proposed structural framing system incorporates two gridlines of interior structural columns so as to reduce depths of framing members and accommodate MEPFP routing.

Interior Glazing Systems (where not part of exterior envelope):

- 5/16" thick ceramic fire and safety-rated glazing in all fire-rated assemblies including door lites (i.e. corridor glazing, door vision light glazing, and borrowed light assemblies). Glazing panels shall be limited to the maximum area permitted by fire-tests and to meet acoustical objectives. Rated frames/assemblies and glazing compounds shall be employed.
- 1/4" thick clear tempered safety-rated glass at all non fire-rated assemblies such as interior weather vestibules.
- One-way mirrored tempered safety-rated glass at Kitchen Office.

Architectural – Existing Building

The intent of the work at the existing building is to provide needed replacement and/or repair of the existing building envelope, replacement of key mechanical equipment, and minor upgrades to the interior spaces to accommodate revised classroom designations.

The scope of work described below is based on CPS's Dirksen ES Proposed Roof Replacement and Envelope Repair summary, CPS's Order of Magnitude Scope, and Building Technology Associates's 2018 Roof Assessment Report.

Exterior Envelope

1. Remove and replace existing roof at all low and high roofs
2. 1970 High and Low Roofs: Remove and replace existing perimeter gravel stop and substrate along roof edges – including at courtyard – of original 1970 roofs.
3. 1971 Roof: Remove and replace all existing aluminum box gutters (varies 3'-0" to 5'-0"widths) along all roof edges – including at courtyard – of 1971 south addition.
4. All roofs and perimeter edge systems shall meet ANSI/SPRI/FM 4435/ES-1 standards and include a 20-year warranty.
5. Provide new insulated roof hatch with integral flashings and OSHA-compliant guard rails and OSHA-compliant interior ladders.
6. Selectively remove and replace existing damaged high roof aluminum standing seam mansard metal panels.
7. Remove and replace (4) skylights at the 1971 low roof, each approximately 60 sf.
8. Mechanical Equipment Supports: Weld new frames and/or extend frames to accommodate new roof thickness and adjusted equipment sizes.
9. Façade Face Brick Replacement: Selectively remove existing damaged/ spalled face brick and replace with new face brick to match existing.
10. Façade Stone Veneer Replacement: Selectively remove existing damaged/ spalled stone veneer and replace with new to match existing.
11. Façade face brick pointing: Grind and point face brick veneer and surface wash.
12. Façade stone pointing: Grind and point face stone veneer and surface wash.
13. Concrete Repair: Remove loose concrete; scrape, prime and paint all exposed reinforcement and provide additional reinforcement as necessary. Patch spalled concrete and rout and epoxy repair all concrete cracks. Assume 100 SF.
14. Provide new sealant at all joints between the 1970 and 1971 structures.
15. Provide new infill metal panels in existing curtain wall adjacent to the unit ventilator at Classroom 118. Existing Windows: Replace all window balances on all existing vertical sliding windows.
16. Existing Exterior Doors: Replace (3) existing exterior doors with new insulated 3'-0" x 8'-0" FRP door and thermally broken frames.

Interior Renovations

17. Targeted 20% ceiling tile replacement throughout the building.
18. Patch existing plaster and paint all classrooms.
19. Repair all existing architectural finishes and provide equipment trim at the existing unit ventilators in 10 classrooms.
20. Renovate (2) existing Kindergarten Rooms in the 1970 structure for use as a Music Room and Drama Room.
21. Renovate existing Dining Room and Kitchen to Multi-Purpose Room and Offices.
22. Convert (1) existing south classroom to the new 'link' and an adjacent Conference Room.

Mechanical

NOTE: Refer to the Mechanical Basis of Design for specific scopes of work, proposed scope options and associated impact on architectural assemblies.

23. Replace existing roof mounted mechanical equipment
24. Replace exterior roof mounted lighting
25. Coordinate power for new equipment
26. Modify existing plumbing – vent and sanitary stacks.

BTA
BUILDING TECHNOLOGY ASSOCIATES

Dirksen Elementary

ROOF ASSESSMENT REPORT

2018

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BTA
BUILDING TECHNOLOGY ASSOCIATES

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CHICAGO PUBLIC SCHOOLS | CPS

1. SUBJECTIVE NARRATIVE REPORT

The **Subjective Narrative Report** is the roof evaluation reported conclusion of the data gathered from the field assessment by the BTA representative. The subjective narrative gives a brief outline of any major anomalies or issues that should be brought to the attention of upper management. The report can be incorporated into capital planning and budgeting for any future projects to repair or replace roof areas.

- **Executive Summary**- this section identifies the date, location, operations performed for the assessment, and initial impressions of the roof's condition.
- **Roof Composition Overview**- this section highlights the type of roof systems. *For more detail information of each specific roof area, see Tab 2- Roof Composition.*
- **Concerns and Issues** - this section lists the number of concerns and/or issues identified during the field assessment. *For visual representation of each concern or issue, see Tab 4- Photo Report.*
- **Recommendations**- this section highlights if there are any strategic repairs that can be made to extend the life of a roof, if there are roofs that need to be replaced, and identify if there is any wall or equipment conditions affecting the roof or building needing immediate attention.

ROOF EVALUATION REPORT
SUBJECTIVE NARRATIVE

Executive Summary:

BTA representative Mark Nichols visited the project site on Thursday, June 14, 2018 to conduct a Roof Evaluation. Mr. Nichols met with Genaro Flores to discuss the problems from water intrusion.

Based on the walkover roof inspection, the instances of leakage reported by the Building Engineer and the moisture survey, the roof system on the main building appears to be in generally "poor" condition. The moisture survey indicated that there are areas of moisture mainly on roof area A-01. The roofs on the mobile units are in fair condition and are repairable.

Overview:

The building's roof areas are covered by two different types of roof systems. The main building has a built up roof system that consists of a base layer of polyisocyanurate insulation, a top layer of gypsum with a built up roof. All roof decks on the main building are steel. Roof cores were taken of the built up roof system on the main building and on one mobile unit. The mobile units have steel deck, a base layer of polyisocyanurate insulation a top layer of gypsum with 60 mil EPDM membrane. The EPDM membrane on roof A-08 is a white EPDM.

See Tab 2 - Roof Composition for detail information of each specific roof area.

Concerns and Issues:

1. On the main building the following items were observed.
    a. Split and loose flashing were noted at the expansion joint.
    b. The several of the skylights on the building are broken.
    c. Open flashing laps were found.
    d. Vegetation growth on the roof.
    e. Ridges and blisters.
    f. Repairs to the membrane.
2. On the modular building the following items were observed.
    a. Holes
    b. Debris in gutters.
    c. Inadvisable repairs.

See Tab 4 – Photo Report for pictures of various examples of the Concerns and Issues.

Recommendations:

1. The roofs on the main building and roof A-07 should be replaced. The skylights should also be replaced.
2. Repairs that could be done until the roof is replaced are:
   a. Seal the open flashing laps and split flashing.
   b. Seal the top of the flashings that are open.
   c. Clean the clogged drain.
3. The roof on the modular building (A-08) can have the service life of the roof extended by over 8 years if the following repairs are completed.
   a. Remove and replace wet insulation.
   b. Keep the gutters clean.

Respectfully submitted,

BUILDING TECHNOLOGY ASSOCIATES (BTA)

Mark Nichols
Mark Nichols, RRC, CCS
Consultant

2. ROOF COMPOSITION

The **Roof Area Summary Report** is a brief description of each individual roof area, (one page per roof area), listing: general information, contractor/warranty information, roof construction, and basic roof details.

The **Defect Summary Report** is a detailed description of each individual roof area's deterioration based off roof defects observed during the inspection of the school.

This defect list provides a summary of all defects present on the roof area which includes the following:

- The code used to represent each defect type
- A description of each defect type
- The quantity of each defect by type
- The recommended repair strategy for each defect type (No work (blank), Temporary or Reconstructive)

*Each defect code located on the table is color coded to match the recommended repair strategy (No Work = Grey, Temporary = **Red**, Reconstructive = **Blue**).

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: BUILT-UP

Building: Dirksen Elementary
Roof Area ID: A-01

Roof Area General Information

Size (Square Ft):	7,888	Year Installed:	1997
Slope:	Less than or equal to .125 in	Area Use:	Gym
Drainage Type:	Internal Drains	Method of Roof Access	Interior Roof Hatch
Replacement Cost	$98,501	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface	Aggregate					
Membrane	3 Ply	Organic Felt		Coal-tar Pitch		.18
Insulation Layer 1 (Top)	Lt. Wt. Insulating				Tapered	
Underlayment	Base Sheet			Adhered		
Deck	Steel					
Is there an underlying roof system?	No				Total R-Value	.27

Roof Area Details

Type of Base Flashing	Composition (Roofing Felt /	Base Flashing Coating	None
Type of Coping	None	Coping Panel Size (LxWxH)	
Number of Mechanical Units	2	Number of Penetrations	19
Is there Asbestos present in this roof area?		Are there leaks?	Yes, Reoccuring

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: BUILT-UP

Building: Dirksen Elementary
Roof Area ID: A-02

Roof Area General Information

Size (Square Ft):	10,412	Year Installed:	1997
Slope:	Less than or equal to .125 in	Area Use:	School
Drainage Type:	Internal Drains	Method of Roof Access	
Replacement Cost	$130,020	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface	Aggregate					
Membrane	3 Ply	Organic Felt		Coal-tar Pitch		.18
Insulation Layer 1 (Top)	Lt. Wt. Insulating				Tapered	
Underlayment	Base Sheet			Adhered		
Deck	Steel					
Is there an underlying roof system?	No				Total R-Value	.27

Roof Area Details

Type of Base Flashing	Composition (Roofing Felt /	Base Flashing Coating	
Type of Coping	None	Coping Panel Size (LxWxH)	
Number of Mechanical Units	6	Number of Penetrations	30
Is there Asbestos present in this roof area?		Are there leaks?	Yes, Reoccuring

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: BUILT-UP

Building: Dirksen Elementary
Roof Area ID: A-03

Roof Area General Information

Size (Square Ft):	10,495	Year Installed:	1997
Slope:	Less than or equal to .125 in	Area Use:	School
Drainage Type:	Internal Drains	Method of Roof Access	
Replacement Cost	$131,056	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface	Aggregate					
Membrane	3 Ply	Organic Felt		Coal-tar Pitch		.18
Insulation Layer 1 (Top)	Lt. Wt. Insulating				Tapered	
Underlayment	Base Sheet			Adhered		
Deck	Steel					
Is there an underlying roof system?	No				Total R-Value	.27

Roof Area Details

Type of Base Flashing	Composition (Roofing Felt /	Base Flashing Coating	
Type of Coping	None	Coping Panel Size (LxWxH)	
Number of Mechanical Units	6	Number of Penetrations	32
Is there Asbestos present in this roof area?		Are there leaks?	No

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: PANEL

Building: Dirksen Elementary
Roof Area ID: A-04

Roof Area General Information

Size (Square Ft):	2,369	Year Installed:	1997
Slope:	Less than or equal to .125 in	Area Use:	School
Drainage Type:	Internal Drains	Method of Roof Access	
Replacement Cost	$22,128	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface						
Membrane	Flat Seam	Galvanized Steel				
Underlayment						
Deck	Steel					
Is there an underlying roof system?					Total R-Value	

Roof Area Details

Type of Base Flashing	Composition (Roofing Felt /	Base Flashing Coating	
Type of Coping		Coping Panel Size (LxWxH)	
Number of Mechanical Units	0	Number of Penetrations	9
Is there Asbestos present in this roof area?		Are there leaks?	No

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: BUILT-UP

Building: Dirksen Elementary
Roof Area ID: A-05

Roof Area General Information

Size (Square Ft):	6,315	Year Installed:	1997
Slope:	Less than or equal to .125 in	Area Use:	School
Drainage Type:	Internal Drains	Method of Roof Access	
Replacement Cost	$78,859	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface	Aggregate					
Membrane	3 Ply	Organic Felt		Coal-tar Pitch		.18
Insulation Layer 1 (Top)	Lt. Wt. Insulating				Tapered	
Underlayment	Base Sheet			Adhered		
Deck	Steel					
Is there an underlying roof system?	No				Total R-Value	.27

Roof Area Details

Type of Base Flashing	Composition (Roofing Felt /	Base Flashing Coating	
Type of Coping	None	Coping Panel Size (LxWxH)	
Number of Mechanical Units	1	Number of Penetrations	25
Is there Asbestos present in this roof area?		Are there leaks?	No

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: BUILT-UP

Building: Dirksen Elementary
Roof Area ID: A-06

Roof Area General Information

Size (Square Ft):	6,099	Year Installed:	1997
Slope:	Less than or equal to .125 in	Area Use:	School
Drainage Type:	Internal Drains	Method of Roof Access	
Replacement Cost	$76,161	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface	Aggregate					
Membrane	3 Ply	Organic Felt		Coal-tar Pitch		.18
Insulation Layer 1 (Top)	Lt. Wt. Insulating				Tapered	
Underlayment	Base Sheet			Adhered		
Deck	Steel					
Is there an underlying roof system?	No				Total R-Value	.27

