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# 28 DIVISION

# ELECTRONIC SAFETY AND SECURITY

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DIVISION 28: ELECTRONIC SAFETY AND SECURITY

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SECTION 281300

ACCESS CONTROL SYSTEM

GENERAL GUIDELINES

1.1 GENERAL

A. This Section defines the general design requirements for a uniform Access Control System that shall be followed for all OSFC Technology construction projects.

B. Refer to Sections 8500, Technology Systems, 28 16 00 Intrusion Detection, and 28 23 00 Video Surveillance for additional information.

1.2 SECTION INCLUDES

A. Integrated Security Management (ISM) System

B. Uninterruptible Power Supply (UPS).

1.3 QUALITY ASSURANCE

A. National Fire Protection Association.

***B. NFPA 730 – Guide for Premises Security***

***C. NFPA 731 – Standard for the Installation of Electronic Premises Security Systems***

***D.*** National Electric Code.

***E.*** American with Disabilities Act.

***F.*** Underwriter's Laboratory.

***G.*** Latest ANSI TIA/EIA-568, 569, 606, 607 Standards and ***Eleventh*** Edition (or later).

***H.*** BICSI Telecommunications Distribution Methods Manual (TDMM).

1.4 SYSTEM WARRANTY

A. The ***Access Control*** System shall be warranted by the contractor for a period of one (1) year from date of substantial completion.

1.5 GENERAL

A. Furnish a new Integrated Security Management (ISM) system that provides a simple and easy-to-use graphical user interface.

B. The system shall provide local operational control of all access points and alarm sensors.

C. The ISM System client and server software shall be used in conjunction with intelligent controllers to provide a distributed access control and alarms monitoring system.

D. In the event of a communications failure between the host server and the remote controllers, the controllers shall continue to make local access control decisions and save all transactions in memory until communications are restored. At that time the controller shall upload all stored transactions to the Central Server.

E. When a District has more than one building, the Central Server shall be located in one of the District's buildings and the other buildings shall be attached to the Central Server via the Wide Area Network. All buildings in the District shall interface to the Central Server and Control Consoles.

F. The ISM System shall seamlessly integrate the functions of Access Control, Alarm Monitoring and Response, Digital Video Imaging and Badge Design/Creation, and Visitor Management.

G. Access Readers supporting various technologies shall provide data from proximity card presentations or biometric authentications via a door control unit that includes the electrical interface to the reader as well as inputs for door sensors and relays for outputs.

H. The Door Controllers shall support industry-standard Wiegand communications to the associated readers.

I. The Door Controllers shall support bi-directional, supervised, and encrypted communications to the readers.

1.6 HARDWARE FEATURES

A. MODULAR SYSTEM DESIGN

1. Device Control Modules shall be located in the Telecommunications Rooms (TRs) and connected to the Building Controller via hardwired bus connections or via an Ethernet TCP/IP Network.

2. The Building Controller shall be located in the Main Equipment Room (ER) and connected to the Central Server via an Ethernet TCP/IP connection over the District's Wide Area Network (WAN). All WAN communication shall be AES encrypted.

B. ELEVATOR CONTROL, AS APPLICABLE

1. The system shall have the ability to provide elevator access control by (1) using a card reader to activate the elevator call button, (2) using a card reader in the cab to activate the correct floor selection button, or (3) a combination of both of these functions.

2. Each cardholder shall then have floor permissions assigned as part of the normal access rights. The system shall provide outputs to the elevator controls to verify which floors are authorized for each cardholder. The system shall be capable of tracking which floor was enabled/selected by that person

C. AVAILABILITY AND DISASTER RECOVERY

1. The system shall automatically synchronize any distributed databases.

2. The system shall be capable of having a redundant or clustered Central Server.

3. In the event of loss of communications with the Central Server, the Building Control Units shall revert to a survivable remote operation and continue operation until communications is restored.

1.7 SOFTWARE FEATURES

A. PERMISSIONS

1. The system shall support multiple Operator permission levels.

B. VIDEO IMAGING AND ID BADGE PRINTING

1. The system shall incorporate video imaging as a fully integrated function to customize access control cards by printing an identity badge directly onto the card.

2. The badge design and image capture capabilities shall combine with the latest technology card printers to allow the production of an ID badge pass for each cardholder at the time of registration.

3. For each cardholder both a facial image and a signature shall be able to be captured, or imported, and stored as part of the card record.

4. A comprehensive integrated badge design and printing facility shall also be provided, allowing an unrestricted number of custom badge layouts to be defined then saved with a suitable description as a reference.

5. When creating a new card record a badge preview screen shall also be included that displays the specific card's details on the selected badge design to allow confirmation prior to requesting the badge to be printed.

6. Each new cardholder record shall have the option to be flagged for future printing. Cards flagged in this manner shall be easily recalled at a later stage and processed for output to the printer in a single action.

7. The ISM System shall support any manufacturer's ID badge printer with a ***current*** Microsoft ***platform*** (depending on the workstation configuration) compatible printer driver.

8. Provide one (1) Video Camera and Badging system per District.

C. VIDEO VERIFICATION

1. Depending on the District's needs, a Video Imaging option shall be available to provide a monitoring screen that will automatically display the stored image for a card when used at a reader.
2. This screen shall operate in conjunction with a live video input from a CCTV camera viewing the selected access point, allowing the operator to verify that each card offered is in fact being used by the person to whom it was issued.

3. This screen shall also be frozen and printed to provide a hard copy evidence of any abuse observed by the operator. For District's with high security access points, the system shall be configured to <u>not grant</u> access until the operator has verified the stored and live images are the same person, with the door release being controlled by the system operator.

D. REPORT GENERATION

1. Extensive history reporting shall be a standard integrated feature and shall include the ability to review all system alarms, access control activity, and operator actions. These reports shall be made available for review via the operator's display screen, a printer, or to another disk media. Extensive sort parameters shall include by any of the "Personal Details" fields or Titles, for example, by "Department", and only Names commencing with "Sm*".

2. The system shall also support generation of reports detailing the system operation such as:

   a. Cards on site.

   b. Hours on site.

   c. Cardholders with access to each door.

   d. Access rights of each cardholder.

   e. System Configuration.

   f. Scheduled and Conditional Commands defined.

   g. System operator transaction history.

3. It shall be possible to replay video clips associated with events by directly interacting with the report as published to the computer screen.

E. ADDITION OF CARDHOLDERS TO THE SYSTEM DATABASE

1. The system shall provide a means of assigning access control rights to each cardholder. Access control rights determine which access points are accessible to the cardholder based on date and time of day.

2. The software shall also provide an ALTERNATE set of Access rights to a cardholder on a temporary basis. The change may be initiated at any time by an authorized operator, or automatically between specified dates. This shall provide the ability of automatically changing a card's rights between a specified date range, after which the card will revert to its normal Doors and Times. Alternate access rights shall be able to be configured for multiple date ranges.

3. Each cardholder shall either be associated with standard door timings, for door release, door open and door pre-held or be given extended timings for disabled persons or someone who has to push a cart.

4. The system shall permit individual Access Rights or Group Access Rights to be assigned.

F. CARDHOLDER DETAILS

1. Cardholder information shall include first and last name, card number, PIN code and valid period to provide automatic expiration. Each cardholder record shall also incorporate at least 50 user-defined personal data fields, independent of user-defined fields for visitor management.

2. Data base synchronization utilities shall be provided to synchronize the Access Control Database with the District's HR database. Removing an individual from the District's HR database shall automatically be queued for removal from the Access Control Database.

G. LOCATOR

1. This feature shall provide a quick method of locating cardholders by displaying the last 10-25 valid history events along with the time, date and access point used. This information shall be available for an individual or group of persons by name, card number or by personal data.

H. CARD WATCH FEATURE

1. It shall be possible to easily track any individual as they move around a large site by selecting a card watch. As the person uses their access control card, the system shall have the ability to automatically notify the operator of the person's presence at each location.

I. MASTER CARD MODE

1. Master card mode authority shall be assigned to special cardholders, such as building maintenance, principals, etc. These features should be enabled on a per reader basis. This shall allow a person when vacating an area or building to change the reader's mode of operation from normal access control to Master Card Out operation.

2. When in this condition only persons with Master card privileges shall gain access through the door, all non-Master card users are rejected regardless of their card's current access rights.

3. This special feature shall be activated/deactivated by the Master cardholder, using a card presentation followed by a special code entered via the reader's keypad.

J. AUTOMATIC HOLIDAY OVERRIDE

1. The software shall be able to be programmed by the operator to recognize special or holiday dates, which in turn can be linked to operational changes in how the site is to be managed on these specific days.

2. This feature shall notify a system operator of individual holiday dates up to seven days prior provides a useful check on the date's current validity.

3. Multiple types of holiday dates shall also be provided so that partial school days or early closing requirements on specific dates can be accommodated.

K. ALARM MANAGEMENT

1. The system shall provide flexible alarm management.

2. The system shall support the ability to selectively choose alarms to acknowledge and/or clear.

3. Each alarm shall be capable of linking video from the CCTV digital video recorders for incident playback – fully integrated system.

4. An alarm monitor display shall support the display of alarm statistics.

5. Alarms shall be capable of being routed to specific client machines by time of day or day of week.

6. Unacknowledged alarms shall be capable of being routed to alternate client or Email address based on age and priority of alarm.

7. The display of reader door alarms shall be automatically enabled or disabled by the use of timed commands, either by reader or by a group of readers.

L. GRAPHICAL SITE MAPS

1. To further enhance the presentation to the operator, the system shall have the ability to import and use graphical maps. Individual building Maps shall be linked together using a tiered tree structure. To speed the location of an incident, each map level shall contain a clearly visible indicator as to which sub map the operator should select next to find the device that is in alarm.

2. The status of readers, doors, monitor points and auxiliary outputs shall be requested from any map by simply selecting the icon representing the device and its current state will be displayed.

3. Maps shall be created using standard office tools such as Paint® or drawing packages such as AutoCAD®. It shall be possible to import drawings in the following formats: JPEG, Bitmap, Windows metafile or DXF. The maps shall be prepared by the Contractor for the District.

4. Icons representing access points, monitoring points, switching outputs, alarm inputs, CCTV cameras or intercom call stations shall be placed on any map at the required location in a drag and drop manner.

5. It shall be possible to define on the map the location of readers, access doors, alarm-monitored points, output switching relays, CCTV cameras, Digital Video Recorder Cameras, Intercom call stations and alarm panel devices.

6. The map display shall allow the operator to switch the video display of any defined CCTV camera to any defined CCTV monitor. The map display shall allow the display of stored and live Digital Video Clips – fully integrated system

7. The map display shall include the option to group and display similar devices as a single icon. Once devices are grouped it shall be possible to change their status. For example, it shall be possible to unlock/lock all Building or District entrance doors by executing a single command from the map display.

M. MANUAL AND AUTOMATIC COMMANDS

1. The system shall provide for both manual and automated commands. For example it shall be possible to schedule a command to automatically lock/unlock all doors at a specified time.

N. USER CODE MODE

1. The System shall support the ability to put a keypad-equipped reader into User Code Mode. This feature shall allow a cardholder to gain access by entering a valid card's number at a reader keypad, therefore not requiring the holder to carry a card.

2. User code mode shall be enabled on a per reader basis.

O. VISITOR MANAGEMENT ***- OPTIONAL***

1. Visitor Management shall be incorporated as ***an optional*** feature of software, ***as coordinated with the School District's requirements.*** Operators shall be able to pre-enroll visitors. Any operator with visitor permissions assigned the ability to pre-enroll visitors.

2. Visitor time of arrival and time of departure shall be tracked by the system. This feature shall be available even if a visitor is not issued a card or card number in the system.

3. The System shall support an optional driver's license scanner including optical character recognition to ease data entry.

4. The System shall support capture of a business card image.

5. The system shall include the ability to monitor the occupancy of an area.

P. WINDOWS DAYLIGHT SAVING AUTO ADJUSTMENT

1. The system shall support automatic Daylight Savings Time Adjustment.

Q. HISTORY ARCHIVE AND SYSTEM BACK UP

1. The system shall allow on line archiving of history logs, along with database back up of system configuration and cardholder details. This function shall be able to be automated to occur without intervention at a pre-set time.

R. SMART CARD ENCODING

1. The system shall provide the ability to encode contactless smart cards with access control information.

2. The system shall be capable of capturing fingerprint biometrics and storing them on a contactless smart card, which will then be read and used to verify the cardholder during an access control transaction.

3. The fingerprint solution shall support the enrollment and use of at least two fingerprints, which shall allow the cardholder to present either finger to gain entry.

4. On a timed or manual basis the system shall be configurable to allow entry using the smart card only, smart card plus fingerprint or smart card plus two fingerprints, thereby raising or lowering the level of security as required.

5. The system shall allow the assignment of a fingerprint for normal entry and a different fingerprint for duress entry. The cardholder shall have the ability to trigger a silent duress alarm by presenting the duress fingerprint. This provides the cardholder with a safe way to indicate a duress condition, without alerting anyone locally that the alarm has been triggered.

6. An option to store the fingerprint acceptance threshold in the smart card or at the reader shall be provided. By storing the threshold in the smart card, overall site security is not compromised by a poor quality fingerprint, which would normally require a low acceptance threshold to be set at the reader.

S. DIGITAL VIDEO MONITORING AND CCTV MATRIX SWITCH CONTROL OPTION

1. For larger Districts, the system shall provide an option to interface to a CCTV matrix switcher. This component shall allow an operator with appropriate privileges to display any available video source on any available video monitor.

T. DATA IMPORT/EXPORT

1. The system shall support a data import/export ability to permit the District to bulk-load employee information at the beginning of a school year.

U. BUILDING CONTROL MODULE

1. The system shall provide a Building Control Module, to allow the definition of one or more building controls, each used to control a separate HVAC or other building system. Readers and/or motion detector inputs shall be able to be used to determine the occupancy of the area represented by the building control – a fully integrated solution.

2. The Building Control Module shall support standard BACnet communications to project the current status of building controls, monitor points, doors and the last alarm generated to third-party building systems.

3. The system shall allow manual commands to interface with (turn on or off) building controls through the BACnet protocol. It shall be possible to issue these commands from on-screen graphical maps or plans of the building.

4. The system shall allow scheduled commands to interface with (turn on or off) building controls through the BACnet protocol. It shall be possible to issue these commands automatically at any time of the day, any day of the week or holiday dates.

5. The system shall allow conditional commands to interface with (turn on or off) building controls through the BACnet protocol. It shall be possible to issue these commands automatically depending on another event occurring. For example, a cardholder could use a "card command" at an access control reader to switch an HVAC system on or off.

