



Wilkie & Zanley

ENGINEERS • ARCHITECTS • CONSULTANTS • PROJECT MANAGERS

"A Siodock Company"

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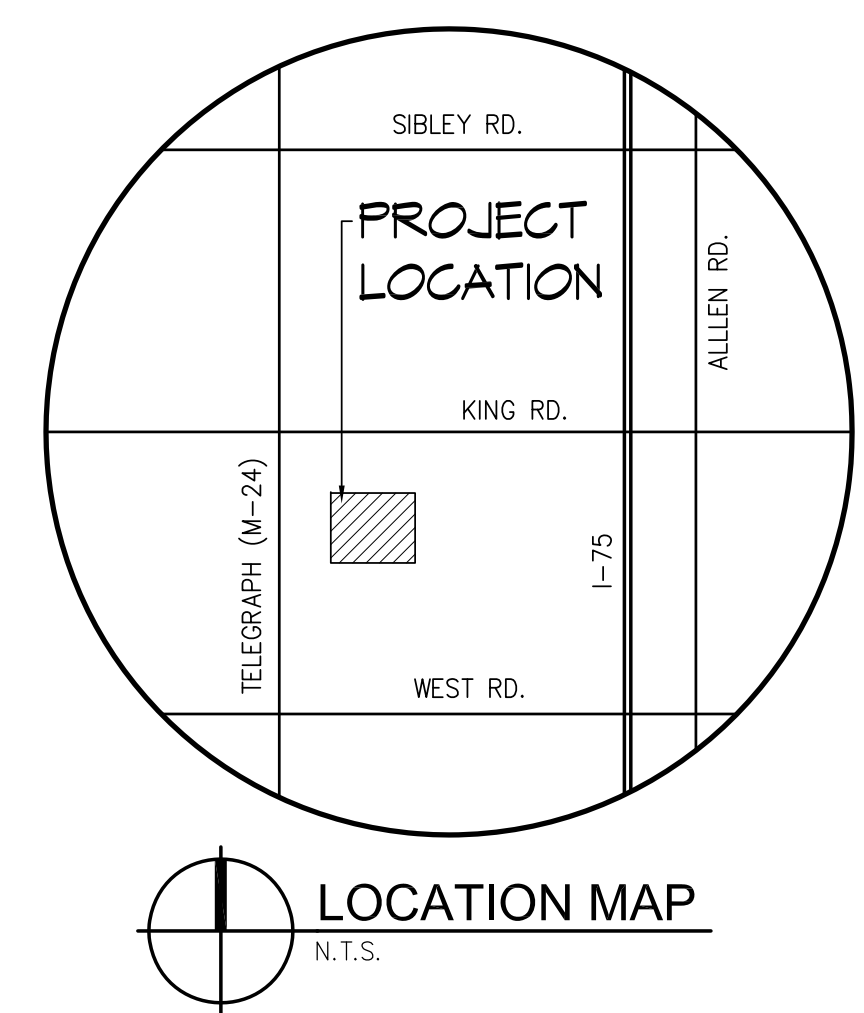
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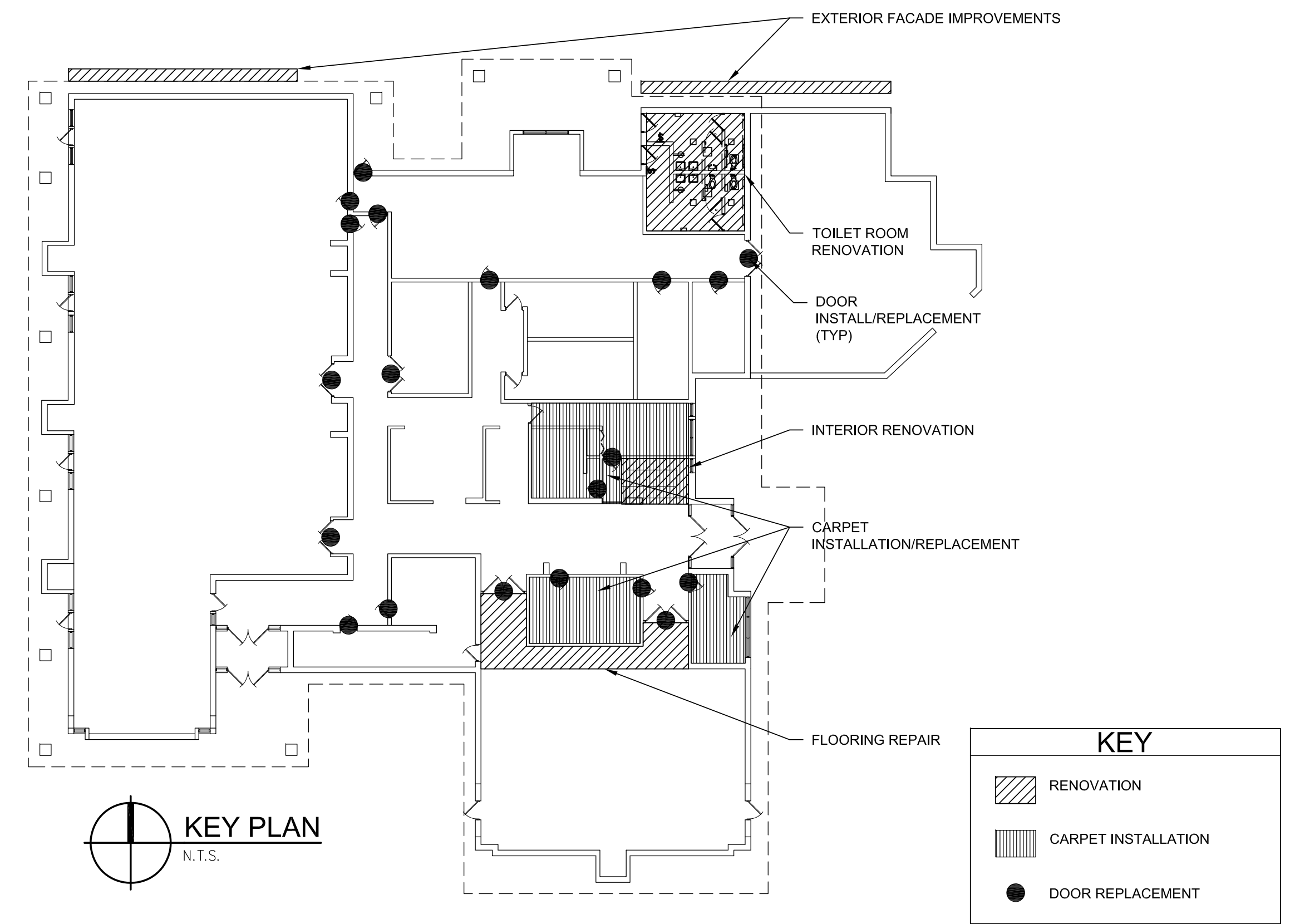
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BROWNSTOWN TOWNSHIP
COMMUNITY CENTER
RENOVATIONS
BROWNSTOWN TWP, MICHIGAN



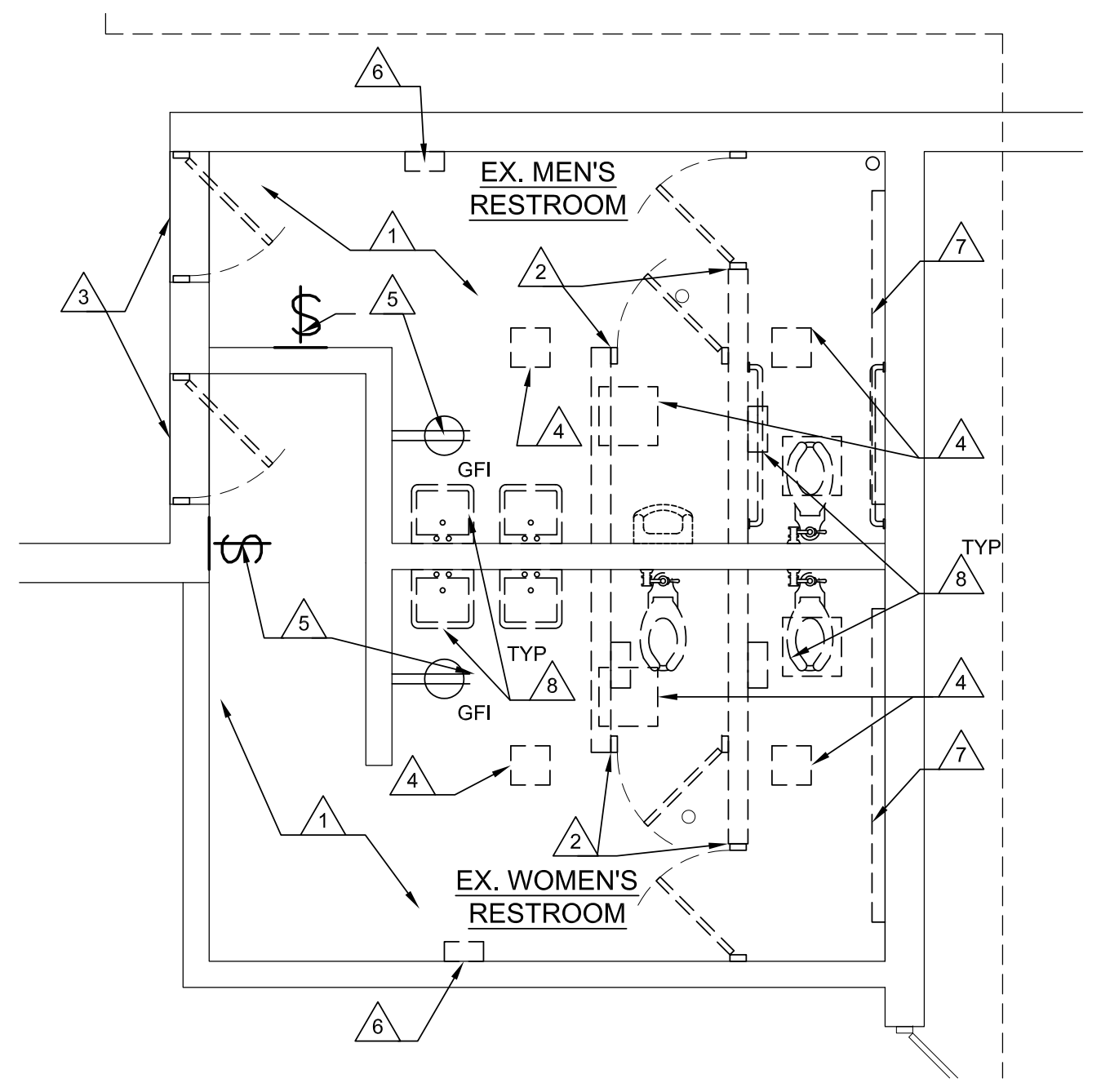
- GENERAL NOTES
1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL LOCAL, STATE, COUNTY CODES/REGULATIONS AND OSHA.
2. TIME IS OF THE ESSENCE OF THE CONTRACT. ALL WORK SHALL PROCEED AS EXPEDITIOUSLY AS POSSIBLE IN A WORKMANLIKE MANNER.
3. CONTRACTORS SHALL VISIT THE PREMISES AND SHALL BE THOROUGHLY ACQUAINTED WITH THE CONDITIONS TO BE ENCOUNTERED.
4. CONTRACTORS SHALL INCLUDE COSTS OF ALL PERMITS & FEES IN BASE BID.
5. CONTRACTORS SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, TOOLS, TRANSPORTATION, ETC. FOR A COMPLETE & PROPER COMPLETION OF THE PROJECT AS INDICATED ON THE DRAWINGS & AS SPECIFIED HEREIN AND/OR AS REQUIRED.
6. ALL SUBSTITUTIONS SHALL BE APPROVED BY ARCHITECT & OWNER PRIOR TO BIDDING.
7. DO NOT SCALE DRAWINGS. USE ONLY DIMENSIONS PROVIDED.
8. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY ON THIS PROJECT, INCLUDING ALL NECESSARY SIGNS, BARRIERS, & SUPERVISION.
9. GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT ADJACENT PRIVATE & PUBLIC PROPERTY FROM DAMAGE DURING CONSTRUCTION.
10. ALL MATERIALS & EQUIPMENT SHALL BE NEW & IN PERFECT CONDITION WHEN INSTALLED & SHALL BE OF THE BEST GRADE & OF THE SAME MANUFACTURE THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT.
11. GENERAL CONTRACTOR SHALL REMOVE ALL DEBRIS FROM SITE & LEGALLY DISPOSE OF.
12. CONTRACTOR SHALL PROVIDE OWNER WITH COMPLETE SET OF "AS BUILT" DRAWINGS AT COMPLETION OF JOB.
13. CONTRACTOR SHALL PROVIDE A WRITTEN GUARANTEE THAT WILL BE MADE GOOD AT CONTRACTORS OWN EXPENSE FOR ANY IMPERFECTIONS IN MATERIAL AND/OR WORKMANSHIP WHICH MY DEVELOP WITHIN (1) ONE YEAR FROM FINAL ACCEPTANCE. FURTHER, THIS CONTRACTOR SHALL OBTAIN WRITTEN GUARANTEES FROM ALL MANUFACTURES STATING ON WHAT OPERATING CONDITIONS & PERFORMANCE CAPACITIES EACH EQUIPMENT PIECE GUARANTEE IS BASED.
14. ALL COLOR SELECTIONS SHALL BE BY ARCHITECT.
15. THE LOCATION OF UTILITIES & IMPROVEMENTS INDICATED HEREIN ARE APPROXIMATE ONLY & WERE FROM SOURCES BELIEVED TO BE RELIABLE, BUT NO GUARANTEE IS EXPRESSED OR IMPLIED AS TO LOCATION, TYPE OR EXTENT OF UTILITIES OR IMPROVEMENTS WHETHER OR NOT SAME ARE INDICATED OR SHOWN, & THIS CONTRACTOR SHALL MAKE HIS OWN INVESTIGATION AS TO THE EXTENT OF THESE OR OTHER UTILITIES & SHALL BE RESPONSIBLE FOR PROTECTION & RESTORATION OF SAME IF DAMAGED AS A RESULT OF HIS OPERATIONS.
16. CAULK AROUND ALL OPENINGS & WHERE WOOD OR METAL MEETS MASONRY.



- DEMOLITION NOTES
1. REMOVE EXIST. Q.T. FLOOR AND BASE IN ITS ENTIRETY. PREPARE FLOOR FOR NEW SKID RESISTANT EPOXY COATING.
2. REMOVE EXIST. MASONRY PARTITIONS AND WOOD DOORS.
3. REMOVE EXIST. H.M. DOORS, FRAMES, AND THRESHOLDS.
4. REMOVE EXIST. LIGHTING DIFFUSERS AND GRILLS.
5. REMOVE EXIST. SWITCHES AND RECEPTACLES - CIRCUITS TO BE REUSED.
6. REMOVE EXIST. ELECTRICAL HAND DRYERS - CIRCUITS TO BE REUSED.
7. REMOVE EXIST. BASEBOARD HEATERS, CIRCUITS TO BE REUSED.
8. REMOVE EXIST. PLUMBING FIXTURES AND ACCESSORIES. REMOVE EXIST. CONCRETE FLOOR AS REQUIRED TO IDENTIFY EXIST. PLUMBING LOCATIONS AND INSTALL NEW PLUMBING. SAWCUT ALL DEMO AREAS.

- SPECIFICATIONS
PAINT
ALL WORK TO BE 3 COATS - 1 COAT PRIMER/ 2 COATS FINISH. ALL PRODUCTS SHERWIN-WILLIAMS OR EQUAL.
H.M. DOORS & FRAMES:
1 COAT SW PRO-INDUSTRIAL PROCRYL UNIVERSAL ACRYLIC PRIMER.
2 COATS SW DURATION EXTERIOR ACRYLIC SATIN FINISH
INTERIOR CMU:
1 COAT SW PREP-RITE BLOCK FILLER/PRIMER.
2 COATS SW PRO-INDUSTRIAL HIGH PERFORMANCE EPOXY, EGGSHELL FINISH
CONTRACTOR TO PROVIDE DRAWDOWN SAMPLES AND PRODUCT & APPLICATION DATA.
PAINT SCHEDULE
H.M. DOORS & ALL H.M. FRAMES - MATCH EXIST.
ALL INTERIOR PAINTED CMU - MATCH EXIST.
TOILET PARTITIONS - COMTEC BY SCRANTON PRODUCTS FLOOR MOUNTED, OVERHEAD BRACED SOLID PLASTIC PARTITIONS W/ ALUMINUM OVERHEAD RAIL AND SOLID PLASTIC SHOE AND WALL BRACKET. COLOR TO BE MOCHA, w/ ORANGE PEEL TEXTURE.
SKID RESISTANT EPOXY COATING - DEX-O-TEX POSI-TREAD "O" SKID RETARDANT SURFACING - MEDIUM PROFILE HIGH PERFORMANCE FLOOR COATING AND BUILT UP BASE, OR EQUAL AS APPROVED BY OWNER. COLOR SELECTED FROM MANUFACTURERS STANDARD. SUBMIT COLOR SAMPLES AND PRODUCT DATA FOR APPROVAL.
H.M. DOORS, FRAMES & PANELS - STEELCRAFT OR EQUAL.
EXTERIOR DOOR EXTRA HEAVY COMMERCIAL, SEAMLESS, 16 GAUGE, GALVANIZED, INSULATED w/ POLYSTYRENE CORE, FACTORY PRIMER. SIZES AS INDICATED. PAINT FRAMES, 16 GAUGE, GALVANIZED, MITERED AND WELDED CORNERS, FACTORY PRIMER, SIZES AS INDICATED.
CONTRACTOR TO INCLUDE \$500 HARDWARE ALLOWANCE PER DOOR IN BASE BID.
CONTRACTOR TO SUBMIT SHOP DRAWINGS, PRODUCT DATA AND HARDWARE SCHEDULE.
STAIN - PENETRATING INTERIOR OIL BASED WOOD STAIN, CABOT #8100 SERIES OR EQUAL. COLOR SELECTED FROM MANUFACTURERS STANDARD. SUBMIT COLOR SAMPLES FOR APPROVAL.
COMPOSITE CEILING - 5/8"x5.5"x18" TREX DECKING COMPOSITE BEAD BOARD, SMOOTH FINISH - OR EQUAL AS APPROVED BY OWNER.
BARRIER-FREE SIGNAGE - CONTRACTOR TO PROVIDE AND INSTALL BARRIER-FREE SIGNAGE AT TOILET ROOM DOORS. SUBMIT SAMPLES AND PRODUCT DATA FOR APPROVAL.
STRUCTURAL PLASTIC LUMBER - FIBER FORCE BY BEDFORD TECHNOLOGIES (1-800-721-9037) OR EQUAL. STRUCTURAL PLASTIC LUMBER SHALL BE MANUFACTURED WITH HDPE AND FIBERGLASS ELEMENTS TO ACT REINFORCING WITH THE HDPE. LUMBER SHALL BE MOLDED IN ONE PIECE PER SPECIFIED SIZE. ALL MATERIALS WILL HAVE UV ADDITIVES TO PREVENT DETERIORATION OF THE PLASTIC LUMBER FROM EXPOSURE TO UV LIGHT. HDPE WILL BE MADE UP OF NO LESS THAN 80% RECYCLED MATERIAL. BOTH POST INDUSTRIAL AND POST CONSUMER. FINISHED PLASTIC LUMBER WILL NOT ROT, SPLIT, CRACK OR SPLINTER FOR A MINIMUM OF 50 YEARS. IT SHALL BE RESISTANT TO TERMITES, MARINE BORERS, SALT SPRAY, OIL, AND FUNGUS. COLOR: MINK CONTRACTOR TO SUBMIT PRODUCT & INSTALLATION DATA & SAMPLES
MECHANICAL PROPERTIES:
ENGLISH UNITS METRIC UNITS
TEST ASTM TEST VALUE UNITS VALUE UNITS
Flexural Strength D6108-97 2350 PSI 163 Kg/cm²
Flexural Modulus D6108-97 30600 PSI 21520 Kg/cm²
Compression Strength D6108-97 2842 PSI 165 Kg/cm²
Compression Modulus D6108-97 16976 PSI 8071 Kg/cm²
Specific Gravity D6113-97 0.93 g/cc 0.93 g/cc
Flash Point 644 Deg F 340 Deg C
Moisture Absorption D6341-98 < 0.08 % by Weight 0.08 % by Weight
Thermal Expansion D6341-98 0.00053 in/in/Deg F
Average Screw Pull Out D6117-97 644 Lbs
DIMENSIONAL TOLERANCES:
CUP/BULGE TOLERANCES - deviation in the face from a straight line from edge to edge of piece.
FACE WIDTH 4" 6" 8" 10" 12"
Tolerance (+/-) 3/32" 1/8" 3/16" 1/4" 1/4"
LENGTH TOLERANCE = +/- .01" Measured at 70 deg F.