Roof Area Details

Type of Base Flashing	Composition (Roofing Felt /	Base Flashing Coating	
Type of Coping	None	Coping Panel Size (LxWxH)	
Number of Mechanical Units	1	Number of Penetrations	27
Is there Asbestos present in this roof area?		Are there leaks?	Yes, Reoccuring

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: SINGLE-PLY

Building: Dirksen Elementary
Roof Area ID: A-07

Roof Area General Information

Size (Square Ft):	4,053	Year Installed:	2001
Slope:	Less than or equal to .125 in	Area Use:	School
Drainage Type:	External Gutter	Method of Roof Access	
Replacement Cost	$42,870	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface	Exposed Sheet					
Membrane	Reinforced Elasto			Fully Adhered		
Insulation Layer 1 (Top)	Lt. Wt. Insulating				Tapered	
Underlayment	Base Sheet			Adhered		
Deck	Steel					
Is there an underlying roof system?	No				Total R-Value	

Roof Area Details

Type of Base Flashing	Elastomeric / Thermoplastic	Base Flashing Coating	
Type of Coping		Coping Panel Size (LxWxH)	
Number of Mechanical Units	4	Number of Penetrations	10
Is there Asbestos present in this roof area?		Are there leaks?	No

Dirksen Elementary Roof Area Summary Report

Client: Chicago Public Schools
Facility:
Roof System Type: SINGLE-PLY

Building: Dirksen Elementary
Roof Area ID: A-08

Roof Area General Information

Size (Square Ft):	5,046	Year Installed:	2014
Slope:	Less than or equal to .125 in	Area Use:	School
Drainage Type:	External Gutter	Method of Roof Access	
Replacement Cost	$53,374	Roof Height:	

Roof Area Contractor/Warranty Information

System Manufacturer	Unknown	Manufacturer's ID	
Manufacturer's Agreement Type	Unknown	M.A. Expiration Year	
Contractor's Agreement Type	Unknown	C.A. Expiration Year	

Roof Area Construction

Layer Type	Description			Method of Attachment	Insulation Thickness	R-Value
Surface	Exposed Sheet					
Membrane	Reinforced Elasto			Fully Adhered		
Insulation Layer 1 (Top)	Lt. Wt. Insulating				Tapered	
Underlayment	Base Sheet			Adhered		
Deck	Steel					
Is there an underlying roof system?	No				Total R-Value	

Roof Area Details

Type of Base Flashing	Elastomeric / Thermoplastic	Base Flashing Coating	
Type of Coping		Coping Panel Size (LxWxH)	
Number of Mechanical Units	1	Number of Penetrations	7
Is there Asbestos present in this roof area?		Are there leaks?	No

Dirksen Elementary Defect Summary Report

Building: Dirksen Elementary
Subsystem: BUILT-UP
Area ID: A-05
Sqft: 6,315

Code	Description	Quantity	Action
R2	Wet insulation--Suspected	208 sf	Reconstructive

Building: Dirksen Elementary
Subsystem: SINGLE-PLY
Area ID: A-08
Sqft: 5,046

Code	Description	Quantity	Action
DD3	Gutter filled with debris/vegetation	100 lf	Reconstructive
S2	Insulation wet - Suspected	623 sf	Reconstructive

3. SERVICEABILITY DRAWINGS

- SERVICEABILITY ESTIMATE DRAWING
- ADJUSTED SERVICEABILITY ESTIMATE DRAWING

The **Serviceability Drawings-** identifies the graphic projection of remaining life by roof area. Each separate color represents a different range of life expectancy. This allows the user to identify the overall condition of the inventory in various stages of remaining life at a glance.

Serviceability Estimate (SE) Drawing: identifies life expectancy of the roof in its current condition.

Adjusted Serviceability Estimate (ASE) Drawing: indicates the adjusted remaining life if optimal repairs are performed, therefore, extending the life of the roof system.

Life Expectancy Ranges:

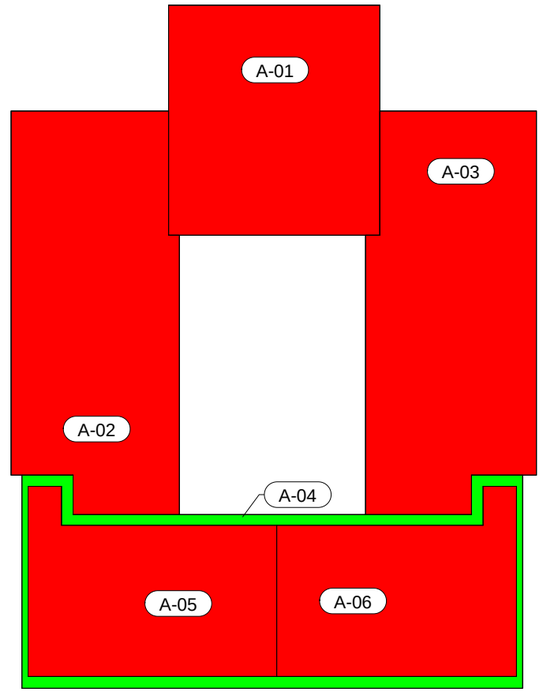
Red roof areas indicate an anticipated remaining financial life of 1-3 years.

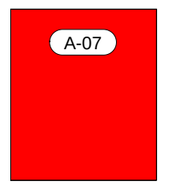
Yellow roof areas indicate an anticipated remaining financial life of 4-10 years.

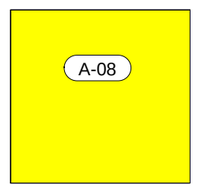
Green roof areas indicate an anticipated remaining financial life of 11+ years.

* Core cuts were not permitted during assessment , therefore unless data was provided all non-visible as-built data (i.e. insulation) was assumed based on minimum ASHRAE insulating standards (R=20). Replacement costs and service life projections may vary if actual as-builts are obtained.

Dirksen Elementary - Remaining Life Drawing





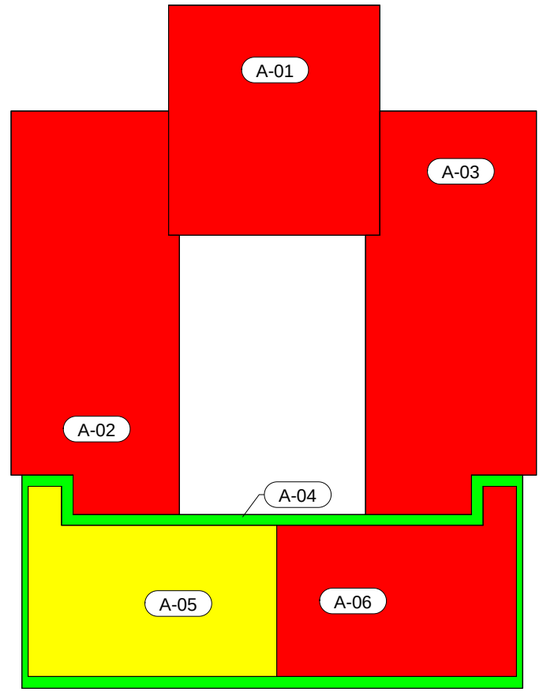


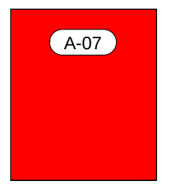
2018 Remaining Life (yrs)

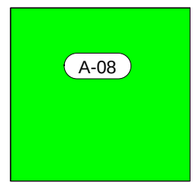
- 1 - 3 Yrs
- 4 - 10 Yrs
- 11 or more

Date: July 11, 2018

Dirksen Elementary - Adjusted Serviceability Estimate Drawing







2018 ASE (yrs)

- 1 - 3 Yrs
- 4 - 10 Yrs
- 11 or more

Date: July 11, 2018

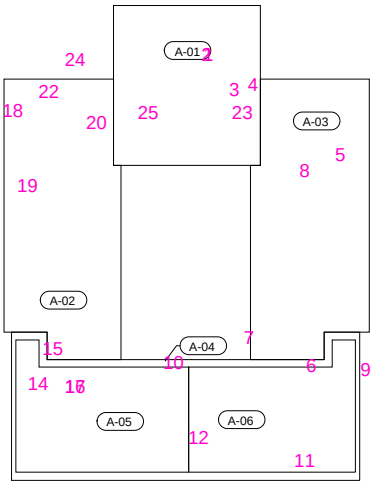
4. PHOTO REPORT

The **Aerial Image with Identified Roof Areas** is the prequel to the Photo Report, which locates the roof areas on an overall aerial image of the school.

The **Photo Report** displays each captured photo that was taken during the on-site assessment. Each photo is labeled by number and includes a description. The first page of the Photo Report identifies the location of each photo on an overview drawing of the assessed school. The following pages are organized by Roof Area, which is listed in the upper left of each page. The photos on each page correspond with the identified Roof Area. In the upper right of each page is a small drawing of that Roof Area which includes the location of each photo.

Dirksen Elementary Photo Report

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656
Size of Building: 52,677 sqft.



Building
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Address: 8601 West Foster Ave. Chicago, IL 60656
Size of Building: 52,677 sqft.

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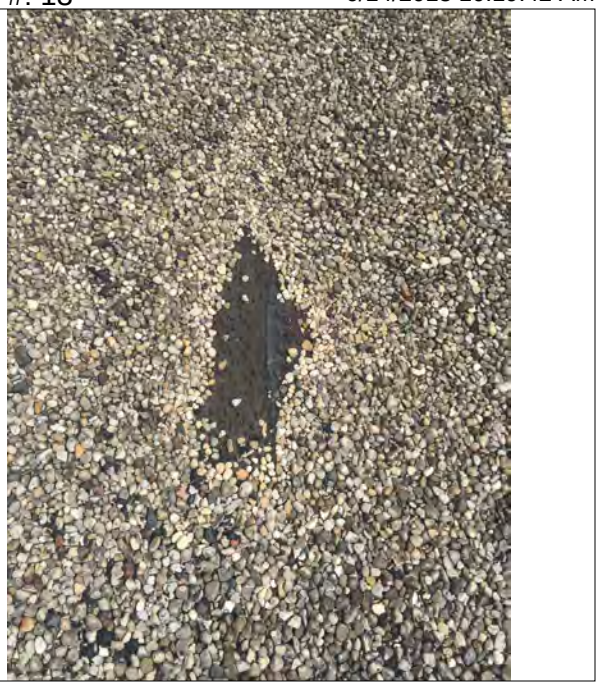

BLISTERED MEMBRANE

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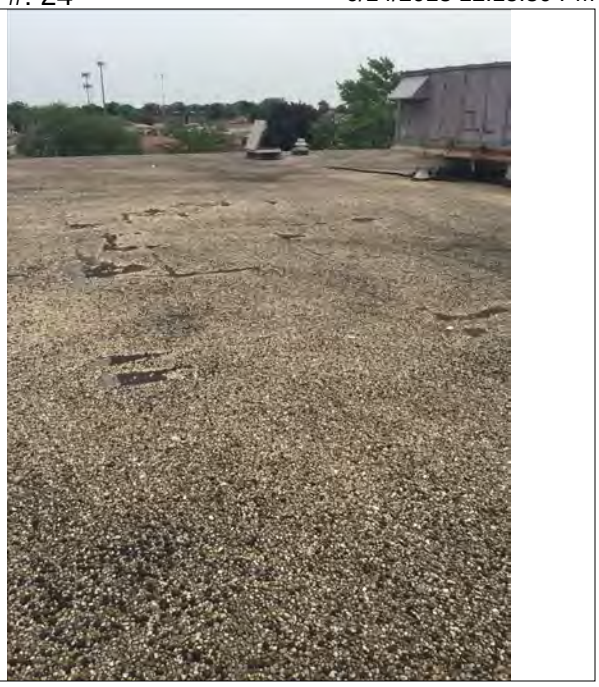
MEMBRANE REPAIR

Photo #: 24 6/14/2018 12:15:30 PM



MEMBRANE REPAIR

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SPLIT FLASHING

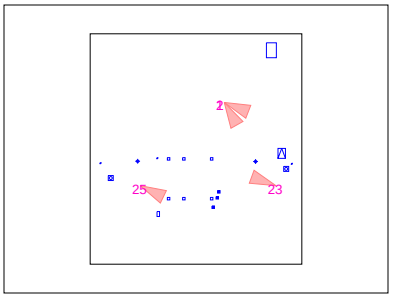
Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656
Size of Building: 52,677 sqft.