6. It shall be possible to view the current status of a building control from the View/Status screen in the System software.

7. The system shall allow the definition of groups of building controls, which enables, for example, a single command to switch on several building controls in one operation.

V. GUARD TOUR OPTION

1. This optional feature shall allow District Guard Tour patrol sequences to be created consisting of a number of designated clocking points, which the patrolling guard has to visit.

2. A guard tour sequence shall define the order in which the clocking points are to be visited and how long the guard should take to move between each clocking point location.

W. E-MAIL ALARMS

1. The System shall support the ability to automatically e-mail alarm condition messages.

X. INTERCOM INTEGRATION OPTION

1. The system shall support a serial or other high-level connection to an intercom system. The intercom system shall be accessed by users through a call station -- typically installed outside the building at doors, parking barriers, etc.

2. Visitors or other personnel generally ask permission to gain entry at the intercom call stations.

Y. INTRUSION DETECTION SYSTEM INTEGRATION

1. The System shall support a high-level (serial interface) to an intrusion detection system (IDS). The IDS shall be UL 1076 listed. The System shall support events to be recorded and displayed from the IDS system on the alarm management screen and in the transaction history reports – fully integrated system.

1.8 CARD READERS

A. Furnish Wiegand compatible Card Readers at all Controlled Access Entrances, Elevators, Food Storage areas and Technology Rooms, as required by the District.

B. All Card Readers shall be Proximity Type (no Card swipe type readers) and may include optional Biometric readers as required by the District.

C. All Card readers shall include a keypad for duress entry or PIN Number entry.

1.9 POWER SUPPLIES

A. All system Power supplies shall be centrally located in the Technology Rooms and connected to the Technology Room Generator Powered, UPS units.

1.10 INSTALLATION

A. The Administrator Terminal shall be connected to the remote terminals before connecting to any card reader processors.

B. The Contractor shall coordinate with the District's locksmith if converting from mechanical to electric locks.

C. The Contractor shall install the appropriate cable from the CPU to readers, door contacts, request-to-exit devices, and electric locks at each door and/or gate.

D. All communications cables shall be kept away from power circuits.

E. The Contractor shall install the power supply(s) for electric locks in locations where they will not interfere with other operations.

F. The Contractor shall do nothing to modify a UL. rated door or frame that would void the UL label or fire rating.

G. All cables shall be labeled with self-laminating, machine-printed, wrap-around labels.

H. ***Review and coordinate door hardware characteristics and integration requirements with the Design Professional.***

1.11 INITIAL PROGRAMMING AND CONFIGURATION

A. Contractor shall provide initial programming and configuration of the Integrated Security Management (ISM). Programming shall include defining hardware, doors, monitor points, clearance codes, time codes, door groups, alarm groups, operating sequences, camera call-ups, and the like. Input of all program data shall be by Contractor. Contractor shall consult with Security Consultant and District to determine operating parameters.

B. The Contractor shall develop and input system graphics, such as maps and standby screens. The District shall provide floor plan drawings as the basis for the creation of maps. Development of maps shall include the creation of icons for all doors, monitor points, and tamper circuits. Owner shall provide floor plan drawings, in the form of AutoCAD .DWG or .DXF files, as the basis for the creation of maps.

C. The District, with the cooperation and assistance of Contractor, will input the cardholder data for each access card.

D. The system shall be configured with a minimum of 1 user license per building.

1.12 TRAINING

A. The Contractor shall provide complete operator training on the Security Management System. Training shall consist of a minimum of thirty-two hours of classroom instruction, plus two (2) hours of individual hands-on training. Hands-on training shall include the opportunity for each person to operate the system, and to practice each operation that an operator would be expected to perform.

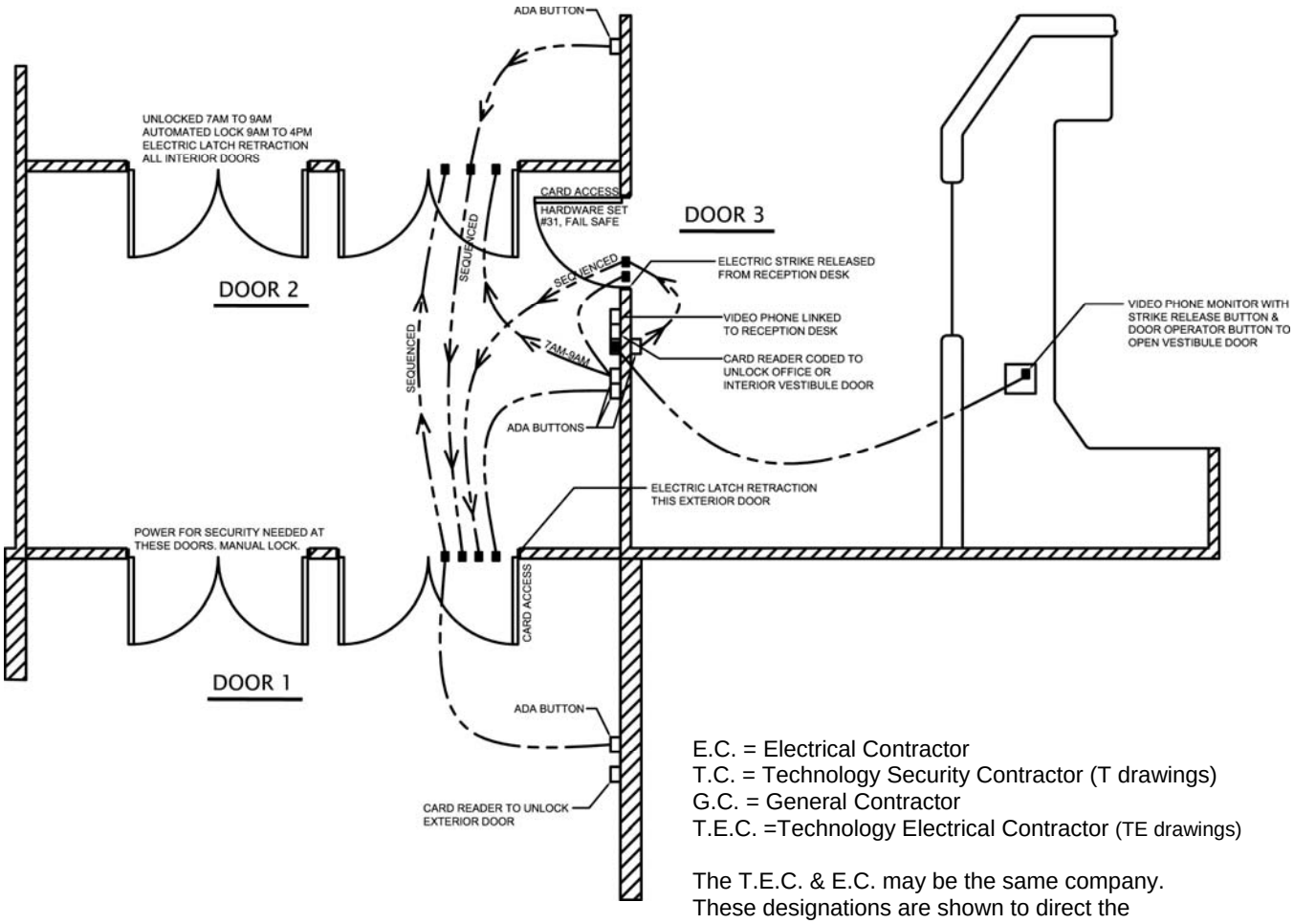
B. Provide two (2) video copies of all training.

1.13 SEQUENCING

A. The following figures provide recommendations for the sequencing and operation of the Access Control for the building's main doors. Suggested breakdown of tasks by trade are also provided. The Designer should consult with the District to determine final operating parameters.

(please see following diagrams)

## DOOR OPERATING SEQUENCE DIAGRAM




E.C. = Electrical Contractor
T.C. = Technology Security Contractor (T drawings)
G.C. = General Contractor
T.E.C. =Technology Electrical Contractor (TE drawings)

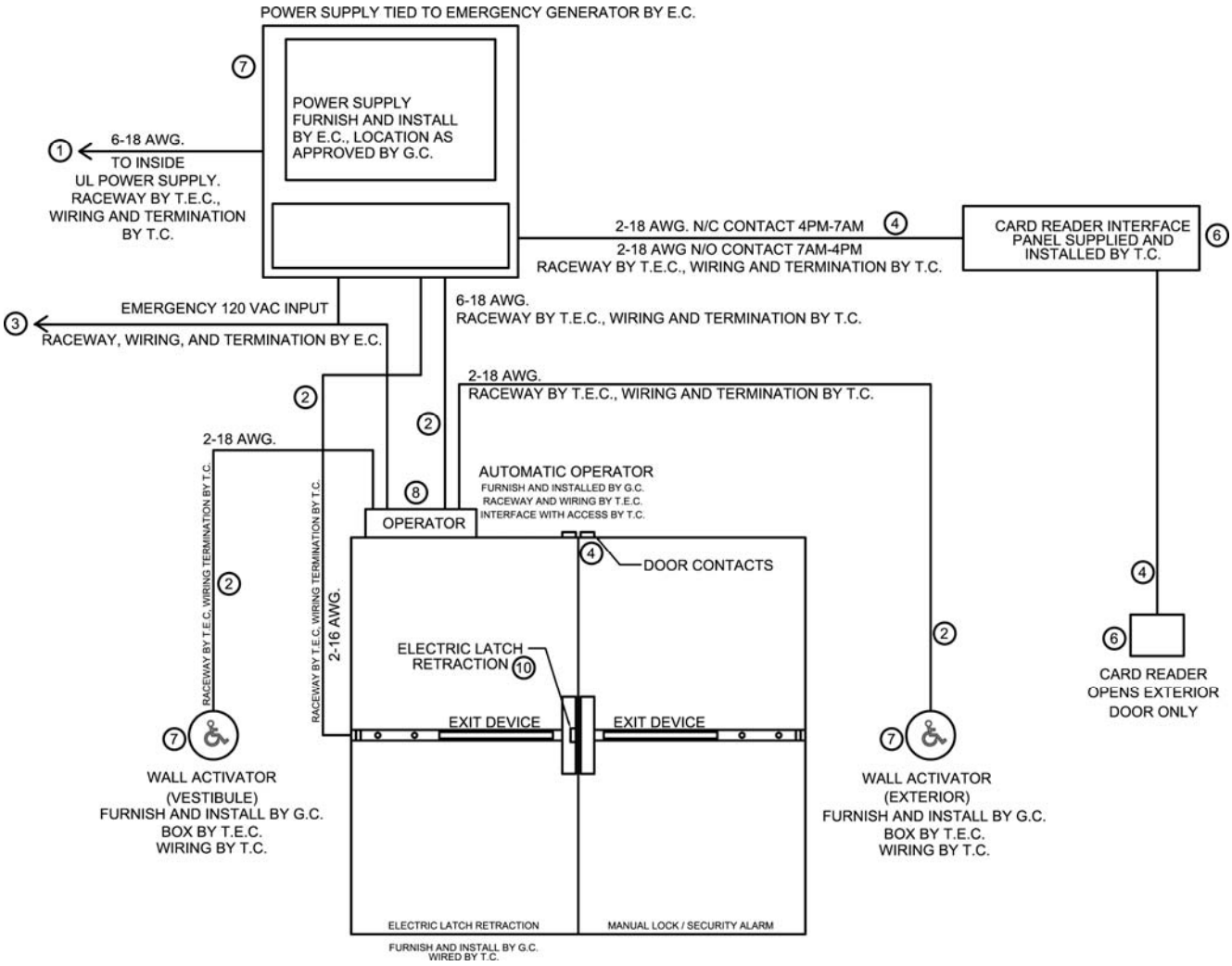
The T.E.C. & E.C. may be the same company. These designations are shown to direct the contractor(s) to the appropriate support documents.

NOTES:

1. Pathway by T.E.C; wire and termination by E.C.
2. Pathway, wire, and termination by T.E.C.
3. All by E.C.
4. Pathway by T.E.C.; wire and termination by T.C.
5. Card reader coded to unlock vestibule to office door 3.
   Pathway by T.E.C.; device, wire, and termination by T.C.
6. Device furnished and installed by T.C.
7. Device furnished and installed by G.C.
8. Device furnished and installed by G.C.; access interface by T.C.
9. Pathway by T.E.C.; device, wire, and terminaton by T.C.
10. Device furnished and installed by G.C.; access interface by T.C.
11. Video phone monitor with strike release button to open vestibule door 3.
12. Video phone linked to reception desk. Pathway by T.E.C.; device, wire, and termination by T.C.

13. Doors on the operating diagram are a typical standard schematic only. The number of doors and size of openings vary per project. Consult with door sheets of the architectural, electrical, and technology drawings.
14. Door power supply tied to emergency generator.
15. See door elevation diagrams for contractor responsibilities.

## TYPICAL DOOR 1




Door 1:

Push plates needed for assisted access to and from vestibule 7 a.m. – 4 p.m.

Card reader access to unlock door 4 p.m.-1 a.m. weekdays and weekends.