- PROVIDE & INSTALL NEW WOOD DOORS & CARPET. LOCATIONS & QUANTITIES PER OWNER INSTRUCTION. SEE OWNER PROVIDED SCOPE OF WORK FOR MORE INFO.
CARPET
COLOR SELECTED BY OWNER
PROVIDE SAMPLE FOR OWNER APPROVAL
Style Name Faculty IV
Style Number DK166
Brand Lees
Product Type Broadloom
SPECIFICATIONS
Minimum Sq. Yd. No Minimum
Tufted Performance Loop Pile
Surface Texture 1/8" (31.50 rows per 10 cm)
Gauge 6455
Density 167.830
Weight Density 8.3 per inch (32.68/10 cm)
Finished Pile Thickness .145" avg (3.7 mm)
Dye Method Yarn Dyed
Backing Material Unibond Flex
Fiber Type Antron Legacy Nylon 6,6 with DuraTech Soil Protection by Invista
Fiber Technology Duracolor by LEES Stain Resistant System. Passes GSA requirements for permanent stain resistant carpet.
Face Weight 26.0 oz. per sq. yd. (882 g/m²)
Pattern Repeat None
Indoor Air Quality Green Label Plus 4952
Foot Traffic Recommendation TARR Severe
NSF 140
PERFORMANCE
Static 3.0 kv when tested under the Standard Shuffle Test 70 degrees Fahrenheit (21 degrees Celsius) - 20% R.H.
Flammability Passes DOC-FF-1-70 Pfl Test
Flooring Radiant Panel Test Meets NFPA Class 1 when tested under ASTM E-648 glue down
Smoke Density NBS Smoke Chamber NFPA-258 - Less than 450 Flaming Mode
CR1 Green Label Plus Certified Y
WARRANTIES
Warranties Lifetime Limited Unibond Flex Warranty
Lifetime Duracolor Stain Warranty
Lifetime Static



DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

Table with 2 columns: Date, Issued For. Rows include 03-21-2013 OWNER REVIEW, 05-10-2013 OWNER REVIEW, 05-17-2013 OWNER REVIEW, 05-20-2013 BIDDING.

Drawn: C. WHITE
Checked: D. ZANLEY
Approved: D. ZANLEY

Sheet Title:
TITLE SHEET /
GENERAL INFO.
/DEMOLITION

Project Number: 313105

Sheet Number: CS-001



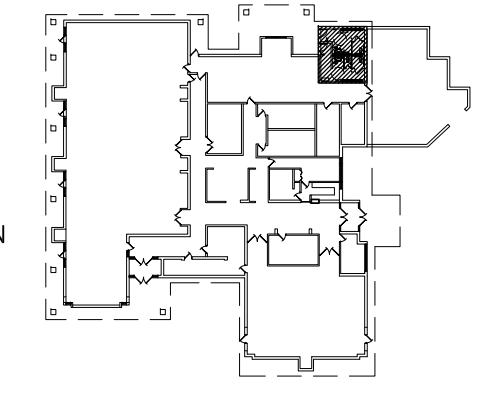


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Key Plan: NO SCALE



Client:  
**BROWNSTOWN TOWNSHIP**

Project:  
**COMMUNITY CENTER RENOVATION**

21311 TELEGRAPH RD.  
 BROWNSTOWN TWP, MI

Seal:

Date	Issued For
03-21-2013	OWNER REVIEW
05-10-2013	OWNER REVIEW
05-20-2013	BIDDING

Drawn: C. WHITE  
 Checked: D. ZANLEY  
 Approved: D. ZANLEY

Sheet Title:  
**TOILET ROOM PLAN AND DETAILS**

Project Number: **310318**

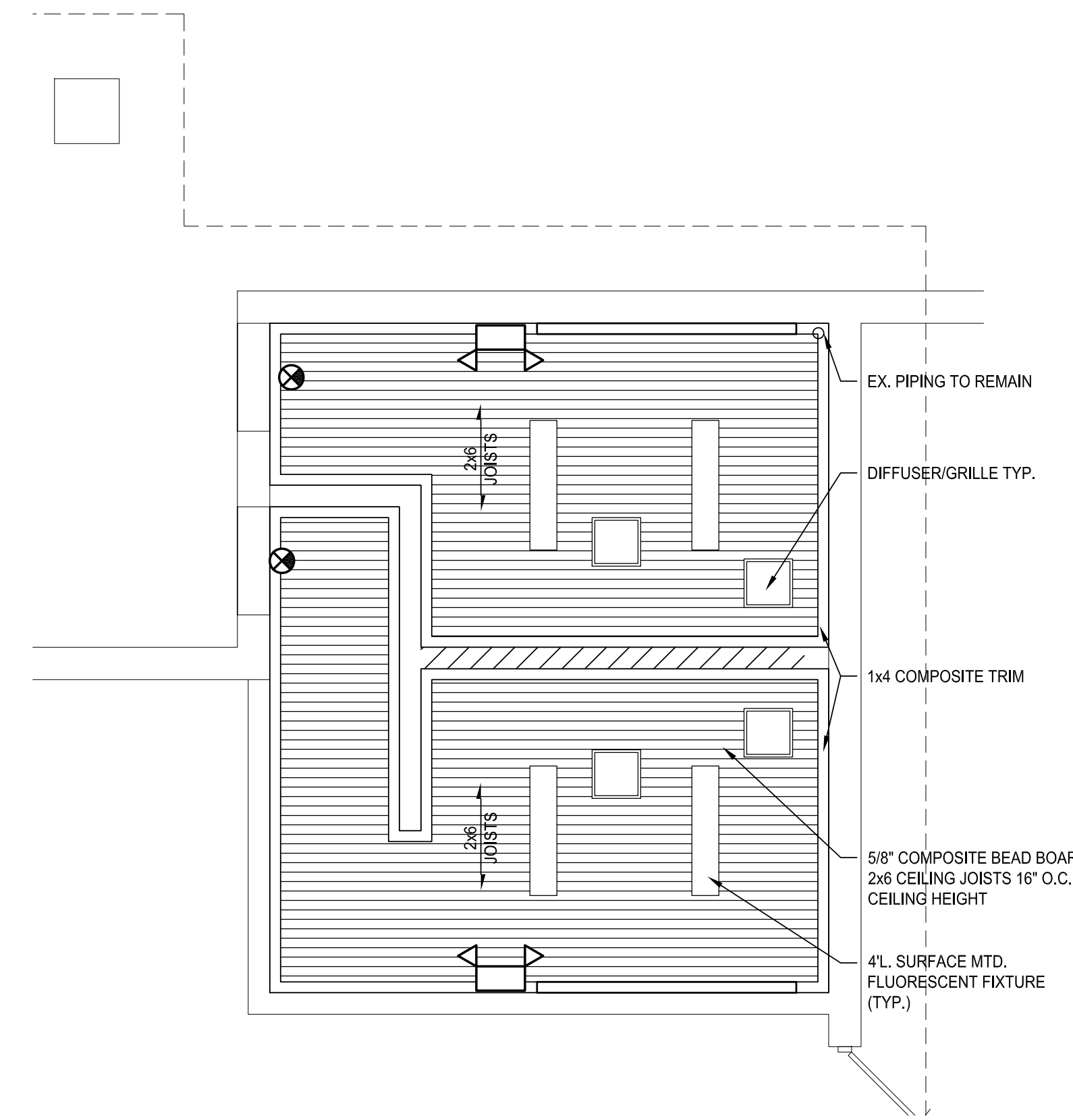
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ROOM SCHEDULE										
ROOM NUMBER	ROOM NAME	FLOOR	BASE	WALL	CEILING	MTG	HT.	REMARKS		
									SKID RESISTANT EPOXY COATING	SKID RESISTANT EPOXY BASE
102	WOMENS RESTROOM	1	1	1	1			SURFACE	.	
101	MENS RESTROOM	1	1	1	1			SURFACE	.	

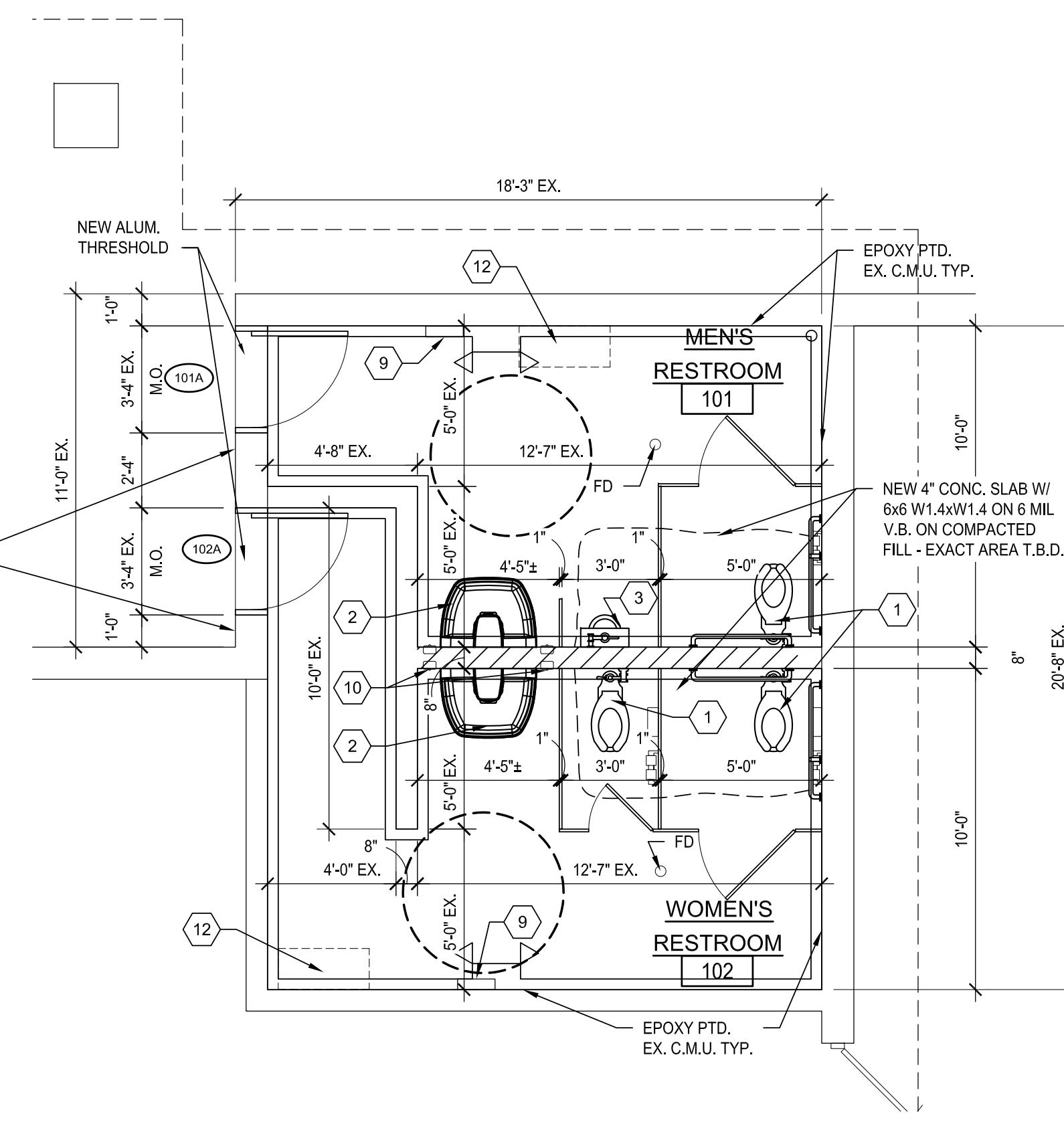
TOILET ROOM ACCESSORIES :	
(ALL TO BE SUPPLIED / INSTALLED BY CONTRACTOR)	
MIRROR; BOBRICK B-1556-1830 VANDAL RESISTANT 18"x30" STAINLESS STEEL FRAMELESS MIRROR.	1 PER LAV.
SOAP DISPENSER; BOBRICK B-4063 RECESSED SOAP DISPENSER 50 OZ.	2 PER TOILET ROOM
TOILET TISSUE DISPENSER; BOBRICK B-4288 SURF. MTD. MULTI-ROLL TOILET TISSUE DISPENSER.	1 PER STALL
HAND DRYER; BOBRICK B-7128 SURFACE MTD., ADA, STAINLESS STEEL HAND DRYER.	1 PER TOILET ROOM
S.S. GRAB BARS; BOBRICK STAINLESS STEEL 1 1/2" PEENED FINISH	
SANITARY NAPKIN DISPOSAL; BOBRICK B270 STAINLESS STEEL, SURFACE MTD.	1 PER WOMENS TOILET STALL.
HOOK & BUMPER; BOBRICK B212.	1 PER TOILET STALL DOOR
BABY CHANGING STATION; BOBRICK/KOALA CARE KB100-01ST GREY POLYETHYLENE STANDARD HORIZONTAL, RECESSED, WITH STAINLESS STEEL FLANGE.	1 PER TOILET RM.

PLUMBING FIXTURE & ACCESSORY SCHEDULE					
KEY	ITEM	COUNT	KEY	ITEM	COUNT
1	STAINLESS STEEL FLOOR MOUNT FLUSH VALVE TOILET	3	8	18"x30" S.S. FRAMED MIRROR	2
2	WALL-HUNG TRI-FOUNT WASHFOUNTAIN	2	9	HAND DRYER	2
3	STAINLESS STEEL URINAL	1	10	RECESSED SOAP DISPENSER	4
4	TOILET PAPER DISPENSER	3	11	WALL / PARTITION MOUNTED COAT HOOK	3
5	36" LONG GRAB BAR	2	12	BABY CHANGING STATION	2
6	42" LONG GRAB BAR	2	13	SANITARY NAPKIN DISPOSAL	2
7	18" LONG VERTICAL GRAB BAR	2			



**REFLECTED CEILING PLAN**  
 SCALE: 1/4" = 1'-0"

NOTE:  
 EXTEND EXISTING FIRE PROTECTION HEADS TO NEW NEW CEILING HEIGHT.

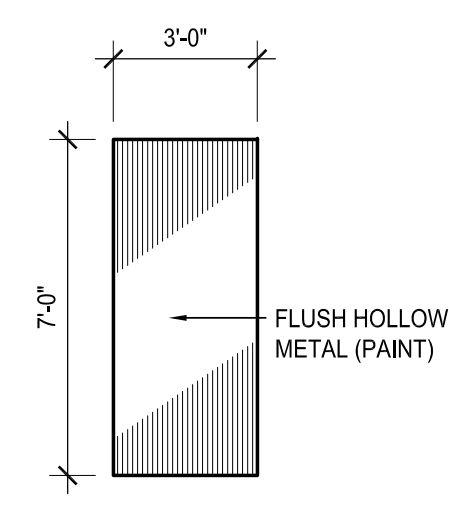


**FLOOR PLAN**  
 SCALE: 1/4" = 1'-0"

NOTE:  
 CONTRACTOR TO REPAIR/PATCH MASONRY WALLS AT ALL AREAS DAMAGED/EXPOSED DUE TO DEMOLITION. TOOTH IN NEW MASONRY AS REQUIRED.

