

METAL SCHOOL
N ST.

1
4" BARRIER CURB
AT EDGE OF RAMP

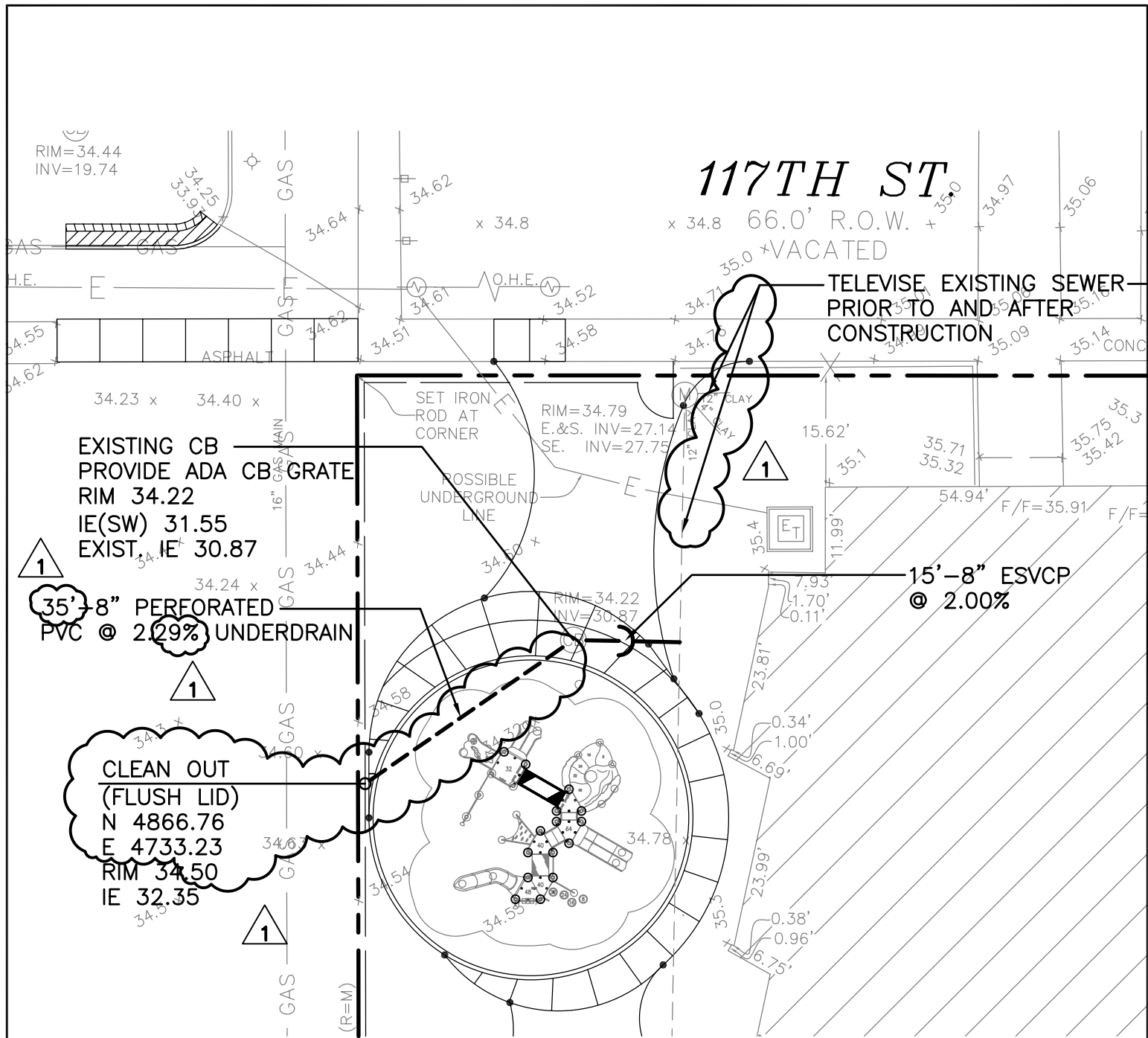


REFERENCE SHEET C6.1

drawn FG	checked JMM
date 03.28.13	job no. 13704
dwg no. CSK-1	

HIGGINS ELEMENTARY SCHOOL
GRADING REVISION-MAIN ENTRANCE RAMP
ADDENDUM NO.1
SCALE 1"=20'





RIM=34.44
INV=19.74

117TH ST

66.0' R.O.W. + VACATED

TELEWISE EXISTING SEWER
PRIOR TO AND AFTER
CONSTRUCTION

EXISTING CB
PROVIDE ADA CB GRATE
RIM 34.22
IE(SW) 31.55
EXIST. IE 30.87

35'-8" PERFORATED
PVC @ 2.29% UNDERDRAIN

CLEAN OUT
(FLUSH LID)
N 4866.76
E 4733.23
RIM 34.50
IE 32.35

UTILITY NOTE 11:
WHERE TELEVISIONING IS NOTED ON PLANS, CLEAN AND TELEWISE SEWER LINE, IN ACORDANCE WITH CHICAGO DEPARTMENT OF WATER MANAGEMENT STANDARDS, TO NEXT STRUCTURE (OR PUBLIC SEWER CONNECTION) IN EACH DIRECTION. CONFIRM BLOCKAGE REMOVAL AND CLEAR PATH IN PIPE.