Photo #: 9 6/14/2018 10:01:34 AM

ROOF OVERVIEW

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-01
Subsystem: BUILT-UP
Size: 7,888 sqft.
Year Installed: 1997



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ROOF OVERVIEW

Photo #: 2 6/14/2018 9:29:30 AM

ROOF OVERVIEW

Photo #: 23 6/14/2018 12:02:04 PM

ROOF OVERVIEW

Photo #: 25 6/14/2018 12:18:29 PM

PLUGGED DRAIN

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-01
Subsystem: BUILT-UP
Size: 7,888 sqft.
Year Installed: 1997

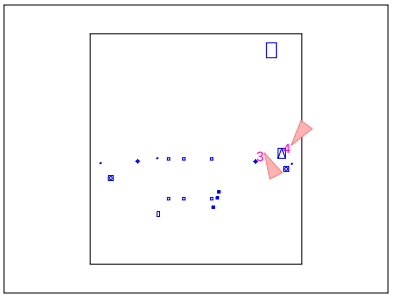


Photo #: 3 6/14/2018 9:29:38 AM

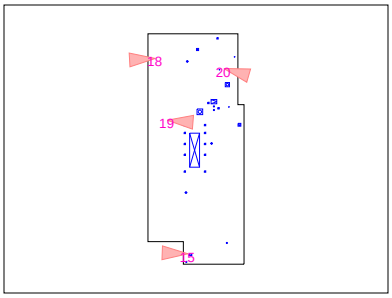
BLISTERED MEMBRANE

Photo #: 4 6/14/2018 9:29:47 AM

MEMBRANE REPAIR

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-02
Subsystem: BUILT-UP
Size: 10,412 sqft.
Year Installed: 1997



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BROKEN SKYLIGHT

Photo #: 18 6/14/2018 10:46:46 AM

VEGETATION GROWTH

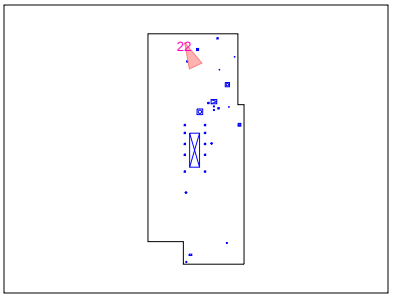
Photo #: 19 6/14/2018 10:50:42 AM

MEMBRANE RIDGES

Photo #: 20 6/14/2018 10:51:28 AM

BLISTERED MEMBRANE

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656



Roof Area
Name: A-02
Subsystem: BUILT-UP
Size: 10,412 sqft.
Year Installed: 1997

Photo #: 22 6/14/2018 10:58:27 AM

LOW ELEVATION OF FLASHING

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-03
Subsystem: BUILT-UP
Size: 10,495 sqft.
Year Installed: 1997

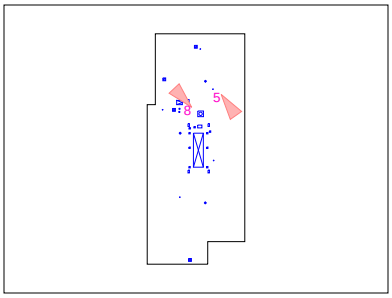
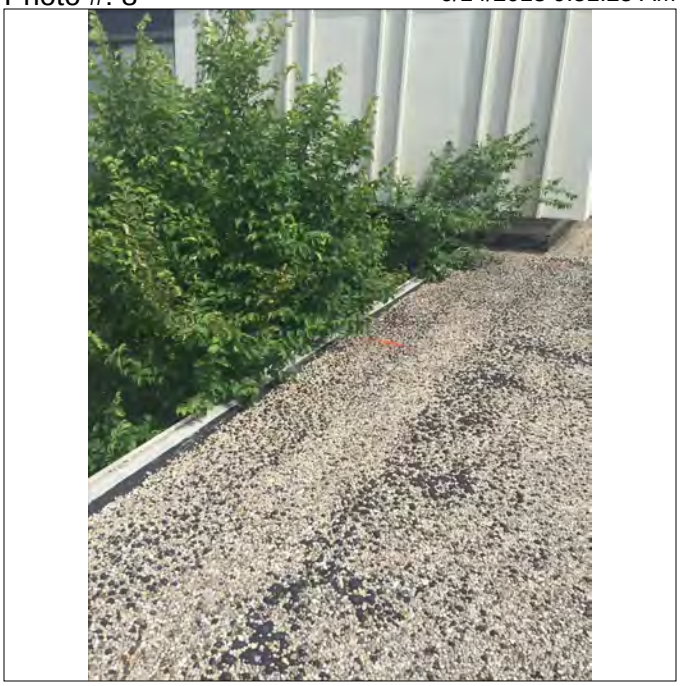


Photo #: 5 6/14/2018 9:38:45 AM

VEGETATION GROWTH

Photo #: 8 6/14/2018 9:51:25 AM



VEGETATION OVERGROWTH

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-04
Subsystem: PANEL
Size: 2,369 sqft.
Year Installed: 1997

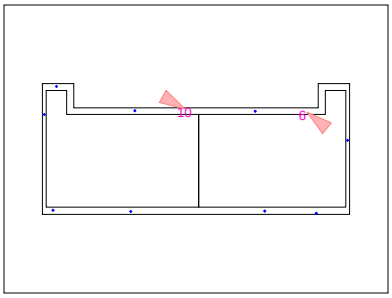
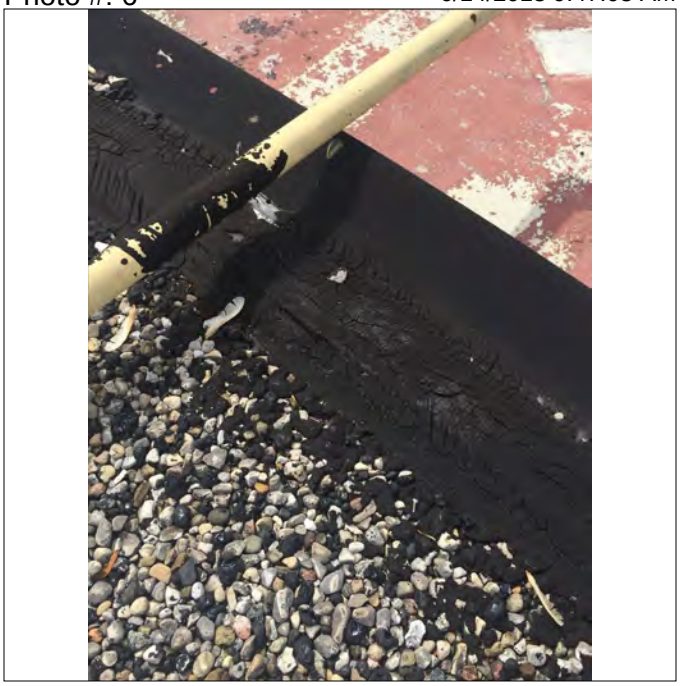


Photo #: 10 6/14/2018 10:07:44 AM

LOOSE LAP

Photo #: 6 6/14/2018 9:47:08 AM



OPEN FLASHING

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-05
Subsystem: BUILT-UP
Size: 6,315 sqft.
Year Installed: 1997

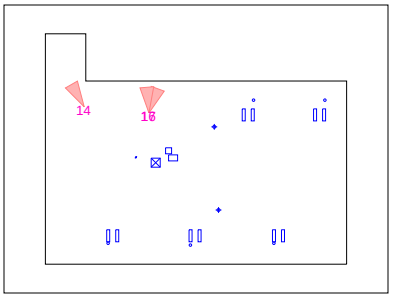


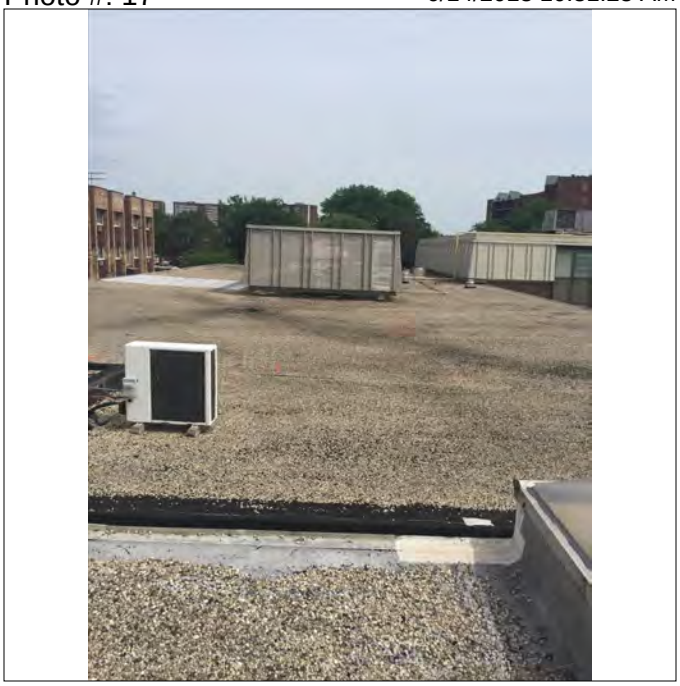
Photo #: 14 6/14/2018 10:27:48 AM

LOOSE FLASHING

Photo #: 16 6/14/2018 10:28:47 AM

REPAIRED SKYLIGHT

Photo #: 17 6/14/2018 10:31:28 AM

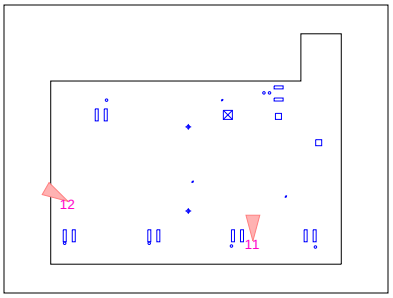


ROOF OVERVIEW

Dirksen Elementary Photo Report

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-06
Subsystem: BUILT-UP
Size: 6,099 sqft.
Year Installed: 1997



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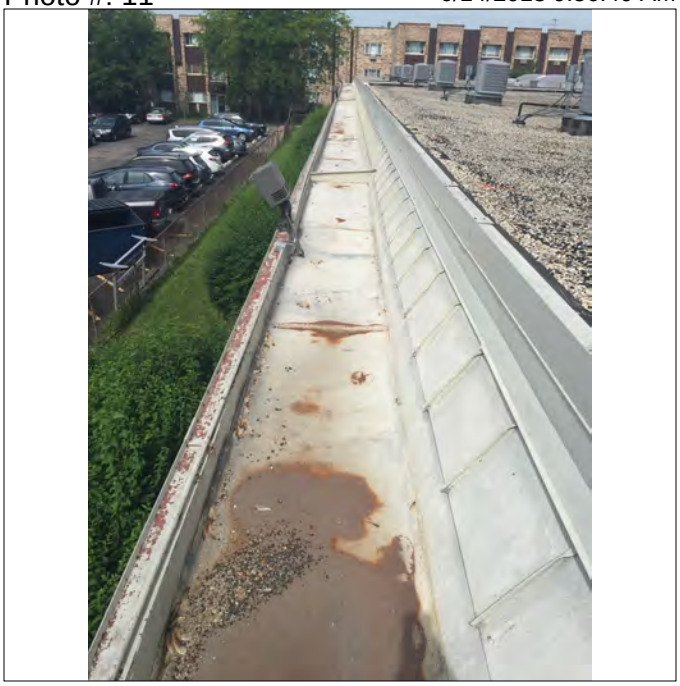
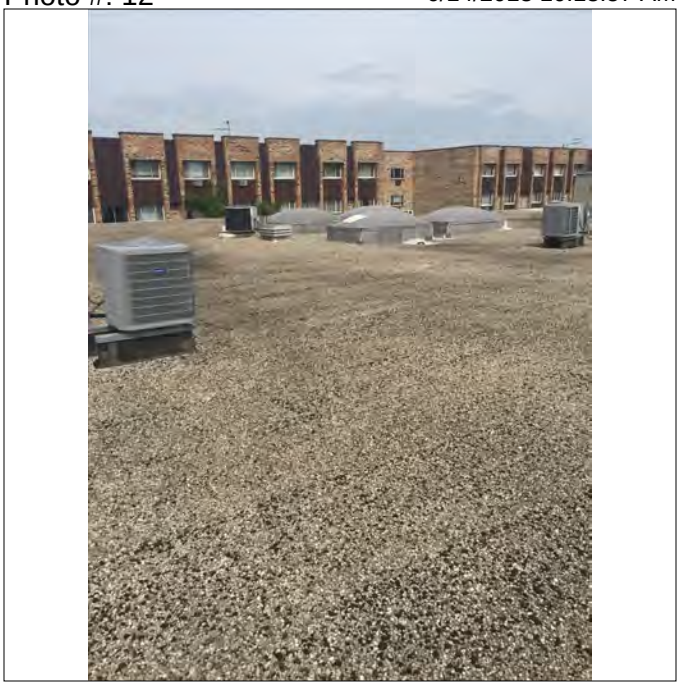


ROOF AREA OVERVIEW

Photo #: 12 6/14/2018 10:18:57 AM



ROOF OVERVIEW

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656

Roof Area
Name: A-07
Subsystem: SINGLE-PLY
Size: 4,053 sqft.
Year Installed: 2001

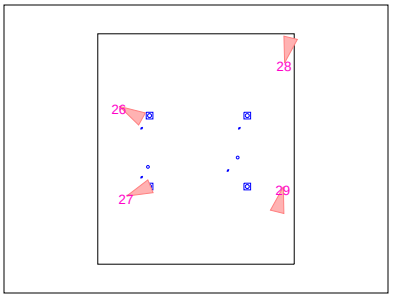


Photo #: 26 6/14/2018 1:21:23 PM

ROOF OVERVIEW

Photo #: 27 6/14/2018 1:21:50 PM

HOLE IN MEMBRANE

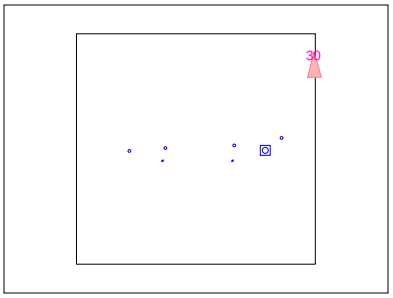
Photo #: 28 6/14/2018 1:23:53 PM

LOOSE MEMBRANE REPAIR

Photo #: 29 6/14/2018 1:25:59 PM

ROOF OVERVIEW

Building
Name: Dirksen Elementary
Address: 8601 West Foster Ave. Chicago, IL 60656



Roof Area
Name: A-08
Subsystem: SINGLE-PLY
Size: 5,046 sqft.
Year Installed: 2014

Photo #: 30 6/14/2018 1:33:13 PM

DEBRIS IN GUTTER

5. ROOF PLAN

The **Roof Plan** is an overall drawing of the entire school's roof plan with graphic representation of each roof area identifying roof subsystem (BUR, SINGLE-PLY, PANEL, FOAM, or SHINGLE), square footage (SF), and the locations of all visible roof features on the roof.