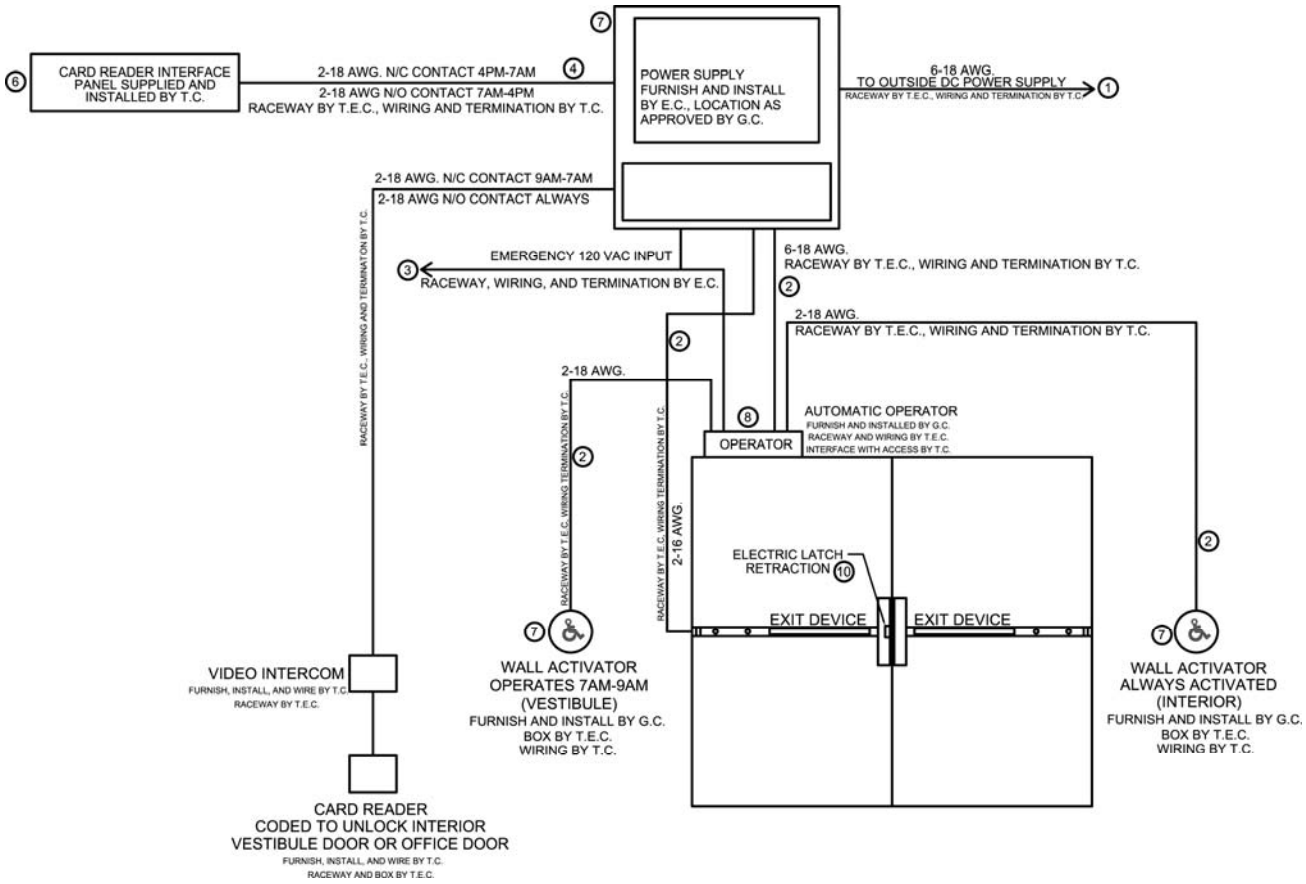
Only one door has power for card reader and push plates. All others need security power.

All other doors are manually locked 4 p.m.-7 a.m. They will open from inside vestibule via panic devices.

All exterior doors have security breach alarm hardware.

All components should be installed in one location as designated by G.C., 8” above ceiling (typical).

## TYPICAL DOOR 2




Door 2:

This door will be unlocked between 7 a.m.-9 a.m. and both push plates will work.

After 9 a.m. the door will be locked and the vestibule push plate will not work but the interior push plate will still unlock the panic bar and open the door.

There will need to be one set of contacts to the inside door to control the locking and unlocking of the panic bar between 7 a.m.-9 a.m.

This door can be opened by card reader at all times.

All interior vestibule doors have electric latch retraction and are connected to building security.

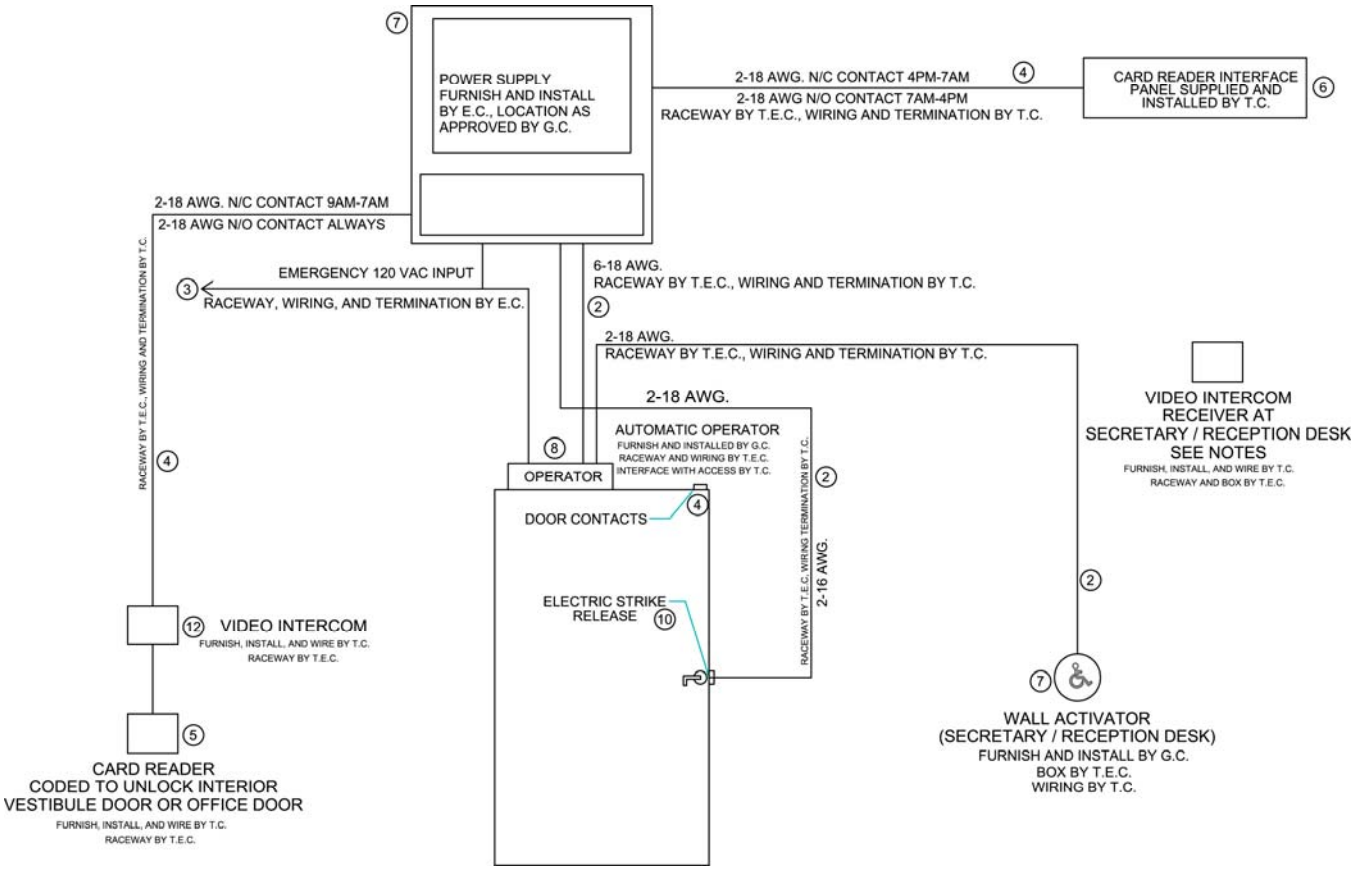
All interior vestibule doors lock from 9 a.m.-4 p.m.

All interior doors can be opened from inside the building at all hours via panic hardware.

Lock out of doors can be overridden during fire drills or other events.

All components shall be installed in one location as designated by G.C., 8” above ceiling (typical).

## TYPICAL DOOR 3




Door 3:

This door is locked at all times.

Entry is only allowed via card reader or by push plate located at the office personnel's desk.

Visitors must first be identified at the video intercom located in the vestibule by the office personnel through their video receiver.

There is a push plate inside the office to let visitors out when they are leaving.

There are no push plates inside the vestibule to let people into the office.

All visitors must be identified prior to gaining access to the rest of the building.

The security/receptionist has control over releasing the door strike to unlock the door or releasing the strike and activating automatic door operator, depending on which button is pressed on the intercom receiver.

All components should be installed in one location as designated by G.C., 8" above ceiling (typical).

END OF SECTION

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SECTION 281600

INTRUSION DETECTION SYSTEM

GENERAL GUIDELINES

1.1 GENERAL

A. This Section defines the general design requirements for a uniform Intrusion Detection System that shall be followed for all OSFC Technology construction projects.

B. Refer to Sections 8500, Technology Systems, 28 13 00 Electronic Access Control and 28 23 00 Video Surveillance for additional information.

1.2 SECTION INCLUDES

A. Intrusion Detection System.

B. Uninterruptible Power Supply (UPS).

1.3 QUALITY ASSURANCE

A. National Fire Protection Association.

***B. NFPA 730 – Guide for Premises Security***

***C. NFPA 731 – Standard for the Installation of Electronic Premises Security Systems***

***D.*** National Electric Code.

***E.*** American with Disabilities Act.

***F.*** Underwriter's Laboratory.

***G.*** Latest ANSI TIA/EIA-568, 569, 606, 607 Standards and ***Eleventh*** Edition (or later).

***H.*** BICSI Telecommunications Distribution Methods Manual (TDMM).

***I.*** UL 1610 -- Central-Station Burglar-Alarm Units.

***J.*** UL 1023 -- Standard for Safety Household Burglar-Alarm System Units.

***K.*** UL 609 -- Standard for Safety Local Burglar Alarm Units and Systems.

***L.*** UL 365 -- Standard for Safety Police Station Connected Burglar Alarm Units and Systems.

***M.*** UL 985 -- Household Fire Warning System Units.

***N.*** Products -- Factory Mutual approved.

***1.4*** SYSTEM WARRANTY

A. The Intrusion Detection System shall be warranted by the contractor for a period of one (1) year from date of substantial completion.

***1.5*** SYSTEM OPERATION

A. Upon entering a valid access code via a system control keypad, the system shall disarm the applicable zones, disarm the alarm system, and log the transaction pertaining to time, date, and user.

B. The Intrusion Detection System shall provide the following functions:

1. A system control panel, control keypads, magnetic door contacts, motion sensors, and alert sirens.

2. Provide interconnection to the District provided dedicated telephone connection for monitored response to after-hours alarms. Consider cellular backup system.

3. Provide interconnection to the central control panel for monitoring all applicable doors with door contacts.

4. System shall be fully integrated with the building's Access Control and CCTV System.

5. The System shall be integrated with the building lighting system and shall activate the corridor lights and other selected areas in the event of alarm activation.

6. The System shall be supervised, i.e. power failure, line cuts and communication failures shall signal the monitoring station(s) of the problem.

7. The fire system flow and tamper points shall be attached to the system.

8. The System shall provide monthly reports, detailing as a minimum:

a. Alarm System usage.

b. Door Openings.

c. Door Closings.

d. Alarm Conditions.

C. The System shall be programmed to accept individual access codes from authorized employees. Codes shall not be shared.

1.6 EXTERIOR ENTRANCE / EXIT DOOR

A. KEYPAD

1. A keypad shall be mounted within six (6) feet of the entrance on the inside of the facility.

2. The keypad shall utilize a minimum of a two (2) line, 32-character LCD display and an integral multi-tone speaker.

3. The keypad shall contain an internal diagnostics program allowing for system troubleshooting without disabling the system.

4. The keypad shall allow for the use of three dedicated keys to function as panic keys.

5. Keypads shall have a keypad activated duress code feature.

6. All keypads shall be interfaced with the Control Panel.

B. DOOR CONTACT

1. A magnetic door contact switch shall be installed at each exterior door to provide door open/closed status to the system.

2. The contact switch shall be installed recessed into the doorframe where applicable.

C. CENTRAL CONTROL PANEL

1. Provide one Central Control Panel, which shall be equipped with a lock and transparent door panel.

2. The Central Control Panel shall provide the required input zones, operate on 24V D.C., indicate ground fault, and activate audio and visual devices.

3. The Central Control Panel shall have a battery charging system and battery(s).

4. Connect the Central Control Panel to the Main Equipment Room**,** generator powered, UPS Units.

5. Provide necessary auxiliary contacts (alarm and trouble), for sending signals to the digital communication system.

6. Provide necessary auxiliary contacts to power the exterior bell.

7. The Central Control Panel shall provide a telephone digital communication actuation and supervisory circuit.

8. Connect Central Control Panel to the District provided telephone line(s).

D. P.I.R. MOTION SENSOR ***- Optional***

***1. The Technology Designer shall verify requirements of motion sensors with the school district.***

***2.*** The system ***type*** shall be passive infrared motion detectors.

***3.*** The sensors shall be microprocessor controlled and contain a false alarm protection feature.

***4.*** The sensors shall provide a minimal coverage pattern of 50 feet by 50 feet to 120 feet by 12 feet based on interchangeable lenses. Select lenses based on coverage area required.

***5.*** Short, medium and long-range motion detectors shall be selected as required to suit the area to be covered.

***6.*** The sensors shall be capable of mounting either on a ceiling, wall surface or in a corner.

***7. Consider sensor installations*** on all floors of the facility, in corridors and all rooms with outside access.

***8. Consider*** each entry point backed up by Motion Detectors.

***9. Consider motion detectors in computer labs.***

***10.*** Locate motion detectors to provide full coverage and minimize false alarms.

***11.*** Provide single or dual technology motion detectors based on application.

***12.*** Dual Technology sensors shall employ both Microwave and Passive Infrared.

E. ALARM SIREN

1. The system shall be provided with an external alarm siren(s) (horn) and strobe light as required.

2. The alarm sirens and strobes shall be housed in a tamper proof, weather resistant metal enclosures.

1.7 INSTALLATION

A. The system wiring and installation shall comply with all applicable codes and drawings, and shall be installed in accordance with the manufacturer's recommendations.

B. All wiring shall be color-coded and labeled at each end with self-laminating, machine-printed labels.

C. All wiring shall be installed in metallic raceways and shall comply with the latest edition of the National Electric Code (NEC).

***1.8*** MOUNTING HEIGHTS

A. All mounting heights shall comply with the Americans with Disability Act (ADA).

B. Mount Motion Detectors to provide maximum coverage, and minimal false alarms. Do not obstruct viewing angle.

***1.9*** TRAINING

A. Provide a minimum of four (4) hours training on the operation of the system.

B. Provide two (2) video copies of all training.

END OF SECTION

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SECTION 282300

VIDEO SURVEILLANCE SYSTEM

GENERAL GUIDELINES

1.1 GENERAL

A. This Section defines the general design requirements for a uniform Video Surveillance System that shall be followed for all OSFC Technology construction projects.

1. Figure 1 describes a Typical District-Wide Analog CCTV System.

2. Figure 2 describes a Typical District-Wide ALL IP CCTV System.

3. Refer to Sections 8500, Technology Systems, 28 13 00 Electronic Access Control and 28 16 00 Intrusion Detection for additional information.