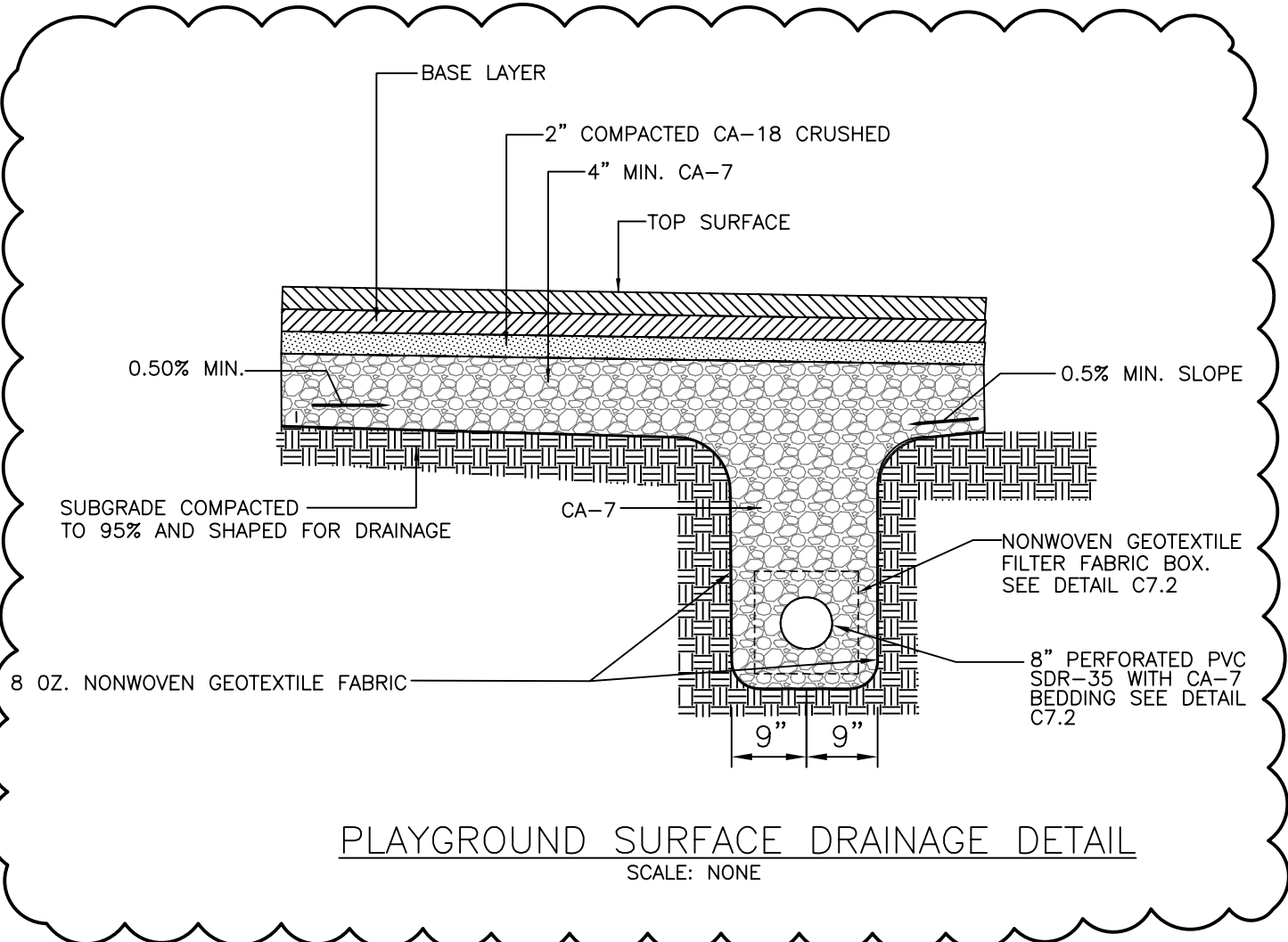
REFERENCE SHEET C7.1



drawn FG	checked JMM
date 03.28.13	job no. 13704
dwg no. CSK-3	

**HIGGINS ELEMENTARY SCHOOL
UTILITY REVISIONS
ADDENDUM NO. 1
SCALE 1"=20'**





PLAYGROUND SURFACE DRAINAGE DETAIL
SCALE: NONE

drawn FG	checked JMM
date 03.28.13	job no. 13704
dwg no. CSK-4	

**HIGGINS ELEMENTARY SCHOOL
DRAINAGE DETAIL
ADDENDUM NO. 1
SCALE :NONE**



ROOM FINISH SCHEDULE

NO.	AREA NAME	FLOOR			BASE			WALLS								CEILING			REMARKS
		MATERIAL	FINISH	TYPE	MATERIAL	FINISH	TYPE	MATERIAL NORTH	FINISH NORTH	MATERIAL SOUTH	FINISH SOUTH	MATERIAL EAST	FINISH EAST	MATERIAL WEST	FINISH WEST	MATERIAL	FINISH	HEIGHT	
FIRST FLOOR																			
002	VESTIBULE	QT PATCH	--	COVE	ETR	PNT	ETR	PNT	ETR	PNT	ETR	PNT	ETR	PNT	APC	--	MATCH EXIST HEIGHT	PATCH FLOOR AT NEW DOORS.	
092	ENGINEER AREA	VCT PATCH	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR	PATCH WALL ADJACENT TO NEW DOOR FRAME PATCH FLOOR AT NEW DOORS.	
099	FACULTY ROOM	ETR	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR	PATCH FLOOR AT NEW DOORS. PANT ALL WALLS TO BE POINTED. MATCH EXIST COLOR.	
100	KINDERGARTEN	ETR	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR	PANT ALL WALLS TO BE POINTED. MATCH EXIST COLOR.	
101	KINDERGARTEN	ETR	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR		
115	CORRIDOR	VCT PATCH	--	ETR	ETR	PNT	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR	PATCH FLOOR AT NEW DOORS.	
118	CORRIDOR	VCT PATCH	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR	PATCH FLOOR AT NEW DOORS. PANT ALL WALLS TO BE POINTED. MATCH EXIST COLOR.	
119	CORRIDOR	VCT PATCH	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR	PATCH FLOOR AT NEW DOORS.	
120	CORRIDOR	VCT PATCH	--	ETR	ETR	PNT	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	--	ETR	PATCH FLOOR AT NEW DOORS.	
123	GYMNASIUM	ETR	--	ETR	ETR	PNT	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR / APC	PNT / --	21'-7" / MATCH EXIST HEIGHT	1. NEW ACOUSTIC PANEL - CEILING SYSTEM ABOVE ENTRY 2. NEW ADHERED ACOUSTICAL CEILING TILE AT FORMER LOCATION - MATCH EXIST 3. PAINT ALL CEILING MOUNTED ELEMENTS INCLUDING DUCTWORK	
123	GYMNASIUM	WOOD MATCH PATCH EXIST	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR / ETR	-- / PNT	ETR / ETR	PATCH FLOOR AT NEW DOORS.	
126A	JANITOR'S CLOSET	ETR	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	-- / PNT	MATCH EXIST HEIGHT	PATCH OPENING AT EXIST PLASTER CEILING.	
206	LIBRARY	ETR	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR / APC	--	MATCH EXIST HEIGHT	NEW CEILING TILES AT EXIST GRID TO REMAIN - SEE SECOND FLOOR REFLECTED CEILING PLAN ON A-105	
216	CORRIDOR	ETR	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR / APC	--	MATCH EXIST HEIGHT	NEW CEILING TILES AT EXIST GRID TO REMAIN - SEE SECOND FLOOR REFLECTED CEILING PLAN ON A-105	
217	BOYS TOILET	ETR	--	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR	ETR / PLS	-- / PNT	MATCH EXIST HEIGHT	NEW 24"X36" ACCESS PATCH AT EXIST PLASTER CEILING FOR ACCESS TO WORK ABOVE.		
219	INACTIVE STORAGE	ETR	--	ETR	ETR	PNT	ETR	ETR	ETR	ETR	ETR	ETR	ETR	APC	--	MATCH EXIST HEIGHT	SOFFIT AROUND NEW MECHANICAL EQUIP/DUCTS AS REQUIRED.		
220A	JANITOR'S CLOSET	ETR	--	ETR	ETR	CLEAN	ETR	ETR	ETR	CLEAN	ETR	CLEAN	ETR	APC / GYP/BD	-- / PNT	MATCH EXIST HEIGHT	CLEAN ALL WALLS & PAINT NEW GYP BD SOFFIT.		

DUCT ALTERNATE # 1

DUCT ALTERNATE # 1

DUCT ALTERNATE # 1

DUCT ALTERNATE # 2

DUCT ALTERNATE # 1

DUCT ALTERNATE # 3



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Project

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 11710 S. MORGAN STREET, CHICAGO, IL 60643

Date

3/28/2013

Scale

NOT TO SCALE

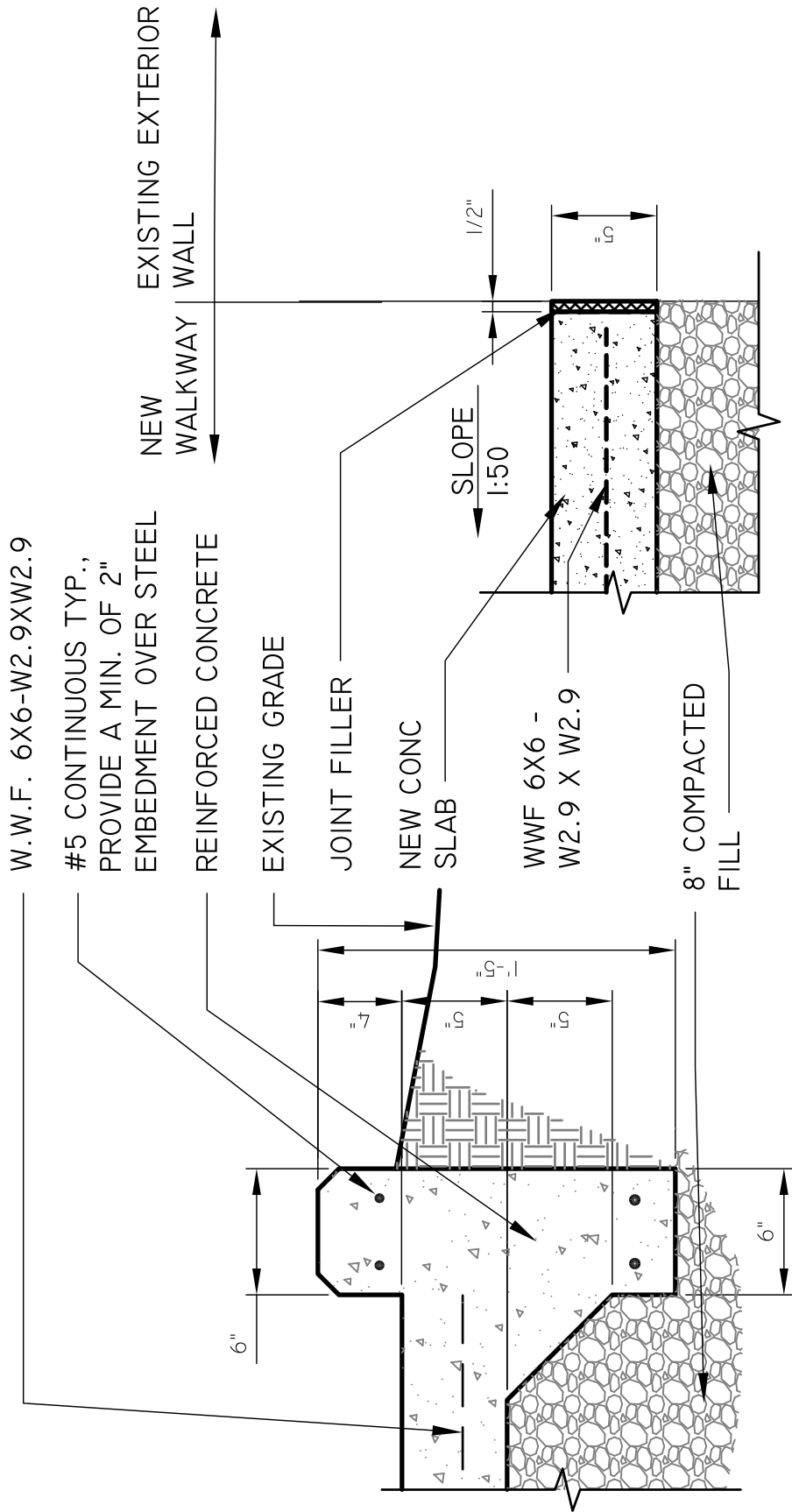
Reference Dwg

A-602

Sketch No.