Symbol Legend: located on the roof plan to describe the various equipment/penetration symbols, roof core locations, and moisture content within the insulation.

Moisture Survey Identification (*if applicable*): located on the roof plan in **Red** are the locations where moisture was discovered.

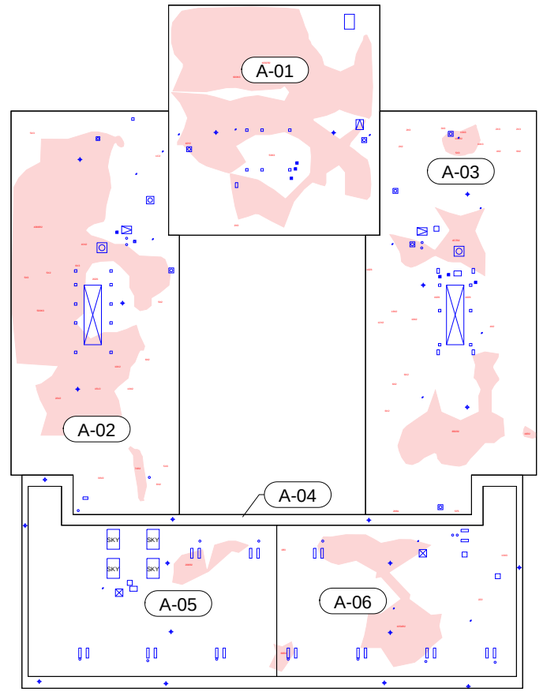
Dirksen Elementary

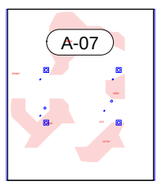
Equipment Legend

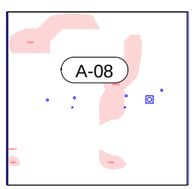
- Drain
- Insulation Vent
- Pitch Pan
- Vent Pipe
- Small Round Penetration
- Medium Round Penetration
- Large Round Penetration
- Hatch
- Square Penetration
- Mechanical Unit
- Power Vent
- Column Support
- Scupper
- Ladder
- Plugged Drain

Symbol Legend

- Wet Insulation







Date: July 11, 2018

BTA
BUILDING TECHNOLOGY ASSOCIATES

FTL FLOOD
Testing Laboratories, Inc.
A Certified Woman Owned Business Enterprise

6. MOISTURE SURVEY REPORT

The **Moisture Survey Report,** through our subcontractor Flood Testing Laboratories, inc. is the evaluation of any moisture content that is located within the roof membrane and its components. The survey is recorded through roof cores analysis and roof plan mapping, *if applicable*. The report can be incorporated into capital planning and budgeting for any future projects to repair or replace roof areas.

- **Roof Moisture Test Results:** this section defines what actions were taken during the survey as well as the moisture results of individual cores at identified roof areas, following a brief summary of what was identified.

- **Moisture Mapping (*if applicable*):** this section displays a table of the moisture survey as well as a roof plan of the moisture results. The roof plan displays a grid spacing of approx. 10' used to lists the amount of moisture discovered at each location, **Blue** showing minimal moisture and **Red** showing heavy moisture.

FLOOD
Testing Laboratories, Inc.
A Certified Woman Owned Business Enterprise

1945 EAST 87TH STREET
CHICAGO. IL 60617-2946
PHONE (773) 721-2200
FAX (773) 721-2206

June 21, 2018

Mark Nichols, RRC, CCS
Regional Director
Building Technology Associates, Inc.
21850 Greenfield Rd.
Oak Park, MI 48237

Re: Nuclear Roof Moisture Test Results
Dirksen ES

Dear Mr. Nichols:

Attached are the results from the roof moisture inspection performed on June 14, 2018 at the Dirksen Elementary School. Grids were created with 10-foot spacing in order to take accurate readings on the roof areas. The grids were assigned coordinates based on the extents of the roof areas and began at the northwest corner of each roof. Results were logged and taken back to the laboratory for statistical analysis. Additionally, roof cores were taken at various gauge readings to determine moisture content. Insulation contents were followed up by Gravimetric Analysis in the laboratory.

The cores taken during the survey revealed a similar construction in certain roof areas. Additional cores were not taken in these areas due to the same roof construction and/or location and the determination that any additional would be unnecessary for purposes of the survey.

Cores taken on the main building roofs revealed an asphalt built-up roof over tapered lightweight insulating concrete with EPS insulation. EPS was approximately 6.0” thick in one of the areas cored but is assumed to vary with slope. The LWC was over a steel roof deck. The annex roofs revealed EPDM membrane over 0.5” gypsum cover board over 2.5” poly iso over a steel roof deck.

Moisture content of the insulation of the roof cores are provided below as well as core locations and data on separate sheets. A roof plan is also attached to this report:

Roof A-02
Core #1 – 29.7% moisture (27)
Core #2 – 37.0% moisture (42)

Roof A-07

Core #1 – 10.5% moisture (8)

Typically, a normal distribution is used to analyze the moisture data. Moisture plots are attached to this report. Based on the overall data; readings for each roof section are assumed:

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1945 EAST 87TH STREET
CHICAGO. IL 60617-2946
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FAX (773) 721-2206

June 21, 2018

For Roof A-01 through A-06, it appears that data readings of up to 26 are relatively dry. Data readings above 26 are likely to have a higher moisture content, beginning at slightly damp and transitioning to wet. A-04 could not be scanned due to its small size.

For Roof A-07 and A-08, it appears that data readings up to 7.5 are relatively dry. Data ranges above 7.5 are likely to have a higher moisture content.

The grid used to survey the roofs and the actual readings obtained during the moisture survey are also attached. Core locations are indicated by a yellow box on the grid/data reading pages. Please feel free to contact me if you have any questions.

Respectfully submitted,

Raymond A. Makiejus, RRC, RRO

Moisture Map for Roof

Location:				**Dirksen - A-01**											
Date:				**Measured 6/14/18**											
Customer:				**BTA**											
Grid Spacing:				Each square represents 10 Ft											
Input Data				Grid measured from the northwest corner of roof and notated in feet below and alongside the grid line identification											
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**						
Distance		**2**	**12**	**22**	**32**	**42**	**52**	**62**	**72**						
A	**2**	22	40	40	34	33	20	19	18						
B	**12**	35	40	42	29	33	25	20	27						
C	**22**	20	39	62	58	36	29	22	30						
D	**32**	26	25	18	24	21	47	37	40						
E	**42**	14	39	41	41	36	26	20	26						
F	**52**	25	28	29	0	0	26	28	22						
G	**62**	19	25	26	24	16	27	25	30						
H	**72**	16	23	25	33	27	24	25	26						
I	**82**	16	22	23	19	26	22	20	21						

Moisture Map for Roof

Location:		**Dirksen - A-02**	
Date:		**Measured 6/14/18**	
Customer:		**BTA**	
Grid Spacing:		Each square represents 10 Ft	
Input Data		Grid measured from the northwest corner of roof and notated in feet below and alongside the grid line identification	

		1	**2**	**3**	**4**	**5**	**6**	**7**
Distance		**2**	**12**	**22**	**32**	**42**	**52**	**62**
A	**2**	18	20	13	17	18	20	24
B	**12**	16	26	26	30	27	24	20
C	**22**	12	26	40	35	22	24	26
D	**32**	28	48	44	34	24	24	13
E	**42**	41	42	39	37	19	21	19
F	**52**	30	35	35	23	17	18	15
G	**62**	31	28	30	36	32	24	24
H	**72**	71	62	71	0	0	36	32
I	**82**	70	69	66	0	0	31	21
J	**92**	32	27	31	0	0	24	18
K	**102**	33	48	42	30	39	27	16
L	**112**	22	22	27	35	30	23	22
M	**122**	20	27	32	32	26	22	17
N	**132**	17	25	29	34	27	22	16
O	**142**	16	26	27	18	25	24	16
P	**152**	0	0	0	19	22	27	19

Moisture Map for Roof

Location:				**Dirksen - A-03**											
Date:				**Measured 6/14/18**											
Customer:				**BTA**											
Grid Spacing:				Each square represents 10 Ft											
Input Data				Grid measured from the northwest corner of roof and notated in feet below and alongside the grid line identification											
		1	**2**	**3**	**4**	**5**	**6**	**7**							
Distance		**2**	**12**	**22**	**32**	**42**	**52**	**62**							
A	**2**	17	14	12	10	21	16	15							
B	**12**	18	24	23	35	24	25	14							
C	**22**	19	24	19	23	19	19	20							
D	**32**	21	20	17	25	18	20	12							
E	**42**	23	25	26	20	26	21	18							
F	**52**	25	23	11	36	19	19	17							
G	**62**	19	31	28	37	26	22	17							
H	**72**	17	23	0	0	26	21	16							
I	**82**	21	19	0	0	22	20	14							
J	**92**	24	22	0	0	19	17	16							
K	**102**	18	24	26	22	24	23	15							
L	**112**	11	18	24	20	30	17	15							
M	**122**	18	17	26	21	27	23	13							
N	**132**	20	24	27	23	27	23	14							
O	**142**	22	28	29	31	34	24	28							
P	**152**	24	27	25	37	0	0	0							

Moisture Map for Roof

Location:		**Dirksen - A-05/A-06**
Date:		**Measured 6/14/18**
Customer:		**BTA**
Grid Spacing:		Each square represents 10 Ft
Input Data		Grid measured from the northwest corner of roof and notated in feet below and alongside the grid line identification

		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
	Dist	**2**	**12**	**22**	**32**	**42**	**52**	**62**	**72**	**82**	**92**	**102**	**112**	**122**	**132**	**142**	**152**	**162**	**172**	**182**	**192**
A	**2**	18																			16
B	**12**	19																			18
C	**22**	24	18	18	0	23	0	23	25	28	25	18	22	31	33	27	29	26	14	25	22
D	**32**	17	20	19	0	24	0	31	26	18	20	26	19	23	20	27	24	21	22	20	22
E	**42**	19	18	21	20	23	18	20	15	17	17	19	24	21	22	21	27	20	21	19	17
F	**52**	20	17	17	13	21	21	21	26	24	22	19	23	26	23	30	26	30	18	23	19
G	**62**	18	16	21	22	21	22	21	18	16	19	28	24	22	25	25	31	25	21	17	17
H	**72**	19	22	21	18	20	20	20	21	16	24	25	21	17	17	21	19	17	19	21	18

Moisture Map for Roof

Location:				**Dirksen - A-07**											
Date:				**Measured 6/14/18**											
Customer:				**BTA**											
Grid Spacing:				Each square represents 10 Ft											
Input Data				Grid measured from the northwest corner of roof and notated in feet below and alongside the grid line identification											
		1	**2**	**3**	**4**	**5**	**6**								
Distance		**2**	**12**	**22**	**32**	**42**	**52**								
A	**2**	6	6	8	7	6	6								
B	**12**	7	7	8	8	8	7								
C	**22**	7	6	8	6	6	7								
D	**32**	7	7	7	6	8	7								
E	**42**	8	7	8	6	7	7								
F	**52**	6	8	7	7	8	6								
G	**62**	7	7	6	8	7	7								

Moisture Map for Roof

Location:				**Dirksen - A-08**											
Date:				**Measured 6/14/18**											
Customer:				**BTA**											
Grid Spacing:				Each square represents 10 Ft											
Input Data				Grid measured from the northwest corner of roof and notated in feet below and alongside the grid line identification											
		1	**2**	**3**	**4**	**5**	**6**	**7**							
Distance		**2**	**12**	**22**	**32**	**42**	**52**	**62**							
A	**2**	6	7	8	8	6	6	7							
B	**12**	8	8	7	7	7	8	7							
C	**22**	7	7	7	7	7	8	6							
D	**32**	7	6	6	6	8	7	6							
E	**42**	7	7	7	7	8	7	8							
F	**52**	6	5	6	7	6	6	5							
G	**62**	8	6	6	7	8	7	6							

TERRA ENGINEERING LTD.

DATE: 11/02/2018

TO: Molly Kinsella – SMNGA

FROM: Scott Rasmussen – TERRA Engineering

RE: Everett McKinley Dirksen Elementary School Annex - Civil Engineering 60% Schematic Design Narrative

MEMO: Please see the below civil engineering 60% Schematic Design narrative regarding the Dirksen Elementary School Annex.