1.2 SECTION INCLUDES

A. Integrated Video Surveillance System

B. Uninterruptible Power Supply (UPS).

1.3 QUALITY ASSURANCE

A. National Fire Protection Association.

***B. NFPA 730 – Guide for Premises Security***

***C. NFPA 731 – Standard for the Installation of Electronic Premises Security Systems***

***D.*** National Electric Code.

***E.*** American with Disabilities Act.

***F.*** Underwriter's Laboratory.

***G.*** FCC Class B.

***H.*** NEMA Type 4AX.

***I.*** NEMA Type 1.

***J.*** NTSC/EIA.

***K.*** ISO/IEC 14496-2 MPEG-4.

***L.*** H.264.

***M.*** Latest ANSI TIA/EIA-568, 569, 606, 607 Standards and ***Eleventh*** Edition (or later).

***N.*** BICSI Telecommunications Distribution Methods Manual (TDMM).

1.4 SYSTEM WARRANTY

A. The Video Surveillance System shall be warranted by the contractor for a period of one (1) year from date of substantial completion.

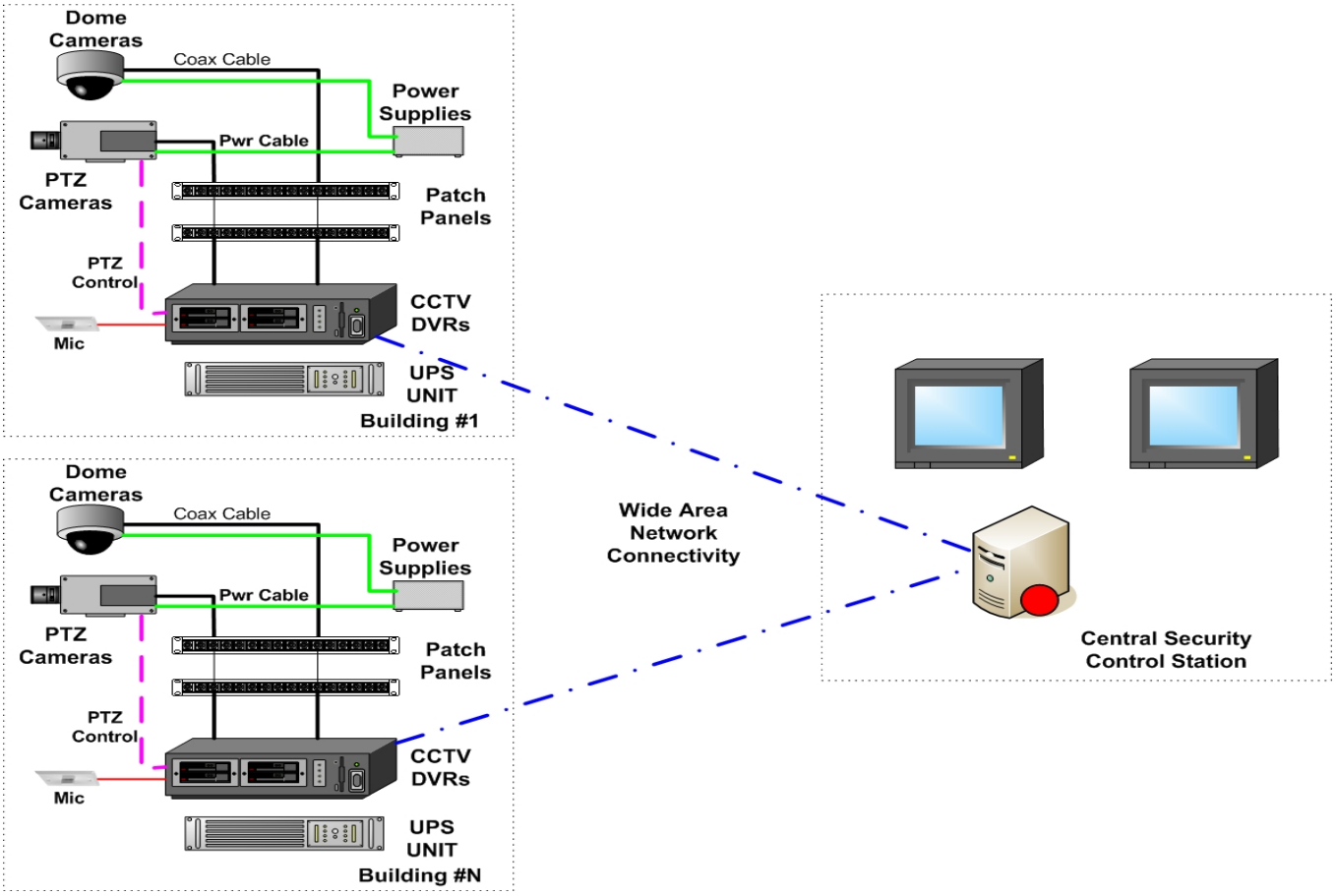


Figure 1 – Typical District-Wide Analog CCTV System

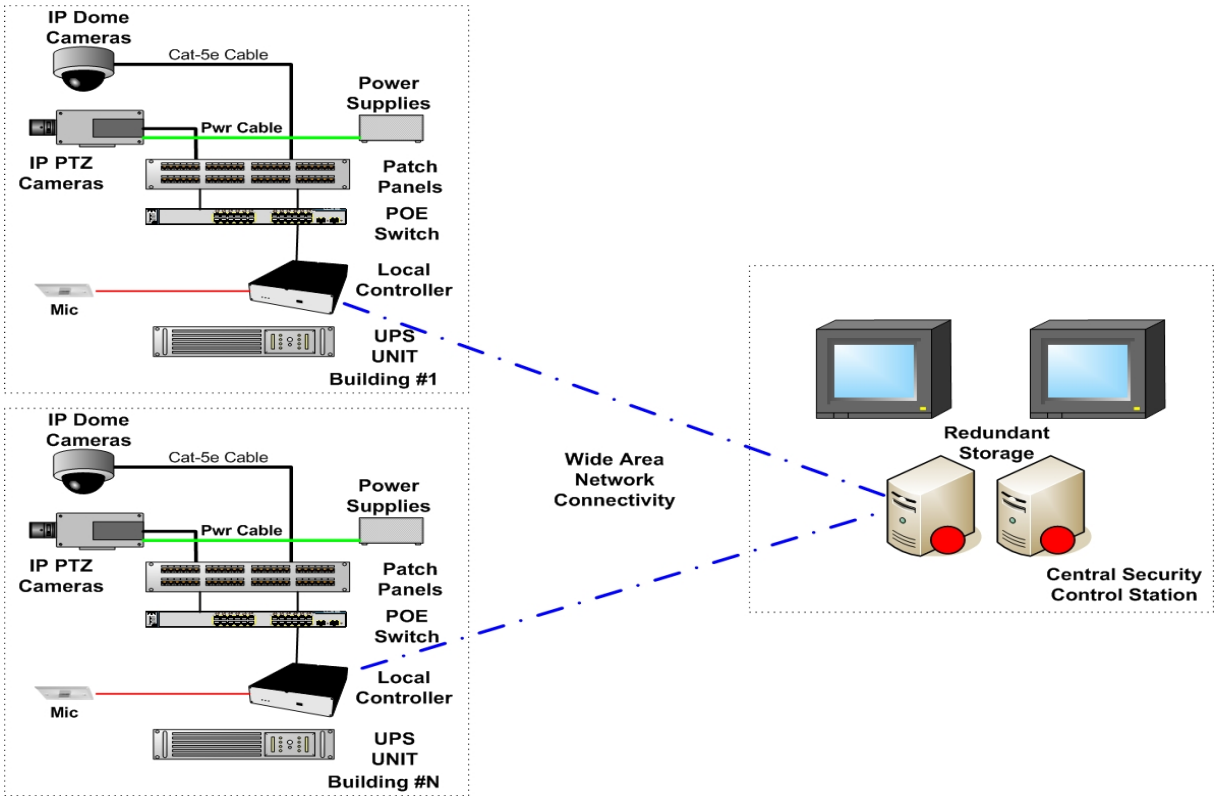


Figure 2 – Typical District-Wide ALL IP CCTV System

***1.5*** GENERAL

A. Furnish a new Integrated Video Surveillance System that provides a simple and easy-to-use graphical user interface.

B. The system shall provide local and central operational control and viewing of all cameras

C. For Districts with existing Analog Systems, consider upgrading the system to a Hybrid Analog /IP system or continue to supply Analog Systems as shown in Figure 1 above.

D. For Districts without an imbedded base of CCTV Systems, consider deploying the ALL IP System as shown in Figure 2 above, since this is the current trend in CCTV systems.

E. All IP systems provide mega pixel technology that permits greater image resolution and detail, and enable advanced video analysis and recognition technologies. All IP Systems require less storage, simplify cabling and eliminate the need for analog cameras and DVRs.

F. All IP cameras permit digital pan, tilt and zoom and can create multiple window videos. They permit video analysis and intelligence at the camera before the video is degraded by transmission distortion. In short, analog cameras and DVRs are being replaced by more effective and less costly ALL IP systems. Consider utilizing ALL IP or Hybrid IP/Analog technology.

G. Analog Cameras may be cabled with standard RG-59 Coax cable and Separate/Siamese Power Cable or may be cabled with UTP Category-5 cable and Baluns depending on the District's preference.

H. Hybrid Designs may use IP Cameras, POE Ethernet Switches and Local DVR units per building.

I. When a District has more than one building, the Central Server and Viewing Station shall be located in one of the District's buildings and the other buildings shall be attached to the Central Server via the Wide Area Network. All buildings in the District shall interface to the Central Server and Control Consoles and shall function as a single unified system.

J. The Video Surveillance System shall seamlessly integrate with the Access Control and Intrusion Detection Systems.

K. The Systems shall be located in the Main Equipment Room (ER) and connected to generator-powered UPS Units. Backup power shall be provided for both cameras and recording equipment.

L. Provide sufficient cameras to cover the entire school and surrounding lots.

M. As a minimum provide fixed focus camera coverage for:
1. All entrances/exit doors.
2. Hallways.
3. Restroom entrance/exit doors.
4. Loading docks.
5. Kitchen areas.
6. Lunch lines.
7. Cafeteria.
8. Auditoriums.
9. Playgrounds.
10. Bus pickup/delivery.
11. Parking lots.
12. Athletic Areas.

N. As a minimum provide additional PTZ camera coverage for:
1. All outside building corners.
2. Parking lots.
3. Playgrounds.
4. Bus Drop-Off.
5. Building Services Areas.

O. Mount external cameras to the side of the building for most situations. Use pole mounting for special circumstances, as required.

P. Connect a minimum of one building mic to the CCTV Recording system. Locate the Mic in the Central Office area (typical). Connect the audio output from the building paging system to the CCTV recorder. Consider connecting the audio output from the PABX E911 calling system to the CCTV recorder.

Q. Systems shall be monitored with a 19-inch (minimum) LCD color monitor in the Central Office area. – supply monitors based on system camera requirements. An additional 19-inch (minimum) LCD color monitor should be mounted on the ceiling at the public entrance to show that cameras are being used in the public areas. Post the appropriate signs advising the public that audio/video recording is taking place in the facility.

1.6 CAMERAS

A. All cameras shall be contained in smoked-dome, impact and vandal-resistant enclosures. Consider bulletproof enclosures for high crime areas.

B. Compatible lenses specific to each placement and required field of view will be used. ***In addition, MPIX cameras require specialized MPIX compatible lenses.***

C. Typical lenses shall range from 2.3 mm (wide) to 12 mm (long range). Consider using vari-focal lenses (typical 3.6 – 8 mm) for fine-tuning.

D. All analog cameras shall use 1/3 inch, CCD technology and provide progressive scan only – no interlaced scan cameras shall be used.

E. Coordinate lens type with CCD sensor size.

F. Place multiple cameras in hallways and avoid single cameras covering a long hallway.

G. Limit camera spacing to 75 feet maximum.

H. Camera placement guidelines:

1. Avoid backlight (this problem can occur when attempting to capture an image from behind a window, etc.). Utilize wide dynamic range cameras in these applications.
2. Always use auto iris lenses for outdoor applications.
3. Avoid direct sunlight – try to position the camera the same direction as the sun.
4. Avoid viewing too much sky – it results in too much contrast.
5. Avoid reflections.

I. Cameras shall have integral motion detectors for changing the frame per second recording rate, depending on system set up.

J. Coordinate placement of all cameras with District and a Qualified Security Professional.

K. All analog cameras shall meet the following minimum specifications:
1. An effective minimum pixel density of 704 (H) and 480 (V).
2. Video output signal from 1.0 to 1.2 V p-p at 75 ohms, adjustable.
3. Signal to Noise ratio of at least 50 dB.
4. 0.4 Lux sensitivity.
5. 30 fps.

L. All cameras shall be equipped with an auto-iris, automatic gain control and automatic white balance.

M. All cameras shall be centrally powered from associated Telecommunication Room***,*** generator powered, UPS Unit.

N. All exterior PTZ cameras shall be contained in a pendant style, vandal proof, exterior enclosure with integral heater module.

O. All PTZ cameras shall meet the following minimal features:
1. 22X Optical Zoom, 10X Digital Zoom.
2. Window Blanking.
3. 64 Presets.
4. 0.5° Preset Accuracy.
5. 140°/second Pan Speed.
6. Rotating Discreet Liner.
7. One Dynamic Window Blanking Area.
8. Proportional Pan and Tilt.
9. Programmable Zoom Speeds.
10. 360 Degree scan.
11. Day/Night Operation.
    a. 0.08 lux at ½ sec shutter (Color).
    b. 0.30 lux at 1/60 sec shutter (B/W).
    c. 0.013 lux at ½ sec shutter (B/W).
12. 30 fps – NTSC.

P. All analog cameras shall operate on 75 ohm RG-59 coax or Category-5e UTP (supply Baluns and line conditioners as required).

Q. Provide fiber-optic interfaces for all external, pole-mounted cameras.

R. All IP cameras shall meet the following minimal features:
1. Powered via 802.3af Power-Over Ethernet using standard Category-5e cable.
2. Optional additional power for External PTZ cameras.
3. MPEG-4***, MJPEG, and H.264 video compression. Minimum dual stream.***
4. Audio capabilities with optional mic.
5. Optional DSP for video intelligence and recognition techniques.
6. ***Optional*** mega pixel sensor.
7. Digital Pan/Zoom.
8. CCD sensor – ¼-inch minimum.
9. Integrated PZT control over one Category-5e cable.
10. IR Cut Filter for low-light conditions.
11. SNMP support for management.
12. HTTPS for encrypted Communications.
13. Built-in Web Server.
14. Fixed IP address.
15. 30 fps – NTSC.

S. Designs may use Analog or IP Cameras; however, Analog cameras should be limited to existing installations.

1.7 DIGITAL VIDEO RECORDER (DVR)

A. Existing installations may still use individual Digital Video Recorders (DVRs) for District compatibility. New installations should consider centralized Digital Storage Servers with Satellite Collectors in Individual Buildings.