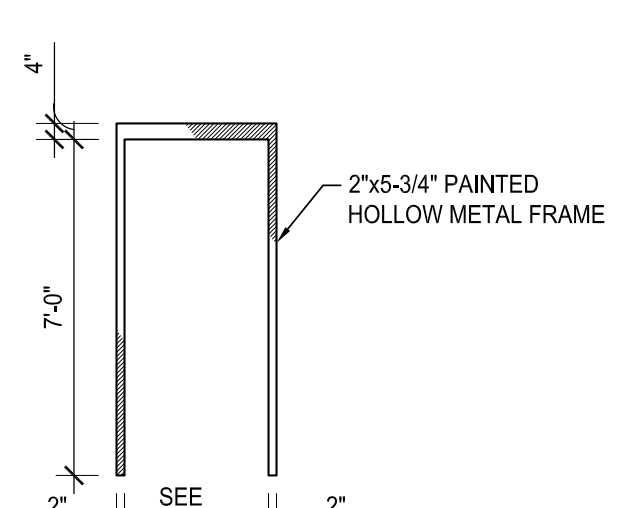
DOOR SCHEDULE										
DOOR MARK	DOOR						FRAME		REMARKS	
	SIZE			TYPE	MATERIAL	GLASS	THRESHOLD	TYPE		MATERIAL
	WIDTH	HEIGHT	THICKNESS							
101A	3'-0"	7'-0"	1-3/4"	I	H.M.	---	ALUM.	A	H.M.	INSUL. & WEATHERSTRIP
102B	3'-0"	7'-0"	1-3/4"	I	H.M.	---	ALUM.	A	H.M.	INSUL. & WEATHERSTRIP

PROVIDE & INSTALL BARRIER-FREE SIGNAGE AT TOILET RM DOORS



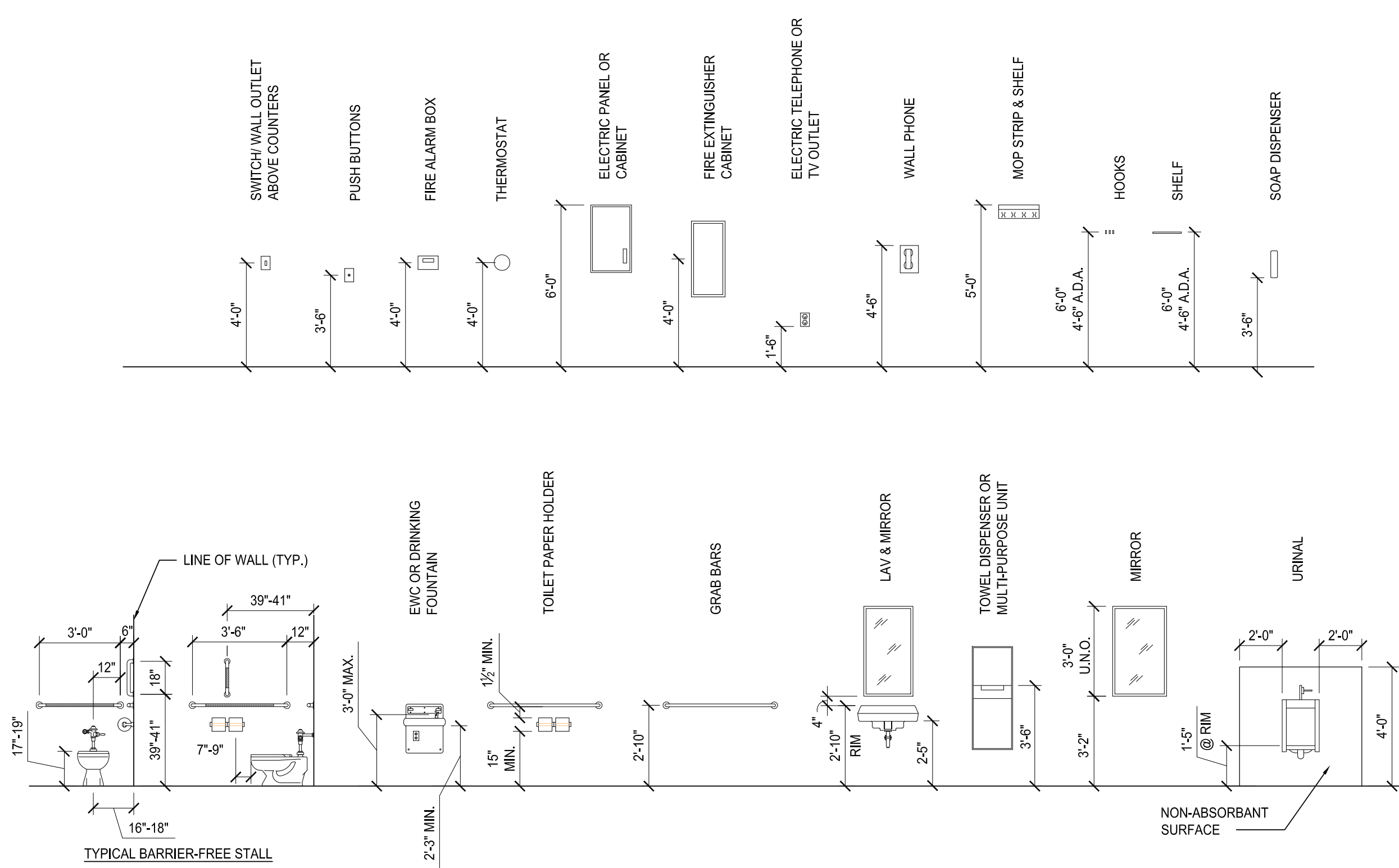
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**DOOR TYPES**  
 SCALE: 1/4" = 1'-0"

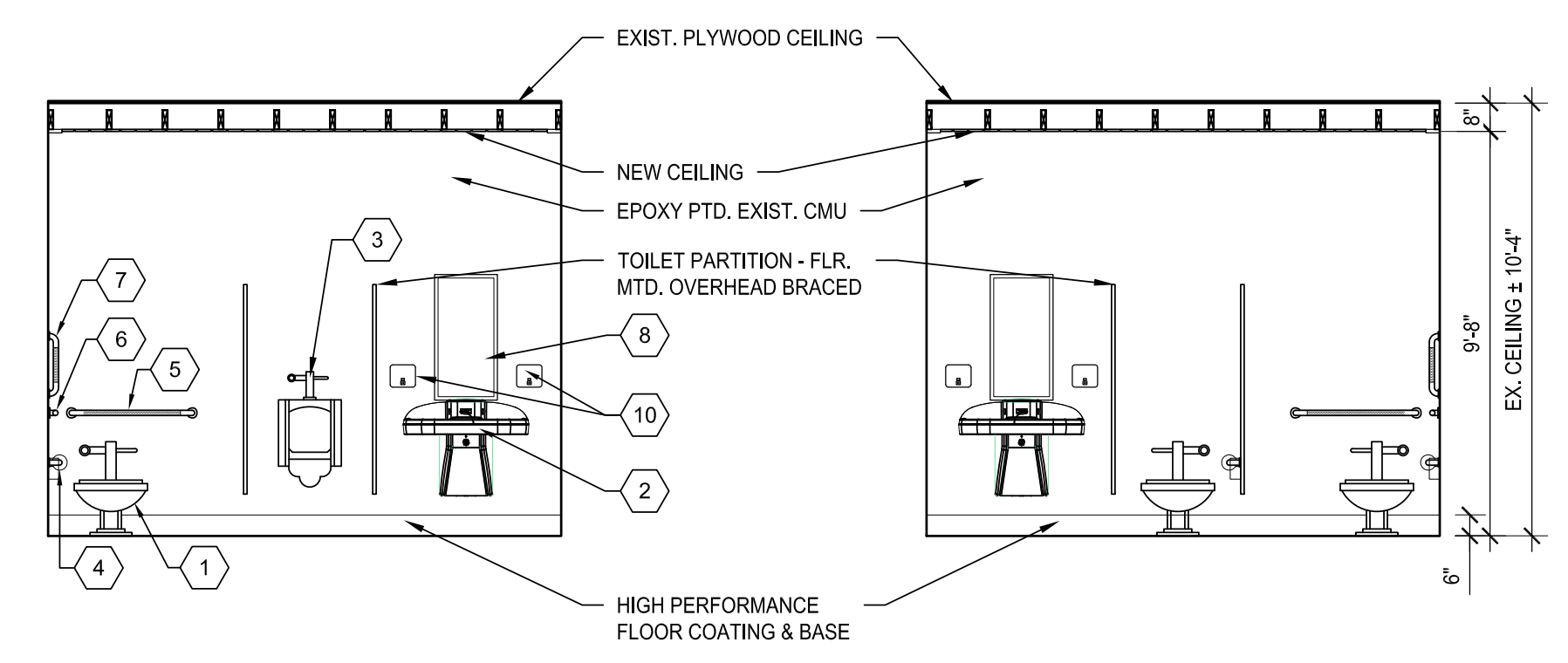


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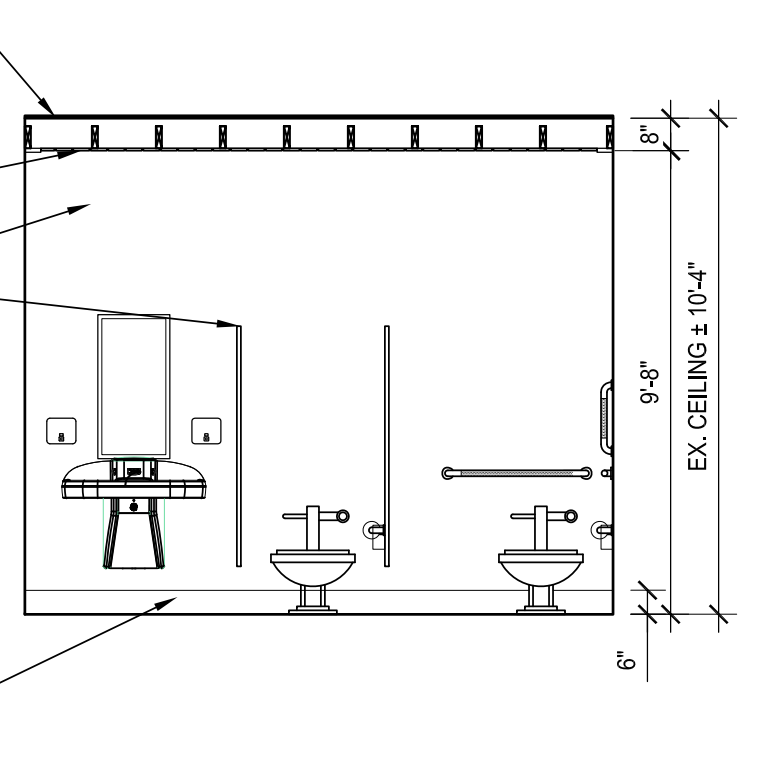
**FRAME TYPES**  
 SCALE: 1/4" = 1'-0"



**3 TYP. BARRIER FREE MOUNTING HEIGHTS**  
 A-210 N.T.S.



**2 MEN'S RESTROOM**  
 A-210 SCALE: 1/4" = 1'-0"



**1 WOMEN'S RESTROOM**  
 A-210 SCALE: 1/4" = 1'-0"



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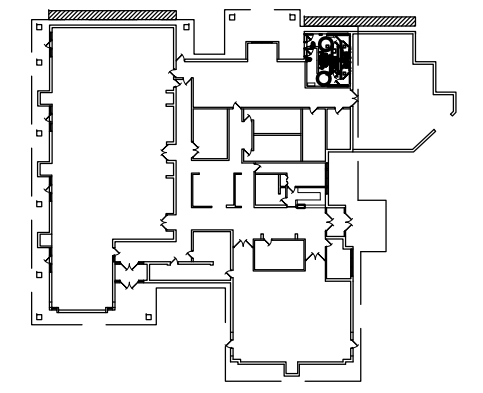
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Key Plan: NO SCALE



Client:  
**BROWNSTOWN TOWNSHIP**

Project:  
**COMMUNITY CENTER TOILET ROOM RENOVATION**

KING RD.  
BROWNSTOWN TWP, MI  
Seat:

Date	Issued For
04-12-2013	REVIEW
05-10-2013	OWNER REVIEW
05-20-2013	BIDDING

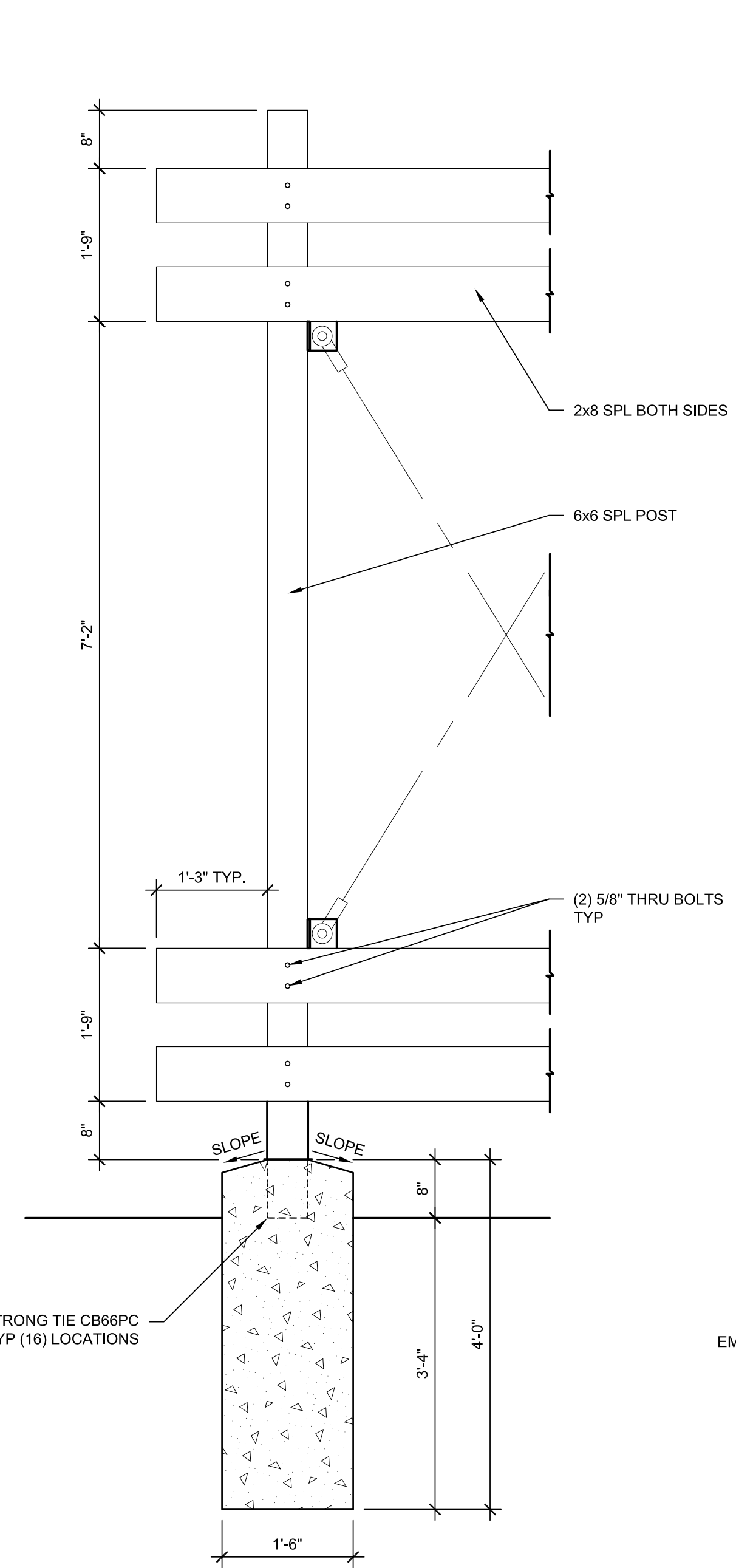
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**EXTERIOR ELEVATIONS**

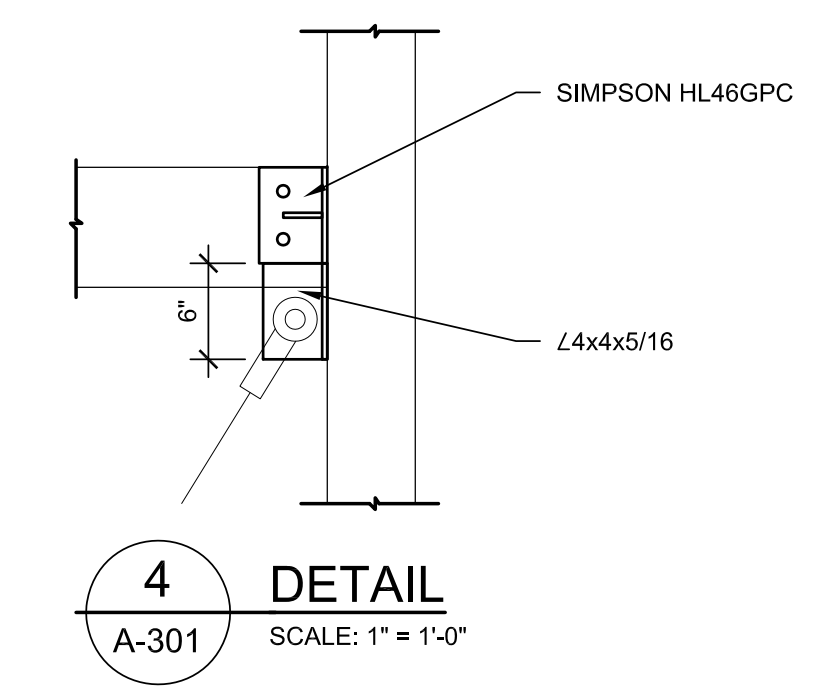
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Sheet Number: **A-301**

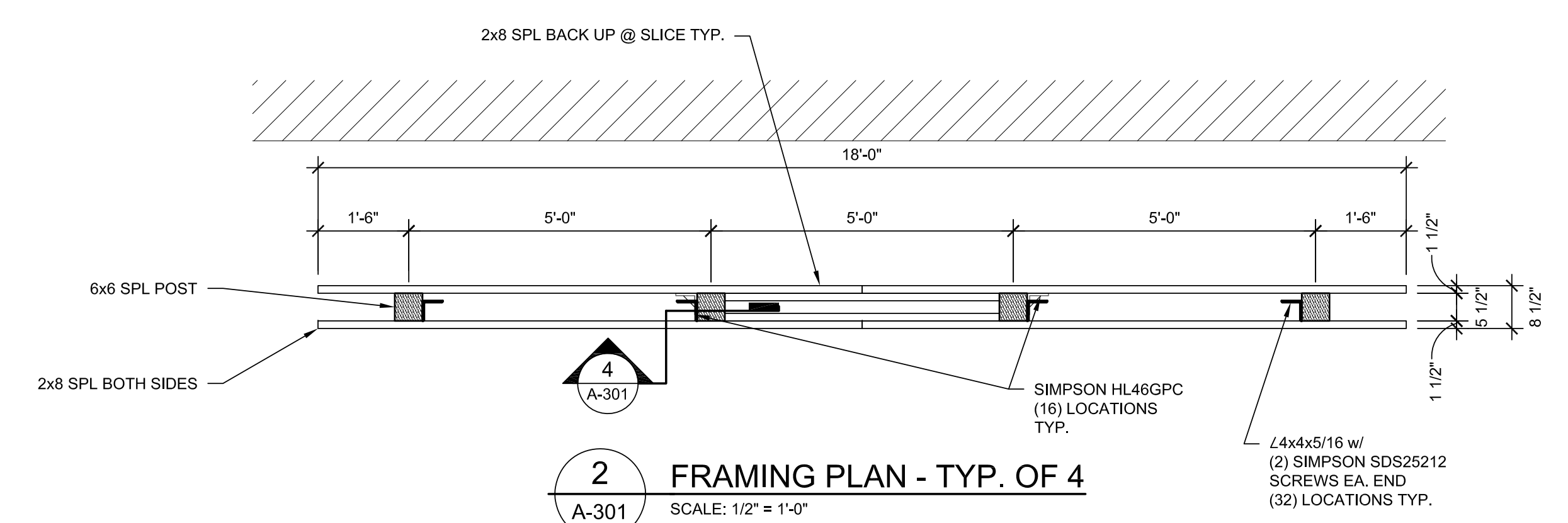
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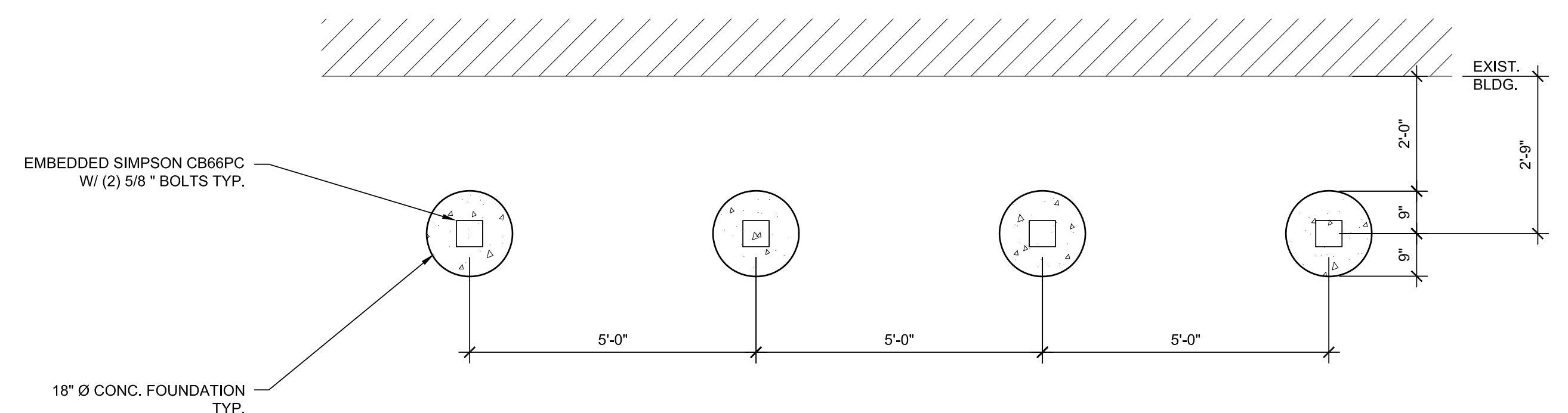
**3** DETAIL  
A-301 SCALE: 1/4" = 1'-0"