Civil Engineering Narrative

1. Project Summary
    - A. Existing Parcel
        1. The School is located at the corner of W Foster Ave. and N Delphia Ave. in the northwest City Limits of Chicago. The project will develop a ~2.4 acres of the existing parcel that is about 4.3 Acres in size.
    - B. Proposed Project
        1. The scope of the school project is to construct a new Annex to the south of the existing school, removing the parking lot and existing modular buildings. The project will add a new parking lot and fire lane at the buildings east façade with access at two locations from N Delphia Ave. Along with the building and parking lot there is an area dedicated at the north end of the existing building as a “Play Area.” It is anticipated this is to be an artificial turf or poured in place rubber surface play area.
2. Basis of design for civil site improvements:
    - A. Earthwork: Excavation shall be performed in accordance with IDOT Standard Specifications for Road and Bridge Construction (latest edition) and shall also include the following:
        1. Excavation to design subgrade ±0.1'.
        2. Hauling, placement, and compaction of excavated material to 95% Standard Proctor Density, in fill areas.
        3. Discing and drying of suitable materials to obtain proper compaction.
        4. Borrow excavation to obtain suitable material.
        5. Undercutting, hauling, and placement of unsuitable materials to non-structural fill areas.
        6. Handling, hauling, and placement of all excess spoil, to fill areas.
        7. Import or export of material necessary to bring site to final grade.
        8. Fill to obtain desired subgrade shall be coordinated with stormwater management objectives.
    - B. Underground Utility Improvements:
        1. All underground utility improvements shall be constructed in accordance with the Standard Specifications for Water and Sewer Main Construction in Illinois, and the City of Chicago Department of Water Management (CDWM).
        2. Select granular trench backfill will be required for all storm sewer trenches lying under existing or proposed streets, loading dock or sidewalks, and within 24" thereof. Trench materials shall be Illinois Department of Transportation CA-6 gradation.
        3. Manholes, catch basins, and inlets shall be constructed of reinforced precast concrete ring construction with tongue and groove joints in conformance with ASTM C-478.
    - C. Sanitary/Combined sewer shall be installed in accordance with the following:
        1. Pipe material shall be of water main quality, Ductile Iron Pipe (DIP), Class 56 or equivalent or Extra Strength Vitrified Clay Pipe, ASTM C-700 specification, with PVC compression collar seal type joints conforming to ASTM Specification D 1784.
        2. Pipe bedding shall consist of compacted aggregate, CA-11, placed 6" below to springline of pipe, and compacted FA-6 from springline

CIVIL 60% SD NARRATIVE

of the pipe to 12" above for the width of the trench. Up to 25% RAP allowable for base course aggregate as long as required gradation is maintained.

3. Frames and lids shall be as specified by the DWM and shall include an external 10" elastomeric band extending from the frame to the manhole.
4. Testing and televising of sanitary sewer shall be in accordance with the Standard Specifications for Sewer and Water Main Construction and City of Chicago Department of Water Management.

D. Storm Sewer shall be installed in accordance with the following:

1. Pipe material shall be reinforced concrete pipe for pipes greater than 21 inches, ASTM C-76, Class III, Wall-B O-ring joints is the minimum requirement. Pipe material shall be DIP, Extra Strength Vitrified Clay Pipe [ESVCP] or PVC-SDR-26 for pipes 21" and smaller in diameter.
2. Pipe bedding shall consist of Illinois Department of Transportation CA-11 gradation compacted from 6" below to the spring line of the pipe and compacted CA-11 or CA-16 from springline of the pipe to 12" above, over the trench width. Up to 25% RAP allowable for base course aggregate as long as required gradation is maintained.
3. Frame and lids shall be as specified by the City of Chicago Department of Water Management.

E. Paving Improvements:

1. Subgrade preparation shall include final grading of the pavement subgrade to ±1" with an average subgrade elevation of ±0.02' from the proposed subgrade elevation.
2. Aggregate base course for concrete and asphalt pavements shall be constructed in conformance with Section 351. It shall be type "B" with a CA-6 gradation, unless otherwise specified. Up to 25% RAP allowable for base course aggregate as long as required gradation is maintained.
3. Hot mix asphalt aggregate base course shall be constructed in accordance with Section 311 of the Standard Specifications for Road and Bridge Construction. It shall have a minimum Marshall Stability of 1,700 or greater.
4. Hot mix asphalt binder course shall conform to IDOT SSRBC, latest edition.
5. Hot mix asphalt surface course shall conform to IDOT SSRBC, latest edition. A prime coat will be required prior to surfacing.
6. Concrete sidewalks shall be 5" thick with a 6" aggregate base. The concrete shall be 3,500 psi air entrained. A ½" premoulded expansion joint shall be provided at minimum 30' intervals and tooled contraction joints at 5' centers will be required. Maximize recycled content for concrete; substitute fly-ash and slag for up to 40% of cementitious material.
7. Combination concrete curb and gutter shall be B6.12. Construction will conform to Section 606 of the Illinois Standard Specifications. The concrete shall be Class SI in accordance with Section 720. Maximize recycled content for concrete. Substitute fly-ash and slag for up to 40% of cementitious material.
8. Concrete pavement for driveways shall be 8" thick with 6" CA-6 granular base. The concrete shall be equivalent to IDOT class PV concrete and conform to Section 1020. Provide 3/4" premoulded expansion joints at 30' intervals and tooled contraction joints at 10' centers.
9. Pavement markings shall be thermoplastic in accordance with Illinois Department of Transportation T501 of the Standard Specifications for Traffic Control Items.

3. Demolition/Site Clearing/Erosion Control:

A. Earthwork removal will be in accordance with the environmental investigation reports and shall be in accordance with IEPA regulations for Subtitle D,

CCCD, or any other landfill identified in the anticipated environmental investigation report.

B. Demolition is anticipated for the existing modular building at the southeast corner of the site. Along with the modular removal, all utility service connection will be removed, abandoned, and/or disconnected for service. Coordinate all service disconnect with service provider.

C. Erosion control measures anticipated for the project are as follows:
   1. Construction fence with dust screening at property boundary
   2. Silt fence at property boundary
   3. Inlet filters at all proposed and existing catch basins
   4. Temporary seeding at all stock piles
   5. Permanent erosion control blankets and seeding at all berms

4. At Grade Improvements
   A. Pavement
      1. Proposed, on-site new paving improvements within the project site are planned as follows, pending coordination with geotechnical engineer and their forthcoming report:
         a) Two-lane paved access drive with 90 Degree parking.
            a. 8” compacted CA-6 subbase
            b. 3.5” HMA Binder Course IL-4.75, N50
            c. 2.5” HMA Surface Course Mix D, N70
         b) Parking stalls: Non-ADA
            a. Permeable paver
            b. 2” CA-16
            c. 6” CA-7
            d. 12” CA-1
         c) Parking Stall: ADA
            a. 8” compacted CA-6 subbase
            b. 3.5” HMA Binder Course IL-4.75, N50
            c. 2.5” HMA Surface Course Mix D, N70
         d) Concrete barrier curb and gutter shall line the access drive and landscape islands.
         e) 5” concrete walk with 6” base between the access drive and existing building and proposed annex.

5. Site Grading:
   A. Grading of site pavements will follow Chicago Department of Water Management (CDWM) requirements for drainage, with a minimum slope of 1.0%. All pedestrian paving onsite will meet the Mayor’s Office for People with Disabilities (MOPD) and Illinois Accessibility Code (IAC) requirements for grading and slopes for accessibility. Drainage of site areas will consist of routing landscape and pavement areas to a series of catch basins, trench drains, and inlets that will connect to the site detention storage areas and ultimately outfall to a sewer connection in N Delphia Ave.

6. Stormwater Detention:
   A. Requirements:
      1. The proposed project is a regulated development as defined by the City of Chicago Department of Water Management (CDWM). As such, stormwater detention will be required for the project.
      2. The CDWM requires two different stormwater components: Rate Control and Volume Control. Rate control is stormwater that will be temporarily stored in an onsite detention system, and volume control is stormwater that will be retained on site.
      3. At this time the project has not determined if it will upgrade the detention and volume control systems to achieve the requirements set out by The Sustainable Development Policy.
   B. Stormwater Assumptions:
      1. School Project:
         a) We have assumed +/-2.3 acres of disturbed site area.
         b) Preliminary calculations have been completed to determine the site sewer capacity. Based on the City of Chicago’s sewer infrastructure the site has a release or 0.20 cfs/ac.

CIVIL 60% SD NARRATIVE

This is a low release rate compared to other areas of the City. The release rate is based on the areas outfall at basin 'Foster West".

c) We estimated areas of impervious site and pervious (landscape) in order to calculate the detention per CDWM code requirements.

d) We assume there is no off-site drainage flowing into the School property.

C. RATE CONTROL:

1. School Annex, parking lot, and north site.

a) Based on the above assumptions, the preliminary stormwater detention required for the southern portion of the site is 30,500 cubic feet. The preliminary stormwater detention required for the northern portion of the site is 5,000 cubic feet.

D. VOLUME CONTROL:

1. We will be able to confirm volume control required once we receive the geotechnical report, however the site will require a volume control component based on CDWM regulations. Due to site constraints the most suitable option for the site is to utilize the parking stalls for a best management practice. Permeable pavers are anticipated to be used in the non-ADA parking stalls.

E. Detention

1. Detention for the south is anticipated to be handled in a subsurface detention tank. Due to the limited amount of site area, a tank is the best economical option for this development. Other detention options such as permeable paver, oversized RCP would generate an already large amount of haul off.
2. Detention for the north is anticipated to be handled in subsurface stone and oversized detention pipe.

7. Underground Utility Improvements

A. The new Annex will require sanitary, storm, electrical, gas, and water services.

B. Electric Service is anticipated to be pulled from the existing city line at the west property line. The primary will be pulled to will be feed to a new transformer. Location of transformer and service is to be determined.

C. Gas Service. Based on preliminary survey information, Peoples Gas has infrastructure at W Foster Ave. The existing school has a gas service connection to this gas main. Further coordination with mechanical engineer and People Gas is required to determine if existing service can be upgraded to serve the new annex or an extension of the Peoples Gas main down N Delphia Ave is required.

D. Water. The new Annex will require its own service connection. The City Water main is located in the west sidewalk of Delphia Ave. it is anticipated that the service will be greater than 100' long. Coordination with the Department of Water Management is required to determine if a heated enclosure is required with an above ground RPZ and meter are required for this service. Coordination with the Department of Water Management will be required for all water service tap terminations for the existing modulars

E. Storm Service.

1. South: A new connection from the proposed detention system(s) will be provided to the 12" sewer at Delphia Ave.
2. North: It is assumed that all roof drains and existing pavement drainage is in good condition and will remain as is. The north system is anticipated to use the existing sewer tap.

8. LEED SSc4 – Rainwater Management

A. Based on preliminary site investigations, it is not believed that this credit will be achievable based on the proposed site programming. It will be verified throughout the design process if this credit will be achievable.

9. Sustainability Matrix – Exceed Stormwater Ordinance by 25%.

A. South Detention – 38,125 cubic feet required.

B. North Detention – 6,250 cubic feet required.
C. Volume Control - 3,050 cubic feet required.

10. Outstanding Items Required for Civil Engineering Design:
    A. A final boundary and topographic survey with 3D, digital, topographic information and underground utility information, in .dwg format.
    B. Geotechnical report outlining soil profiles, water table, pavement/earthwork recommendations, etc.
    C. Environmental Remedial Action Plan.
    D. OUC Atlases sent to Surveyor by City of Chicago.
    E. Ground Penetrating Radar.

Thank you,
Scott Rasmussen, P.E.

CC: Danielle Kowalewski – TERRA Engineering
Mitch Horras – TERRA Engineering

Attachments: C4.0 – Site Utility Plan
AT-1 “Fire Truck Turning Maneuver
AT-2 “Refuse Truck Turning Maneuver

CIVIL 60% SD NARRATIVE

Dirksen Annex- CPS
Structural Narrative
50% Schematic Design
11.02.2018

Introduction

The **Dirksen Annex** will consist of a new three story 62,000 square foot structure. The exterior Architectural enclosure will be brick with steel stud back up.
The structural system was selected based on the current project schedule, the ease of construction, the recommendations from CPS regarding slab thicknesses (to mitigate moisture conditions) and the suitability of the structural system for future modifications. No provisions have been made for future expansion in this phase of the design as CPS has not requested any considerations for future additions.

Floor Framing

The floor framing of the building will consist of 2" composite metal deck with 4 1/2" Normal weight concrete slab supported on composite steel beams spaced at 7' to 8'-6" on centers with girders spaced at 25'-30' on centers. The portion of the second floor, above the dining room, will consist of 2" composite metal deck with 6" Normal weight concrete slab supported on composite steel beams spaced at 6'-8" on centers. The composite beams typically span 30' (+/-) with a 15' span at the corridors. The floor framing will be supported on W10 wide flange steel columns. The column locations and the spacing will be determined as the design is further developed.

The stairs will be metal pan with concrete infill per the Architectural requirements.

Roof

Due to the school's proximity to the airport, concrete will be used at the roof. The roof structure will consist of composite metal deck with concrete floor, similar to the floor framing. The composite slab will be supported by composite wide flange beams.

Lateral System

The lateral load resisting system consists of 12" thick core walls. The stair core and elevator core concrete walls will be used for this purpose.

Foundations

A comprehensive Geotechnical Report needs to be obtained prior to structural foundation design. Based on the preliminary discussions with the Geotechnical Engineer Drilled Piers, with bells, bearing at approximately 15' below grade will be the required foundations. Grade beams will be required at the perimeter and under all shear walls.
The slab on grade will be 5" thick concrete slab with 6x6 -W2.9xW2.9 Welded Wire Fabric.
Any vibration sensitive machinery will be supported on isolated foundations. The foundation mass will be determined per machinery manufacturer's recommendations.