B. The DVR shall provide a high quality, 1- to 16-channel recorder capable of storage and playback of images from 1 to 16 camera inputs. ***DVR shall support a minimum of 7.5 fps from each attached camera simultaneously.***

C. The DVR shall be able to record full-screen video images continuously, upon motion detection, or according to a time schedule to its internal hard drives.

D. The DVR shall have the capability to simultaneously record, archive background images, and allow multiple user network viewing and playback with no loss of performance.

E. Internal DVR hard drives shall provide for ***30 days*** of storage at an average rate of 5 fps per camera, ***CIF resolution***.

F. All recording to the hard drive shall have a digital signature applied to the disk file including time, date and camera info.

G. The DVR shall support simultaneous audio recording and playback on at least one channel in real time.

H. The DVR shall have video motion search to allow recorded searches on the hard disks, based on movement in a particular area of the image.

I. The DVR shall provide a list of the activity events that occurred within a defined area.

J. The DVR shall have a standard Ethernet connection and The Ethernet connection shall allow live and recorded viewing on a networked PC using a manufacturer's Network Viewer or via web pages over a standard Internet browser.

K. The DVR shall support file export of digitally signed images over the network.

L. The DVR shall provide a user-friendly, paged menu system that is controlled from the face of the DVR and viewable on a composite monitor that can be connected to the DVR's main monitor output.

M. The DVR central Viewing station shall be completely integrated with the Intrusion Detection and Access Control Systems.

1.8 CENTRAL STORAGE

A. Newer installations shall use a Centralized Digital CCTV Storage system.

B. Interface the Centralized Digital CCTV Storage System with DVRs in remote buildings or Remote Video Servers.

C. The Centralized Storage Systems shall function as the main depositary for CCTV Videos. Remote Video Servers shall transmit the CCTV Video to the Central Servers.

D. The Centralized Storage System shall have the following minimum features:
1. Live video review of up to 32 concurrent cameras per client PC attached to the Server.
2. Managed, indexed storage of MPEG-4 video from Remote Video Servers and selected IP cameras.
3. Event-based recording that is fully integrated with the Intrusion and Access Control Systems.
4. Internal redundant hard drives that shall provide for 30 days of storage, ***based upon minimum 10 ips, MJPEG, or HCIF, per camera.***
5. All recording to the hard drives shall have a digital signature applied to the disk file including time, date and camera info.
6. Alarm Management, including video loss alarms.
7. Graphical Maps with interactive video control.
8. Review stored video from DVR, IP camera archive and video servers.
9. Instant Replay of recently recorded videos.
10. Record Now feature -- allows security-monitoring personnel to initiate recording.
11. Flexible event presentation of videos.
12. Integrated HTML Web Page support in virtual matrix for remote viewing.
13. Several Operator permission Levels for Individual Cameras and Videos.
14. PTZ Control support.
15. Management Reports.
16. Support for multiple client PCs – minimum 6.
17. Activity logging.
18. Configuration Change and Operator Activity Reporting.
19. Seamless integration with Intrusion Detection System and Access Control System.
20. Support for various Storage and archiving functions.
21. Connect to the Central Video Servers via IP.
22. Provide support for legacy Analog and new IP cameras.

1.9 REMOTE VIDEO SERVERS

A. Remote Video Servers shall have the following minimum features:

B. Store and Forward capability - Store data at the edge of the LAN/WAN and only forward over the network when required.

C. Event based recording for intrusion or access control activity.

D. Provide local storage of video streams in the event of WAN communication failure to the Central Storage Servers.

E. Complete control over frame rate, video resolution and other settings on a timed and trigger basis.

F. MPEG-4 compression technology.

G. Integrated with Access Control and Intrusion Detection Systems.

H. PTZ support.

I. Motion detection support.

J. Integrated web server for configuration.

K. Video loss alarm capability.

***1.10 IP VIDEO DECODERS***

***A. In all IP installations, any place where analog video is to be provided for local viewing, a multi-stream decoder (minimum 2x2 image per display) will be required.***

***B. A local PC, running the CCTV remote view software and connected to the local monitor, can also be utilized for this purpose.***

***1.11*** INSTALLATION

A. The system wiring and installation shall comply with all applicable codes and drawings, and shall be installed in accordance with the manufacturer's recommendations.

B. All wiring shall be color-coded and labeled at each end with self-laminating, machine-printed labels.

C. All wiring and component installations shall comply with the latest edition of the National Electric Code (NEC).

***1.12*** TRAINING

A. Provide a minimum of eight (8) hours training on the operation of the system.

B. Provide two (2) video copies of all training.

END OF SECTION

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SECTION 282600

AREA OF REFUGE INTERCOMMUNICATION SYSTEM

1.1 General

A. This section defines the general design requirements for an ADAAG compliant Area of Refuge Assistance Intercommunications System that shall be followed for all OSFC Technology projects where applicable.

B. Coordinate requirements and device locations with the project architect.

1.2 Section Includes

A. Area of Refuge Intercommunication System

1.3 Quality Assurance

A. National Fire Protection Association

B. National Electric Code

C. American with Disabilities Act

D. Underwriter's Laboratory

E. Products – Factory Mutual approved

1.4 System Warranty

A. The Area of Refuge Intercommunication System shall be warranted by the contractor for a period of one (1) year from date of substantial completion.

1.5 System Operation

A. The Area of Refuge Intercommunication System is used to call for assistance from Areas of Refuge as defined in the Americans with Disabilities Act.

B. When a call is placed from a remote station, it is annunciated at the master station with both audible and visual signals and displayed on an alpha-numeric display. The alpha-numeric display shall indicate the name and location of the calling station. Once a call is acknowledged at the Master Station, the remote station provides visual and audible confirmation. The Master Console controls the direction of the talk circuit.

C. A call may only be canceled from the Master Console after it has been acknowledged. After the call has been canceled from the Master Console, the indicators extinguish and communication is terminated.

D. The Master Console may initiate audio communication with a Remote Call Station at any time by dialing the station number on its keypad or by pressing the button associated with the station. The Master Console may also page a group of Remote Call Stations to broadcast evacuation information. In the event of circuit trouble with any Remote Call Station, the Master Console will display the location and number of the station and "Trouble."

1.6 System Head-end

A. Provide a multi-station, ADAAG compliant Area of Refuge Assistance 2-way intercommunications system. System shall consist of a wall mounted master station and remote call in stations as indicated on the drawings. The System shall be micro-processor based and utilize multiplexing technology.

1.7 Call in Stations

A. The call in stations shall utilize common bus architecture with no home runs. Multiple stations and masters may be on one main.

B. The station has a flush mounting for standard electrical multi-gang wall box, weather/vandal resistant 11-gauge brushed stainless steel panel with tamperproof hardware, speaker/microphone for voice communication, a call button and two LED indicator. The panel resists damage from common cleaning agents. Supervision of the station is indicated at the Master Console.

1.8 Master Station

A. Ultra compact console with spill-proof keypad, backlit display panel, low-light readability, alpha-numeric display of station number and name, handset privacy or hands-free communication, auto-answer by lifting handset or scroll to any call, group voice page, digital volume keys, call tones with mute for calls in progress, programmable station name.

B. Master station may be either desk mounted or flush wall mounted with appropriate hardware.

1.9 Telephone Interface

A. Telephone Interface – the PBX telephone interface connects a call from a remote station to a PBX telephone system. The interface allows calls from remote stations to be forwarded to outside telephones. Interface is used in conjunction with the Master Station

1.10 Installation

A. The system wiring and installation shall comply with all applicable codes and drawings, and shall be installed in accordance with the manufacturer's recommendations.

B. All wiring shall be color coded and labeled at each end with self-laminating, machine printable labels.

C. All wiring shall be installed in metallic raceways from rough-in boxes to above accessible ceilings. Cabling installed open above accessible ceilings shall be supported with manufacturers and approved cable support systems and shall comply with the latest edition of the National Electric Code (N.E.C.).

D. All equipment shall follow manufacturer's guidelines for mounting heights and installation methods.

1.11 Testing

A. Verify proper operation of system

1.12 Training

A. Provide a minimum of eight (8) hours training including system programming, trouble shooting and basic operation.

B. Provide two (2) video copies of all training.

END OF SECTION

SECTION 283111

DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for fire-alarm control unit, manual fire-alarm boxes, system smoke detectors, heat detectors, notification appliances, magnetic door holders, remote annunciator, addressable interface device, and digital alarm communicator transmitter.

1.2 QUALITY ASSURANCE

A. NFPA 70 - National Electrical Code

B. Underwriter's Laboratory

1.3 FIRE-ALARM CONTROL UNIT

A. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.

B. Addressable initation devices that communicate device identity and status.

C. Addressable control circuits for operation of mechanical equipment.

D. Alphanumeric Display and System Controls

E. Circuits:
1. Initiating device, notification appliance, and signaling line circuits: NFPA 72, Class B.

F. Elevator Recall:
1. Smoke detectors shall initiate automatic elevator recall.

G. Heat detectors in alarm installed in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.

H. Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.

I. Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

J. Primary Power: 24-V dc obtained from a 120-V emergency generator branch circuit and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.

K. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
1. Batteries: Sealed lead calcium
2. Capacity: Comply with NFPA 72

1.4 MANUAL FIRE-ALARM BOXES

A. Single-action mechanism, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.

1.5 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:
1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors do not require resetting or readjustment after actuation to restore them to normal operation. Integral visual-indicating light: LED type indicating detector has operated and power-on status.

B. Photoelectric Smoke Detectors:
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
1. Detector address shall be accessible from fire-alarm control unit and shall be able identify the detector's location within the system and its sensitivity setting.

1.6 HEAT DETECTORS

A. Heat Detectors: Comply with UL 521.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 degrees Fahrenheit or a rate of rise that exceeds 15 degrees Fahrenheit per minute unless otherwise indicated.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 degrees Fahrenheit.

1.7 NOTIFICATION APPLIANCES

A. Horns: Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.

B. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with a clear polycarbonate lens.

C. Flashing shall be in a temporal pattern, synchronized with other units.

1.8 NOTIFICATION APPLIANCE CIRCUIT POWER SUPPLY UNITS

A. Power-limited design, complying with UL 864 and listed and labeled by an NRTL.

B. Primary Power: 24-V dc obtained from a 10-v emergency generator branch circuit and a power-supply module.

C. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
1. Batteries: Sealed lead calcium.
2. Capacity: Comply with NFPA 72

1.9 MAGNETIC DOOR HOLDERS

A. Units equipped for wall mounting complete with matching doorplate.

B. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.

1.10 REMOTE ANNUNCIATOR

A. Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

B. Alphanumeric display with LED indicating lights.

1.11 NON-ELECTRIC GRAPHIC ANNUNCIATOR

A. Framed plexiglass floor plan display with room numbers assigned by Owner.
   1. Color image printed on the reverse side of a polycarbonate Lexan laminated to a a rigid backing with a removable adhesive for future replacement.
   2. Graphics shall show location of fire-alarm control unit, “YOU ARE HERE”, detection devices and nomenclature.
   3. Mounting: Adjacent to remote annunciator.

1.12 ADDRESSABLE INTERFACE DEVICE

A. Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to the following:
   1. Elevator controller to initiate elevator recall.
   2. Circuit-breaker shunt trip for power shutdown.
   3. Theatrical lighting controller for panic lighting.
   4. Heating, ventilating, and air-conditioning equipment controllers for power shutdown.
   5. Smoke dampers for closing.
   6. Magnetic door holders, electric locks, coiling doors and grilles for releasing.
   7. Building management system for equipment shutdown and alarm notification.

1.13 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.

1.14 DEVICE GUARDS

A. Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection in gymnasiums and locker rooms.

1.15 EQUIPMENT INSTALLATION

A. Comply with NFPA 72 for installation of fire-alarm equipment.

B. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch.

C. Mounting height of appliances shall comply with Americans with Disability Act.

D. Grounding: Ground fire-alarm control unit and associated circuits.

***E. Wiring shall be installed in conduit in compliance with Allowable Conduit Schedule in section 260533.***

END OF SECTION

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# 31 DIVISION EARTHWORK

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## DIVISION 31: EARTHWORK

311000 Site Clearing
312000 Earth Moving

SECTION 311000

SITE CLEARING

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for removal of vegetation at the site, including stripping of sod and soil for site clearing.

1.2 SITE CLEARING

A. Clearing and grubbing obstructions, trees, shrubs, and other vegetation, including removal of stumps, roofs, and debris.

B. Provide temporary erosion- and sedimentation-control measures.

LEED SUGGESTIONS

2.1 As a prerequisite for LEED certification, an erosion- and sedimentation-control plan is required for the project. This plan must comply with the more stringent of either the “2003 EPA Construction General Permit” or local erosion- and sedimentation-control standards and codes. According to the EPA, the permit applies to construction sites greater than 1 acre except for smaller sites that are part of a larger common plan of development or sale. However, for LEED certification, the requirements are applied to all projects for this prerequisite.

END OF SECTION

SECTION 312000

EARTH MOVING

GENERAL ***GUIDELINES***

***1.1*** SECTION INCLUDES

A. Qualitative requirements for grading, excavation, embankments, and sedimentation and erosion control. Earth moving for foundations, structures, pavement, ditches, culverts, drains, and utilities.

***1.2*** MATERIALS

**A.** Satisfactory Soils: ASTM D 2487 soil classification groups ***and Geotechnical Engineer.***

***B. Engineered Fill: Graded mixture of gravel, crushed stone, and sand with 90% passing a 1-1/2-inch sieve and not more than 12% passing a No. 200 sieve.***

***C.*** Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

***D.*** Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

1. Aggregates used for subsurface storage of storm water or for use with underdrains shall be washed limestone, washed gravel, or river rock. In all cases the aggregates shall be 100 percent crushed.

***E.*** Topsoil: Shall be fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds, and other litter or stones larger than 1/2 inch.

1. Provide 6 inches minimum topsoil.

F. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; AST D 448; coarse-aggregate grading size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 passing a No. 8 sieve.