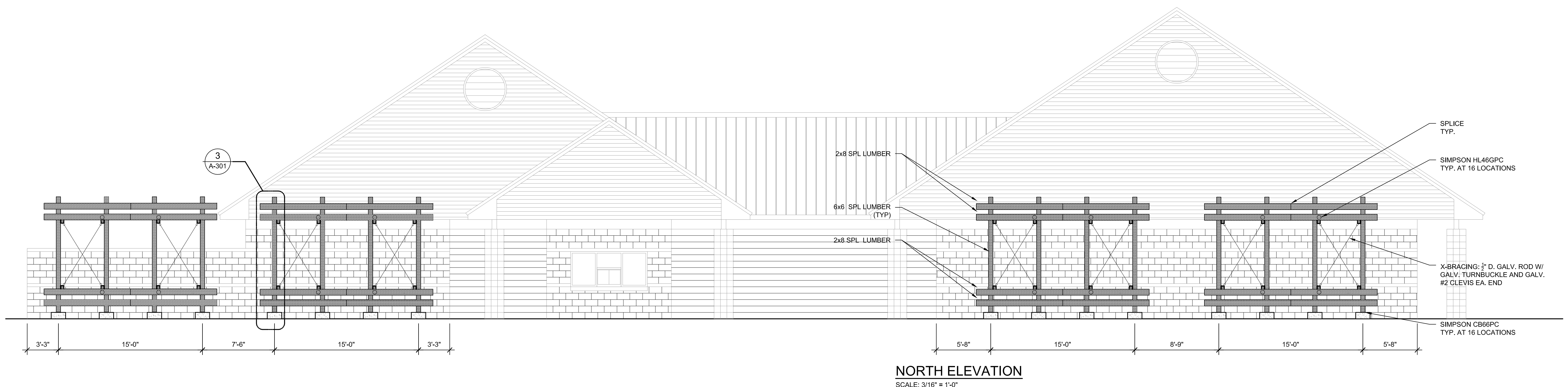
**4** DETAIL  
A-301 SCALE: 1" = 1'-0"



**2** FRAMING PLAN - TYP. OF 4  
A-301 SCALE: 1/2" = 1'-0"



**1** FOUNDATION PLAN - TYP. OF 4  
A-301 SCALE: 1/2" = 1'-0"



**NORTH ELEVATION**  
SCALE: 3/16" = 1'-0"

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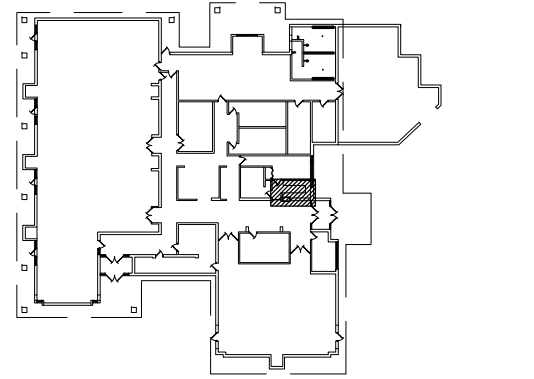
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**COMMUNITY CENTER TOILET ROOM RENOVATION**

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Seat:

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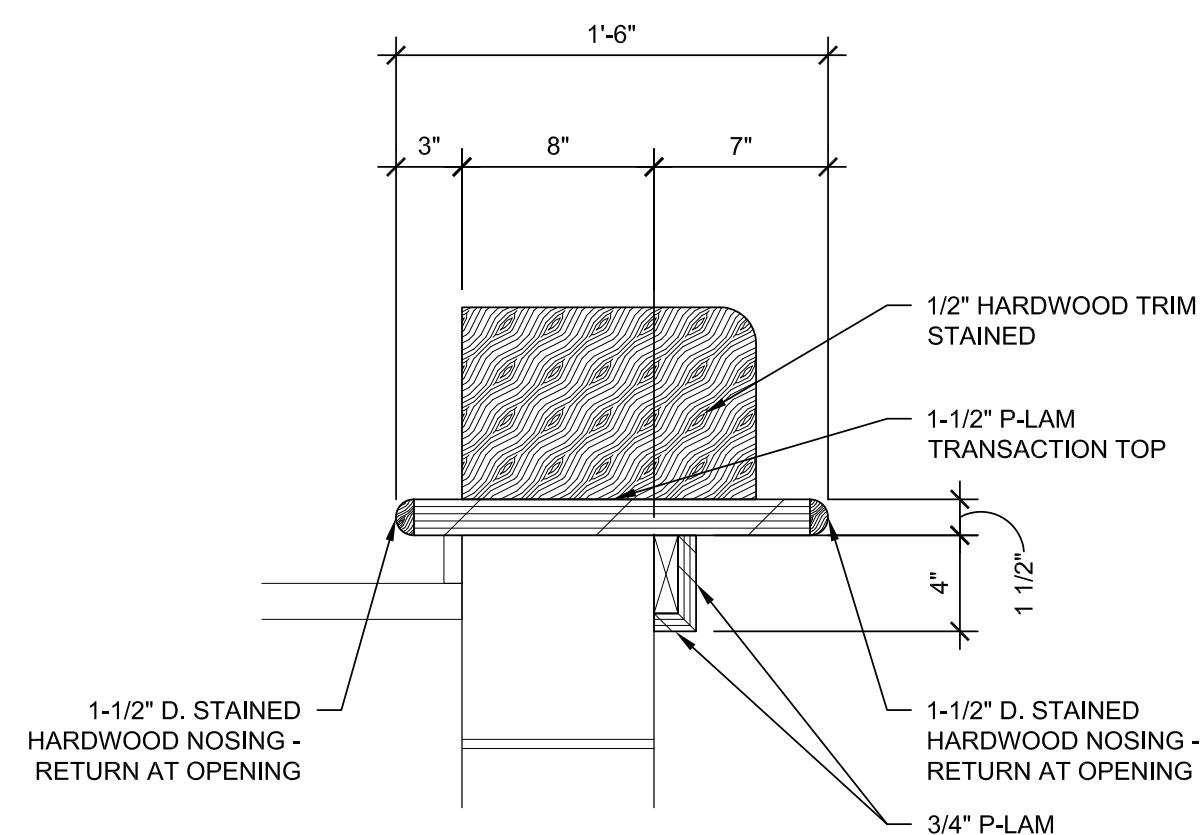
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Sheet Title:  
**INTERIOR RENOVATIONS**

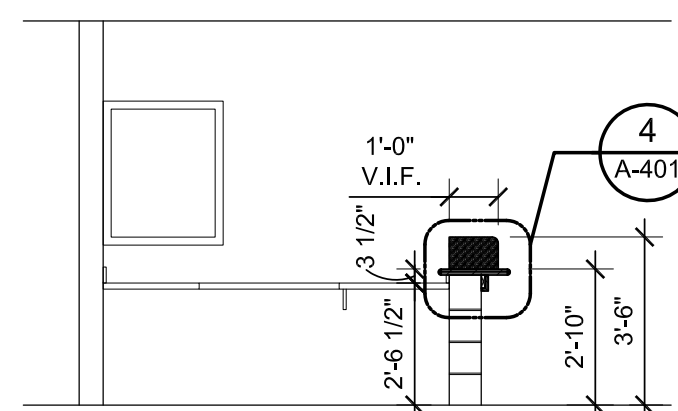
Project Number: 310318

Sheet Number: **A-401**

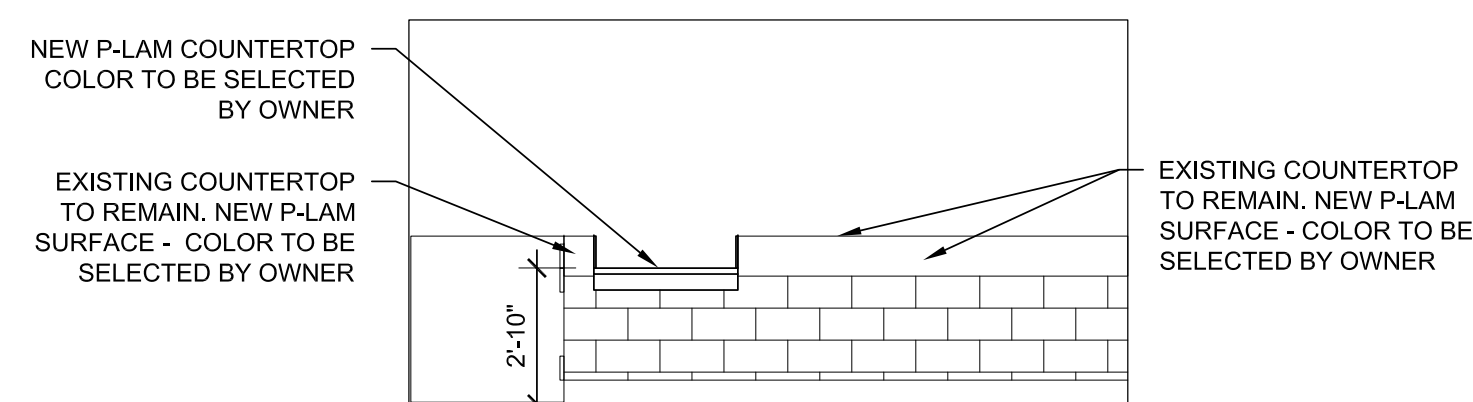
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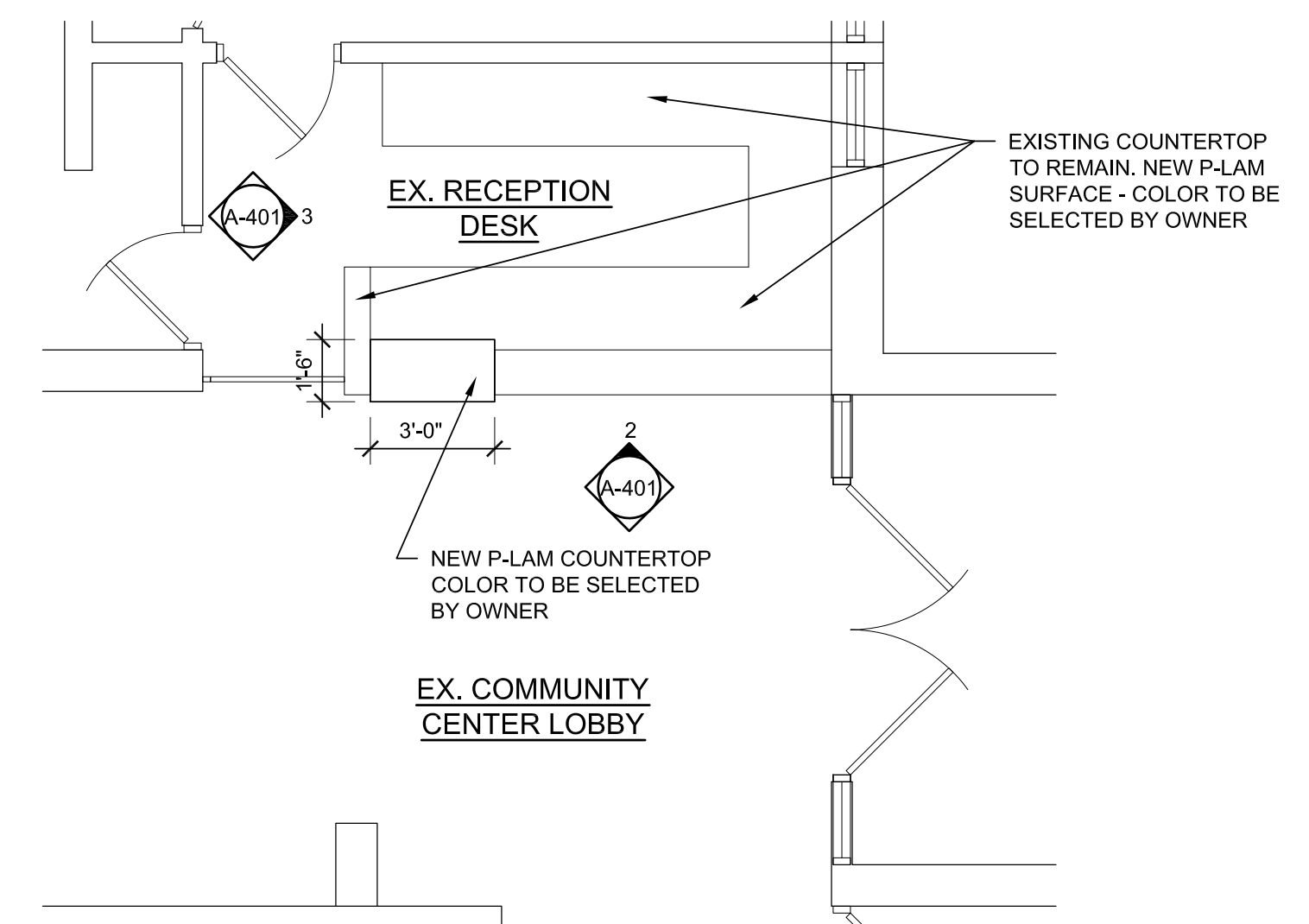
**3** DETAIL  
A-401 SCALE: 1 1/2" = 1'-0"



**3** RECEPTION ELEVATION  
A-401 SCALE: 1/4" = 1'-0"



**2** RECEPTION ELEVATION  
A-401 SCALE: 1/4" = 1'-0"



**1** LARGE SCALE RECEPTION PLAN  
A-401 SCALE: 1/4" = 1'-0"





Wilkie & Zanley

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Key Plan: NO SCALE

Client:  
**BROWNSTOWN TOWNSHIP**

Project:  
**COMMUNITY CENTER RENOVATION**

21311 TELEGRAPH RD.  
BROWNSTOWN TWP, MI

Seal:

Date: 05-10-2013 Issued For: OWNER REVIEW  
05-20-2013 BIDDING

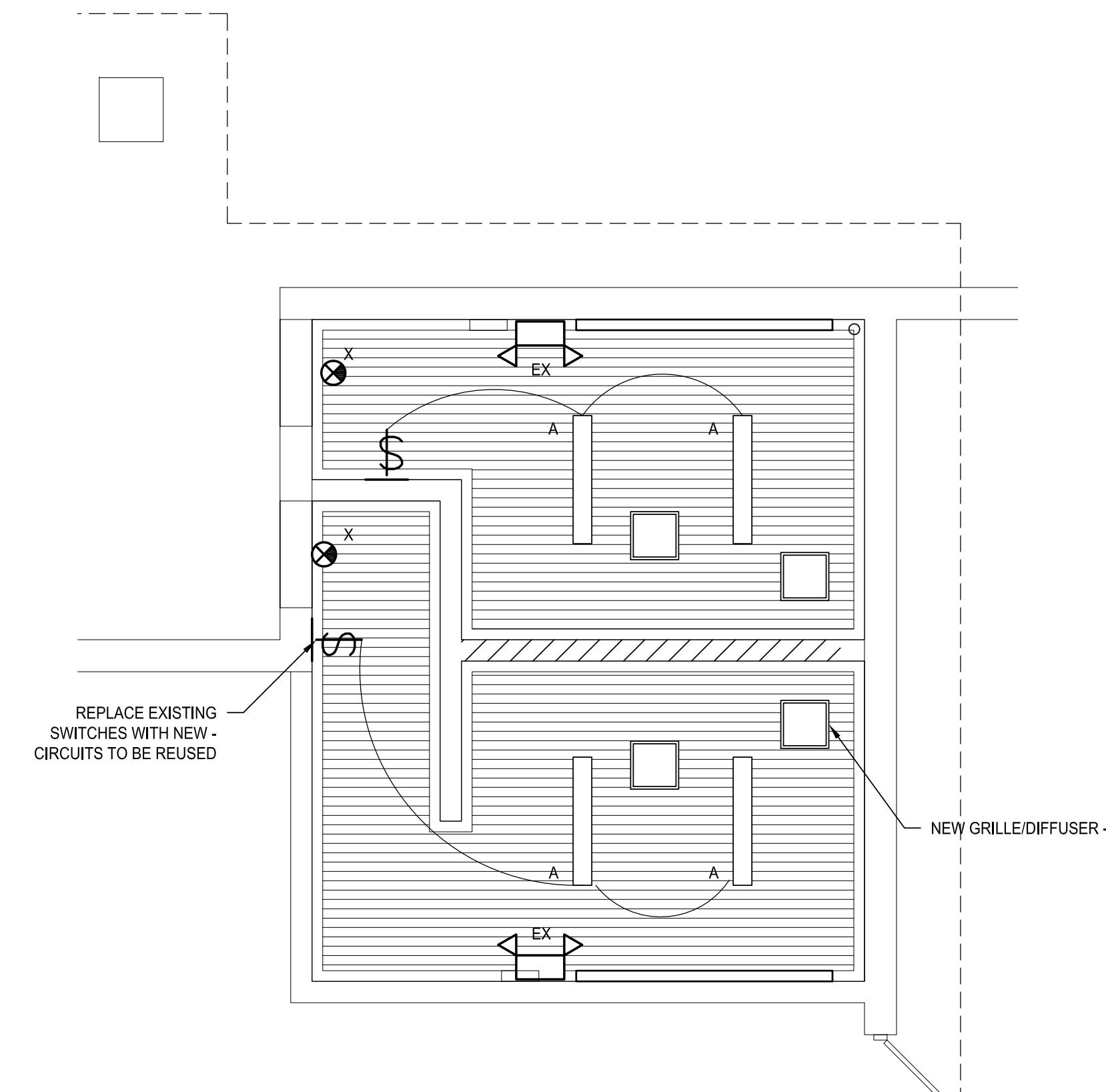
Drawn: C.WHITE  
Checked: D.ZANLEY  
Approved: D.ZANLEY