Codes and Technical References

- Governing Building Code: **Chicago Building Code (CBC), 2018**
- ANSI-A58.1 & ASCE 7: Minimum Design Loads for Buildings
- Structural Steel: AISC Specification for Structural Steel Buildings
- Concrete: ACI - 318 Building Code Requirements for Structural Concrete
- Precast Concrete: PCI – Design Handbook Latest Edition
- Masonry: ACI - 530 – Building Code Requirements for Concrete Masonry Structures
- Cold Formed: AISI – North American Specification for the Design of Cold Formed Steel Structures
- Steel Deck: SDI – Diaphragm Design Manual
- Elevators and Escalators: ASME A17.1 Safety Code for Elevators and Escalators

Design Load Criteria

Dead Load

- 2” Metal Deck + 4 1/2” N. WT. Concrete Slab = 69 psf
- 2” Metal Deck + 6” N. WT. Concrete Slab = 88 psf
- Structure = 7 psf
- Partitions = 20 psf
- MEP = 15 psf
- Roofing + Insulation = 12 psf
- Misc = 5 psf
- RTUs = Per Mechanical Data

Live Load

- Classrooms (Typ.) = 40 psf + Partitions
- Public Areas = 100 psf
- Corridors = 100 psf
- Stairs, Lobbies = 100 psf
- Library Stacks = 150 psf
- Mechanical Rooms = 150 psf
- Storage = 125 psf

Snow Load

- Uniform = 25 psf
- Drift = 60 psf (16’ width)

Wind Load

- Structure = 20 psf
- Cladding = 25 psf (Typical)
- Cladding = 30 psf (Corners)
- Uplift (Canopy) = 40 psf

Thrust on

- Handrails and Stairway railings = 50 plf (on top horiz. and vert. or 200 lbs at any point)

TERRA ENGINEERING LTD.

DATE: 11/2/2018

TO: Molly Kinsella – SMNGA

FROM: Will Prescott – TERRA Engineering

RE: Everett McKinley Dirksen Elementary School Annex –
Landscape Architecture Concept Design Narrative

MEMO: Please see the below Landscape Architecture Concept design narrative regarding the Dirksen Elementary School Annex.

LANDSCAPE CONCEPT NARRATIVE

Landscape Architecture Narrative

1. Project Summary
   - A. Existing Parcel
     1. The School is located at the corner of W Foster Ave. and N Delphia Ave. in the northwest City Limits of Chicago. The project will develop a ~1.8 acres of the existing parcel that is about 4.3 Acres in size.
   - B. Proposed Project
     1. The scope of the school project is to construct a new Annex to the south of the existing school, removing the parking lot and existing modular buildings. The project will add a new parking lot and fire lane at the buildings east façade with access at two locations from N Delphia Ave.
     2. The landscape design shall be in accordance with the Chicago Public School Program, Public Building Commission of Chicago Site Development Guidelines, and the Chicago Landscape Ordinance. Landscaping shall be designed to complement the adjacent setting and proposed annex and is anticipated to include code required parkway and parking lot landscape, building foundation landscape around the annex, and landscape restoration for disturbed areas of the site. Additionally, pedestrian hardscape and landscape planters are included to blend the new and existing site improvements while improving pedestrian safety and paths of travel across the northern portion of the site to the parking lot and playlot if necessary.
2. Basis of design for landscape architecture improvements:
   - A. Site Plantings
     1. All proposed plantings within the limit of construction will be adaptive and drought tolerant species. Plantings shall include shrubs, ornamental grasses, perennials, and ground covers. Trees shall be min. 4” caliper for shade trees, 10’ ht. for ornamental trees and evergreen trees. Tree pit areas shall be dug 2x the size of the rootball and backfilled with amended topsoil. Shrub, perennial and groundcover planting beds shall be backfilled with 24” of pulverized topsoil with required amendments.
   - B. Parkway Planting:
     1. The existing parkway planting shall be assessed in detail by the Landscape Architect and additional trees provided as needed to meet the requirements of the Chicago Landscape Ordinance. Pending receipt of the final topographic survey, we estimate the following will be required:
        - One (1) 4” caliper shade tree will be required to supplement the existing parkway trees along West Foster Ave.
        - Eight (8) 4” caliper shade trees will be required to supplement the existing parkway trees along North Delphia Ave. Several existing Elms, Honey Locusts, and Maples appear in poor shape and may have to be removed and replaced. This is up to the discretion of the Chicago Bureau of Forestry

LANDSCAPE CONCEPT NARRATIVE

C. Parking Area:

1. The proposed parking lot will be designed to comply with the requirements of the Chicago Landscape Ordinance. This will include the following:

Parking Lot and Vehicular Use Area Screening Requirements:

- Seven (7) foot wide perimeter landscaped area adjacent to public ROW.
- Continuous screening hedge, maintained between thirty (30) and forty-eight (48) inches in height.
- Tree planting required in perimeter landscaped area at a rate of one per twenty-five (25) feet of linear frontage for a total of 6 trees.
- Ornamental metal fencing around new parking lot and other vehicular use areas (4 foot height typical), to be located within the seven (7) foot perimeter landscaped area. Proposed parking lot requires approximately 200 L.F. of fence. The existing fence adjacent to proposed is in good condition and can likely be salvaged and reinstalled. Provide two (2) 24' wide manual slide gates the new parking lot entrances.
- Approximately 225 L.F. of 6-foot height wood screen fence south of the parking lot adjacent to residential properties.

Internal Parking Lot Landscape Requirements:

- Required internal landscape area of parking lots and vehicular use areas vary as a function of size. Parking lots between 4,500-30,000 square feet: Internal landscaped area equal to 7.5% of total area, which will be approximately 1,790 square feet of internal landscape.
- One (1) tree per 125 SF of required internal landscaped area, exclusive of tree planting required in perimeter landscaped area, for a total of 15 interior trees.
- Minimum two-foot (2'-0") excavation below the parking surface.
- Backfill internal islands with topsoil to top of curb, and mound topsoil up another six (6) inches above top of surrounding curb.
- Use spreading canopy trees, to increase shade and reduce "urban heat island" effect.

D. Irrigation:

1. Hose bibs will be installed at the new annex building and parking lot to water site landscape during plant establishment period and extreme periods of drought. Assume a minimum of two hose bibs spaced around the annex and parking lot to ensure coverage as required by the Landscape Ordinance.

E. Site Furnishings:

1. Site furnishings will be distributed throughout the site and adjacent the annex to accommodate programming for the facility as well as user needs and comfort. Furnishings may include benches, bicycle racks and trash receptacles.

F. Green Roof:

1. No green roof is proposed as part of this project.

3. LEED:

A. LEED certification requirements to be determined by PBC and architect.

4. Permits / Approvals:
   A. It is anticipated that the landscape scope of this project will be permitted through the following agencies:
      - City of Chicago Department of Buildings – Landscape Zoning Review
      - City of Chicago Department of Streets and Sanitation – Bureau of Forestry

Thank you,
Will Prescott

CC: Danielle Kowalewski – TERRA Engineering
Scott Rasmussen – TERRA Engineering
Stephen Lekan – TERRA Engineering

Attachments:

Everett McKinley Dirksen Elementary School
New Annex and Existing Building
Basis of Design – MEP Narrative
dbHMS
11.02.2018

MECHANICAL

Design Criteria

The design of the Mechanical system shall conform to the following Codes and Standards:

1. City of Chicago Building Code
2. Chicago Mechanical Code
3. Chicago Energy Conservation Code
4. CPS Mechanical Standards
5. CPS design guidelines and master specifications
6. NFPA-90 – Air-Conditioning and Ventilation System
7. ASHRAE 90.1-2010: Energy Standard
8. ASHRAE 62.1-2010: Ventilation Standard
9. ASHRAE 55-2010: Thermal Comfort
10. ASHRAE 55.2-2004: Filtration Standard
11. ANSI-American National Standards Institute
12. ASME-American Society of Mechanical Engineers
13. SMACNA-Sheet Metal and Air-Conditioning Contractors National Association
14. AMCA Standards

Outdoor Design Conditions:

1. Summer (DB/WB): 91.7°F/ 74.9°F
2. Winter (DB): -10°F

Indoor Design Conditions:

1. Summer
   a. Occupied: 75°F
   b. Unoccupied: 85°F
   c. Relative Humidity (RH): 50%

2. Winter
   a. Occupied: 70°F
   b. Unoccupied: 60°F
   c. Relative Humidity (RH): 25%

3. Kitchen
   a. Occupied(winter): 80°F
   b. Relative Humidity (RH - summer): 50%

Utilities

A new gas service is expected to be required to provide natural gas for the building heating, hot water heater, and kitchen equipment, however the available gas capacity of existing service will be confirmed with the utility to determine if a new service is required for the new building. The expected gas load for the new building is approximately 700 CFH for water heating, 500 CFH for kitchen equipment and 2,800 CFH for heating for a total load of 4,000 CFH.

Primary Heating System

The school will be served via a hot water heating system. The system will consist of two (2) high efficiency condensing hot water boilers. The boilers will have an estimated output capacity of 2000 MBH each, for 2/3 redundancy. Boiler efficiency will be at least 95%, with hot water reset controls.

A mixture of water and 30% propylene glycol will be circulated to the AHUs and variable air volume (VAV) boxes via two (2) circulation pumps with variable frequency drives (VFDs) and 100% standby configuration, with variable primary pumping arrangement. The boilers and the pumps will be located in the Third Floor Mechanical Room.

Primary cooling system

An air-cooled chiller will provide chilled water for cooling the building. The chiller will be located on the roof of the new building and is estimated to be 200 tons. The chiller will have two refrigerant circuits.

A mixture of water and 30% propylene glycol will be circulated in the chilled water loop. The pumps will be primary pumps with 100% standby configuration and will be provided with VFDs. Chemical water treatment shall be provided per CPS Mechanical Standard Specifications and details.

Air side systems

Two variable air volume (VAV) air handling units (AHUs) will be located on the roof of the new annex. AHU #1 will be approximately a 42,000 CFM unit and will serve the majority of the building. AHU #2 will be approximately 12,500 CFM and will serve the kitchen and dining areas on the first floor.

Each AHU will have a dual temperature coil for heating and cooling. Each AHU will be equipped with an ECM fan array for both supply and relief fans, and will be provided with outside air monitoring station, MERV 8 pre-filters, and MERV 13 final filters. Air will be distributed via medium pressure ductwork with VAV boxes and reheat coils where necessary. The VAV minimum airflow will be the greater of the zone minimum outside air requirement, 1/3 the Chicago code supply air requirement, or the airflow rate of the zone continuous direct exhaust.

Return air will be transferred back to the AHU #1 via plenum return, which will be mixed with the code required outdoor air. AHU #2 for the kitchen and dining area will have a significant quantity of outdoor air as makeup for the hooded cooking equipment in the kitchen. This unit will have fully ducted return air ducts.

The MDF room will be provided with a low ambient split system for cooling year-round.

Exhaust System

Code required exhaust will be provided for the kitchen via a Type II commercial exhaust hood for heat and smoke containment, with a roof-mounted grease rated exhaust fan. The kitchen exhaust will be controlled manually via a switch. Make-up air will be provided to the space via the VAV system.

Code required exhaust will be provided for toilets, with direct drive exhaust fans controlled via time of day schedule.

Separate exhaust will be provided for electrical distribution and elevator machine rooms, which will be controlled via local thermostat settings per CPS guidelines.

Controls System

Static pressure sensors and controllers will be utilized for the variable air volume control. Air monitoring devices will be provided to maintain proper supply and return air differential for building pressurization. All individual and multi occupant spaces will be provided with thermal comfort controls (quantities as per CPS guidelines) accessible to at least 50% of the occupants in that space. Occupancy sensors (quantities as per CPS guidelines) will be provided in each space except toilets, common areas, kitchen, cafeteria, library, and offices. CO2 sensors (quantities as per CPS guidelines) will be provided in all spaces with an occupant density greater than 25 people per 1,000 square feet. All sensors and controllers will be tied into a central building automation system.

Building Automation System

A Building Management System shall be provided for the new annex, to control all components of the HVAC system. The building automation system (BAS) will comply with ASHRAE/ANSI 135 BACNet and CPS Mechanical Standards: Control Standards.

This new BAS will be back-fed to the renovated roof-top units on the existing building to replace the existing building's limited controls system.

Classrooms

In classrooms, supply air from the roof top unit through the VAV box will be supplied to the space ceiling mounted diffusers. Low pressure duct branches will distribute air from the VAV boxes to both the perimeter and the center of the space. Return air from the classroom will transfer into the corridor return plenum.

Each classroom will be provided with temperature and occupancy sensors tied to the BAS. No CO2 sensors will be provided in the classrooms unless required based on occupant density for Code compliance and LEED purposes.

Vestibules and Stairs

Vestibules and Stairs will be heated by hot water cabinet unit heaters.

Mechanical Rooms and other Support Spaces

Mechanical rooms and other support spaces such as Storage Rooms will be heated by hot water cabinet or unit heaters.

Electrical Rooms will be heated with an electric unit heater.