ASK-1

1 of 1



8 CURB AND SLAB DETAILS

SCALE 1 1/2" = 1'-0"

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Project

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Date

3/28/2013

Reference Dwg

A-401

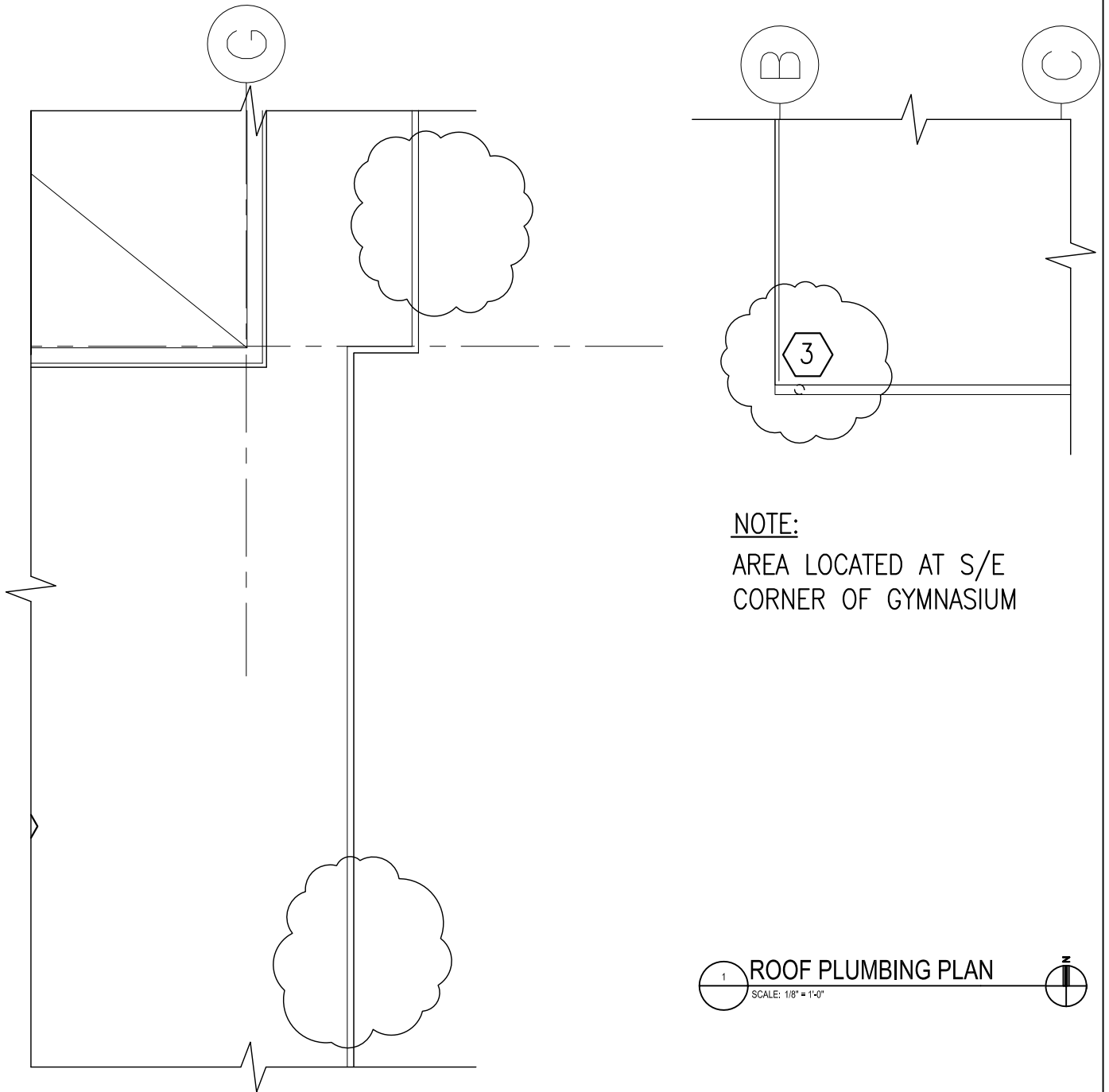
Sketch No.

ASK-2

1 of 1

KEYED NOTE:

③ EXISTING GUTTERS AND DOWNSPOUTS TO BE REMOVED.



NOTE:

AREA LOCATED AT S/E
CORNER OF GYMNASIUM

1 ROOF PLUMBING PLAN
SCALE: 1/8" = 1'-0"

THOMAS J. HIGGINS ELEMENTARY

11710 S. MORGAN STREET CHICAGO, ILLINOIS 60643

DATE

3-27-13

SKETCH NUMBER

PSK-1

DYNACEPT INC. ENGINEERS

2250 DEVON AVENUE DES PLAINES, ILLINOIS 60018 847-299-4848 (FAX: 847-299-4858)

SCALE

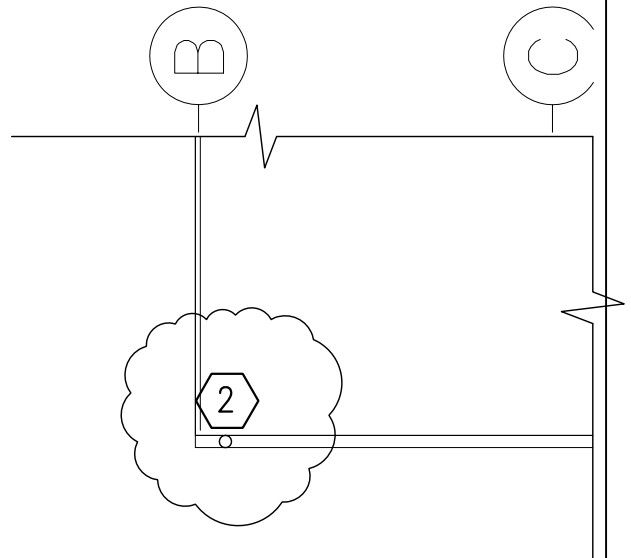
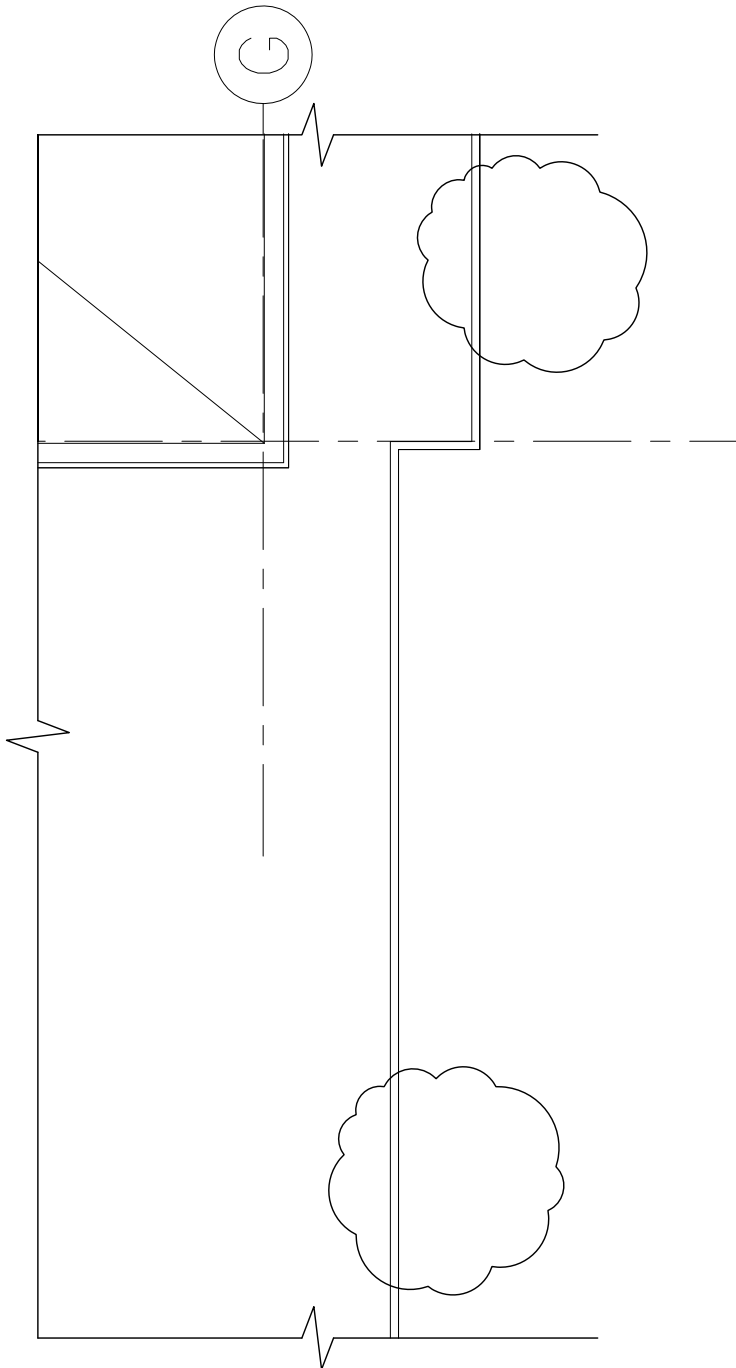
N.T.S.