Sheet Title:  
**MECHANICAL, ELECTRICAL, AND PLUMBING PLANS, DETAILS AND SPECIFICATIONS**

Project Number: 310318

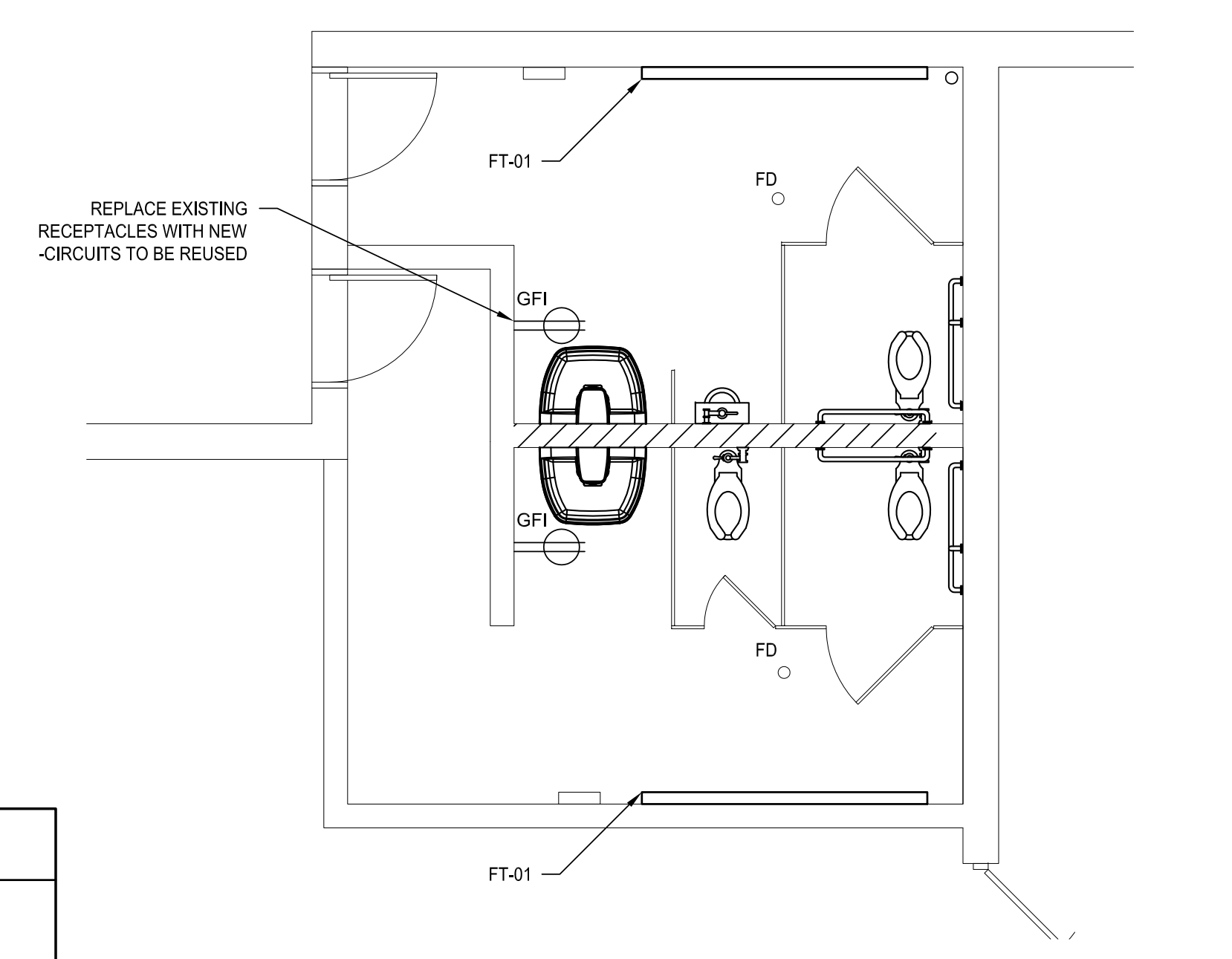
Sheet Number: **M-210**

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MECHANICAL & LIGHTING PLAN  
SCALE: 1/4" = 1'-0"

NOTE:  
CONTRACTOR TO VERIFY EXIST. EXHAUST FAN CAPACITY (CFM)



ELECTRICAL AND PLUMBING PLAN  
SCALE: 1/4" = 1'-0"

**WATER HAMMER ARRESTERS:**

PROVIDE PPE (PRECISION PLUMBING PRODUCTS, INC.) WATER HAMMER ARRESTERS AT ALL FIXTURE HEADERS WITH TWO OR MORE FIXTURES OR AT EACH FIXTURE OR EQUIPMENT WHICH MAY CREATE SURGES IN WATER SUPPLY PIPING. DUE TO SUDDEN ON AND OFF OPERATION OF THE VALVES. SIZES SHALL BE AS RECOMMENDED BY MANUFACTURER FOR THE APPLICATION.

INSTALL WATER HAMMER ARRESTERS BEHIND WALL ACCESS PANEL AS CLOSE AS POSSIBLE TO THE VALVE OR VALVES BEING SERVED.

**FLOOR DRAINS:**

FLOOR DRAINS SHALL BE ANSI A112.21.1; GALVANIZED CAST IRON TWO PIECE BODY WITH DOUBLE DRAINAGE FLANGE, WEEP HOLES, REVERSIBLE CLAMPING COLLAR, AND ROUND, ADJUSTABLE NICKEL-BRONZE STRAINER.

**HUB DRAINS**

**CLEANOUTS:**

**MANUFACTURERS:**

SMITH  
JOSAM  
ZURN  
WADE

INTERIOR FINISHED FLOOR AREAS SHALL BE GALVANIZED CAST IRON, TWO PIECE BODY WITH DOUBLE DRAINAGE FLANGE, WEEP HOLES, REVERSIBLE CLAMPING COLLAR, AND ADJUSTABLE NICKEL-BRONZE STRAINER, ROUND WITH SCORRIATED COVER IN SERVICE AREAS AND ROUND WITH DEPRESSED COVER TO ACCEPT FLOOR FINISH IN FINISHED FLOOR AREAS.

INTERIOR FINISHED WALL AREAS SHALL BE LINE TYPE WITH LACQUERED CAST IRON BODY AND ROUND EPOXY COATED GASKETED COVER, AND ROUND STAINLESS STEEL ACCESS COVER SECURED WITH MACHINE SCREW.

INTERIOR UNFINISHED ACCESSABLE AREAS SHALL BE CAULKED OR THREADED TYPE.

**DIFFUSERS, REGISTERS, AND GRILLES:**

**HVAC**

**SUBMITTALS**

PRODUCT DATA: FOR EACH PRODUCT INDICATED, INCLUDE THE FOLLOWING:

DATA SHEET; INDICATE MATERIALS OF CONSTRUCTION, FINISH, AND MOUNTING DETAILS; AND PERFORMANCE DATA INCLUDING THROW AND DROP, STATIC-PRESSURE DROP, AND NOISE RATINGS.

DIFFUSER, REGISTER, AND GRILLE SCHEDULE; INDICATE DRAWING DESIGNATION, ROOM LOCATION, QUANTITY, MODEL NUMBER, SIZE, AND ACCESSORIES FURNISHED.

CEILING-MOUNTED ITEMS INCLUDING LIGHTING FIXTURES, DIFFUSERS, GRILLES, SPEAKERS, SPRINKLERS, ACCESS PANELS, AND SPECIAL MOLDINGS.

**DUCT ACCESS PANELS.**

**PRODUCTS**

RECTANGULAR AND SQUARE CEILING DIFFUSERS:

MANUFACTURERS: MATERIAL: STEEL  
CARNES. FINISH: BAKED ENAMEL, WHITE.  
HART & COOLEY. FACE SIZE: SEE DRAWING  
KRUEGER. FACE STYLE: FOUR CONE  
NAILOR INDUSTRIES. MOUNTING: SNAP IN  
PRICE INDUSTRIES. PATTERN: ADJUSTABLE  
TITUS. DAMPERS: BUTTERFLY  
TUTTLE & BAILEY. ACCESSORIES: EQUALING GRID

INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.

CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE GENERAL ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. AIR OUTLET AND INLET LOCATIONS HAVE BEEN INDICATED TO ACHIEVE DESIGN REQUIREMENTS FOR AIR VOLUME, NOISE CRITERIA, AIRFLOW PATTERN, THROW, AND PRESSURE DROP. MAKE FINAL LOCATIONS WHERE INDICATED, AS MUCH AS PRACTICABLE. FOR UNITS INSTALLED IN LAY-IN CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL, WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CONFLICT WITH INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOCATION.

INSTALL DIFFUSERS, REGISTERS, AND GRILLES WITH AIRTIGHT CONNECTIONS TO DUCTS AND TO ALLOW SERVICE AND MAINTENANCE OF DAMPERS, AIR EXTRACTORS, AND FIRE DAMPERS.

AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILLES TO AIR PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANCING.

**SHEET METAL NOTES:**

BLANK-OFF RETURN DUCTWORK IN AREAS OF WORK THAT CREATES DUST TO PREVENT DEBRIS FROM ENTERING MECHANICAL SYSTEM.

**LOW PRESSURE DUCTWORK:** ALL DUCTWORK ON DISCHARGE OF ROOFTOP UNIT, ALL RETURN AIR DUCTWORK AND EXHAUST AIR DUCTWORK SHALL BE CONSTRUCTED AND SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST SMACNA'S ISSUE OF "LOW PRESSURE DUCT CONSTRUCTION STANDARDS". IN ADDITION, ALL JOINTS AND SEAMS SHALL BE SEALED WITH DUCT SEALANT EQUAL TO FOSTER #32-14. APPROVED SEALANT MANUFACTURERS: 3M COMPANY, BENJAMIN FOSTER COMPANY, UNITED SHEET METAL, FLINTKOTE.

ALL ROUND TAKE-OFFS DOWNSTREAM OF TERMINAL UNITS SHALL BE MADE WITH CONICAL TAKE-OFF SPIN-IN FITTINGS TYPE SM-2DG, WITH FACTORY INSTALLED ADJUSTABLE DAMPER AS MANUFACTURED BY GENERAL ENVIRONMENT CORPORATION, GLENDALE, CALIFORNIA OR EQUAL.

**FLEXIBLE CONNECTIONS:** AT EACH POINT OF CONNECTION OF DUCTWORK TO FANS, PROVIDE A FLEXIBLE CONNECTION. VENTFABRICS, INC., "VENTGLAS LA," NOT LESS THAN 12" IN LENGTH AND MADE OF HEAVY GRADE GLASS FABRIC DOUBLE COATED WITH NEOPRENE AND PROVIDED WITH A SUITABLE FRAME AT EACH END ARRANGED FOR BOLTING TO INLET AND OUTLET OF FAN AND DUCTWORK, RESPECTIVELY. AS APPROVED BY THE FIRE MARSHAL AND ANY OTHER LOCAL AUTHORITY HAVING JURISDICTION.

**VANES AND DEFLECTORS:** ALL ELBOWS AND TURNS SHALL BE MADE WITH A RADIUS NOT LESS THE 1-1/2" TIMES THE DUCT DIAM. WHERE BUILDING CONSTRUCTION DOES NOT PERMIT A LONG RADIUS ELBOW OR TURN OR IF SHOWN ON THE CONTRACT DOCUMENTS, ACOUSTICAL TURNING VANES AND DEFLECTORS SHALL BE PROVIDED.

**FIRE DAMPERS:** ALL DUCTS, EXCEPT COMBUSTION AIR DUCTS, PASSING THROUGH A REQUIRED FIRE RATED AREA SEPARATION SHALL BE EQUIPPED WITH AN APPROVED MULTI-BLADE OR CURTAIN TYPE FIRE DAMPER COMPLYING WITH THE REQUIREMENTS OF THE LOCAL APPLICABLE BUILDING CODE, FIRE MARSHAL AND ANY OTHER LOCAL AUTHORITY HAVING JURISDICTION. CURTAIN TYPE FIRE DAMPERS SHALL BE AIR BALANCE, INC., NO. 119 UL LISTED WITH TYPE "B" FRAMES.

**FLEXIBLE DUCTWORK:**

ALL LOW PRESSURE AND HIGH PRESSURE FLEXIBLE DUCT SHALL BE FLEXMASTER USA, INC., TYPE 8M INSULATED FLEXIBLE DUCT CONSISTING OF A FACTORY FABRICATED ASSEMBLY OF A TRI-LAMINATE ALUMINUM FOIL, FIBERGLASS AND POLYESTER. THE FLEXIBLE DUCT SHALL BE UL LISTED 181 CLASS 1 AIR DUCT AND COMPLY WITH NFPA 90A AND 90B AND HAVE A FLAME SPREAD OF NOT OVER 25 AND A SMOKE DEVELOPED OF NOT OVER 50. THE FLEXIBLE DUCT SHALL HAVE A MINIMUM PRESSURE RATING OF 12" WC THROUGH TEMPERATURE RANGE OF -20 DEGREES F. TO +250 DEGREES F.

**INSULATION:**

**DUCT INSULATION - GENERAL:**

ALL DUCTWORK SHALL BE THERMALLY INSULATED AS SPECIFIED.

ALL DUCT INSULATION SHALL HAVE A FLAME SPREAD CLASSIFICATION OF 25 OR LESS, A FUEL CONTRIBUTED RATING OF 35 OR LESS AND SMOKE DEVELOPED RATING OF 50 OR LESS, AS RATED BY UNDERWRITERS' LABORATORIES. - BLANKET TYPE (UP TO 1-1/2 LB./CU. FT. INSULATION);

INSULATION WITH ATTACHED FACING SHALL BE SECURED TO THE DUCTS WITH ADHESIVE APPLIED IN 6" BRUSH WIDTHS EVERY 12". THE ADHESIVE SHALL BE RIDGED SLIGHTLY BY USING A SERRATED TROWEL.

INSULATION WITHOUT ATTACHED FACING (PLAIN) SHALL BE SECURED TO THE DUCTS THE SAME AS ABOVE THEN BIND WITH TYING CORD, SPIRAL WRAPPED OR HALF HITCHED.

DUCT FITTINGS SHALL BE INSULATED BY WRAPPING WITH A GLASS FIBER BLANKET. BLANKETS SHALL BE SECURED TO THE DUCT FITTINGS BY INSULATION STAPLES OR JUTE TWINE. THE BLANKET SHALL BE COVERED WITH AN OPEN MESH CLOTH OR GLASS FIBER HEAVILY COATED WITH VAPOR BARRIER ADHESIVE. THE INSULATION THICKNESS SHALL BE EQUAL TO THE THICKNESS OF THE INSULATION ON THE ADJOINING DUCTWORK.

**DUCT INSULATION APPLICATION:**

THE FOLLOWING DUCTWORK SHALL BE INSULATED AS DESCRIBED HEREIN. REFER TO PREVIOUS PARAGRAPHS FOR RELATED INSULATION MATERIALS, DUCT INSULATION AND FINISH APPLICATIONS.

CONCEALED AIR CONDITIONING SUPPLY AIR DUCTWORK, CONCEALED OUTDOOR INTAKE DUCTWORK AND CONCEALED MIXING PLENUMS; (THIS INCLUDES DUCTWORK IN CEILING SPACES USED AS RETURN AIR PLENUM, DUCTWORK IN UNVENTED ATTIC SPACES OR UNVENTED CEILING SPACES WITH ROOF INSULATION), OWENS-CORNING FIBERGLAS

FACED DUCTWRAP COMMERCIAL GRADE TYPE 100 1-1/2" THICK, MINIMUM INSTALLED R VALUE 4.5, 1 LB./CU. FT. DENSITY WITH FACTORY "FRK" VAPOR BARRIER JACKET OR LAMINATED ALUMINUM FOIL, OPEN MESH GLASS FIBER REINFORCING MESH SCRIM AND FLAMEPROOF KRAFT PAPER.

HEATING AND AIR CONDITIONING SUPPLY AIR DUCTWORK, OUTDOOR AIR INTAKE DUCTWORK, RETURN AIR DUCTWORK AND MIXING PLENUMS LOCATED IN CONCEALED SPACES VENTED TO THE OUTDOORS (THIS INCLUDES DUCTWORK IN VENTED CEILING SPACES OR ATTICS) AND IN UNVENTED ATTICS OR CEILING SPACES WITH INSULATED CEILINGS: OWENS-CORNING FIBERGLAS FACED DUCTWRAP COMMERCIAL GRADE TYPE 100 2" THICK MINIMUM INSTALLED R VALUE: 6.0 1 LB./CU. FT. DENSITY WITH FACTORY "FRK" VAPOR BARRIER JACKET OR LAMINATED ALUMINUM FOIL, OPEN MESH GLASS FIBER REINFORCING MESH SCRIM AND FLAMEPROOF KRAFT PAPER.

**PIPING INSULATION:**

INSULATION SHALL BE APPLIED BY EXPERIENCED PIPE COVERERS AS PER BEST TRADE PRACTICE.

ALL ADHESIVES, SEALERS AND COATINGS SHALL BE INCOMBUSTIBLE.

WHERE EXISTING INSULATED PIPING AND SURFACES ARE EXPOSED DUE TO RENOVATIONS, RE-INSULATE EXPOSED SURFACES TO MATCH THE EXISTING INSTALLATION.

APPLY INSULATION TO PIPE LINES AND EQUIPMENT ONLY AFTER TESTING AND INSPECTION, AND ALL SURFACES HAVE BEEN THOROUGHLY CLEANED.

EXPOSED AND CONCEALED: 1" THICK OWENS-CORNING FIBERGLAS AS-JSSL-II "ONE PIECE" PIPE INSULATION WITH FACTORY APPLIED JACKET WITH SELF-SEALING LAP.

INSULATE EXPOSED DRAIN LINES AND HOT AND COLD WATER SUPPLY LINES BELOW PHYSICALLY HANDICAPPED LAVATORIES AND SINKS PER PHYSICALLY HANDICAPPED CODE REQUIREMENTS.

APPROVED MANUFACTURERS: TRUEBRO "LAVGUARD", PLUMBEREX "HANDY SHIELD"

COLOR: WHITE.

MINIMUM PIPE INSTALLATION (DOMESTIC HOT AND COLD WATER):

PIPE SIZE	UP TO 1"	1 1/2" - 2"	OVER 2"
INSULATION THICKNES	0.5"	0.5"	1.0"

**TESTING AND BALANCING:**

**GENERAL:**

TEST AND ADJUST ALL NEW PIPING SYSTEMS INSTALLED IN THIS PROJECT.

PROVIDE ALL TESTING INSTRUMENTS, GAUGES, PUMPS AND OTHER EQUIPMENT REQUIRED OR NECESSARY FOR TEST.

REPAIR ALL DEFECTS DISCLOSED BY TESTS WITHOUT ADDITIONAL COST TO THE OWNER.

REPEAT TESTS AFTER ANY DEFECTS DISCLOSED ARE REPAIRED OR REPLACED, UNLESS WAIVED BY ARCHITECT.

ARRANGE AND PAY THE COST OF ALL UTILITIES USED ON TESTS.

COMPLETE ALL TESTS BEFORE COVERING IS APPLIED.

ISOLATE ALL PIPING SYSTEM COMPONENTS NOT CONSTRUCTED TO WITHSTAND TEST PRESSURES.

**WATER SYSTEMS TEST:**

TEST AT 150 PSIG FOR EIGHT (8) HOURS WITH ZERO LOSS IN PRESSURE. CHECK JOINTS AND FITTINGS FOR LEAKS WITH LIQUID SOAP SOLUTION.