***G.*** Sand: ASTM C33; Clean, general purpose sand, free of organic and deleterious materials.

***H. Geotextiles: Subsurface drainage geotextile and separation geotextile.***

***I.*** Geogrid.

***J. Controlled Low-Strength Material.***

***1.3 EXCAVATION***

***A. Explosives: Not allowed.***

***1.4 FIELD QUALITY CONTROL***

***A. Special Inspector and Testing Agency: Owner engaged.***

***<u>LESSONS LEARNED</u>***

***2.1 During the design process, several professionals on the Design Team might need to revise this section to coordinate Specification Sections within the project manual. Besides input from the Architect and the Geotechnical Engineer, the Civil, Structural, Mechanical, Plumbing, and Electrical Engineers might share editing and review obligations. Each Design Professional's responsibilities and scope of service depends on the agreement with the Prime Consultant or the Owner.***

***A. Assigning specification-review responsibility can be overlooked during the design process. Review may be inferred or expected without expressly stating this in the various agreements, particularly where the agreement is directly with the Owner. Clearly delineate the responsibilities for editing and reviewing this Section in consultants' agreements.***

***2.2 A dewatering system should be designed to keep the excavation continuously stable and dry. For deep excavations, ground-water extraction must be carefully controlled. For this purpose, piezometers measuring hydrostatic pressure are installed at various depths in sufficient number to detect the important piezometric water level changes resulting from removing the ground water.***

***2.3 Adjacent Structures: Occasionally, settlement of adjacent structures might be attributed to dewatering. Existing structures founded on weak, compressible soils or on saturated, loose sand could settle. The condition of structures, type of foundation, and water table elevations immediately adjacent to the project should be determined before dewatering. If dewatering and excavation will lower the water table significantly at such structures, underpinning precautions may be necessary.***

***2.4 Typically, the type of damage produced by dewatering is caused by settlement, particularly differential settlement. Settlement under walls, foundations, and stone and concrete masonry can cause cracking in these structures and in finishes. Buildings with deep foundations will usually be less affected by dewatering than those with shallow foundations; older buildings are usually more affected than newer ones.***

END OF SECTION

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# 32 DIVISION

# EXTERIOR IMPROVEMENTS

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DIVISION 32: EXTERIOR IMPROVEMENTS


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SECTION 321216

ASPHALT PAVING

GENERAL ***GUIDELINES***

***1.1*** SECTION INCLUDES

A. Qualitative requirements for base course and pavements above base course including conventional pavements for walks, roads, parking lots, and recreation areas. Also includes bituminous base courses, bituminous binder courses, and bituminous surface courses; tack coats.

***1.2*** QUALITY ASSURANCE

A. Road and paving materials and methods shall be in accordance with the State of Ohio Department of Transportation (ODOT), "Construction and Material Specifications", latest edition.

B. Pavement markings within public right-of-ways shall be in accordance with US Manual on Uniform Traffic Control Devices.

***1.3*** COMPACTED AGGREGATE

A. Aggregate base shall consist of stone, gravel, or slags with composition and gradation described as "Item 304," and conforming to requirements of 703.04 of the State of Ohio Department of Transportation (ODOT), "Construction and Material Specifications."

***1.4*** PAVING MATERIALS

***A.*** Bituminous Base Course: ODOT "Item 301".

***B.*** Binder Course Asphalt Concrete: ODOT "Item 448".

***C.*** Surface Course Asphalt Concrete: ODOT "Item 448".

***D.*** Tack Coat: Emulsified asphalt.

***1.5 AUXILIARY MATERIALS***

***A. Paving Geotextile: Non-woven polypropylene.***

***B. Pavement-Marking Paint.***

***C. Wheel Stops: Precast concrete or solid, recycled plastic with galvanized-steel dowels.***

***1.6 FIELD QUALITY CONTROL***

***A. Testing: By Owner-engaged agency.***

END OF SECTION

SECTION 321313

CONCRETE PAVING

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for rigid cement concrete pavements above base course including conventional and modified pavements for walks, roads, parking lots, and service areas.

1.2 QUALITY ASSURANCE

A. Quality Standard: ACI 301.

1.3 MATERIALS

A. Concrete: ASTM C 150.
1. Normal-weight aggregate.
2. Air-entraining admixture.
3. Color pigment (optional).
4. Finish: Broom finish.

B. Wire Mesh: Welded plain steel wire fabric.

C. Reinforcing Bars: Deformed steel bars.

D. Fabricated Bar Mats: Steel bar or rod mats.

E. Joint Dowel Bars: Plain steel bars.

F. Detectable Warnings.

***G. Fiber Reinforcement: Synthetic fiber.***

1.4 FIELD QUALITY CONTROL

A. Testing: By Owner-engaged agency.

END OF SECTION

SECTION 321314

PERVIOUS CONCRETE PAVEMENT

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for pervious concrete paving.

1.2 QUALITY ASSURANCE

A. State of Ohio Department of Transportation (ODOT), "Construction and Material Specifications".

***B. ACI 522R-06 Pervious Concrete***

***C. ACI 522.1-08 Specification for Pervious Concrete Pavements***

1.3 PRODUCTS

A. Stormwater Detention Layer or Groundwater Recharge Bed
1. Test Subgrade
a. Field Method: ASTM D 3385.
2. Coarse Aggregate for Stormwater Detention Layer: ODOT Item 703.1, AASHTO size No. 2.
3. Choker Base Coarse Aggregate for Stormwater Detention Layer: ODOT Item 703.1, AASHTO size No. 57.
4. Impervious Liner.
5. Filter Fabric.
6. Isolation Joint Material.
7. Curing Materials.

B. Pervious Concrete Pavement
1. Cement: ASTM 150 or ASTM C 595.
2. Supplementary Cementitious Materials
a. Fly Ash
b. Ground Granulated Blast-Furnish Slag.
3. Admixtures
a. Air Entraining Admixture.
b. Chemical Admixtures
1) Mid-range water reducing admixtures or high range water-reducing admixtures.
2) Extended set control admixtures or water-reducing/retarding admixtures.
3) Viscosity modifying admixtures.
4. Aggregates for Pervious Concrete: ASTM C33 and ODOT Item 703.02, No. 67, 7, 8, and 89 or 9.
5. Water.
6. Mixture Proportions: Appendix 6 of ACI 211.3R.

1.4 FIELD QUALITY CONTROL
A. Owner engaged.

LEED SUGGESTIONS

2.1 Pervious Paving: Credit for Sustainable Sites, SS 6.1 for stormwater design awards one point for stormwater management practices that reduce runoff to meet certain criteria. Pervious paving can be used as part of a stormwater management design to obtain this point.

LESSONS LEARNED

3.1 Pervious paving, also called porous paving, gap-graded paving, permeable paving, or enhanced porosity paving, can be used as part of a stormwater management design to reduce stormwater runoff and replenish aquifers.

3.2 Most concrete paving is produced from dense mixes of well-graded aggregate sizes that interlock with each other, making a stable low-porosity mass. This paving is designed to shed rather than absorb water. Pervious paving uses an open-graded aggregate mix with a large percentage of one-sized coarse aggregate, also called gap-graded or uniformly graded aggregate. Fine aggregates are typically not used in the mixes. The course of porous paving is placed over a reservoir of uniformly graded clean aggregate. Stormwater flows through the pervious paving into the reservoir, which has about 40% voids to store runoff and allow it time to infiltrate through subgrade soils.

3.3 Because paving structures that absorb or allow passage of water are fairly sophisticated systems, care must be taken in their design, detailing, and construction. If subgrades do not drain quickly enough under cold conditions, trapped water may freeze and damage paving. Passage of water may also allow more dissolved salts to reach embedded reinforcing, thereby increasing the opportunity for salt damage.

END OF SECTION

SECTION 321443

POROUS UNIT PAVING

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for porous paving consisting of concrete pavers set in aggregate setting beds.

1.2 MATERIALS

A. Concrete Grid Pavers.

B. Solid Interlocking Concrete Pavers of shapes that provide openings between units.

C. Edge Restraints: Plastic or aluminum.

D. Curbs: Precast concrete.

E. Graded Aggregate for Subbase: Open graded for stormwater storage.

F. Graded Aggregate for Base: Well graded.

G. Leveling Course: Sand or crushed stone.

H. Paver Fill: Crushed stone.

LEED SUGGESTIONS

2.1 Porous paving can reduced stormwater runoff, compared to nonporous paving, by increasing infiltration. The effectiveness of porous paving for providing stormwater infiltration can be further increased by providing a highly porous base course, and possibly subbase, to store stormwater until the underlying soil can absorb it. Stormwater runoff carries pollutants from paved surfaces directly into streams and scours exposed soil surfaces, causing silt buildup downstream and degrading water quality. Infiltrated stormwater is filtered by subsurface soil layers, removing pollutants. It also recharges aquifers, resulting in steadier stream flows; peak flows are absorbed and then released during times of low flow. Porous paving may also help reduce heat buildup resulting from the absorption of solar energy by pavement materials, thereby helping to reduce the urban heat island effect.

2.2 LEED Credit SS 6.1 provides one point for stormwater management practices that reduce runoff to meet certain criteria, and LEED Credit SS 6.2 provides one point for removing suspended solids and phosphorous from stormwater runoff. Porous paving can be used as part of a stormwater management design that can obtain both of these points. LEED Credit SS 7.1 also provides a point for using an open-grid paving system that is less than 50% impervious for at least 50% of the parking lot area. Although porous pavers are more than 50% impervious, using them for more than 50% of the parking lot area can provide an equivalent pervious area, which complies with the intent of the credit.

LESSONS LEARNED

3.1 Traffic loads are usually a primary design consideration. Where light loads are expected, such as in parking areas and possibly including access aisles, grid-type pavers that will allow maximum water infiltration may prove suitable. Where heavy vehicular loads are expected such as in drive aisles, especially those that will carry frequent truck traffic, solid paving or porous paving with minimal open area may be required.

3.2 Consider snow removal needs; critical areas that must be kept clear of snow at all times might better be paved with a smooth material such as concrete or asphalt.

3.3 Subgrade preparation is also important for a successful installation. Remove vegetation and organic materials from the area to be paved. Remove soft spots containing poor subgrade material, and refill them with suitable material properly compacted. Refer to the project's geotechnical report for specific compaction requirements.

3.4 Drainage: Surface and subsurface drainage is of major importance. Exterior paving is usually sloped at least 1/4 inch per foot (2%), but porous pavers may be sloped as little as 1/8 inch per foot (1%). Porous paving should typically have at least a minimal slope so that during heavy rains, when water cannot infiltrate the paving as fast as it falls, water will not build up on the surface. Paving should be sloped away from buildings, retaining walls, and other elements capable of collecting surface water. Localities with impervious soils may require subsurface drains to allow excess water to flow out of the subbase and base course.

END OF SECTION

SECTION 321816

PLAYGROUND SURFACING

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for surfaces for exterior recreational activities.

1.2 QUALITY ASSURANCE

A. Impact Attenuation: According to ASTM F 1292.

B. Accessibility of Surface Systems: According to ASTM F 1951.

C. Minimum Characteristics for Organic Loose-Fill Surfaces: According to ASTM F 2075.

1.3 PLAYGROUND SURFACE SYSTEMS

A. ***Provide one or a combination of the following:***

***1. Organic Loose-Fill Surface,*** Engineered Wood Fibers: Random-sized wood fibers, in manufacturer's standard fiber size, approximately 10 times larger than wide; containing no bar, leaves, twigs, or foreign or toxic materials according to ASTM F 2075; graded according to manufacturer's standard specification for material consistency for playground surfaces and for accessibility according to ASTM F 1951.

***2. Unitary synthetic poured rubber seamless surface: Poured-in-place, two-layer system with wearing course over cushion course. Provide manufacturer's standard thickness for each layer as required for overall thickness indicated, tested for impact attenuation according to ASTM F 1292 and for accessibility according to ASTM F 1951.***

***a. Wearing Course: Formulation of EPDM rubber particles, with minimum of 20 percent and maximum of 26 percent of ethylene propylene-diene-saturated polymethylene main chain along with other organic and inorganic components.***

***b. Cushion Course: Manufacturer's standard formulation of SBR particles and polyurethane, site mixed and applied.***

B. Accessories

1. Edgings.
2. Stabilizing Mats.
3. Drainage / Separation Geotextile.
4. Weed-Control Barrier.

LESSONS LEARNED

2.1 Organic loose-fill systems include wood chips, wood mulch, and engineered wood fibers and should be installed over graded soil or compacted drainage fill with an interlayer of geotextile fabric that may also include premolded drainage matrix. The perimeter curb of the playground surface usually contains the loose material within the equipment area. Engineered wood fibers should be tested according to ASTM F 2075, Specification for Engineered Wood Fiber for Use as a Playground Safety Surface under and around Playground Equipment, for the presence of contaminants such as toxic substances and for consistently sized wood particles. Wood-based, loose-fill materials are flammable and subject to compaction, decomposition, and pulverization. This surface is less abrasive than sand and not as likely to be fouled by animals.

2.2 Manufacturers test the resilience of their products according to ASTM F 1292. Loose-fill sand, gravel, wood chips, and wood mulch are not furnished by playground surface system manufacturers, so product testing is not done for specific CH design depths. Field testing according to ASTM F 1292 can also be done at the completion of installation or periodically during the service life of the installation to verify performance.

A. The International Play Equipment Manufacturers Association provides a third-party product certification service to validate a member manufacturer's certification of compliance with ASTM F 1292.

2.3 Testing for accessibility is done according to ASTM F 1951, Specification for Determination of Accessibility of Surface Systems under and around Playground Equipment. This standard is designed to measure the amount of effort required to propel a wheelchair across the surface for straight and turning movement. The test is primarily directed at loose-fill surfaces to show comparison with the same movements over a smooth, hard surface. Some loose-fill systems will require additional surface mats over the accessible route to play equipment required by the Americans with Disabilities Act (ADA) to meet this standard. Accessible routes are also discussed in 36 CFR 1191, Americans with Disabilities Act (ADA) Accessibility Guidelines; Play Areas. Sloping surfaces should be limited to 2%.

2.4 Testing loose-fill wood systems for the presence of toxic substances such as heavy metals, metal scraps such as nails, and correct particle size is done according to ASTM F 2075. This test is done by engineered wood fiber manufacturers but is not generally conducted for wood chips or wood mulch.

END OF SECTION

SECTION 323113

FENCES AND GATES

GENERAL ***GUIDELINES***

***1.1*** SECTION INCLUDES

A. Qualitative requirements for fences for protective, security, and right-of-way purposes; also pipe gates.

***1.2*** QUALITY ASSURANCE

A. Comply with Chain Link Fence Manufacturers Institute “Product Manual”.

***1.3*** MATERIALS

A. Fabric: ASTM A 392, CLFM 1 CLF 2445
1. Aluminum-coated steel, ASTM A 491, Type I, 0.40 ounce per square foot.
***2.*** Size: 2 inch mesh, 9 gauge steel.

C. Framework: ASTM F 1043.

D. Gates: Swinging type.
1. Chain link pedestrian (single gate leaf) and vehicular (double gate leaf with gate keepers).
2. Pipe gate.
3. Mechanical yard gate.