Piping

2-pipe dual temperature hydronic piping system shall go to each air-handling unit. 2-pipe hot water hydronic piping shall be provided for each VAV box reheat coil.

Piping sizing will be as per ASHRAE Fundamentals. Materials used for piping will be as per CPS Standard Specifications. CPS Standard procedures for installation of piping will be used.

Ductwork

All medium pressure and low-pressure ductwork will be sized for velocities and pressure drop as stated in ASHRAE Fundamentals and/or CPS design guidelines. CPS Standard procedures for insulation, material and installation of ductwork will be used.

Also, all intake and exhaust louvers and grilles will be sized in accordance with CPS standards and guidelines.

Acoustics

No internal lining in the ductwork will be provided for noise attenuation. Sound attenuators will be provided at the supply and return of the air handling units and wherever required per Acoustical Consultant.

Existing School Renovation

As part of the existing school renovation, the rooftop units are being replaced. The original design of these RTUs allowed for multizone control via electric heaters in the ductwork serving each classrooms. The existing ductwork was preserved in the last renovation, but the electric heaters are no longer operational, and each RTU now acts as a single zone unit with one thermostat control per unit located in the engineer's office.

A new gas-fired packaged RTU will be installed in place of each of the existing RTUs, with new electric heaters replacing the nonfunctional existing heaters. The new RTUs will be tied into the new BAS system and will have zone control through local thermostats.

New access panels to each heater will be provided. Access panel to be at least 48x48 below each penetration into the classrooms. Significant ceiling coordination will be needed during this process. This would include removal of lower ceiling grid, lights, conduits between the two ceiling layers, and the gyp ceiling above.

ALTERNATE #1:
Instead of replacing the duct heaters, remove duct heaters, and add perimeter radiant hot water heat to the classrooms. This is to be fed by the new boilers in the annex. During heating season, the air handlers will provide room neutral air to the space, and room-by-room zone control will be provided with baseboard thermostats. New RTUs will still be gas-fired packaged RTUs. This alternate will require increasing the boiler size in the annex to 3,000 MBH each.

Related to the rooftop replacement, there is a significant scope required for testing of equipment to operation before removal and reinstallation.

On the following equipment, we will need to test before removal to confirm acceptable operating conditions, and test and balance after installation:

- 13 rooftop exhaust fans
- 11 3-ton Carrier condensing units serving classroom unit ventilators, 1 4-ton International Comfort Products condensing unit serving the computer lab, 1 2-ton Carrier condensing unit serving the MDF room.
- Gas service line for RTUs and 1st floor water heaters
- Test existing ductwork before with existing RTUs prior to confirming reuse of duct.
- Structural engineer to confirm reuse of existing steel supports for the 3 RTUs and for the condensing units.

All new equipment will need to be tested and balanced after installation.

LEED and Sustainability Considerations

The LEED project boundary will include only the new annex building. The project's goal is LEED silver, and will also need to meet the requirements of the Chicago Sustainable Development Policy. In order to meet the 100 points required for the policy, the project will have 80 points for LEED silver and likely two of the following:

1. (3.1) Exceed stormwater ordinance by 25% -- 10 Points
2. (8.1) 80% construction waste diversion -- 10 Points
3. (8.2) Workforce Development -- 10 Points

All ventilation systems will be designed to meet ASHRAE 62.1 – 2010 as well as the Chicago Mechanical Code in order to comply with the LEED prerequisite Minimum Indoor Air Quality Performance.

Installing high-efficiency condensing boilers and an efficient chiller will contribute positively towards the prerequisite Minimum Energy Performance, which requires a 5% energy reduction compared to an ASHRAE 90.1-2010 baseline building. It will also help for earning points under the credit Optimize Energy Performance, in which similar recent projects have earned 5-7 points.

Selection of a chiller with an appropriate refrigerant may allow 1 point to be earned in the Credit Enhanced Refrigerant Management.

ELECTRICAL

Codes and Standards

1. 2017 Chicago Building Code, Volume 2 (City of Chicago Electrical Code-CCEC)
2. CPS Electrical/ITS requirements Technical Memo 2014.01 dated 07/18/2014
3. CPS New Design Guidelines and Prototype Designs Update – 02/2015
4. 2017 City of Chicago Building Code Chapter 15-16 Fire Protection Equipment
5. Elevator Safety Code ANSI/ASME A17.1 2007 as amended by Local Authority
6. ASHRAE 90.1-2013: Energy Standard (For LEED Only)
7. 2010 Americans with Disabilities Act Standards for Accessible Design
8. Federal Energy Policy Act, Energy Independence and Security Act of 2007, Title III
9. CPS Standards Update Clarification dated 3/17/17.

MSB Service Entrance No. 1
ComEd to furnish, install and terminate new 12kV, 3-phase primary electrical service conductors. Electrical contractor shall provide a new concrete encased electrical underground duct bank with (2) 5" schedule 40 PVC conduits, buried 36" below finished grade will be extended from the existing ComEd utility pole to a new pad mounted transformer with 277/480 V 3-Phase, 4-Wire secondary located near the new proposed annex building main electrical room. ***Final location of the ComEd service transformer is to be determined.***

Secondary service entrance copper conductors in concrete encased RGS (rigid galvanized steel) conduits, will be extended to the indoor type, free standing main switchboard (MSB-2) located in the main electrical room of the new proposed annex building. Provision for ComEd specified current transformers for utility metering will be provided at the new switchboard incoming ComEd C/T section.

The main switchboard MSB to be rated at 277/480 volts, estimated at 1200 amps, 3-phase, 4-wire S/N + GRD will be provided with single power main circuit breaker with digital trip units. The MSB will be provided with digital meters. All breakers in the service main switchboard shall be fully rated. Series rating will not be permitted for this equipment. Main and feeder breakers rated at 800 amps or greater shall be provided with integral solid-state ground-fault protection tripping elements.

Service entrance rated Type 1 SPD (Surge Protection Device) will be provided at the new main service switchboard "MSB" in order to protect the electrical equipment from lightning strikes and power surges.

The new proposed main electrical room located within the new annex building shall be 2 hour rated room with doors which open in the direction of egress from the room.

Fire Pump Service Entrance No. 2
The fire pump electrical service shall be fed directly from the secondary side of the pad mounted ComEd transformer via underground secondary electrical service conductors to the fire pump controller via a ComEd utility service meter socket located within the fire pump room, dedicated for the fire pump service. The incoming underground fire pump service feeders to be rated at 277/480 V 3-Phase, 4-Wire. Secondary service entrance conductors between the outdoor pad mounted transformer and the fire pump controller located in the fire pump room shall be in concrete encased RGS (rigid galvanized steel) conduit. A C/T cabinet with meter socket will be located directly adjacent to the fire pump controller.

Life Safety System
The life safety system will be a class II system which consists of individual emergency battery units with internal 90-minute batteries and battery unit exit signs. All life safety lighting (emergency battery units and exit signs) shall be provided with integral Chicago approved 90-minute battery complete with internal test push-button and indicator lamp. All exit signs shall be LED type. Emergency Life Safety Lighting System shall be sized for 0.1 watt per square foot based on the programmed facility size and 1-foot candle lighting levels as required by the Chicago Building Code. Exit and emergency lights will be provided as required by City of Chicago Fire Prevention Bureau. Per energy code all exit signs shall have a minimum source efficacy of 35 lm/W. All exit signs shall be wall mounted where possible.

Wall pack emergency lighting fixtures will be provided throughout the rooms and spaces as per code in order to provide the required 1-foot candle lighting levels. Lighting fixtures with integral battery packs shall NOT be acceptable per CPS standards.

A master control switch shall be provided to shut off the emergency lights within the new annex building when the building is not occupied. The switch shall be disabled by the security camera system upon activation.

Emergency Means of Egress Lighting
The following areas shall have emergency illumination whether having natural illumination or not:

a. Egress corridors and stairways
b. Assembly areas
c. Locker rooms
d. Student rest rooms
e. Main and other dedicated electrical rooms
f. Mechanical rooms
g. Administration and other building control areas
h. Kitchen/student dining
i. Interior instructional space without natural illumination
j. Rooms with areas exceeding 1000 sq. ft.
k. Exterior side of exterior exit doors

Grounding and Bonding
Grounding: System and equipment grounding will be provided. All switchboards, transformers, motor starters, panel boards, wiring systems, etc., will be effectively grounded via a code compliant Ground Bus System.

Telecommunications Ground Bus System: The building shall have a reference "telecommunication ground bus" (TGB) within each telecommunications and systems closets (MDF room and IDF rooms/closets). Each TGB shall be bonded to the Main Building Grounding point. The Standard for this system shall be: EIA/TIA Standard 607: Commercial Building Grounding (Earthing) And Bonding Requirements for Telecommunications.

All MDF and IDF rooms shall be provided with static dissipative tile which is to be bonded to the local MDF/IDF ground bus bar.

Distribution
Electrical distribution equipment shall be located in dedicated electrical rooms or mechanical rooms. Main electrical service (switchboards) distribution equipment shall be located in a separate electrical room with fire ratings as required by the Chicago Building Code. Branch circuit

distribution panel boards shall be located in dedicated electrical closets. Mounting electrical distribution equipment and panels within classroom or corridor walls shall not be acceptable.

Electrical distribution panels shall be designed with a 15 percent spare amperage capacity and 30 percent spare space capacity. Panel boards shall be designed up to 70 percent of capacity and be provided with a minimum of 6 spare over-current protection devices. Provide 10 spare spaces in branch distribution panel boards and (4) 3 pole spaces on the main distribution boards.

Dedicated distribution equipment shall be provided for all mechanical equipment. Electrical branch circuits to 5 horsepower, 3-phase, and larger motors for air-handling units, exhaust fans, pumps, chillers, and condensing units shall be provided with phase loss protection. Phase loss protection equipment shall be integral to starters or variable frequency drives serving the equipment.

All mechanical and plumbing equipment shall be fed from 277/480V distribution panels, particularly all equipment loads rated 1/2 hp and larger and 2kW and greater.

All general use power receptacle and equipment circuits shall be fed from normal 120/208V branch circuit receptacle panels. These panelboards shall be provided with 10% spares minimum.

All receptacle devices located in kindergarten classrooms shall be "tamper resistant" type.

All computer use power receptacle and equipment circuits shall be fed from "Isolated Ground" type 120/208V branch circuit panels. These panels shall be provided with a type 2 surge protection device, externally mounted adjacent to panel. These panelboards shall be provided with 10% spares minimum.

All lighting circuits shall be fed from 120/208V branch circuit panelboard dedicated for lighting circuits only.

Voltage drop for feeders between the service entrance equipment and the branch circuit distribution equipment shall conform to the requirements of the city of Chicago Electrical Code and LEED as follows: 2% at full connected load for feeders and 3% at full connected load for branch circuits. All branch circuits shall be loaded to a maximum of 60% as per CPS design guidelines.

Branch circuits for the voice and data system receptacles shall contain an isolated ground wire. Neutral conductors for shared neutral multi-wire circuits shall be minimum No. 10 AWG.

All branch circuit panel boards supplying voice and data systems circuits shall be supplied from a separate feeder over current protective device (OCPD) in the main switchboard, or from a separate distribution panel supplied by its own feeder in the main switchboard.

Feeders supplying the branch circuit panel board for voice and data systems circuits shall contain three phase conductors, sized in accordance with Code requirements, a 200% neutral conductor(s), and an isolated ground conductor. The isolated ground conductor system shall be kept separate from the receptacle or branch circuits to the main switchboard ground bus or separately derived system. The isolated ground conductor and equipment ground system shall be connected only at the main switchboard or separately derived system, and shall have a surge suppression device.

Transformers serving all computer receptacle distribution panelboard shall be, K4 rated type complete with 200% neutral bus capacity and isolated ground bus.

Transformers serving all normal receptacle distribution panelboards and lighting distribution panelboards shall be standard rated type.

All dry type transformers shall be energy efficient type and compliant with DOE (Department of Energy 2016) regulations.

All unisex toilet rooms shall be provided with hard-wired electronic, infrared flush valves for water closets and urinals only. All banked restrooms and unisex toilet rooms shall be provided with electric hand dryers and switched power GFI receptacles for future changing tables.

Lighting Systems
The building will consist of 120 volt LED, 3500 degrees kelvin, wall and ceiling mounted lighting fixtures throughout.

Controls shall abide to ASHRAE 90.1, 2013 and LEED requirements for achieving certification level. Ceiling mounted vacancy sensors shall be dual technology with 30 minute maximum delay. All rooms with vacancy sensors and associated manual wall switches shall be programmed to operate on a manual on/automatic off (vacancy) basis. Light fixtures shall be controlled on a per room basis where fixtures are located in accordance with individual control schemes outlined in the room level section. Circuit breakers will not be acceptable for turning lighting "on" and "off". All lighting fixtures located within 15 feet from exterior windows shall be provided with integral automatic daylight sensors.

The building automation system shall be solely responsible for holding schedules; the lighting control systems shall receive schedule-based on/off inputs from the BAS.

Utility space (boiler room, electrical room, janitor closets, storage rooms etc.) lighting shall be controlled via local manual wall mounted timer switch.

All assembly spaces, corridors and lobbies shall be controlled via Network Low Voltage Relay System with Integral Time Clock Function, programmed for shut-off of lights between 11 pm and 5 am.