**DRAINAGE SYSTEM:**

THE DRAINAGE SYSTEM SHALL BE TESTED IN ACCORDANCE WITH ALL LOCAL CODES AND REGULATIONS AND IN THE PRESENCE OF THE PROPER INSPECTOR. AIR TEST SHALL BE 5 PSIG AND SHALL REMAIN IN OPERATION FOR A PERIOD OF 15 MINUTES.

**BALANCING:**

BALANCE ALL OUTLETS AND TERMINAL BOXES TO WITHIN 10% OF RATED C.F.M IN ACCORDANCE WITH AABC AND NEBB, SUBMIT BALANCING REPORT.

**PIPE IDENTIFICATION:**

IDENTIFY ALL NEW PIPING INSTALLED IN THIS PROJECT IN ACCORDANCE WITH ANSI A13.1 1981, OSHA, AND OWNER'S

**COMMISSIONING:**

VERIFY THAT UNITS ARE INSTALLED AND CONNECTED ACCORDING TO THE CONTRACT DOCUMENTS.

COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND DO THE FOLLOWING:

INSPECT FOR PHYSICAL DAMAGE TO UNIT CASING.  
VERIFY THAT ACCESS DOORS MOVE FREELY AND ARE WEATHERTIGHT.

CLEAN UNITS AND INSPECT FOR CONSTRUCTION DEBRIS.  
CHECK THAT ALL BOLTS AND SCREWS ARE TIGHT.  
ADJUST VIBRATION ISOLATION AND FLEXIBLE CONNECTIONS.  
VERIFY THAT CONTROLS ARE CONNECTED AND OPERATIONAL.

LUBRICATE BEARINGS ON FANS.

VERIFY THAT FAN WHEEL IS ROTATING IN THE CORRECT DIRECTION AND IS NOT VIBRATING OR BINDING.

ADJUST FAN BELTS TO PROPER ALIGNMENT AND TENSION.

START UNIT ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS. COMPLETE MANUFACTURER'S STARTING CHECKLIST.

MEASURE AND RECORD AIRFLOW OVER COILS.

CHECK OPERATION OF CONDENSER CAPACITY CONTROL DEVICE.

VERIFY THAT VIBRATION ISOLATION AND FLEXIBLE CONNECTIONS PROPERLY DAMPEN VIBRATION TRANSMISSION TO STRUCTURE.

AFTER STARTUP AND PERFORMANCE TEST, LUBRICATE BEARINGS AND ADJUST BELT TENSION.

**DEMONSTRATION**

STARTUP SERVICES: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL AS SPECIFIED BELOW:

TRAIN OWNER'S MAINTENANCE PERSONNEL ON PROCEDURES AND SCHEDULES RELATED TO STARTUP AND SHUTDOWN, TROUBLESHOOTING, SERVICING, AND PREVENTIVE MAINTENANCE.

SCHEDULE TRAINING WITH OWNER, THROUGH ARCHITECT, WITH AT LEAST 7 DAYS' ADVANCE NOTICE.

FIELD TEST REPORTS: INDICATE AND INTERPRET TEST RESULTS FOR COMPLIANCE WITH PERFORMANCE REQUIREMENTS.

MAINTENANCE DATA: INCLUDE A PARTS LIST, CONTROL, AND ACCESSORY; TROUBLESHOOTING MAINTENANCE GUIDE; AND SERVICING AND PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULE.

COORDINATE LOCATIONS FOR REFRIGERANT PIPING AND ELECTRICAL ROUGH-INS.  
MANUFACTURERS STANDARD, BUT NOT LESS THAN 5 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

FIXTURE SCHEDULE	
A	KENALL ENVIROSEAL, 5"x48", BURNISHED STAINLESS STEEL FINISH. ES5-48-2-F32T8-1-DV-2H-PP
X	LITHONIA TITAN STEEL EXIT SIGN, BLACK LX-S-1-R-120/277-ELN
EX	COMBO EXIT LIGHT & DUAL HEAD EMERGENCY LIGHTING UNITS, SELF CONTAINED 6V BATTERY, 12W HALOGEN HEADS, 120V OPERATION, WHITE ENCLOSURE, TIME DELAY RETURN. LITHONIA LHQM-S-W-1-R-120

NOTES:  
1. EXTEND FIRE PROTECTION HEADS TO NEW CEILING.  
2. USE EXIST. BASEBOARD CIRCUIT. ELECTRICAL CONTRACTOR TO VERIFY CAPACITY AND LOCATION.  
3. AFTER EXIST. UNDERSLAB PLUMBING IS EXPOSED, PLUMBING CONTRACTOR TO PROVIDE DESIGN/BUILD PLUMBING DOCUMENT FOR TOWNSHIP APPROVAL.

ELECTRIC HYDRONIC BASEBOARD (FIN TUBE) HEATER SCHEDULE								
MARK	SERVING	CAPACITY (BTU/HR)	CAPACITY (WATTS)	VOLTAGE PHASE	AMPS	LENGTH	MANUFACTURER MODEL NO.	NOTES
FT-01	MULTI-PURPOSE RM.	6850	2000	208/1	9.6	8 FT.	QMARK #HBB2008	PROVIDE INTEGRAL THERMOSTAT


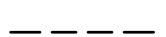

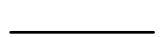

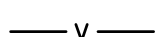
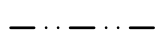
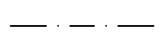
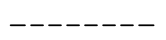


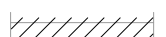
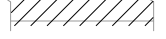
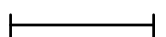
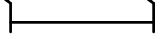

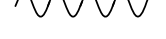
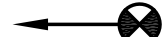








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**LEGEND OF ABBREVIATIONS**

AFF	- ABOVE FINISHED FLOOR
APPROX. OR ~	- APPROXIMATELY
BFP	- BACK FLOW PREVENTER
B.O.	- BOTTOM OF
BOT.	- BOTTOM
CAP.	- CAPACITY
CFM	- CUBIC FEET PER MINUTE
CONC.	- CONCRETE
CONST.	- CONSTRUCTION
CONT.	- CONTINUOUS
DIA	- DIAMETER
DN	- DOWN
E.W.	- EACH WAY
EA.	- EACH
EF	- EXHAUST FAN
EL	- ELEVATION
EQUIP.	- EQUIPMENT
EXIST.	- EXISTING
F	- DEGREES FAHRENHEIT
FD	- FLOOR DRAIN
GALV.	- GALVANIZED
GPM	- GALLONS PER MINUTE
HOR.	- HORIZONTAL
HP	- HORSEPOWER
HVAC	- HEATING/VENTILATING/AIR CONDITIONING
HW	- HOT WATER (DOMESTIC)
IN	- INCHES
LAV.	- LAVATORY
MAX.	- MAXIMUM
MBH	- BTUH (1,000'S)
MIN.	- MINIMUM
MISC.	- MISCELLANEOUS
N.T.S.	- NOT TO SCALE
QTY	- QUANTITY
RAD.	- RADIUS
RD	- ROOF DRAIN
REF.	- REFERENCE
REQ'D.	- REQUIRED
RM.	- ROOM
SCH.	- SCHEDULE
SHT	- SHEET
SI	- SOLID INTERCEPTOR
STD.	- STANDARD
TEMP	- TEMPERATURE
T.O.	- TOP OF
TYP.	- TYPICAL
U.N.O.	- UNLESS NOTED OTHERWISE
VAV	- VARIABLE AIR VOLUME BOXES/ TERMINAL REHEAT
V.I.F.	- VERIFY IN FIELD
VERT.	- VERTICAL
W.C.	- WATER CLOSET

**LEGEND:**

	- EXISTING PIPE (UNDERGROUND)
	- NEW PIPE (UNDERGROUND)
	- EXISTING PIPE (ABOVEGROUND)
	- NEW PIPE (ABOVEGROUND)
	- EXISTING VENT
	- NEW VENT
	- NEW HOT WATER
	- NEW COLD WATER
	- NEW COMPRESSED AIR
	- EXISTING DUCT WORK (TO REMAIN)
	- EXISTING DUCT WORK (TO BE REMOVED)
	- NEW DUCT WORK
	- FLEXIBLE CONNECTION
	- POINT OF CONNECTION, NEW TO EXISTING
	- FIRE DAMPER AND ACCESS DOOR
	- VOLUME DAMPER
	- VARIABLE AIR VOLUME BOX
	- SUPPLY
	- RETURN/ EXHAUST
	- SUPPLY
	- THERMOSTAT
	- CAP
	- PIPING CONNECTION - UP
	- PIPING CONNECTION - DOWN
	- PIPING CONNECTION - BOTTOM
	- VALVE

**MECHANICAL SPECIFICATION**

WORK INCLUDED:

FURNISH ALL LABOR AND MATERIAL, APPLIANCES, EQUIPMENT AND SUPERVISION TO PUT IN PLACE A COMPLETE AND FUNCTIONING MECHANICAL INSTALLATION READY FOR OPERATION, AS SPECIFIED HEREIN AND AS INDICATED ON THE DRAWINGS. SYSTEMS SHALL INCLUDE BUT NOT NECESSARILY LIMITED TO THE FOLLOWING MAJOR EQUIPMENT OR OPERATIONS:

- PLUMBING.
- HEATING, VENTILATING AND AIR CONDITIONING.
- TEMPERATURE CONTROLS.
- FIRE PROTECTION.

DEFINITIONS:

"PROVIDE": TO FURNISH AND COMPLETELY INSTALL SPECIFIED PRODUCTS AND INCIDENTALS, WHETHER SPECIFICALLY INDICATED OR NOT. NECESSARY FOR A COMPLETE, FUNCTIONAL INSTALLATION, INCLUDES ALL GENERAL AND SPECIALIZED LABOR, EQUIPMENT AND TOOLS NECESSARY TO COMPLETE THE INSTALLATION.

"PIPING": A COMPLETE SYSTEM, INCLUDING PIPE, TUBING, FITTINGS, HANGERS, SUPPORTS, VALVES, AND ALL SPECIALTIES THAT COMPRISE A FULLY FUNCTIONAL PIPING SYSTEM, WHETHER SPECIFICALLY INDICATED OR NOT.

CODES, ORDINANCES, AND STANDARDS:

ALL WORK SHALL CONFORM IN ALL RESPECTS TO THE REQUIREMENTS OF THE LATEST ADOPTED FEDERAL, STATE AND LOCAL CODES, ORDINANCES, AND STANDARDS HAVING JURISDICTION OVER THE WORK.

WHERE CONTRACT DOCUMENT REQUIREMENTS EXCEED THE REQUIREMENTS OF THE REFERENCED CODES, ORDINANCES AND STANDARDS, THE CONTRACT DOCUMENT REQUIREMENTS SHALL BE TAKEN AS MINIMUM.

ALL EQUIPMENT CONTAINING ELECTRICAL WIRING AND/OR ELECTRICAL COMPONENTS SHALL HAVE A UNDERWRITERS LABORATORIES (UL) "PACKAGE" LABEL.

PERMITS, FEES AND INSPECTIONS:

SECURE ALL NECESSARY PERMITS AND ARRANGE FOR ALL INSPECTIONS, INCLUDE ALL RELATED COSTS.

FURNISH CERTIFICATES OF FINAL INSPECTION AND APPROVAL UPON COMPLETION OF PROJECT.

EXAMINATION OF SITE:

VISIT PROJECT SITE AND BECOME FULLY COGNIZANT OF ALL EXISTING ARCHITECTURAL, MECHANICAL, ELECTRICAL, STRUCTURAL AND SITE CONDITIONS, OR EXISTING CODE VIOLATIONS WHICH MAY AFFECT THE WORK.

NOTIFY ARCHITECT PRIOR TO SUBMITTING BID IF REVISIONS TO CONTRACT DOCUMENTS ARE NECESSARY TO RECTIFY ANY OF THE AFOREMENTIONED EXISTING CONDITIONS.

NO "EXTRAS" TO CONTRACT PRICE WILL BE ALLOWED AFTER RECEIVING BID IN ORDER TO RECTIFY EXISTING CONDITIONS IN ORDER TO MEET THE DESIGN INTENT OF THE CONTRACT DOCUMENTS OR SATISFY CODE REQUIREMENTS.

COORDINATION WITH OTHER TRADES:

COORDINATE ALL WORK BEFORE AND DURING CONSTRUCTION WITH ALL OTHER AFFECTED TRADES.

WHERE INTERFERENCES DEVELOP, NOTIFY ARCHITECT FOR RESOLUTION OF CONFLICT.

RELOCATION OF CONFLICTING INSTALLED WORK, DUE TO LACK OF COORDINATION, OR POOR COORDINATION WILL NOT BE CONSIDERED EXTRA WORK.

APPROVED MANUFACTURERS:

USE ONLY MATERIALS SPECIFICALLY INDICATED IN CONTRACT DOCUMENTS, OR COMPARABLE MATERIALS BY OTHER LISTED ACCEPTABLE MANUFACTURERS. NOTE THAT "ACCEPTABLE MANUFACTURER" DOES NOT CONSTITUTE AUTOMATIC APPROVAL OF SPECIFIC MATERIALS BY ONE OR ALL OF THE LISTED ACCEPTABLE MANUFACTURERS. ARCHITECT RESERVES THE RIGHT OF FINAL DETERMINATION OF ACCEPTABILITY OF EACH ITEM.

FURNISHING OF MATERIALS AND MANUFACTURERS OTHER THAN THOSE INDICATED AS ACCEPTABLE IN THE CONTRACT DOCUMENTS WILL BE CONSIDERED VOLUNTARY SUBSTITUTES.

SUBMIT ALL VOLUNTARY SUBSTITUTES TO ARCHITECT FOR REVIEW NO LATER THAN FIFTEEN (15) DAYS PRIOR TO BID DUE DATE. IF ACCEPTABLE, ARCHITECT WILL AUTHORIZE USE OF SUBSTITUTE IN WRITTEN FORM BY LETTER OR ADDENDUM TO CONTRACT DOCUMENTS.

APPROVED VOLUNTARY SUBSTITUTES MUST ONLY BE INDICATED ON FORM OF PROPOSAL WITH APPROPRIATE "ADD" OR "DEDUCT" TO CONTRACT PRICE. DO NOT USE VOLUNTARY SUBSTITUTES FOR BASE BID.

AFTER FIFTEEN (15) DAYS PRIOR TO BID DUE DATE, NO CONSIDERATION WILL BE GIVEN TO VOLUNTARY SUBSTITUTES.

SHOP DRAWINGS:

SUBMIT COMPLETE SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT INTENDED FOR USE ON THIS PROJECT.

SHOP DRAWINGS SHALL CLEARLY INDICATE ALL PHYSICAL, PERFORMANCE AND ELECTRICAL CHARACTERISTICS FOR ALL MATERIALS AND EQUIPMENT.

SUBMIT A MINIMUM OF SIX (6) COPIES OF ALL SHOP DRAWINGS FOR REVIEW BY ARCHITECT. ONE (1) COPY WILL BE RETAINED BY ARCHITECT, ONE (1) COPY TO BE INCLUDED IN OPERATION AND MAINTENANCE MANUAL, AND A MINIMUM OF ONE (1) COPY TO BE USED BY MECHANICAL TRADES.

NO WORK IS TO BE INSTALLED PRIOR TO RETURN OF ARCHITECT REVIEWED SHOP DRAWINGS.

OPERATION AND MAINTENANCE MANUALS:

UPON COMPLETION OF PROJECT, SUBMIT TWO (2) COMPLETE BOUND SETS OF OPERATING AND MAINTENANCE MANUALS FOR ALL EQUIPMENT AND SYSTEMS INSTALLED IN THIS PROJECT.

MANUALS SHALL INCLUDE GUARANTEE(S), COMPLETE OPERATING INSTRUCTIONS, REPAIR PARTS LIST, PREVENTATIVE MAINTENANCE SCHEDULE, BELT AND FILTER SCHEDULE, AND LIST OF ALL SUBCONTRACTORS ASSOCIATED WITH THE WORK, INCLUDING TELEPHONE NUMBER AND CONTACT PERSON.

OPERATING AND MAINTENANCE INSTRUCTIONS:

PRIOR TO FINAL ACCEPTANCE BY OWNER, PROVIDE ALL PERSONNEL, EQUIPMENT, AND LABOR AS NECESSARY TO INSTRUCT OWNER'S PERSONNEL IN PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS AND EQUIPMENT INSTALLED IN THIS PROJECT. PROVIDE INSTRUCTIONAL SESSION DURING TIME PERIOD AGREED TO WITH OWNER.

WARRANTY:

WARRANTY PERIOD: FURNACE UNIT - 10 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

WARRANTY PERIOD: AIR-COOLED CONDENSING UNIT - MANUFACTURERS STANDARD, BUT NOT LESS THAN 5 YEARS FROM THE DATE OF SUBSTANTIAL COMPLETION.

EXTRA MATERIALS:

FURNISH EXTRA MATERIALS DESCRIBED BELOW THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS.

DISPOSABLE AIR FILTERS: FURNISH TWO COMPLETE SETS

CUTTING AND PATCHING:

ALL CUTTING AND PATCHING SHALL BE PROVIDED BY THE GENERAL TRADES UNDER THE DIRECTION OF THE MECHANICAL TRADES. COST WILL BE PAID BY THE MECHANICAL TRADE REQUESTING THE WORK.

RESTORED SURFACES SHALL BE OF SAME MATERIALS AND QUALITY AS ADJACENT SURFACES, AND SHALL MATCH SURROUNDING SURFACES, AND/OR BE RESTORED TO PRE-CONSTRUCTION CONDITION.

PROTECTION OF EXISTING SERVICES:

PROTECT FROM ALL DAMAGE, EXISTING SERVICES (I.E., GAS, WATER, ELECTRICAL, ETC.), ENCOUNTERED IN THE WORK, NOT SPECIFICALLY INDICATED TO BE DEMOLISHED. INCLUDE ALL RELATED COSTS.

REPAIR AND/OR REPLACE EXISTING ACTIVE SERVICES INTENDED TO REMAIN IN SERVICE, BUT DAMAGED DURING THE COURSE OF CONSTRUCTION. ABSORB ALL RELATED COSTS. NO "EXTRAS" WILL BE PAID TO RESTORE EXISTING ACTIVE SERVICES DAMAGED DURING CONSTRUCTION.

ARCHITECT WILL DETERMINE COURSE OF ACTION WHEN EXISTING INACTIVE SERVICES ARE DAMAGED DURING COURSE OF CONSTRUCTION. ABSORB ALL COSTS RELATIVE TO ADDITIONAL DEMOLITION, TERMINATION, RELOCATION AND/OR RESTORATION OF EXISTING, DAMAGED INACTIVE SERVICES AS DIRECTED BY ARCHITECT.

CLEANING AND FINISHING:

PRIOR TO FINAL ACCEPTANCE BY OWNER, THOROUGHLY CLEAN ALL WORK INSIDE AND OUT AS APPLICABLE, AND LEAVE ALL SYSTEMS AND EQUIPMENT IN PERFECT WORKING ORDER. THOROUGHLY CLEAN ALL PLUMBING FIXTURES, EXPOSED PIPING, FLOOR DRAIN GRATES, AND CLEANOUT COVERS AS APPLICABLE.