REFERENCE DWG

DP1.1

KEYED NOTE:

② NEW GUTTERS, DOWNSPOUTS AND SPLASH BLOCKS, SEE ARCHITECTURAL PLANS.



NOTE:
AREA LOCATED AT S/E
CORNER OF GYMNASIUM

1 ROOF PLUMBING PLAN 2
SCALE: 1/8" = 1'-0"

THOMAS J. HIGGINS ELEMENTARY

11710 S. MORGAN STREET CHICAGO, ILLINOIS 60643

DATE

3-27-13

SKETCH NUMBER

PSK-2

DYNACEPT INC. ENGINEERS

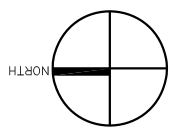
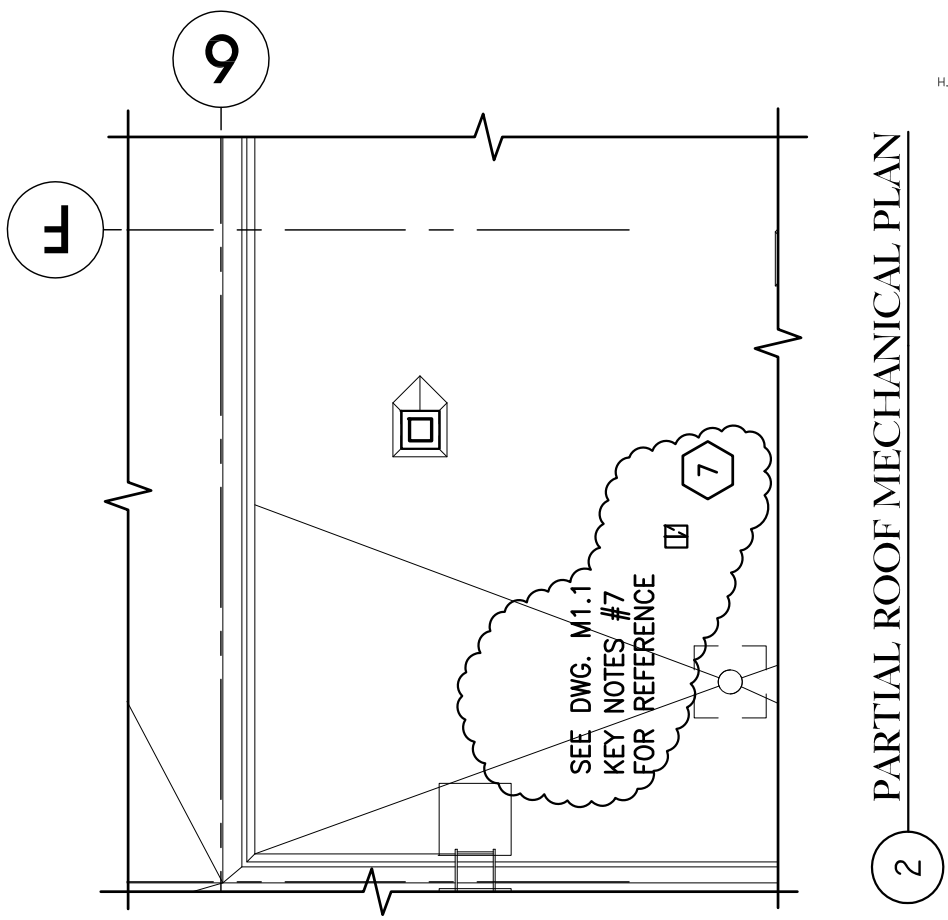
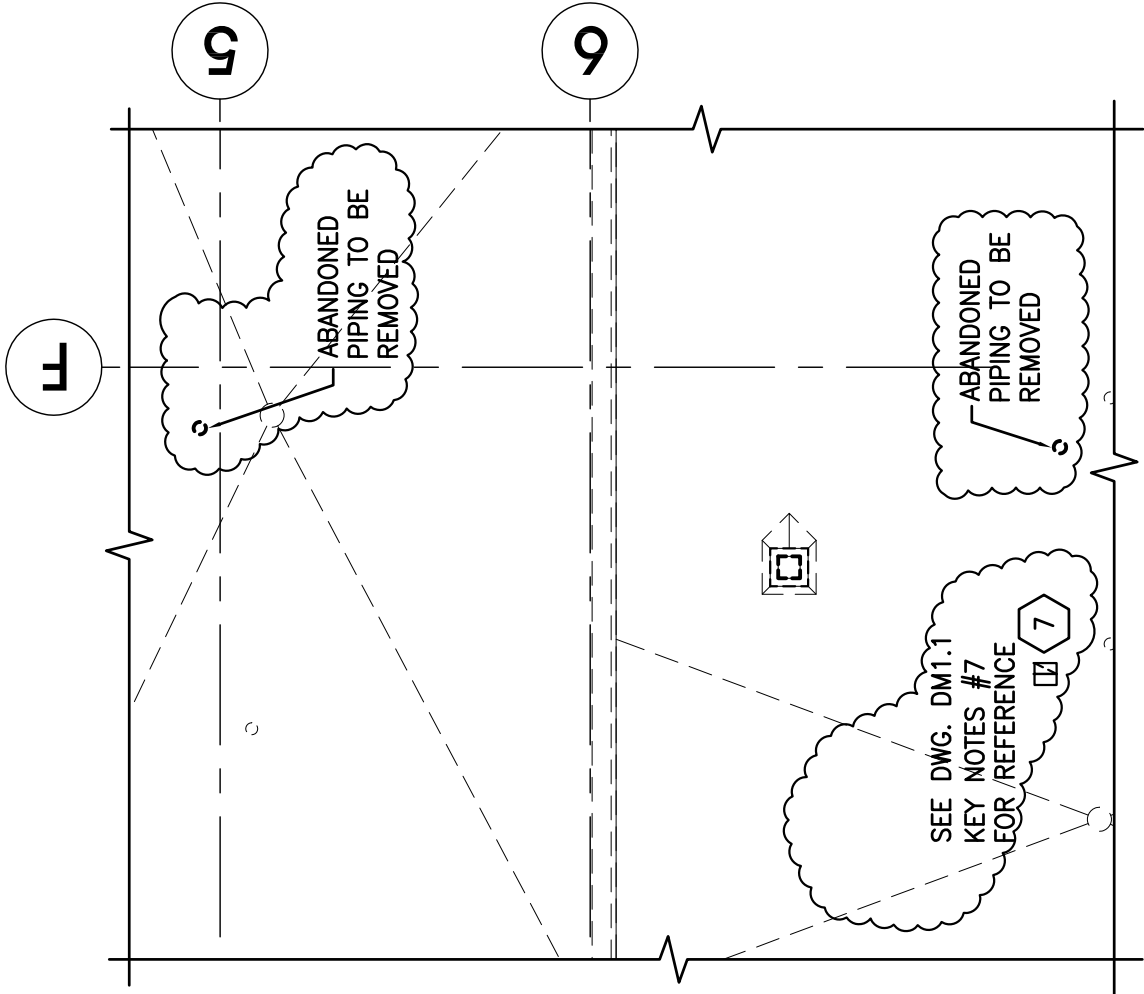
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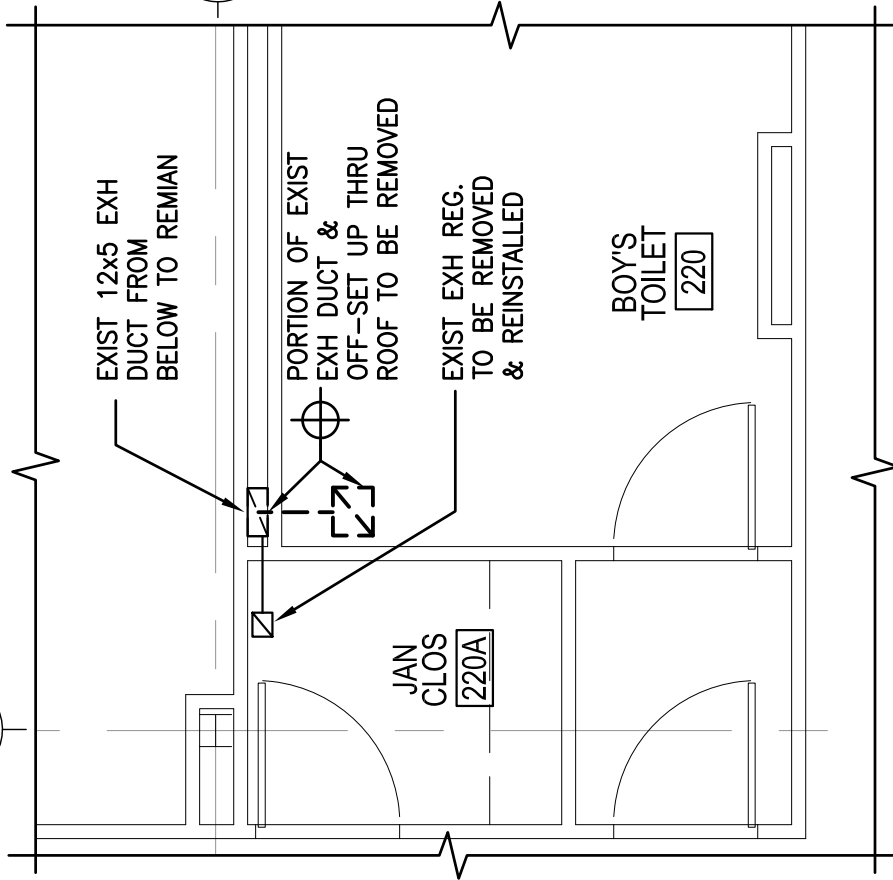
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REFERENCE DWG