E. Framing and Fittings: ASTM F 626.

END OF SECTION

SECTION 329200

TURF AND GRASSES

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for application of seed, sod, or plants; fertilizer; lime and mulch; and maintenance until acceptance.

1.2 QUALITY ASSURANCE

A. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil testing agency stating percentages or organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant nutrient content of topsoil.

1.3 MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but not for less than the following periods:
1. Seeded Lawns: 60 days after date of Contract Completion.
a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.
2. Sodded Lawns: 30 days after date of Contract Completion.

***1.4 MATERIALS***

***A. Seed or Turfgrass Sod***

***B. Planting Soils***

***C. Mulch***

***D. Erosion-Control Materials***

***E. Grass-Paving Materials***

***LEED SUGGESTIONS***

***2.1 Grass paving is cellular, three-dimensional "eggcrate" matting specifically designed for locations load-bearing strength for occasional vehicular or heavy pedestrian traffic on turfgrass is anticipated. It will protect vegetation root systems from soil compaction that can restrict growth or kill plants. To obtain higher load-bearing capability, these units are often installed over a specially prepared base course as determined by the manufacturer. Load-bearing capacity can exceed 5000 psi (34.5 MPa).***

***2.2 Seldom-used "green-space" areas for overflow parking or fire lines are good use for grass paving. Where anticipated loads are significant or greater traction is needed, the use of concrete grid-type pavers should be considered.***

END OF SECTION

# 33 DIVISION UTILITIES

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DIVISION 33: UTILITIES

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SECTION 330513

MANHOLES AND STRUCTURES

GENERAL ***GUIDELINES***

***1.1*** SECTION INCLUDES

A. Qualitative requirements for manufactured units and components for utility services including hydrants, manholes, meters, utility boxes, and valves.

***1.2*** HYDRANTS

A. Yard Hydrants: As approved by Local Fire Department.

1. Hydrants within 20 feet of playgrounds shall be protected.

***1.3*** MANHOLES

A. Precast Concrete Manholes: ASTM C 478.

B. Manhole Steps: Ductile iron, cast aluminum, or steel reinforced plastic.

C. Drainage castings: Gray iron, ASTM A 48, Class 35 B to meet or exceed AASHTO axle loading specifications for specific site location, with lettering. Lettering shall be “STORM” or “SANITARY” as applicable.

***1.4*** METERS

A. Water Meter: AWWA C700 or utility company water meter.

B. Meter Box: Cast iron body and cover with lettering.

***1.5*** UTILITY BOXES

A. Valve Pits and Meter Pits: Reinforced concrete with ladder and cast iron manhole frame and cover.

***1.6*** VALVES

A. Nonrising stem gate valves 3 inches and larger, AWWA C500.

B. Rising stem gate valves 3 inches and larger, AWWA C500 or AWWA C509.

C. Nonrising stem gate valves 2 inches and smaller, MSS SP-80.

D. Valve Accessories: Cast iron valve boxes, curb stops, and service boxes for curb stops.

E. Tapping sleeve and tapping valve for new connections larger than 2 inches.

F. Service clamps and corporation stops for new connections 2 inches and smaller.

END OF SECTION

SECTION 331000

WATER UTILITIES

GENERAL ***GUIDELINES***

***1.1*** SECTION INCLUDES

A. Qualitatitve requirements for site water distribution systems for domestic consumption, fire fighting, and irrigation.

***1.2*** SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:
   1. Potable Water Service: 160 psig (1100 kPa).
   2. Fire Protection Water Service: 150 psig (1035 kPa).
   3. Fire Protection Water Service, Downstream from Fire Department Connections: 250 psig (1725 kPa).

***1.3*** QUALITY CONTROL

A. Comply with NSF 61, “Drinking Water System Components - Health Effects,” for materials for potable water.

B. Comply with NFPA 24, “Installation of Private Fire Service Mains and Their Appurtenances,” for materials, installation, tests, flushing, and valve and hydrant supervision.

C. Water main testing shall be performed in accordance with local agency jurisdiction. Pressure testing – comply with AWWA (American Water Works Association) guidelines.

D. Utility Compliance: Comply with regulations pertaining to water distribution systems.

***1.4*** MATERIALS

A. Ductile Iron Pipe 4 to 12 Inches: AWWA C151, Class 52 minimum.
   1. Lining: AWWA C104, cement mortar, seal coated.
   2. Gaskets: AWWA C111.
   3. Ductile iron and cast iron fittings, AWWA C110 or AWWA C153, 250 psi minimum pressure rating; AWWA C104 cement mortar lining; AWWA C111 rubber gaskets.

B. Ductile Iron Pipe Greater Than 12 Inches: AWWA C151, Class 51 minimum.
   1. Lining: AWWA C104, cement mortar, seal coated.
   2. Gaskets: AWWA C111.
   3. Ductile iron and cast iron fittings, AWWA C110 or AWWA C153, 250 psi minimum pressure rating; AWWA C104 cement mortar lining; AWWA C111 rubber gaskets.

C. Couplings: ASTM A 126, gray iron sleeve assembly with followers, rubber gaskets, bolts, nuts, and enamel paint finish.

D. Valves
   1. Nonrising stem gate valves 3 inches and larger, AWWA C500.
   2. Rising stem gate valves 3 inches and larger, AWWA C500 or AWWA C509.
   3. Nonrising stem gate valves 2 inches and smaller, MSS SP-80.
   4. Valve Accessories: Cast iron valve boxes, curb stops, and service boxes for curb stops.
   5. Tapping sleeve and tapping valve for new connections larger than 2 inches.
   6. Service clamps and corporation stops for new connections 2 inches and smaller.

E. Anchorages
   1. Clamps, Straps, and Washers: ASTM A 506, steel.
   2. Rods: ASTM A 575, steel.
   3. Rod Couplings: ASTM A 197, malleable iron.
   4. Bolts: ASTM A 307, steel.
   5. Cast Iron Washers: ASTM A 126, gray iron.
   6. Concrete Reaction Backing: ASTM C 150, Type I Portland cement for 3000 psi, 28-day minimum compressive strength.

F. Fire Service Main Accessories
   1. Hose House: 16 gauge steel with red baked enamel finish, hoses, and nozzles.
   2. Alarm Devices: UL 753 and FM approved including water flow indicators, supervisory switches, and pressure switches.

END OF SECTION

SECTION 333000

SANITARY SEWERAGE UTILITIES

GENERAL ***GUIDELINES***

***1.1*** SECTION INCLUDES

A. Qualitative requirements for site sanitary sewerage construction to buildings and municipal sanitary mains.

***1.2*** PERFORMANCE REQUIREMENTS

A. Gravity Flow, Nonpressure Piping Pressure Ratings: At least equal to system test pressure.

B. Force Main Pressure Ratings: At least equal to system operating pressure, but not less than 150 psig (1035 kPa).

***1.3*** PIPE AND FITTINGS

A. Provide one of the following for Gravity Systems:
1. PVC Sewer Pipe and Fittings: ASTM D 3034, SDR 35 for solvent cement or elastomeric gasket joints.
2. Reinforced Concrete Sewer Pipe and Fittings: ASTM C 76, Class III, Wall B, for rubber gasket joints.
3. ABS Sewer Pipe and Fittings: ASTM D 2751, for solvent cement or elastomeric gasket joints (4 and 6 inch only).
4. Gaskets: Compatible with pipe materials joined.

B. Provide the following for Forced Main Systems:
1. Piping shall be PVC D18, Class 150, C-900 AWWA piping with push-on joints. Piping and fittings shall meet ASTM D 1784 and ASTM 3139.

***1.4*** MANHOLES

A. Precast Concrete Manholes: ASTM C 478.

B. Manhole Steps: Ductile iron, cast aluminum, or steel reinforced plastic.

C. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, heavy duty-ductile iron with lettering.

***1.5*** CLEANOUTS

A. PVC with cast iron adapter.

END OF SECTION

SECTION 334000

STORM DRAINAGE UTILITIES

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative Requirements for:
1. Site storm drain construction to buildings and municipal storm drainage.
2. Storm drainage piping for surface, or a combination of surface and subsurface water.
3. Structures for access to underground pipe.
4. Conduit, chambers, and units for drain pipe, catch basins, inlets, and underground water detention chambers.

1.2 PIPE AND FITTINGS

A. Provide one of the following:
1. Ductile Iron Pressure Pipe: AWWA C151, Class 52 for push-on joints.
2. Reinforced Concrete Sewer Pipe and Fittings: ASTM C 76, Class III, Wall B, for rubber gasket joints.
3. Polyvinyl Chloride (PVC): ASTM D 3034, SDR 35, or ASTM F 949 for solvent cemented or gasketed joints.
4. Aluminized Steel: Type 2 per AASHTO M36 or ASTM A 760 with gasketed joints or bell and spigot joints.
5. Polyethylene Pipe: AASHTO M252 or M294; Type S or Type SP ***or ASTM F 2648; solid or perforated.***
***6. Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers: ASTM F 2418.***

B. For diameter greater than 24 inches, pipe shall be concrete, aluminized steel, or HDPE.

1.3 CLEANOUTS

A. Cast iron.

1.4 CATCH BASINS FOR STORM SEWERAGE SYSTEM

A. Precast Concrete Catch Basins: ASTM C 478 or ASTM C 858.

B. Catch Basin Steps: Ductile iron, cast aluminum, or steel reinforced plastic.

C. Catch Basin Frames and Grates: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron.

***D. PVC plastic body catch basins: H-20 DOT rated for roadway applications with a minimum 6" concrete collar and ductile iron frame and grate and meet all applicable ASTM standards and environmental regulations.***

1.5 DRAINAGE STRUCTURES

A. Curb Inlets: Precast concrete, stone, or brick conforming to utility standards.

B. Outfalls for Storm Sewerage System: Cast-in-place reinforced concrete pipe, head wall apron, tapered sides, and rip rap.

C. Dry Wells for Storm Sewerage System: ASTM C 858, precast reinforced perforated concrete rings with cast-in-place concrete floor and lift-off concrete cover.

D. Slot Drain: Interlocking precast polymer concrete modular units with grates, channel caps, and related accessories.

***E. Stormwater Collection Chambers: Polypropylene (PP) chambers with open bottom, buried chambers of corrugated wall construction used for collection, detention, and retention of stormwater runoff per ASTM F2418.***

***F. Curb inlets: PVC plastic body catch basins: H-20 DOT rated for roadway applications with a minimum 6" concrete collar and ductile iron frame and grate and meet all applicable ASTM standards and environmental regulations.***

END OF SECTION

SECTION 334600

SUBDRAINAGE

GENERAL GUIDELINES

1.1 SECTION INCLUDES

A. Qualitative requirements for subdrains for interception and removal of water from pavements and structures.

1.2 SUBDRAINAGE

A. Drainage Pipe - ***Provide one of the following:***

1. Perforated PVC pipe, ASTM D 2729.
2. ***Perforated PE pipe, AASHTO M 252, Type SP or AASHTO M 294, Type CP.***
3. ***Solid Wall PVC pipe, ASTM D 3034.***
4. ***Solid Wall PE pipe, AAHSHTO M 252 or AASHTO M 294, Type S.***

***B. Drainage Panels: Molded-sheet, mesh fabric or net fabric drainage panels.***

***C. Geotextile filter fabrics.***

END OF SECTION

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Only those specifications not addressed within the Ohio School Facilities Commission Design Manual are included within this document.

Specifications define the qualitative requirements for products, materials, and workmanship upon which the content is based. They are organized into ***50*** Divisions and ***6*** digit numbering system. Section titles have been closely coordinated with the numbering system established in CSI's ***New*** Masterformat ***2004*** Edition. In certain instances, section titles vary slightly from those recommended, but only where necessary to make them correspond more closely to text subject matter.

The specifications are no more than outlines complied to establish minimum quality requirements. They do not cover all materials required for a complete Project and do not attempt to include every possible variable, particularly where doing so would require an almost unlimited number of choices. These specifications are not to be used as bid documents.

Specifying methods include both performance (a statement of required results with criteria for verifying compliance, but without unnecessary limitations on the methods for achieving the required results) and reference standard (requirements set by authority, custom, or general consensus and are established as accepted criteria). There was no attempt to establish these specifications based on proprietary specifications which identify the desired products by manufacturer's name, brand name, model numbers, type designation, or other unique characteristics.

Section format conforms to 3 part arrangement developed by CSI and accepted by the Design Professionals to achieve uniformity in locating and organizing specification content.

Streamlined language is used where possible to describe requirements for products, systems, and processes. In these instances a generic term is punctuated by a colon and then followed by a list of requirements without a liking verb such as "shall be" or "provide" which is implied by colon.

Spelling and punctuation conform as closely as possible to current standards of usage. If conflicts occur between spellings of words in the dictionary versus industry practices, the latter takes precedence.

Minimums and maximums are defined in text only where possibility of confusion exists. Otherwise, because of the nature of this document, it shall be assumed items indicated in documents are guidelines and shall be adhered to, unless discussed with state authority.

Abbreviations included in text are defined in Chapter 1.

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# INDEX OF SUPPLEMENTARY SPECIFICATIONS
(see the other Chapter 9 for specifications reference for all other sections)

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END OF INDEX

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SECTION ***033516***

CONCRETE FLOOR ***HARDENER***/SEALER

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** hardener finish for exposed interior concrete floors.

PART 2 PRODUCTS

2.01 MATERIALS

***A. Metallic Dry-Shake Floor Hardener: Pigmented or unpigmented, factory-packaged, dry combination of Portland cement, graded metallic aggregate, rust inhibitors, and plasticizing admixture; with metallic aggregate consisting of no less than 65 percent of total aggregate content.***

***B. Pigmented Mineral Dry-Shake Floor Hardener: Factory-packaged, dry combination of Portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.***

PART 3 EXECUTION

3.01 INSTALLATION

***A. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:***

***1. Uniformly apply dry-shake floor hardener at a rate of 100 lb./100 sq.ft. minimum.***

***2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.***

***3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.***

END OF SECTION

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SECTION ***060565***

***SLATWALL PANELING***

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** display wall and miscellaneous hardware.