GUARANTEE:

PROVIDE A ONE (1) YEAR GUARANTEE COVERING ALL LABOR AND MATERIAL PROVIDED IN THIS PROJECT. GUARANTEE SHALL INCLUDE ALL SHIPPING AND TRANSPORTATION CHARGES NECESSARY TO RETURN DEFECTIVE MATERIALS TO MANUFACTURER, AS WELL AS LABOR CHARGES NECESSARY TO REMOVE AND REPLACE DEFECTIVE MATERIALS.

DEFECTIVE MATERIALS AND/OR EQUIPMENT MAY BE REPAIRED IN LIEU OF REPLACED WITH PRIOR APPROVAL OF ARCHITECT AND/OR OWNER.

PLUMBING SYSTEM:

THE WORK UNDER THIS SECTION SHALL CONSIST OF PROVIDING AND INSTALLING NEW PLUMBING FIXTURE, EQUIPMENT, AND PIPING, INCLUDING ALL LABOR AND MATERIALS, FOR A COMPLETE PLUMBING SYSTEM, TESTED AND READY FOR USE, AS INDICATED ON THE ARCHITECTURAL AND MECHANICAL DRAWINGS AND AS DESCRIBED HEREIN.

SYSTEM DESCRIPTION:

PLUMBING FIXTURES AND EQUIPMENT.

SANITARY SEWER SYSTEM: CONNECT TO EXISTING SYSTEMS AS INDICATED. VERIFY THE EXACT LOCATION, SIZE, AND DEPTH BEFORE STARTING CONSTRUCTION.

DOMESTIC WATER SYSTEM: CONNECT TO EXISTING BUILDING DOMESTIC WATER SYSTEM, AS INDICATED. VERIFY THE EXACT LOCATION, SIZE, AND WATER PRESSURE BEFORE STARTING CONSTRUCTION.

PLUMBING SERVICES TO EQUIPMENT FURNISHED UNDER THE OTHER SECTIONS OF THE WORK OR OWNER-FURNISHED.

ROUGH-IN AND MAKE ALL FINAL CONNECTIONS FOR WATER, AND WASTE SERVICES, AS REQUIRED, AND AS INDICATED AND SPECIFIED.

ALL DRILLING, CUTTING AND PATCHING REQUIRED FOR THE WORK; PATCHING MATERIALS AND FINISH SHALL MATCH THE SURROUNDING WORK.

ALL LABOR, MATERIALS, AND EQUIPMENT NOT INDICATED BY THE DRAWINGS OR SPECIFICATIONS, WHICH ARE REQUIRED FOR PROPER OPERATION OF THE SYSTEMS IN ACCORDANCE WITH THE TRUE INTENT AND MEANING OF THE CONTRACT DOCUMENTS, SHALL BE PROVIDED AND INCORPORATED IN THE WORK BY AND AT THE EXPENSE OF THE CONTRACTOR.

PIPING NOTES:

SANITARY AND VENT PIPE, FITTINGS: ABOVE GRADE, BELOW GRADE AND/OR BELOW FLOOR SLABS WITHIN BUILDING WALLS.

UP TO 6" DIAMETER (IF CODE APPROVED): PIPE: ASTM D2865 SCHEDULE 40 PVC-DWV INSTALLED PER MANUFACTURER'S RECOMMENDATIONS, FITTINGS: ASTM D1554 SOLVENT CEMENTED, SOLVENT CEMENT: ASTM D2564. INSTALLATION: IN ACCORDANCE WITH ASTM D3221, WHEN PENETRATING FIRE RATED ASSEMBLY THE PIPING MATERIAL NEEDS TO COMPLY WITH UL 723 AND ASTM E84.

ABOVEGROUND DOMESTIC HOT AND COLD WATER:

DOMESTIC HOT WATER:

PIPE: ASTM B88, TYPE L, SEAMLESS HARD DRAWN RIGID COPPER WATER TUBE. FITTINGS: ANSI B16.22, WROUGHT COPPER, ASTM B32-95TA SOLDER JOINT, FOR PIPING 2" AND SMALLER, "SILFOS" SILVER BRAZING ALLOY SOLDER RATED FOR 1000 DEGREES FOR PIPING 3" AND LARGER.

DOMESTIC COLD WATER 4" AND SMALLER:

PIPE: ASTM B88, TYPE L, SEAMLESS HARD DRAWN RIGID COPPER WATER TUBE. FITTINGS: ANSI B16.22, WROUGHT COPPER, ASTM B32-95TA SOLDER JOINT, FOR PIPING 2" AND SMALLER, "SILFOS" SILVER BRAZING ALLOY SOLDER RATED FOR 1000 DEGREES FOR PIPING 3" AND LARGER.

VALVES:

PROVIDE ALL VALVES NECESSARY FOR THE PROPER OPERATION AND DRAINAGE OF THE SYSTEMS. PROVIDE DRAIN VALVES AT ALL LOW POINTS IN ALL SYSTEMS. PROVIDE DRAIN VALVES IN EACH HORIZONTAL RUNOUT FROM EACH RISER ON ALL FLOORS SO THAT ALL HORIZONTAL PIPING ON ALL FLOORS CAN BE INDIVIDUALLY DRAINED WITHOUT DRAINING THE ENTIRE PIPING SYSTEM.

PROVIDE BALL VALVES AT EACH PIECE OF EQUIPMENT REQUIRING A WATER CONNECTION, IN RISERS AND MAIN BRANCHES AT POINTS OF TAKE-OFF FROM THEIR SUPPLY AND RETURN MAINS, ADJACENT TO CONTROL VALVES AND ALL EQUIPMENT REQUIRING DISCONNECTION FOR REPAIRS.

PROVIDE CHECK VALVES WHERE SHOWN OR NECESSARY TO PREVENT BACKFLOW.

PROVIDE BALANCING VALVES IN LINES WHERE IT IS NECESSARY TO REGULATE THE QUANTITY OF WATER FLOWING IN A CIRCUIT.

ALL VALVES SHALL BE LINE SIZE UNLESS OTHERWISE INDICATED.

ALL PRODUCTS THAT CONSTITUTE A PART OF ANY VALVE ASSEMBLY SHALL BE ASBESTOS-FREE.

DOMESTIC COLD WATER AND DOMESTIC HOT WATER SYSTEMS:

BALL VALVES:

BALL VALVES 1/4" TO 1" PIPE SIZE: APOLLO 77C-140-01 FULL PORT, TWO PIECE WITH SCREWED ENDS, BRONZE BODY AND END PIECE, STAINLESS STEEL BALL, TEFLON SEAT RINGS, STAINLESS STEEL STEM, REINFORCED PTFE TEFLON PACKING WITH BRASS PACKING GLAND, ZINC PLATED STEEL HANDLE WITH PLASTIC GRIP SECURED BY ZINC PLATED STEEL HANDLE NUT, 150 PSI STEAM, 600 PSI WOG WORKING PRESSURE.

BALL VALVES 1-1/4" TO 2" PIPE SIZE: APOLLO 82-140-01, 3 PIECE, FULL SIZE PORT WITH SCREWED ENDS, BRONZE BODY, STAINLESS STEEL BALL, TEFLON DOUBLE SEAL SEATS AND THRUST WASHER, BRASS PACKING GLAND, REINFORCED TEFLON PACKING, STAINLESS STEEL STEM, PLASTIC COATED ZINC PLATED STEEL HANDLE AND ZINC PLATED STEEL HANDLE NUT, 150 PSI SATURATES STEAM, 600 PSI WOG.

HOT WATER TEMPERING VALVE:

PROVIDE THERMOSTATIC MIXING VALVES MEETING ASSE 1017 WHERE SHOWN ON THE CONTRACT DOCUMENTS FOR SOURCE HOT WATER MIXING. UNITS SHALL HAVE A BRASS BODY, REPLACEABLE HYDRAULICALLY OPERATED THERMOSTAT, HEAVY DUTY STAINLESS STEEL PRESSURE EQUALIZING SPRING, THREADED CONNECTIONS AND MANUAL DIAL TEMPERATURE ADJUSTMENT CAP RANGING FROM 100 DEGREES F., TO 130 DEGREES F., TEMPERED WATER DISCHARGE TEMPERATURE: 105 DEGREES F.

PROVIDE TEMPERING VALVES MEETING ASSE 1016 FOR ALL FIXTURE MIXING VALVES EQUAL TO POWERS HYDROGUARD T/P E480.

PIPING INSTALLATION:

INSTALL ALL PIPING PARALLEL OR PERPENDICULAR TO BUILDING WALL AND COLUMNS LOCATIONS TO AVOID INTERFERENCE WITH DUCTWORK, STRUCTURE, OTHER PIPING, LIGHTING AND ELECTRICAL EQUIPMENT OR OTHER EQUIPMENT.

DO NOT LOCATE PIPING ABOVE OR WITHIN 3 FEET HORIZONTALLY OF ELECTRICAL PANELS OR EQUIPMENT.

FOR PIPING PASSING THROUGH WALLS, PACK VOID BETWEEN PIPE AND STRUCTURE WITH APPROVED, NON-COMBUSTIBLE MATERIAL.

DO NOT ALLOW CONTACT BETWEEN PIPING AND MASONRY OF CONCRETE SURFACES.

PROVIDE ALL THE NECESSARY HANGERS, RODS, SUPPORTS, CHANNELS, ANGLES, STRUCTURAL MEMBERS AND CONCRETE INSERTS TO PROPERLY SECURE PIPING AND RELATED EQUIPMENT. ALL SUPPORTS AND PARTS SHALL CONFORM TO THE LATEST REQUIREMENTS OF ANSI CODE FOR PRESSURE PIPING B31.1, AND MSS STANDARD PRACTICE SP-58.

PROTECT ALL INSULATED PIPE LINES AGAINST INSULATION DAMAGE AT ALL HANGERS BY THE USE OF 1 FOOT LONG, 12 GAUGE STEEL SEMI-CIRCULAR SHIELDS FOR PIPE SIZES WITH 12" OD AND LESS (INCLUDING INSULATION) AND 2 FOOT LONG, 1/2" STEEL SEMI-CIRCULAR SHIELDS FOR PIPE SIZES OVER 12" OD (INCLUDING INSULATION). SECURELY CEMENT ALL SHIELDS TO THE INSULATION. PROVIDE RIGID PIPE INSULATION AT EACH HANGER.

FIXTURE CONNECTIONS SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE:

FIXTURE	SOIL OR WASTE	VENT	TRAP	HOT WATER	COLD WATER
WATER CLOSETS	4"	2"			1"
URINALS	2"	1-1/2"			3/4"
LAVATORY	1-1/2"	1-1/2"	1-1/4"	1/2"	1/2"
SINK	1-1/2"	1-1/2"	1-1/4"	1/2"	1/2"

OTHERS AS INDICATED IN THE CONTRACT DOCUMENTS.

FIXTURES SHALL BE ACORN OR OWNER-APPROVED EQUAL. ACORN MODEL NUMBERS ARE USED TO ESTABLISH A STANDARD.

FIXTURE SUPPORTS SHALL BE ZURN, J.R. SMITH, JOSAM OR WADE. FLUSH VALVE SHALL BE SLOAN OR ZURN.

FAUCETS SHALL BE SYMMONS, CHICAGO OR SPEAKMAN.

WC-1 WALL MOUNTED WATER CLOSET (PHYSICALLY HANDICAPPED):

WATER CLOSET:

A. BOWL SHALL BE FLOOR MOUNTED, STAINLESS STEEL CLOSET WITH ELONGATED RIM, REINFORCED FLANGE, TOP SUPPLY, 1 1/2" SPUD, MANUFACTURED BY ACORN ENGINEERING WITH SLOAN ROYAL 110 FLUSH VALVE. THE WATER CLOSET AND FLUSH VALVE SHALL BE RATED AT 1.8 GALLONS PER FLUSH. WATER CLOSET SHALL BE ACORN DURA-WARE, 2120 SERIES, BLOWOUT JET TOILET, ON FLOOR, OR ACCEPTABLE EQUAL, AS APPROVED BY OWNER.

B. SUPPORT SHALL BE MATCHING ADJUSTABLE FACE PLATE TYPE WITH FLOOR SUPPORT.

C. FLUSH VALVE SHALL BE SLOAN ROYAL 110, 1.8 GPF MODEL.

WC-2 WALL MOUNTED WATER CLOSET:

WATER CLOSET:

SHALL BE THE SAME AS FOR ITEM WC-1, EXCEPT FIXTURE SHALL BE SET AT STANDARD HEIGHT.

L-1, LAVATORY:

A. LAVATORY DECK AND BOWL MATERIAL: THERMOSET ACRYLIC MODIFIED POLYESTER RESIN CERTIFIED BY APPROVED INDEPENDENT TESTING AGENCY AS COMPLYING WITH ANSI/APA-SS-1-2001, ANSI Z124.3, AND ANSI Z124.6 - BASIS OF DESIGN: BRADLEY TERREON.

B. LAVATORY SHALL BE WALL MOUNT, ACCESSIBLE, 3 USER WASHFOUNTAIN WFNBMF2939, OR ACCEPTABLE EQUAL AS APPROVED BY OWNER, CONSTRUCTED OF SOLID SURFACE MATERIAL WITH INTEGRAL CONTINUOUS BOWL, COMPACT DECK, AND BACKSPASH LEDGE CONTAINING CONCEALED, VANDAL-RESISTANT SPRAY HEAD AND LIQUID SOAP DISPENSER, UNIT INCLUDES WASTE AND SUPPLY CONNECTIONS TO WALL WITH STOP, STRAINER, AND CHECK VALVES, AND STEEL SUPPORT FRAME, CONCEALED BY TAMPER-RESISTANT STAINLESS STEEL ACCESS PANEL, DAD/ABA, AND ANSI A117.1 COMPLIANT. IP/CI/UPC-CERTIFIED BY IAPMO, BRADLEY, MULTI-FOUNT WASHFOUNTAIN SYSTEM MF 2900 SERIES

C. SPRAY HEAD VALVE OPERATION: INFRARED SENSING MODULE AND SOLENOID WITH ADJUSTABLE TURN OFF DELAY AND AUTOMATIC SHUT-OFF, WITH 110/24 VAC PLUG-IN TRANSFORMER.

URINAL UR-1:

A. URINAL SHALL BE WALL MOUNTED STAINLESS STEEL WITH WASHOUT FLUSHING ACTION. URINAL SHALL BE ACORN DURA-WARE SERIES 2167 OR ACCEPTABLE EQUAL AS APPROVED BY OWNER.

B. TOP SPUD FLUSH VALVE SHALL BE SLOAN ROYAL 186-11 FLUSH VALVE. THE URINAL AND FLUSH VALVE SHALL BE RATED AT 1.0 GALLONS PER FLUSH.

C. SUPPORT SHALL BE MATCHING ADJUSTABLE WITH BOTTOM BEARING PLATE.



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Key Plan: NO SCALE

Client:  
**BROWNSTOWN TOWNSHIP**  
 Project:





# Wilkie & Zanley

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## BROWNSTOWN TOWNSHIP

## BROWNSTOWN TOWNSHIP

21311 TELEGRAPH RD.  
BROWNSTOWN TWP, MI

Seat:

Date	Issued For
05-10-2013	OWNER REVIEW
05-20-2013	BIDDING

Drawn: C. WHITE  
Checked: D. ZANLEY  
Approved: D. ZANLEY

## ELECTRICAL SPECIFICATIONS

Project Number: 310318

Sheet Number: E-300

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### ELECTRICAL SPECIFICATION

#### PART 1 - GENERAL

##### COOPERATION WITH OTHER TRADES

WHEN INTERFERENCES EXIST WITH THE WORK OF OTHER TRADES, NOTIFY THE OWNER BEFORE PROCEEDING WITH THE INSTALLATION OF THE WORK. IF ADDITIONAL WORK IS REQUIRED TO REARRANGE INTERFERING EQUIPMENT AND THE CONTRACTOR HAS FAILED TO NOTIFY THE OWNER OF THE INTERFERENCE, THEN THE CORRECTIVE WORK REQUIRED TO CURE THE INTERFERENCE WILL BE DONE AT NO ADDITIONAL EXPENSE TO THE OWNER.

##### ORDINANCES AND CODES

THE ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE GOVERNING RULES AND REGULATIONS OF THE NATIONAL ELECTRIC CODE, ALL LOCAL GOVERNING BOARDS HAVING JURISDICTION, AND, IN ADDITION, SHALL MEET ALL THE STANDARDS AND REQUIREMENTS OF THE OWNER.

THE ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF APPLICABLE FEDERAL, STATE AND LOCAL CODES, ORDINANCES AND REGULATIONS.

PROVIDE MATERIALS LISTED BY THE UNDERWRITERS' LABORATORIES, INC. AND BEARING THEIR LABEL WHERE SUCH SERVICE IS AVAILABLE FOR THE TYPE OF EQUIPMENT SPECIFIED.

WHERE PLANS AND SPECIFICATIONS CONFLICT WITH SUCH LAWS AND ORDINANCES, NOTIFY THE ARCHITECT BEFORE SUBMISSION OF THE BID. AFTER ENTERING INTO THE CONTRACT, THE CONTRACTOR WILL BE HELD RESPONSIBLE TO COMPLETE ALL WORK IN STRICT ACCORDANCE WITH ALL GOVERNING REGULATIONS WITHOUT ADDITIONAL COST TO THE OWNER.

##### PERMITS

OBTAIN AND PAY FOR ALL REQUIRED PERMITS.

##### INSPECTIONS

GIVE ALL REQUIRED NOTICES OF INSPECTIONS REQUIRED BY THE LAWS OR OTHER REGULATIONS AND PAY ALL FEES IN CONNECTION THEREWITH.

FINAL ELECTRICAL INSPECTION IS REQUIRED BY THE LOCAL INSPECTION AUTHORITY. FORWARD A COPY OF THE FINAL APPROVAL TO THE FIRE MARSHAL DIVISION, LOCAL FIELD OFFICE.

##### COORDINATION AND PROJECT RECORD DOCUMENTS

PROJECT RECORD DOCUMENTS ARE REQUIRED UPON COMPLETION OF THE WORK AND BEFORE FINAL PAYMENT IS MADE.

##### GUARANTEE

THE COMPLETE ELECTRICAL SYSTEM OR SYSTEMS FURNISHED AND INSTALLED SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THE WORK AGAINST DEFECTIVE MATERIALS AND/OR WORKSMANSHIP. UPON RECEIPT OF NOTICE OF FAILURE OF ANY PART OF THE WORK DURING THE GUARANTEE PERIOD, THE AFFECTED PART OR PARTS SHALL BE REPLACED PROMPTLY AT NO ADDITIONAL COST TO THE OWNER, INCLUDING ANY DAMAGE DONE TO THE WORK OF OTHERS CAUSED BY THE FAILURE OF THE ELECTRICAL SYSTEM.

##### CHARACTER OF WORK

THE INSTALLATION SHALL BE SO MADE THAT ITS MANY COMPONENT PARTS WILL FUNCTION TOGETHER AS A WORKABLE SYSTEM. IT SHALL BE COMPLETE WITH ALL ACCESSORIES NECESSARY FOR ITS OPERATION, AND SHALL BE LEFT WITH ALL EQUIPMENT PROPERLY ADJUSTED AND IN WORKING ORDER.