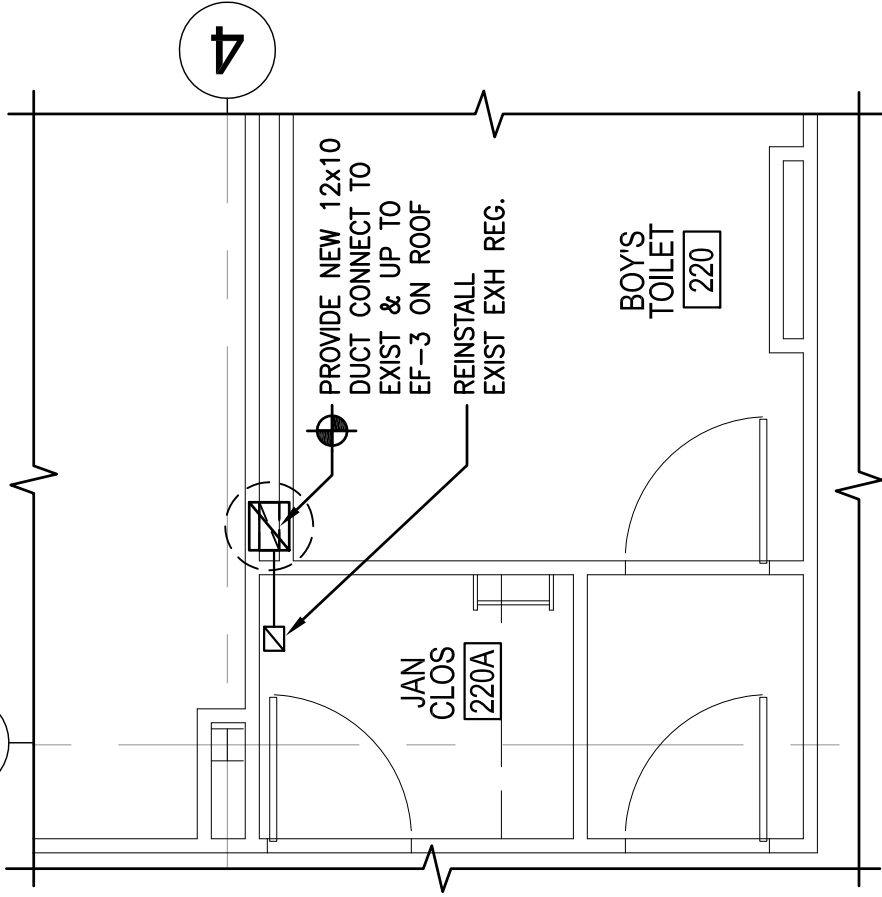
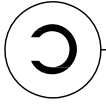
P1.1



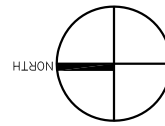
 2250 E DEVON AVE. SUITE 218 DES PLAINES, ILLINOIS 60018-4500 TELE. (847) 298-4848 FAX. (847) 298-4858	 DEPARTMENT OF FACILITIES CAPITAL IMPROVEMENT PROGRAM	Reference Sheet DM1.1 & M1.1	MSK-1
		SCALE: 1/8"=1'-0" DATA: 032713	
THOMAS J. HIGGINS ELEMENTARY COMMUNITY ACADEMY 11710 S. Morgan Street Chicago, Illinois 60643 CPS Project No. 2013-31251-MCR			



1 PARTIAL 2nd FLOOR MECH DEMO PLAN



2 PARTIAL 2nd FLOOR MECH PLAN



DYNACEPT, INC.
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CHICAGO PUBLIC SCHOOLS | CPS
DEPARTMENT OF FACILITIES
CAPITAL IMPROVEMENT PROGRAM

**THOMAS J. HIGGINS ELEMENTARY
COMMUNITY ACADEMY**
11710 S. Morgan Street Chicago, Illinois 60643
CPS Project No. 2013-31251-MCR

Reference Sheet
DM1.1 & M1.1
SCALE: 1/4"=1'-0"
DATA: 032713

MSK-2

NOTE:

1. PROVIDE ECONOMIZER WITH FRESH AIR AUTO DAMPERS.
2. PROVIDE MINIMUM TWO COMPRESSORS WITH INDEPENDENT CIRCUITS.
3. PROVIDE MERV 8 FILTER (2").
4. PROVIDE SINGLE POINT POWER CONNECTION AND WEATHER PROOF MAIN DISCONNECT.
5. PROVIDE RETURN DUCT SMOKE DETECTOR FOR UNIT TO BE HARD-WIRED TO RTU CONTROLS. UPON SMOKE DETECTION, UNIT WILL DISABLE AND OA DAMPER CLOSE.
6. PROVIDE FREEZE-STAT AT DX COIL DISCHARGE TO DISABLE MECHANICAL COOLING.
7. NOT TO USED.
8. PROVIDE PREFABRICATED VIBRATION ROOF CURB.
9. PROVIDE SELF-CONTAINED CONTROLS.
10. VENDOR TO PROVIDE FINAL TSP AND HP DATA.
11. PROVIDE NEW PROGRAMMABLE THERMOSTAT EQUAL TO OR BETTER THAN EXISTING.
12. EXISTING ELECTRICAL DUCT HEATER TO BE INTERLOCKED WITH NEW ROOFTOP UNIT.
13. PROVIDE WATERPROOF ELECTRICAL RECEPTACLE.

DYNACEPT, INC.
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CHICAGO
PUBLIC
SCHOOLS | CPS
DEPARTMENT OF FACILITIES
CAPITAL IMPROVEMENT PROGRAM

**THOMAS J. HIGGINS ELEMENTARY
COMMUNITY ACADEMY**
11710 S. Morgan Street Chicago, Illinois 60643
CPS Project No. 2013-31251-MCR

Reference Sheet

M2.1

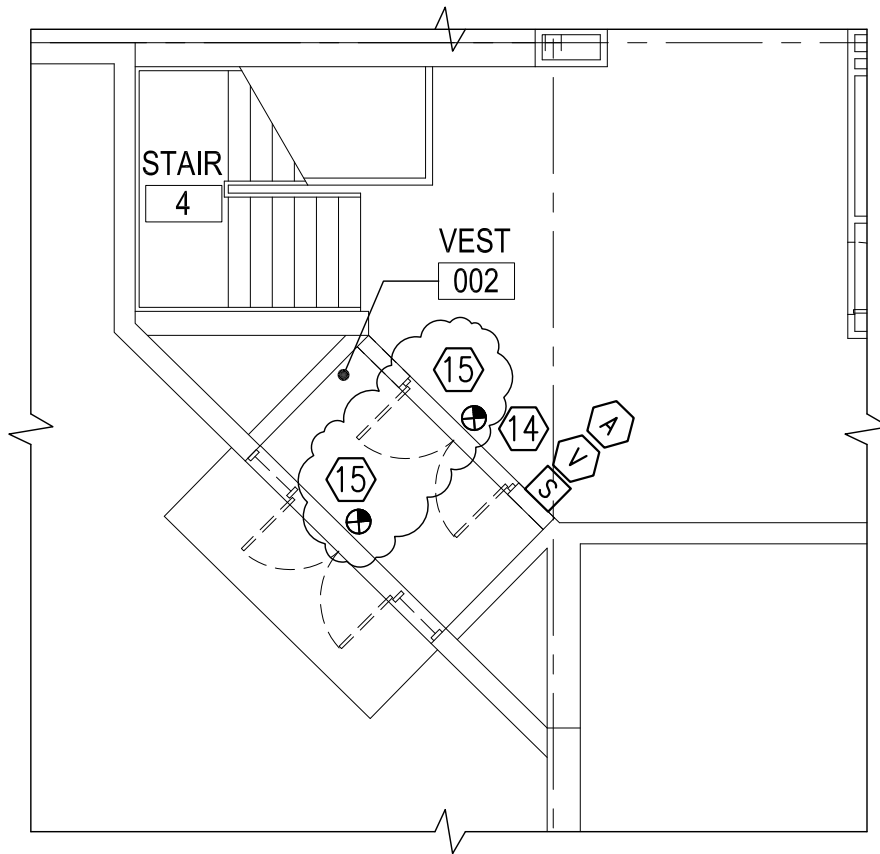
SCALE: NONE

DATA: 032713

MSK-3

KEYED NOTE:

15 EXISTING EXIT SIGN SHALL BE REMOVED AND REINSTALLED.



1 PARTIAL FIRST FLOOR ELECTRICAL DEMOLITION PLAN
SCALE: 1/8" = 1'-0"

THOMAS J. HIGGINS ELEMENTARY

11710 S. MORGAN STREET CHICAGO, ILLINOIS 60643

DATE

3-27-13

SKETCH NUMBER

ESK-1

DYNACEPT INC. ENGINEERS

2250 DEVON AVENUE DES PLAINES, ILLINOIS 60018 847-299-4848 (FAX: 847-299-4858)

SCALE

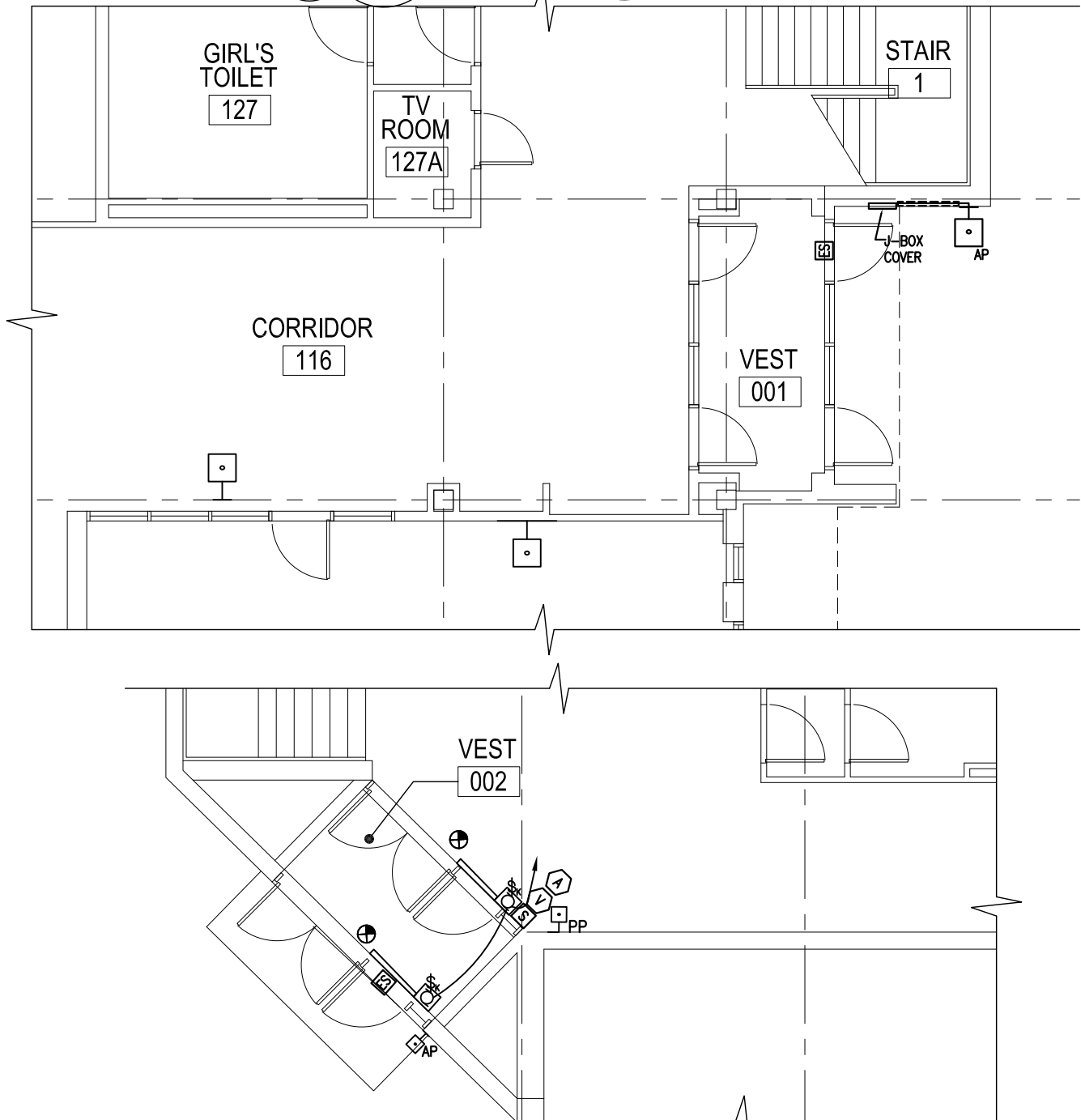
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REFERENCE DWG

**DE1.1 &
E1.1**

GENERAL NOTE:

1. IN-LIEU OF INSTALLING HORIZONTAL RACEWAYS FOR ALL PHONE DEVICES ABOVE THE CEILING, RACEWAYS MAY BE INSTALLED IN WIREMOLD BELOW THE CEILING.



1 PARTIAL FIRST FLOOR ELECTRICAL PLANS
SCALE: 1/8" = 1'-0"

THOMAS J. HIGGINS ELEMENTARY

11710 S. MORGAN STREET CHICAGO, ILLINOIS 60643

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DATE

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SCALE

N.T.S.

SKETCH NUMBER

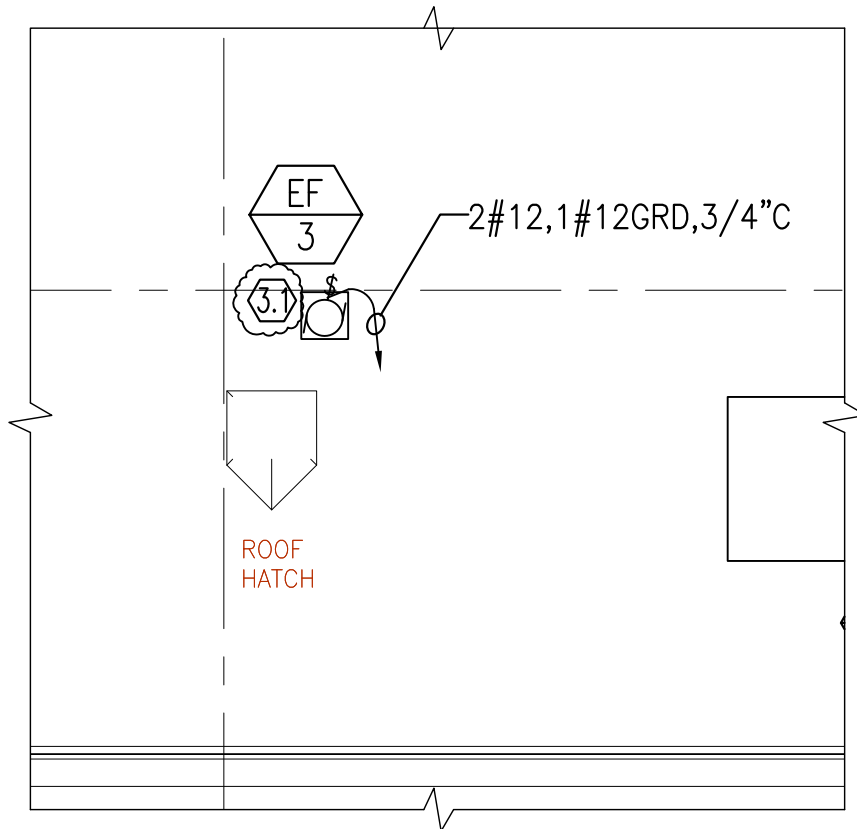
ESK-2

REFERENCE DWG

E1.1

KEYED NOTE:

3.1 PROVIDE NEW CONDUIT AND CONDUCTORS TO ACCOMMODATE THE NEW EXH. FAN AT NEW LOCATION AND AT NEW CURB HEIGHT; REUSE EXISTING PANELBOARD AND EXISTING BREAKERS; PROVIDE NEW AND ADDITIONAL BREAKERS AS REQUIRED.