All classrooms shall be locally controlled via four manual 0-10 volt digital dimmer switches for video presentation and daylighting scene control as per CPS design guidelines. All interior lights located within daylight harvesting zones to be provided with integral automatic daylight sensors. All lights within these rooms shall be automatically shut off via ceiling mounted vacancy sensors after 30 minute time delay.

The new proposed link connection between the new annex building and existing building to be provided with new LED lighting fixtures.

Exterior Lighting
Site Lighting:

a. Provide site lighting for the new proposed parking lot. Pole lights shall be energy efficient LED, 4000 degrees kelvin, full cutoff fixtures on 20 foot poles for parking areas. No light trespass will be allowed to adjacent properties. The new proposed pole lights to be fed from the existing main building.

Building Perimeter:

b. Exterior building perimeter lighting shall be provided and mounted every 60 feet and at all exterior doors for safety and security. Perimeter lighting shall spotlight the building mounted school signage. Provide an exterior, weatherproof ground fault protected duplex receptacle outside each main exterior door. Provide weatherproof ground fault interrupter receptacles on all outdoor locations for rooftop maintenance, and same with lockable covers on all exterior wall mounted receptacles.
c. All exterior lighting shall be controlled via building automation interface as per CPS design guidelines.

Fire Alarm System

Provide a new fire alarm system. System shall be class 1, non-coded, zoned, supervised fully addressable type detection, with initiation and notification devices. New notification and detection devices shall be provided throughout the new annex and existing building.

Provide magnetic door-hold open devices and associated smoke detectors at each double-door access between the existing and new building.

All new fire alarm devices and equipment shall be the of the addressable type, incorporating activation devices such as pull stations, smoke detectors, flow switches, duct detectors, etc., and audio visual devices such as horns and strobes. Photoelectric type smoke detectors at the following locations:

a. Electrical, MDF and IDF Rooms.
b. Storage Areas.
c. Duct smoke detectors on all supply and return fans including HVAC equipment serving the Kitchen Area.

A complete fire alarm and detection system shall be provided in accordance with the City of Chicago Building Code, National Fire Protection Association and the requirements of the Bureau of Fire Prevention and the Americans with Disabilities Act whichever is more stringent. All fire alarm and detection system wiring shall be installed in its own dedicated conduit system.

Lightning Protection System

The existing main building currently not provided with a lightning protection system. A lightning protection system for the new annex building will not be provided nor will it be required.

LEED Considerations

New annex building lighting systems shall be designed to meet ASHRAE 90.1 lighting power density requirements by a minimum of 30%. Lighting controls will comply with the requirements of the *Indoor Lighting* credit. Metering shall be installed to record consumption, demand, and power factor for the building electrical system. Considerations should also be given to providing electric vehicle charging stations in the parking lot.

Existing School Renovation

Existing first floor classrooms along the east corridor of the existing main building will be converted into a Music classroom and a drama classroom. Existing kitchen/server area in main building will be converted into a multi-purpose space. Other existing spaces near the main building entrance will be converted into storage and office space.

The existing rooftop units and associated electric heaters are being replaced. A new RTU will be installed in place of each of the existing RTUs, with new electric heaters.

TECHNOLOGY

Design Criteria

The design of the Technology systems shall conform to the following codes:

1. Chicago Building Code
2. National Electric Code

The design of the Technology systems shall conform to the following standards:

1. Standard for Safety of Information Technology Equipment
2. Standard for Safety of Telephone Equipment
3. BICSI Network Design Reference Manual
4. IEEE 802.1 - Telecommunications and information exchange between systems--IEEE standard for local and metropolitan area networks--Common specifications
5. IEEE 802. - Telecommunications and information exchange between systems--Local and metropolitan area networks—Specific requirements--Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications
6. IEEE 802.11 - Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
7. IEEE 802.15 - Telecommunications and Information Exchange between Systems - LAN/MAN Specific Requirements - Part 15: Wireless Medium Access Control (MAC) and Physical Layer (PHY) specifications for Wireless Personal Area Networks (WPAN)
8. IEEE 802.16 - Telecommunications and Information Exchange between Systems - LAN/MAN Specific Requirements - Part 16: Air Interface for Fixed Broadband Wireless Access Systems
9. CPS design guidelines and master specifications

Structured Cabling System

The new annex building cable infrastructure will be served via a copper and fiber backbone. The cable infrastructure shall provide transport to support voice/data, video and other systems residing on the CPS network. The fiber backbone shall consist of multimode fiber optic cables in protective innerducts, cabletray, conduit, sleeves and cores. Copper cabling shall consist of UTP type cable for backbone or horizontal distribution.

Access Control System

Contractor to upgrade existing Access Control System to accommodate new annex building. The system will control or limit access through card reader controlled doors based on the card user's access levels to an area, floor or the building.

Intrusion Detection System
Contractor to upgrade existing Intrusion Detection System to accommodate new annex building. The system will monitor after hour entry into any area of the building by microwave PIR motion detection

Two-way Intercom System
The system will provide two-way communication between visitors, students or faculty. The system shall have the capability to release secured doors as defined by CPS.

Video Surveillance System
The system will be a digital IP base video monitoring system. The system will monitor internal and external movement to be captured, compressed and stored. The system will have the capability to review archived images (remotely or on-site) providing an instant video source of an incident or annunciated alarm through the CPS-OTS network via the WAN. The cable infrastructure will resemble the UTP structured cabling system.

Master Antenna TV System
The system will be a star topology two-way coaxial video cabling system capable of passing reverse channels. The cable infrastructure will be a combination of coaxial and UTP. Contractor to upgrade existing Master Antenna TV system to accommodate new annex building.

Public Address System & (ALS)
Provide a new Public Address System to accommodate new annex building and existing building. Public address system master station shall be located in the existing main building. Provide new public address system speaker devices and associated conduit and wiring throughout the existing and new annex building. All new devices in both buildings shall be connected to master station.

Existing School Renovation
Existing MDF room will become and IDF and a new MDF room will be provided in the new annex.

PLUMBING

Dirksen School addition has multiple space uses with respect to plumbing fixtures and fire protection requirements. The following is a brief summary of noteworthy design elements.

Summary of Design Criteria and Standards

From the referenced standards provided by CPS, the following most recently adopted versions of the following codes have particular impact in the assessment of the plumbing and fire protection requirements.

a. City of Chicago Building Code
b. CPS Design Guidelines – Chapter 7
c. Chicago MOPD requirements
d. NFPA 10, 13, 20, 24, and 25.
e. USGBC: Applicable LEED™ Requirements
f. ADA: Americans with Disabilities Act
g. IAC: Illinois Accessibility Code
h. IDPH 270/280: Illinois Department of Public
i. City of Chicago Energy Conservation Code
j. State of Illinois Energy Code
k. OSHA: Occupational Safety and Health Administration
l. CEC: Chicago Energy Conservation Code
m. AGA: American Gas Association
n. MSS: manufacturers Standardization Society of the Valve and Fittings Industry
o. Municipal Plumbing Code of Chicago
p. Illinois Plumbing Code (IPC)
q. City of Chicago Department of Water Management
r. City of Chicago Accessibility Code
s. Chicago Bureau of Fire Prevention Requirements
t. Chicago Storm Water Ordinance

Building Utilities

A new 8" ductile iron incoming combined water service will be served. Combined service to split into a 4" domestic water line to serve both the new annex and back feed the existing building, and a new 6" fire service with a double detector check valve assembly for new annex building.

The annex will be served by two sanitary sewers (approximately 6" and 4") and one storm sewer (approximately 12"). Standard sanitary waste will collect into the 6" building drain and leave separate from the Kitchen Waste, which will exit the building into an exterior grease separator prior to connection to the sewer. Sewers will drain by gravity wherever possible. The need for ejecting below grade drainage is not anticipated in the new annex.

Main systems

Dirksen school domestic water supply is currently served by city pressure alone (40 PSI at the street). The building will be provided with a new, skid-mounted duplex, variable speed system to deliver approximately 75% of the total fixture unit demand (approximately 140 gallons per minute) at the

design head (approximately 70 feet) to maintain 35 psi operating at the most remote fixture and a maximum of 80 psi at any fixture in the building.

The water heating plant will be a duplex tank-type condensing system to provide 75% redundant capacity (two units at 75%). Each unit will be capable of recovering 128 gallons per hour, at a 100°F temperature rise. Gas firing will be coordinated with the available natural gas pressure. Each heater will be served by an appropriately sized ASME rated expansion tank sized on the total system water volume. Water will be heated and stored at 140°F, and distributed to the kitchen at this temperature for final boosting at dishwashers. Other spaces will receive lower temperature water at 120°F via a master thermostatic mixing valve located near the domestic water heaters, and further downstream will be controlled by individual thermostatic mixing valves at individual fixtures. All hot water fixtures will be circulated with return pumps via a programmable timer or aquastat.

Piping

Piping will be sized to limit pressure drop to 2 psi / 100 feet of piping. The incoming water service to the pump header will be sized at 5 feet per the Chicago Plumbing Code. Other pipe velocities will be selected in addition to the pressure drop requirements not to exceed those values set out in the CPS plumbing guidelines.

3" domestic cold water and 2" domestic hot water distribution will be routed in the ceiling of the new annex to all the plumbing equipment and fixtures. All piping to be type L copper.

Terminal equipment

Fixtures will be selected in compliance with CPS standard specifications and LEED for the project. The following flow rates have been selected for fixtures:

- 0.5 GPM Lavatories
- 1.28 GPF Water Closets
- 1.5 GPM Electric water cooler
- 0.125 Urinal
- 1.5 GPM Sinks
- 1.5 GPM Showers (If applicable)

Electric water cooler with bottle filling station will be provided near the gym. Recessed, vandal resistant stainless-steel electric water coolers will be provided.

Bathroom fixtures will be manually activated flush valve or metering lavatory faucet in public restrooms, vandal resistant, low flow by approved manufacturers. Water closets and urinals will be wall mounted vitreous china.

Floor drains will be selected based on space usage and finished floor. In general, finished areas will be served by 6" round floor drains with vandal resistant covers. General utility and mechanical spaces will be provided with 8" round utility grade floor drains. Kitchen areas will have floor sinks and trough drains as required.

Domestic water will be provided to exterior non-freezing hose bibs connections downstream of a reduced pressure zone backflow preventer or testable double check detector assembly. Hose threaded connections within the building shall be provided with a vacuum breaker mounted 7'-6" above the finished floor. All accessible exterior hose connections will be vandal resistant and lockable.

Existing School Renovation

As part of the existing school renovation, the roof is going to be replaced. Demo existing roof drains and provide new drain bodies with enameled cast iron dome strainers, drain pan and approximately 10'-0" of piping to accommodate with new roof elevation. Remove existing flashing and install new flashing with new roof drains.

All storm drainage piping shall be jet-rodded for roof drains to outside catch basin for sign of blockage, deteriorations, or cracks with the intent being to uncover any additional problems before constructions.

Disconnect existing vent pipe below roof. Connect new vent pipe in ceiling below and extend minimum 18" above new roof. Provide new flashing to vent piping above roof.

Lunchroom and kitchen area will be converted into a teacher's lounge. Demolish all the existing kitchen plumbing fixtures, equipment and associated piping to mains and cap it.

Potential provisions of a built-in sink and faucet or a unisex restroom within the existing building's lunch and kitchen room to meet the potential program requirements for this area to serve as the teacher's lounge room.

LEED Considerations

New annex building goal is to achieve LEED silver. Provide low flow plumbing fixtures in new annex building to meet minimum reductions requirement of 35% (3 points) for indoor water to achieve.

FIRE PROTECTION

A complete automatic fire sprinkler system is required for the Dirksen School Annex. New 8" combined domestic water/fire service main will split to feed the domestic and fire system. The fire service main shall be a 6" diameter with double detector check and bypass meter.

Main systems

New annex building will be provided with a fire pump system sized at 500 GPM / 25 HP with a pump controller. The fire protection system will be installed with a pressure maintaining jockey pump.

A U.L. listed, vertical inline centrifugal type fire pump assembly will be selected to meet pressure and flow requirements. The pump assembly will include a reduced voltage starting pump controller and integral automatic transfer switch. A pressure maintenance pump assembly will be provided complete with controller. Separate sprinkler zones will be provided for each floor based on square footage requirements, for a total of three sprinkler zones. Each zone will be provided with a supervised control valve, water flow sensor, inspector's test and drain assembly and a pressure gauge. An additional inspectors test connection will be provided at the hydraulically most remote location of each sprinkler zone.

Piping

4" Fire protection wet pipe will be routed in the ceiling space to all the sprinklers. All piping will be schedule 40 steel pipe, grooved coupling or threaded, depending on the pipe diameter.

Terminal equipment

The new annex building will be provided with new automatic sprinklers system to complete building coverage. Space are primary light hazard areas for offices, meeting rooms, classrooms, and corridors. Mechanical rooms, telecommunication rooms, and storage spaces will be protected at ordinary hazard levels.

New Annex will be provided with upright sprinklers in exposed areas, concealed sprinklers heads in the finish ceiling, sidewall sprinklers in all vestibules and MDF rooms.

Sprinklers shall be provided throughout the building with the exceptions of the main electrical room.

A deep floor sink receptor will be located near the fire pump for high flow testing with a 6" drain to the building sewer.