PART 2 PRODUCTS

2.01 MATERIALS

A. Display Wall – "Slatwall": ¾" thick medium density fiberboard with grooves @ 3 " o.c. with aluminum "T" extrusion with milled aluminum finish. Panel Finish to be high pressure laminate.
   1. Display Wall Accessories: Provide the following:
      a. Shelf knife bracket
      b. 6 ball slant display arm
      c. Straight out display arm
      d. 14" deep tempered glass shelves

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION ***068200***

GLASS FIBER-REINFORCED PLASTIC

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for special wall surfaces, including*** fiberglass reinforced plastic panels.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wall (ceiling) panels shall be of polyester resin, reinforced with glass fiber in a random, chopped-strand mat.
   1. ***Performance Properties:***
      ***a. Class A flamespread of less than 25, smoke developed less than 450 per ASTM E84.***
      ***b. Barcol Hardness: 35 per ASTM D 2583.***
      ***c. Meets USDA/FSIS requirements.***

B. Fasteners and Accessories: Standard nylon or metal drive rivets and vinyl molding strips.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION ***083416***

BOTTOM ROLL SLIDE HANGER DOORS

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** bottom roll slide hanger doors.

PART 2 PRODUCTS

2.01 MATERIALS

A. Bottom Roll Slide Hanger Doors:
1. Frame and Panels: Galvanized steel frame and steel panels.
2. Panel Profile: Flat
3. Track Type: Standard track
4. Bottom Rollers: Solid steel with tapered roller bearings and a greasable axle assembly.
5. Operation: Power driven bottom rollers with manual release clutches.

B. Auxiliary Materials:
1. Lifting handles and locking bars
2. Vision panels
3. Pass doors
4. Automatic reversing control for bottom bar for electrically operated sectional overhead doors.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION ***083436***

REVOLVING DARKROOM DOORS

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for revolving*** darkroom doors.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pre-fabricated revolving darkroom door
   1. Frame and Panels: Aluminum frame and ABS plastic panels.
   2. Panel finish: Pebble
   3. Color: Standard black
   4. ADA wheelchair access compliant including ramp accessories
   5. Push out emergency egress capability

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 096000

WOOD DANCE FLOOR

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Qualitative requirements for a wood dance floor.

1.02 PROJECT CONDITIONS

A. Moisture Content: At time of delivery, average moisture content of wood flooring to be 7 to 10 percent.

B. Conditioning: Do not install wood flooring until spaces are enclosed and at approximate humidity condition planned for occupancy. Condition wood for 5 days before start of installation by placing in spaces to receive flooring and maintaining ambient temperature between 65 and 75 degrees F (18 and 24 degrees C) before, during, and after installation. Open sealed packages of wood flooring to permit natural adjustment of moisture content and allow flooring to acclimate to the room conditions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pad: Dance, ¾ DPM (50 durometer)

B. Plywood: 2 layers of 15/32 inch thick 4x8 APA structural rated sheathing, Exposure I (CD-X), Fir or Southern Pine.

C. Flooring: 7/16 inch by 13/16 inch by 9 inch, Seconds and Better, Square Edge, Edge Grain, Kiln Dried, Northern Hard Maple.

D. Base: Vented.

E. Finish Materials: Oil modified polyurethane sealer and finish.

PART 3 EXECUTION

3.01 PREPARATION

A. Where direct application of wood flooring to concrete substrate is indicated, test for dryness before proceeding with installation. Check levelness of concrete substrate to ensure not more than 1/8 inch deviation in any direction when checked with a 10 foot straight edge. Grind down high spots or fill in low spots to correct improper conditions.

B. Concrete Slabs: Verify that slabs are dry according to test methods recommended by flooring manufacturer or, if none, by test methods in NOFMA's "Installing Hardwood Flooring."

1. When concrete slabs are tested according to ASTM F1869, Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride, 4-1/2 pounds of water/1000 sq.ft. of slab in a 24 hour period is generally acceptable as a maximum moisture-emission level.

END OF SECTION

SECTION 099600

HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SUMMARY

A. Qualitative requirements for water-based epoxy floor paint coating system.

1.02 QUALITY ASSURANCE

A. Master Painters Institute (MPI) Standards:
1. Products: Complying with MPI standards indicated and listed in “MPI Approved Products List”.

PART 2 PRODUCTS

2.01 MATERIALS

A. Epoxy Coatings
1. Water-Based Epoxy Floor Paint

PART 3 EXECUTION

3.01 INTERIOR COATING SCHEDULE

A. Concrete Substrates, Horizontal Surfaces
1. Water-Based Epoxy Floor Paint System
a. Prime Coat: Water-based epoxy floor paint, MPI #93.
b. Topcoat: Water-based epoxy floor paint, MPI #93.

END OF SECTION

SECTION ***112713***

DARK ROOM EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** dark room equipment.

1.02 QUALITY ASSURANCE

***A.*** Regulations: OSHA, EPA compliance, ADAAG and local accessibility requirements.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide products specifically designed for intended use:
1. Print and film processing sink units of epoxy resin fiberglass or stainless steel.
2. Cabinetry and work surfaces ***plastic*** laminate with built in U.L. approved view lights and light tight drawers where needed.
3. Safe lights and in-use warning lights.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION ***113100***

RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for residential equipment.***
1. Kitchen area appliances
2. Laundry area appliances

1.02 QUALITY ASSURANCE

***A. Regulatory Requirements: Comply with provisions of the following product certifications:***
***1. Electrical Appliances: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.***
***2. UL and NEMA Compliance: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.***
***3. AGA and ANSI Standards: Provide gas-burning appliances that carry the design certification seal of AGA and that comply with ANSI Z21-Series standards.***
***4. NAECA: Provide residential appliances that comply with NAECA standards.***

***B. Regulatory Requirements, Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."***
***1. Operable Parts: Provide controls with forward reach no higher than 48 inches above the floor, horizontal front reach no more than 25 inches, horizontal side reach no more than 24 inches, and that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.***
***2. Range or Cooktop: Provide knee clearance for forward approach of 27 inches high, 30 inches wide, and 11 inches horizontally; toe space clearance of 9 inches high and 17 inches horizontally; with insulated underside of cooktop to prevent burns, shocks, or abrasions. Provide top surface 34 inches above the floor, with controls that do not require reaching across burners.***
***3. Refrigerator/Freezer: Provide 50 percent of freezer space within 54 inches of the floor.***

***C. AHAM Standards: Provide appliances that comply with the following AHAM standards:***
***1. Dishwashers: AHAM DW-DW1***
***2. Electric Ranges: AHAM ER-1***
***3. Clothes Dryers: AHAM HLD-1***
***4. Refrigerators: AHAM HRF-1***
***5. Freezers: AHAM HRF-1***

PART 2 PRODUCTS

2.01 MATERIALS

A. Kitchen Appliances:
1. Ranges, electric
2. Range hoods, ventilating type
3. Refrigerator/freezer
4. Undercounter refrigerators
5. Microwave ovens
6. Dishwashers
7. Garbage disposals

B. Laundry Appliances:
1. Clothes washers
2. Clothes dryers, electric

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 116135

PIPE GRID

PART 1 GENERAL

1.01 SUMMARY

A. Qualitative requirements for dark pipe grid.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipe Grid: 5'0" increments both directions, centered in room.
   1. Pipe: ASTM A 53, standard weight (Schedule 40).
   2. Pipe joints shall be threaded and coupled, open ends, no caps.
   3. Pipe intersections shall be made with cross grid connectors.

B. Installation Accessories: Cable or threaded rod.

PART 3 EXECUTION

A. Hang grid from structural members only. Do not support grid from metal deck.

END OF SECTION

SECTION 116615

BALLET BARS

PART 1 GENERAL

1.01 SUMMARY

A. Qualitative requirements for wall mounted ballet bars.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wall Mounted Ballet Bars

1. Single bar, either non-adjustable or adjustable.

2. Double bar, non-adjustable.

B. Oak Ballet Bars

1. 1-3/4” inch diameter

PART 3 EXECUTION

3.01 MOUNTING

A. Spacing for brackets

1. General: 96 inch maximum span between brackets
   a. Minimum overhang 2 inches.
   b. Maximum overhang 20 inches.

B. Bar heights

1. Single Bar: 32 inches to 46 inches from floor.

2. Double Bar: 32 inches to 34 inches from the floor for the lower bar, and 44 inches to 46 inches from the floor for the upper bar.

C. Distance from wall to bar

1. Inside at 7-1/2 inches.

SECTION 116800

PLAY FIELD EQUIPMENT AND STRUCTURES

PART 1 GENERAL

1.01 SUMMARY

A. Qualitative requirements for play field equipment and structures.

1.02 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer of playground equipment.

B. Manufacturer's Qualifications: A firm who playground equipment components have been certified by IPEMA's "3rd Party Certification" service.

1. Provide only playground equipment and play structure components bearing the IPEMA Certification Seal.

C. Safety Standards: Provide playground equipment complying with or exceeding requirements in the following:

1. CPSC No. 325, "Handbook for Public Playground Safety".
2. Label play structures with warning label and manufacturer's identification per ASTM F 1487.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide units specifically designed for exterior exposure and intended use:

1. Swing main frame
2. Sand manipulating equipment
3. Modular/Composite play structure
   a. Play platform
   b. Bridge component
   c. Climbing component
   d. Slide component
   e. Crawl tube component
   f. Overhead play component
   g. ADA structure access components
   h. Roof/canopy component

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Anchor playground equipment securely, positioned at locations and elevations indicated on Shop Drawings.

B.

1. Maximum Equipment Height: Coordinated installed heights of equipment and components with installation of protective surfacing. Set equipment so fall heights and elevation requirements for age group use and accessibility are within required limits. Verify that playground equipment elevations comply with requirements for each type and component of equipment.

END OF SECTION

SECTION ***131900***

KENNELS & ANIMAL SHELTER EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** chain link animal shelter/kennel equipment.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Chain-Link Fence Fabric:
   1. Mesh and Wire Size: 2 inch mesh, 0.148 inch diameter (9 gage).
   2. Coating: ASTM A 817, Type 2, Class 2, zinc-coated (galvanized).

B. Framework:
   1. Galvanized steel, ASTM F 1083.

C. Gates:
   1. Swinging & sliding type.

D. Miscellaneous:
   1. Isolation panels – stainless steel sheets 24 ga. (18-8 type 304-2B)
   2. Animal operated doors
   3. Automatic feeding system

PART 3 EXECUTION

3.01 INSTALLATION

A. Install materials in accordance with manufacturer's instructions and approved submittals. Comply with ASTM F 567. Install materials in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Install posts to depth to avoid frost heave.

B. Cut pipe with pipe-cutters only. Cuttings with backsaws is not acceptable. Tack weld gates for strength. Use spring loaded latches, not yokes.

END OF SECTION

SECTION ***133413***

GLAZED STRUCTURES (GREENHOUSE)

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** greenhouse superstructure including all glazing, doors, door hardware, and ventilation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide units specifically designed for intended use:
1. Superstructure
2. Gutters and related drainage systems
3. Wall and vent sills
4. Glazing bars
5. Operable roof and gable vents
6. Vent operators and power actuators
7. Doors and frames
8. 8mm colorless polycarbonate glazing (U-value/R-value=0.62/1.61)
9. Exhaust system and horizontal air flow fans
10. Wet pad evaporative cooling system
11. Heating system (maintain 70degF @ outside conditions of 9degF and 15mph wind)
12. Ground cover fabric (17 mill, 3.2 oz polypropylene fabric)

PART 3 EXECUTION ***(NOT USED)***

END OF SECTION

SECTION ***133419***

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** pre-engineered metal buildings.
1. Structural framing
2. Roofing and siding
3. Doors, windows, vents, and louvers

1.02 QUALITY ASSURANCE

A. ***Manufacturer: AISC certified for Category MB.***

PART 2 PRODUCTS

2.01 MATERIALS

A. Framing:
1. Structural Framing: Structural steel shapes, and primary, secondary, and endwall framing including columns, beams, purlins, girts, struts, and bracing.

B. Siding Panels:
1. Type: Factory-assembled insulated panels for concealed fastening.
2. Material: ***Metallic***-coated steel sheets.
3. Siding Panel Finish: ***High-performance organic finish*** (fluoropolymer)

C. Roofing Panels:
1. Type: Factory-formed standing-seam roof panel system.
2. Material: ***Metallic***-coated steel sheets.
3. Roofing Panel Finish: ***High-performance organic finish*** (fluoropolymer)

D. Doors and Hardware:
1. Steel Doors and Frames: SDI-100 requirements.
2. Hardware: ANSI A115 requirements.

E. Windows:
1. Type: Operable, with insect screens.
2. Material: Aluminum, mill finish.
3. Material: Aluminum, anodized finish.

F. Glazing:
1. Clear
2. Translucent

G. Related Materials:
   1. Vapor barriers
   2. Gutters and downspouts
   3. Caulking and sealants
   4. Wall louvers
   5. Roof ventilators

PART 3 EXECUTION

3.01 INSTALLATION

***A. Insulation: Over purlins with spacer blocks.***

END OF SECTION

SECTION 233500

VEHICLE FUME EXHAUST EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Qualitative requirements for fume exhaust equipment for carbon monoxide vehicle exhaust and welding fume exhaust.

1.02 QUALITY ASSURANCE

A. ***Design and installation shall be in accordance with 1) ANSI/AIHA Standard Z9.2 – 2006: American National Standard for Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems and 2) Industrial Ventilation: A Manual of Recommended Practice, 24th Edition, American Conference of Governmental Industrial Hygienists (ACGIH).*** Provide products of acceptable manufacturers which have been satisfactorily used in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Overhead Carbon Monoxide Vehicle Exhaust System
1. Hanging overhead system with tubing sling and winch.
2. Articulated arm: welded construction, structural tubular steel, with pivot assembly and swivel connection to ductwork. Provide adjustable stops at all pivoting members and flexible tubing drop with spring balancer and adapter.
3. Power operated tubing storage reels with pendant-type remote control.
4. Exhaust Fans: Belt-drive exhaust fans, 15,000+ cfm min., AMCA rated, statically and dynamically balanced.
5. Furnish vibration isolations system of type to suit the fan(s).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Restore damaged finishes and test for proper function. Clean and protect work from damage.

END OF SECTION

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SECTION ***412223***

HOISTS & CRANES

PART 1 GENERAL

1.01 SUMMARY

A. ***Qualitative requirements for*** electric chain hoist.

1.02 QUALITY ASSURANCE

***A.*** Safety Code: ASME/ANSI all applicable sections.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide electric chain hoist units specifically designed for intended use:
1. Capacity Range: ¼ thru 2 tons.
2. Lift: 10 feet minimum.
3. Lifting Speed: 5 to 64 FPM.
4. Control: Push-button control.
5. Suspension: Push trolley.
6. Motor: High-torque, 30-minute rated with class “B” with a thermal actuated switch (TAS)
7. Safety: Mechanical load brake and overload protection which prevents lifting loads beyond the hoists load range.
8. Safety: Provide an upper and lower control circuit limit switch.

PART 3 EXECUTION (NOT USED)

END OF SECTION

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