1 ROOF PLAN
SCALE: 1/8" = 1'-0"



THOMAS J. HIGGINS ELEMENTARY

11710 S. MORGAN STREET CHICAGO, ILLINOIS 60643

DATE

3-27-13

SKETCH NUMBER

ESK-3

DYNACEPT INC. ENGINEERS

2250 DEVON AVENUE DES PLAINES, ILLINOIS 60018 847-299-4848 (FAX: 847-299-4858)

SCALE

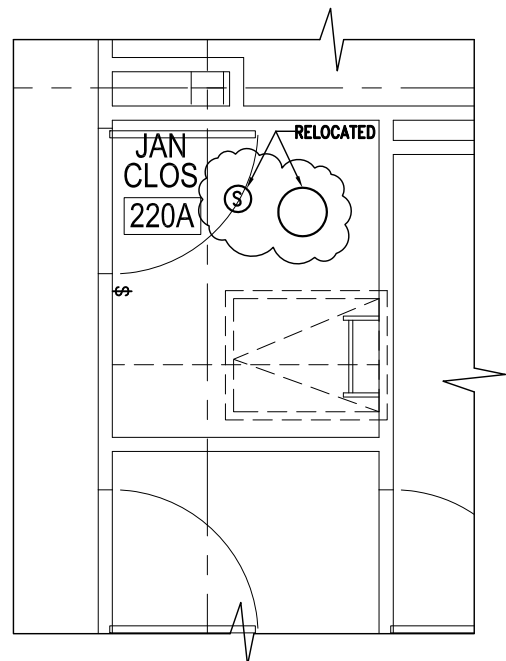
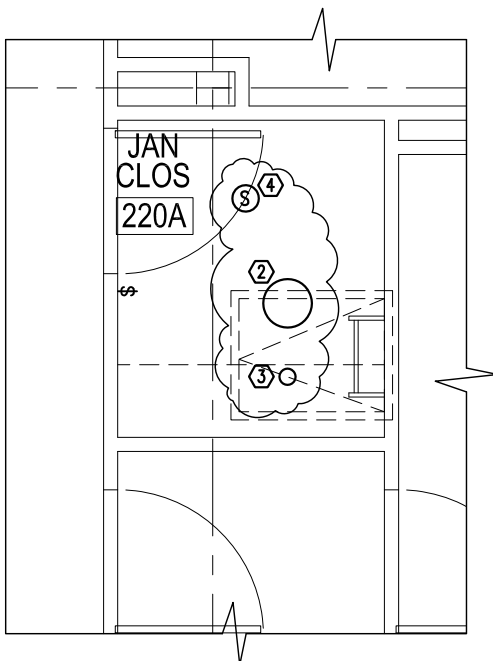
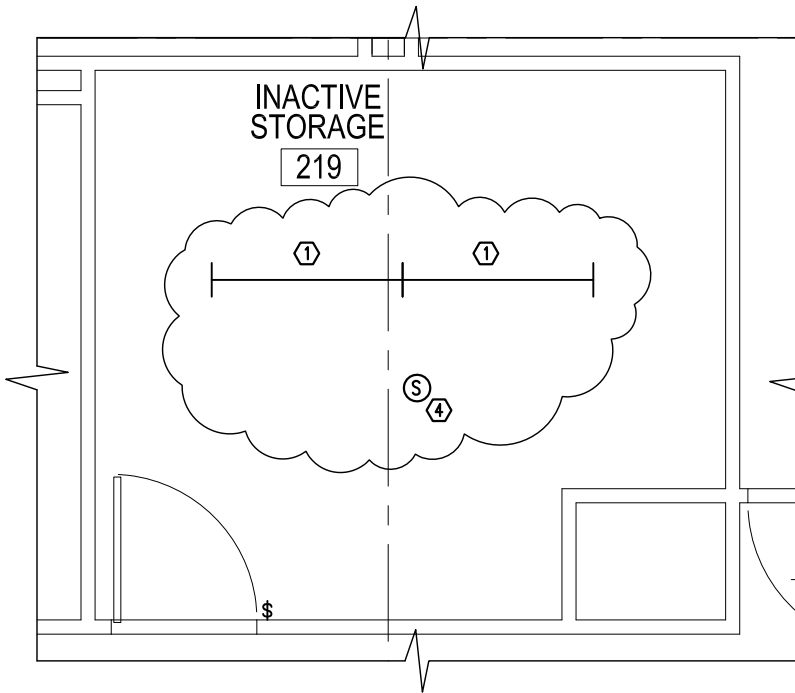
N.T.S.

REFERENCE DWG

E1.2

KEYED NOTE:

- ① EXISTING LIGHT FIXTURE TO BE REMOVED AND REINSTALLED.
- ② EXISTING LIGHT FIXTURE TO BE REMOVED AND RELOCATED.
- ③ EXISTING ABANDON FIRE DETECTION DEVICE TO BE REMOVED.
- ④ EXISTING SMOKE DETECTOR TO BE REMOVED AND REINSTALLED.



ENLARGED SECOND FLOOR
ELECTRICAL DEMOLITION PLAN



SCALE: 1/8"=1'-0"

ENLARGED SECOND FLOOR
ELECTRICAL PLAN



SCALE: 1/8"=1'-0"

THOMAS J. HIGGINS ELEMENTARY

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DATE

3-27-13

SCALE

N.T.S.

SKETCH NUMBER

ESK-4

REFERENCE DWG

E1.3

SECTION 23 74 15

ROOFTOP AIR CONDITIONING UNIT (CAV)

1. GENERAL

1.1 SUMMARY

A. Section Includes: Provide packaged rooftop type air conditioning units with accessories.

B. RELATED SECTIONS:

1. Mechanical Materials and Methods, Section 23 05 05.
2. Basic Electrical Materials and Methods, Section 26 05 05.

1.2 REFERENCES

A. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation Systems.

B. ARI 210 - Unitary Air-Conditioning Equipment.

C. ARI 240 - Air Source Unitary Heat Pump Equipment.

D. ARI 270 - Sound Rating of Outdoor Unitary Equipment.

1.3 SUBMITTALS

A. Product Data: Include manufacturer's technical data for each RTU, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

C. Wiring Diagrams: Power, signal, and control wiring.

D. Coordination Drawings: Plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Structural members to which RTUs will be attached.
2. Roof openings
3. Roof curbs and flashing.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For RTUs to include in emergency, operation, and maintenance manuals.

- G. Startup Test Reports: Submit written test reports documenting the activities required by 3.2 – Installation, 3.3 – Connections, and 3.5 – Contractor Startup and Reporting. These reports are to be submitted two weeks after the startup is completed.
- H. Training Reports: Submit reports on training documenting dates and attendance.

1.4 QUALITY ASSURANCE

- A. ARI Compliance:
 - 1 Comply with ARI 210/240 and ARI 340/360 for testing and rating energy efficiencies for RTUs.
 - 2 Comply with ARI 270 for testing and rating sound performance for RTUs.
- B. ASHRAE Compliance:
 - 1 Comply with ASHRAE 15 for refrigeration system safety.
 - 2 Comply with ASHRAE 33 for methods of testing cooling and heating coils.
 - 3 Comply with ASHRAE/IESNA 90.1 for minimum efficiency of heating and cooling.
- C. NFPA Compliance: Comply with NFPA 90A and NFPA 90B.
- D. UL Compliance: Comply with UL 1995.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use. Unit shall comply with Chicago Electrical & Refrigeration Codes.
- F. Safety Standards:
 - 1. Design manufacture and installation of mechanical refrigeration equipment: ANSI B9.1
 - 2. Machinery Guards: Provide guards as shown in AMCA 410 for belts, chains, couplings, pulleys, sheaves, shafts, gears and other moving parts regardless of height above the floor. Drive guards may be excluded where motors and drives are inside factory fabricated unit casings.
 - 3. Corrosion Prevention: Unless specified otherwise, equipment fabricated from ferrous metals that do not have a zinc-coating conforming to ASTM A386 or a duplex coating of zinc and paint shall be treated for prevention of rust with a factory coating or paint system that will withstand 125 hours in a salt-spray fog test, except that equipment located outdoors shall be tested for 500 hours. The salt-spray fog test shall be in accordance with ASTM B117 using a 20 percent sodium chloride solution. Immediately after completion of the test, the coating shall show no signs of blistering, wrinkling or cracking, no loss of adhesion, and the specimen shall show no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. The film thickness of the factory coating or paint system applied on the equipment shall be not less than film thickness used on the test specimen.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Follow manufacturer's instructions for unloading, rigging and storage of equipment.
- B. Maintain manufacturer's recommended temperature and humidity limits during storage and installation. Protect equipment from dirt, dust and other jobsite contaminants and conditions detrimental to the equipment.

1.6 COORDINATION

- A. Verify dimensions of existing roof curbs and duct connections.
- B. Coordinate RTU removal and installation schedules with Owner.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Fan Belts: One set for each belt-driven fan.
- C. Filters: One set of filters for each unit.

1.8 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTUs that fail in materials or workmanship within specified warranty period. Provide warranty on materials and labor for 18 months starting from date of delivery, or one year from date of substantial completion, whichever is longer.
- B. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
- C. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than five years from date of Substantial Completion.
- D. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than three years from date of Substantial Completion.
- E. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.

2. PRODUCTS

2.1 MANUFACTURED UNITS

- A. The contractor shall furnish and install package rooftop unit(s) as shown and scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.
- B. APPROVED MANUFACTURERS

- 1. Trane: TSC0240F3R0A

2.2 GENERAL UNIT DESCRIPTION

- A. Unit(s) furnished and installed shall be Cooling Only packaged rooftop (s) as scheduled on contract documents and these specifications. Cooling capacity ratings shall be based on AHRI Standard 210. Unit(s) shall consist of insulated weather-tight casing with compressor(s), air-cooled condenser coil, condenser fans, evaporator coil, return-air filters, supply motors and unit controls210
- B. Unit(s) shall be 100% factory run tested and fully charged with R-410A
- C. Units shall be dedicated downflow airflow as manufactured.

2.3 UNIT CASING

- A. Cabinet: Galvanized steel, phosphatized, and finished with an air-dry paint coating with removable access panels. Structural members shall be 16 gauge with access doors and removable panels of minimum 20 gauge.
- B. Units cabinet surface shall be tested 1000 hours in salt spray test in compliance with ASTM B117.
- C. Cabinet top cover shall be one piece construction or where seams exist, it shall be double-hemmed and gasket-sealed.
- D. Access Panels: Water- and air-tight panels with handles shall provide access to filters, heating section, return air fan section, supply air fan section, evaporator coil section, and unit control section.
- E. Downflow unit's base pans shall have a raised 1 1/8 inch high lip around the supply and return openings for water integrity.
- F. Insulation: Provide 1/2 inch thick coated fiberglass insulation on all exterior panels in contact with the return and conditioned air stream.
- G. Provide openings either on side of unit or thru the base for power, control and gas connections.

2.4 FANS AND MOTORS

- A. Provide evaporator fan section with forward curved, double width, double inlet, centrifugal type fan.
- B. Provide self-aligning, grease lubricated, ball or sleeve bearings with permanent lubrication fittings.
- C. Provide units 12 1/2 tons and above with belt driven, supply fans with adjustable motor sheaves.
- D. Outdoor and Indoor Fan motors shall be permanently lubricated and have internal thermal overload protection.

- E. Outdoor fans shall be direct drive, statically and dynamically balanced, draw through in the vertical discharge position.
- F. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

2.5 EVAPORATOR COIL

- A. Provide configured aluminum fin surface mechanically bonded to copper tubing coil.
- B. Provide an independent expansion device for each refrigeration circuit. Factory pressure test at 450 psig and leak test at 200 psig.
- C. Provide drain pan for base of evaporator coil constructed of PVC or galvanized steel with external connections.

2.6 CONDENSER SECTION

- A. Provide vertical discharge, direct drive fans with aluminum blades. Fans shall be statically balanced. Motors shall be permanently lubricated, with integral thermal overload protection in a weather tight casing.

2.7 REFRIGERATION SYSTEM

- A. Compressor(s): Provide scroll compressor with direct drive operating at 3600 rpm. Integral centrifugal oil pump. Provide suction gas cooled motor with winding temperature limits and compressor overloads.
- B. Units shall have cooling capabilities down to 0 degree F as standard. For field-installed low ambient accessory, the manufacturer shall provide a factory-authorized service technician that will assure proper installation and operation.
- C. Provide each unit with 2 refrigerant circuit(s) factory-supplied completely piped with liquid line filter-drier, suction and liquid line pressure ports.

2.8 OUTDOOR AIR SECTION

- A. Provide 100% return air.
- B. Provide economizer with Comparative Enthalpy Controls and Barometric Relief Damper.
- C. Provide adjustable minimum position control located in the economizer section of the unit.
- D. Provide spring return motor for outside air damper closure during unit shutdown or power interruption.

2.9 OPERATING CONTROLS

- A. Provide factory-wired roof top units with 24 volt control circuit with control transformers,

contactor pressure lugs or terminal block for power wiring. Contractor to provide Unit Mounted Disconnect. Units shall have single point power connections. Field wiring of zone controls to be NEC Class II.

- B. Provide microprocessor unit-mounted control which when used with an electronic zone sensor provides proportional integral room control. This UCM shall perform all unit functions by making all heating, cooling and ventilating decisions through resident software logic.
- C. Provide factory-installed indoor evaporator defrost control to prevent compressor slugging by interrupting compressor operation.
- D. Provide an anti-cycle timing and minimum on/off between stages timing in the microprocessor.
- E. Economizer Preferred Cooling (if supplied with economizer) - Compressor operation is integrated with economizer cycle to allow mechanical cooling when economizer is not adequate to satisfy zone requirements. Compressors are enabled if space temperature is recovering to cooling setpoint at a rate of less than 0.2 degrees per minute. Compressor low ambient lockout overrides this function.
- F. Unit shall be capable of controlling the operation of the existing electrical duct heater.

2.10 UNIT PERFORMANCE REQUIREMENTS

- A. Cooling requirements per schedule
- B. Supply air fan performance data as submitted shall include the effect of a wet coil, fan and the return air filter static loss.
- C. Scheduled performance shall be based on AHRI 210/240/340/360 and ANSI Z21.47 test conditions.
- D. The unit electrical service is 3 phase, 230 volts.

3. EXECUTION

3.1 MECHANICAL DEMOLITION

- A. Remove existing rooftop unit units in their entirety. Temporarily protect existing curb with weatherproof cover until new unit is installed.
- B. Refer to the drawings for replacement curb details and dimensions.
- C. New unit shall sit neatly and level on the curb. Notify Owner's Representative if any defects are observed in an existing curb or ducting inside the curb which would prevent a proper installation. Blank-offs, filler pieces, shims and other similar field-installed accessories used to make new unit fit existing curb and ducting are not acceptable.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.
- B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.
- C. Examine roofs for suitable conditions where RTUs will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 CONNECTIONS

- A. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.
- B. Install piping adjacent to RTUs to allow service and maintenance.
- C. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
 - 1. Install ducts to termination at top of roof curb.
 - 2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
 - 3. Connect supply ducts to RTUs with flexible duct connectors specified in Division 23 Section "Air Duct Accessories."
 - 4. Install return-air duct continuously through roof structure.
 - 5. Existing electric duct heater shall be reused. The duct heater shall be interlocked with the new rooftop unit.

3.4 CLEANING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site during other-than-normal occupancy hours for this purpose.
- B. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.5 CONTRACTOR STARTUP AND REPORTING

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing. Report results in writing.
- C. Tests and Inspections:
 - 1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
 - 2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- D. Remove and replace malfunctioning units and retest as specified above.
- E. Engage a factory-authorized service representative to perform startup service.
- F. Complete installation and startup checks according to manufacturer's written instructions and do the following:
 - 1. Inspect for visible damage to unit casing.
 - 2. Inspect for visible damage to furnace combustion chamber.
 - 3. Inspect for visible damage to compressor, coils, and fans.
 - 4. Inspect internal insulation.
 - 5. Verify that labels are clearly visible.
 - 6. Verify that clearances have been provided for servicing.
 - 7. Verify that controls are connected and operable.
 - 8. Verify that filters are installed.
 - 9. Clean condenser coil and inspect for construction debris.
 - 10. Clean furnace flue and inspect for construction debris.
 - 11. .Connect and purge gas line.
 - 12. Remove packing from vibration isolators.
 - 13. Verify lubrication on fan and motor bearings.
 - 14. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
 - 15. Adjust fan belts to proper alignment and tension.
 - 16. Start unit according to manufacturer's written instructions.
 - 17. Start refrigeration system.
 - 18. Do not operate below recommended low-ambient temperature.
 - 19. Complete startup sheets and attach copy with Contractor's startup report.
 - 20. Inspect and record performance of interlocks and protective devices; verify sequences.
 - 21. Operate unit for an initial period as recommended or required by manufacturer.
 - 22. Calibrate thermostats.
 - 23. Adjust and inspect high-temperature limits.
 - 24. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
 - 25. Start refrigeration system and measure and record the following when ambient is a minimum of 15 deg F above return-air temperature:
 - a. Coil leaving-air, dry- and wet-bulb temperatures.
 - b. Coil entering-air, dry- and wet-bulb temperatures.
 - c. Outdoor-air, dry-bulb temperature.
 - d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
 - 26. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
 - 27. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.
 - a. Supply-air volume.
 - b. Return-air volume.
 - c. Relief-air volume.
 - d. Outdoor-air intake volume.
 - 28. Simulate maximum cooling demand and inspect the following:
 - a. Compressor refrigerant suction and hot-gas pressures.

- b. Short circuiting of air through condenser coil or from condenser fans to outdoor-air intake.
- 29. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:
 - a. High-temperature limit on gas-fired heat exchanger.
 - b. Low-temperature safety operation.
 - c. Filter high-pressure differential alarm.
 - d. Economizer to minimum outdoor-air changeover.
 - e. Relief-air fan operation.
 - f. Smoke and firestat alarms.
- 30. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

3.6 DEMONSTRATION AND COMMISSIONING

- A. Train Owner's maintenance personnel on procedures and schedules for starting up and shutting down, troubleshooting, servicing, and maintaining chillers. The training will occur after the startup report has been provided to the owner and the trainer will provide 4 Installation and operations manuals for the use of the owners personnel during training.
- B. Review data in maintenance manuals. Refer to Division 01 Section "Contract Closeout."
- C. Review data in maintenance manuals. Refer to Division 01 Section "Operation and Maintenance Data." All required and recommended maintenance will be reviewed as well as operational trouble shooting. If the IOM does not include a written trouble shooting guide one will be provided.
- D. Schedule training with Owner, through Architect, with at least seven days' advance notice.
- E. Demonstrate proper operation of equipment to commissioning agent or designated owners personnel. The scope of the demonstration will include functional performance requirements under both local and building automation control as well as any commissioning requirements in Division 01 or 23.

END OF SECTION