EXECUTE THE WORK IN CONFORMITY WITH THE BEST PRACTICE, SO AS TO CONTRIBUTE TO EFFICIENCY OF OPERATION, MINIMUM MAINTENANCE, ACCESSIBILITY AND SIGHTLINESS. EXECUTE SO THAT THE INSTALLATION WILL CONFORM AND ACCOMMODATE ITSELF TO THE BUILDING STRUCTURE, ITS EQUIPMENT AND ITS USAGE.

##### MOUNTING HEIGHTS

MOUNT OUTLET BOXES AND EQUIPMENT AS SHOWN BELOW, UNLESS OTHERWISE INDICATED ON DRAWINGS. MOUNTING HEIGHTS SHOWN, IN GENERAL, ARE ABOVE FINISHED FLOOR TO CENTER LINE OF OUTLET BOXES OR EQUIPMENT.

BRACKET MOUNTED MIRROR LIGHTING FIXTURES: ABOVE MIRROR.

SWITCHES: 3'-10".

RECEPTACLES: FINISHED AREAS: 18".

TELEPHONE OUTLETS - DESK MOUNTED: 18".

TELEPHONE OUTLETS - WALL MOUNTED: 4'-6".

SAFETY SWITCHES: 4'-10".

MOTOR STARTERS: 4'-10".

BRACKET EXIT LIGHTING FIXTURES: 6'-8" TO BOTTOM OF FIXTURE FOR CEILINGS UP TO 9 FEET. MOUNT AT 8'-0" FOR CEILINGS HIGHER THAN 9 FEET.

FIRE ALARM PULL STATION: 4'-0".

FIRE ALARM AUDIOVISUAL OR VISUAL DEVICE: 6'-8" MINIMUM TO BOTTOM OF DEVICE AND 8'-0" MAXIMUM TO TOP OF DEVICE.

REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS BEFORE INSTALLING ANY OF THE ABOVE OUTLETS OR EQUIPMENT FOR INTERFERENCE, AND ADJUST HEIGHTS TO AVOID INTERFERENCES THAT WOULD OCCUR. IF DEVIATIONS ARE REQUIRED, OBTAIN APPROVAL OF THE OWNER BEFORE PROCEEDING WITH INSTALLATION.

##### EQUIPMENT IDENTIFICATION

IDENTIFY ALL PANELS, CONTROL POINTS, CONTROL CENTERS, EQUIPMENT BREAKERS, SWITCHES, ETC., AS APPROVED IN ACCORDANCE WITH THE IDENTIFICATION MARKINGS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED. IDENTIFY EQUIPMENT WITH SUITABLY SIZED ENGRAVED PLASTIC LAMINATE PHENOLIC WHITE BACKGROUND WITH BLACK LETTERING AND ATTACH WITH SHEET METAL SCREWS.

DISCONNECT SWITCHES (INDIVIDUALLY OR PANEL MOUNTED), COMBINATION STARTERS AND TRANSFORMERS SHALL BE IDENTIFIED BY NAME, SOURCE OF POWER AND EQUIPMENT SERVED. PROVIDE NEW NAMEPLATES FOR REVISIONS TO EXISTING EQUIPMENT AFFECTED BY WORK IN THIS CONTRACT.

PANELBOARDS SHALL HAVE TYPED CIRCUIT DIRECTORIES IDENTIFYING EACH LOAD AND LOCATION. UP-DATE ALL EXISTING PANEL SCHEDULES WITH NEW TYPED SCHEDULES FOR PANELS AFFECTED BY WORK IN THIS CONTRACT INCLUDING ADDITIONS OR DELETIONS TO EXISTING PANELS.

CONDUCTORS SHALL BE IDENTIFIED WITH WIRE MARKERS INDICATING THE CIRCUIT NUMBER, WIRE NUMBER OR PHASE LETTER AT EVERY TERMINAL POINT OR SPLICE. PROVIDE CIRCUIT IDENTIFICATION OF EVERY UNSPLICED CONDUCTOR WITHIN EACH JUNCTION OR PULL BOX.

### PARTS 2 AND 3 - PRODUCTS, INSTALLATION AND TESTING

#### RACEWAYS AND FITTINGS

##### CONDUIT:

ELECTRICAL METALLIC TUBING; ZINC-COATED STEEL PER ANSI C80.3-1977 "SPECIFICATION FOR ELECTRICAL TUBING, ZINC-COATED".

RIGID STEEL CONDUIT, ELBOWS, AND COUPLINGS; ZINC-COATED THREADED STEEL PER ANSI C80.1 "SPECIFICATION FOR RIGID STEEL CONDUIT, ZINC-COATED". EACH LENGTH OF CONDUIT SHALL BE THREADED ON BOTH ENDS.

LIQUID-TIGHT FLEXIBLE STEEL CONDUIT: PER UL-360 "LIQUIDTIGHT FLEXIBLE STEEL CONDUIT, ELECTRICAL," "SEALTITE ELECTRIREFLEX".

RIGID NON-METALLIC CONDUIT, ELBOWS, AND COUPLINGS: SMOOTH-WALL POLYVINYLCHLORIDE (PVC), 90°C, UL LISTED AND IN COMPLIANCE WITH THE TESTING REQUIREMENTS DEFINED IN NEMA WTC-2, NEMA TC-3, UL 461, AND UL-514 (FITTINGS), SCHEDULE 40; CARLON PLUS 40 (HEAVY WALL EPC) & SCHEDULE 80; CARLON PLUS 80 (EXTRA HEAVY EPC-80).

MANUFACTURERS: ALLED, ANACONDA-SEALTITE, CERTAINTEC, ELECTRI-FLEX CO., APPLETON, CROUSE-HINDS, PITTSBURGH, REPUBLIC, STEELTUB, TRIANGLE/PVC AND WHEATLAND TUBE.

##### CONDUIT FITTINGS:

COUPLINGS AND CONNECTORS FOR EMT: ZINC-PLATED STEEL, COMPRESSION TYPE.

FITTINGS FOR FLEXIBLE STEEL CONDUIT: MALLEABLE IRON OR STEEL, ZINC OR CADMIUM PLATED, SECURING THE CONDUIT BY CLAMPING ACTION AROUND THE PERIPHERY OF THE CONDUIT, DO NOT FURNISH FITTINGS THAT ANCHOR THE CONDUIT BY MEANS OF SET SCREWS.

##### PERMITS

OBTAIN AND PAY FOR ALL REQUIRED PERMITS.

##### INSPECTIONS

GIVE ALL REQUIRED NOTICES OF INSPECTIONS REQUIRED BY THE LAWS OR OTHER REGULATIONS AND PAY ALL FEES IN CONNECTION THEREWITH.

FINAL ELECTRICAL INSPECTION IS REQUIRED BY THE LOCAL INSPECTION AUTHORITY. FORWARD A COPY OF THE FINAL APPROVAL TO THE FIRE MARSHAL DIVISION, LOCAL FIELD OFFICE.

##### COORDINATION AND PROJECT RECORD DOCUMENTS

PROJECT RECORD DOCUMENTS ARE REQUIRED UPON COMPLETION OF THE WORK AND BEFORE FINAL PAYMENT IS MADE.

##### GUARANTEE

THE COMPLETE ELECTRICAL SYSTEM OR SYSTEMS FURNISHED AND INSTALLED SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THE WORK AGAINST DEFECTIVE MATERIALS AND/OR WORKSMANSHIP. UPON RECEIPT OF NOTICE OF FAILURE OF ANY PART OF THE WORK DURING THE GUARANTEE PERIOD, THE AFFECTED PART OR PARTS SHALL BE REPLACED PROMPTLY AT NO ADDITIONAL COST TO THE OWNER, INCLUDING ANY DAMAGE DONE TO THE WORK OF OTHERS CAUSED BY THE FAILURE OF THE ELECTRICAL SYSTEM.

##### CHARACTER OF WORK

THE INSTALLATION SHALL BE SO MADE THAT ITS MANY COMPONENT PARTS WILL FUNCTION TOGETHER AS A WORKABLE SYSTEM. IT SHALL BE COMPLETE WITH ALL ACCESSORIES NECESSARY FOR ITS OPERATION, AND SHALL BE LEFT WITH ALL EQUIPMENT PROPERLY ADJUSTED AND IN WORKING ORDER.

EXECUTE THE WORK IN CONFORMITY WITH THE BEST PRACTICE, SO AS TO CONTRIBUTE TO EFFICIENCY OF OPERATION, MINIMUM MAINTENANCE, ACCESSIBILITY AND SIGHTLINESS. EXECUTE SO THAT THE INSTALLATION WILL CONFORM AND ACCOMMODATE ITSELF TO THE BUILDING STRUCTURE, ITS EQUIPMENT AND ITS USAGE.

##### MOUNTING HEIGHTS

MOUNT OUTLET BOXES AND EQUIPMENT AS SHOWN BELOW, UNLESS OTHERWISE INDICATED ON DRAWINGS. MOUNTING HEIGHTS SHOWN, IN GENERAL, ARE ABOVE FINISHED FLOOR TO CENTER LINE OF OUTLET BOXES OR EQUIPMENT.

BRACKET MOUNTED MIRROR LIGHTING FIXTURES: ABOVE MIRROR.

SWITCHES: 3'-10".

RECEPTACLES: FINISHED AREAS: 18".

TELEPHONE OUTLETS - DESK MOUNTED: 18".

TELEPHONE OUTLETS - WALL MOUNTED: 4'-6".

SAFETY SWITCHES: 4'-10".

MOTOR STARTERS: 4'-10".

BRACKET EXIT LIGHTING FIXTURES: 6'-8" TO BOTTOM OF FIXTURE FOR CEILINGS UP TO 9 FEET. MOUNT AT 8'-0" FOR CEILINGS HIGHER THAN 9 FEET.

FIRE ALARM PULL STATION: 4'-0".

FIRE ALARM AUDIOVISUAL OR VISUAL DEVICE: 6'-8" MINIMUM TO BOTTOM OF DEVICE AND 8'-0" MAXIMUM TO TOP OF DEVICE.

REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS BEFORE INSTALLING ANY OF THE ABOVE OUTLETS OR EQUIPMENT FOR INTERFERENCE, AND ADJUST HEIGHTS TO AVOID INTERFERENCES THAT WOULD OCCUR. IF DEVIATIONS ARE REQUIRED, OBTAIN APPROVAL OF THE OWNER BEFORE PROCEEDING WITH INSTALLATION.

##### EQUIPMENT IDENTIFICATION

IDENTIFY ALL PANELS, CONTROL POINTS, CONTROL CENTERS, EQUIPMENT BREAKERS, SWITCHES, ETC., AS APPROVED IN ACCORDANCE WITH THE IDENTIFICATION MARKINGS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED. IDENTIFY EQUIPMENT WITH SUITABLY SIZED ENGRAVED PLASTIC LAMINATE PHENOLIC WHITE BACKGROUND WITH BLACK LETTERING AND ATTACH WITH SHEET METAL SCREWS.

DISCONNECT SWITCHES (INDIVIDUALLY OR PANEL MOUNTED), COMBINATION STARTERS AND TRANSFORMERS SHALL BE IDENTIFIED BY NAME, SOURCE OF POWER AND EQUIPMENT SERVED. PROVIDE NEW NAMEPLATES FOR REVISIONS TO EXISTING EQUIPMENT AFFECTED BY WORK IN THIS CONTRACT.

PANELBOARDS SHALL HAVE TYPED CIRCUIT DIRECTORIES IDENTIFYING EACH LOAD AND LOCATION. UP-DATE ALL EXISTING PANEL SCHEDULES WITH NEW TYPED SCHEDULES FOR PANELS AFFECTED BY WORK IN THIS CONTRACT INCLUDING ADDITIONS OR DELETIONS TO EXISTING PANELS.

CONDUCTORS SHALL BE IDENTIFIED WITH WIRE MARKERS INDICATING THE CIRCUIT NUMBER, WIRE NUMBER OR PHASE LETTER AT EVERY TERMINAL POINT OR SPLICE. PROVIDE CIRCUIT IDENTIFICATION OF EVERY UNSPLICED CONDUCTOR WITHIN EACH JUNCTION OR PULL BOX.

### INSTALLATION - PULL AND JUNCTION BOXES:

FOR JUNCTION OR PULL BOXES NOT OVER 100 CUBIC INCHES IN SIZE USE 4-1/16-INCHES X 4-1/16-INCHES OUTLET BOXES. FOR JUNCTION OR PULL BOXES OVER 100 CUBIC INCHES IN SIZE, CONSTRUCT SAME AS CABINETS WITH COVERS OF SAME GAGE METAL AS BOXES AND SECURE BY SCREWS OR BOLTS, USE GALVANIZED SHEET STEEL BOXES WITH METAL THICKNESS NOT LESS THAN NO. 14 GAGE. SIZE AND INSTALL BOXES PER THE LATEST EDITION OF NEC ARTICLE NO. 314. INSTALL REMOVABLE COVERS FOR ACCESS AT ALL TIMES.

##### OUTLET BOXES:

IN GENERAL, USE OUTLET BOXES NOT LESS THAN 4-INCHES SQUARE, AT LEAST 2-INCHES DEEP AND OF SUFFICIENT SIZE TO ACCOMMODATE THE WIRING DEVICES TO BE INSTALLED AT THE OUTLET LOCATION. FLUSH MOUNTED BOXES FOR MULTIPLE OUTLET SHALL BE OF GANG TYPE AND SHALL BE NOT LESS THAN 2-1/4 INCH DEEP AND NOT LESS THAN 3 INCHES DEEP FOR CEILING BOXES.

WHERE SHOWN ON THE DRAWINGS, AND NOTED IN THESE SPECIFICATIONS, USE THREADED-HUB, CAST METAL OUTLETS ON EXPOSED CONDUIT SYSTEMS OR FOR WEATHERPROOF DEVICES SUITABLE FOR THE WIRING DEVICES TO BE INSTALLED.

USE OUTLET BOXES WITH PLASTER COVERS FOR WIRING DEVICES IN FINISHED WALLS WHERE PRACTICABLE. TO BRING BOX OPENINGS FLUSH WITH FINISHED WALL OR NOT MORE THAN 1/4-INCH BACK OF SAME.

WHERE MOUNTING HEIGHT OR LOCATION OF OUTLETS IS NOT SHOWN OR SPECIFIED LOCATE THE OUTLET AS BEST SUITED FOR THE EQUIPMENT CONNECTED THERETO OR AS DIRECTED.

USE 4-INCH OCTAGON BOXES WITH 3/8-INCH FIXTURE STUD FOR LIGHTING FIXTURES.

##### WIRES AND CABLES:

PROVIDE WIRE AND CABLE FOR STANDARD SPECIFICATIONS ESTABLISHED FOR SUCH MATERIAL AND CONSTRUCTION BY ASTM, ANSI, IPCEA AND NEMA, WHERE APPLICABLE. PROVIDE COPPER CONDUCTORS OF 98% CONDUCTIVITY, NOT LESS THAN NO. 12 AWG. PROVIDE CONDUCTOR SIZES AS INDICATED. PROVIDE STRANDED CONDUCTORS.

WIRE FOR GENERAL INTERIOR AND EXTERIOR USE: SINGLE CONDUCTOR, ANNEALED COPPER, RATED 600 VOLTS AS FOLLOWS:

NEC TYPE THHN, RATED 90°C, DRY AND DAMP LOCATION.  
NEC TYPE XHHW, RATED 90°C, DRY AND DAMP LOCATION AND 75°C, WET LOCATION.

##### INSTALLATION - WIRES AND CABLES:

INSTALL WIRING IN ACCORDANCE WITH ARTICLE NO. 210 OF THE NATIONAL ELECTRICAL CODE OR PER ANY OTHER CODES THAT TAKE PRECEDENCE.

INSTALL CONDUCTORS IN SUCH A MANNER THAT THE BENDING RADIUS OF ANY WIRE OR CABLE IS NOT LESS THAN THE MINIMUM RECOMMENDED BY IPCEA AND/OR THE MANUFACTURER. DO NOT EXCEED MANUFACTURER'S RECOMMENDED VALUES FOR MAXIMUM PULLING TENSION OR SIDEWALL FORCE APPLIED TO ANY WIRE OR CABLE.

##### COLOR CODING AND CONDUCTOR IDENTIFICATION:

MATCH EXISTING COLOR SCHEME OR AS REQUIRED BY THE NEC.

##### BRANCH CIRCUITS:

PROVIDE A SEPARATE NEUTRAL WIRE FOR EVERY BRANCH CIRCUIT REQUIRING A NEUTRAL. SHARING OF NEUTRAL WIRES IS NOT ALLOWED.

##### GROUND WIRE:

GROUND WIRE FOR GENERAL INTERIOR USE SHALL BE GREEN INSULATED STRANDED COPPER AND SHALL MEET REQUIREMENTS OF WIRE FOR INTERIOR AND EXTERIOR USE.

##### INSULATING TAPE:

SCOTCH 33 PLUS OR OKONITE TYPE CLF SERIES 602-20 FOR GENERAL USE AND SCOTCH 27 FOR HIGH TEMPERATURE AREAS.

##### RECEPTACLES:

20 AMPERE SINGLE OR DUPLEX CONVENIENCE RECEPTACLES FOR 120 VOLT, SINGLE PHASE SERVICE; STRAIGHT BLADE, 2 POLE, 3 WIRE, NEMA CONFIGURATION 5-20R, RATED 20 AMPERES, 125 VOLTS, NEMA PERFORMANCE STANDARD, SPECIFICATION GRADE, FOR BACK AND SIDE WIRING, COLOR TO MATCH EXISTING OR PER ARCHITECT. NYLON, ARROW-HART 5362, BRYANT, OR HUBBELL INC.

GROUND-FAULT INTERRUPTER SHALL BE DUPLEX, 2 POLE, 3 WIRE, GROUNDING TYPE, RATED 20 AMPERE, 125 VOLT, NEMA CONFIGURATION 5-20R, ARROW-HART GF5342, BRYANT OR HUBBELL.

##### LIGHTING SWITCHES:

TOGGLE OPERATED, SINGLE POLE SINGLE THROW, SINGLE POLE DOUBLE THROW, DOUBLE POLE DOUBLE THROW, SPECIFICATION GRADE, COMPOSITION BASED, HEAVY DUTY, FLUSH, QUIET TYPE, WITH PROVISION FOR BACK AND SIDE WIRING AND RATED 20 AMPERES, 120/277 VOLTS A.C., ARROW-HART 1991 THRU 1994, BRYANT 4901 THRU 4904, OR HUBBELL HBL 1221 THRU HBL 1224.

BOXES, PROVIDE PERMANENTLY INSTALLED BARRIERS BETWEEN ADJACENT SWITCHES.

ILLUMINATED TOGGLE SWITCHES SHALL HAVE LONG LIFE NEON LAMPS AND LEXAN HANDLES, IN EITHER RED OR IVORY, AS INDICATED. HUBBELL #1223-IL-PL, OR #1223-IL-L.

##### DEVICE PLATES:

GANG TOGETHER ALL SWITCHES LOCATED IN ONE LOCATION AND COVER WITH ONE CUSTOM MADE WALL PLATE. SELECT THE CORRECT COMBINATION AND TYPE OF OPENING.

DEVICE PLATES IN FINISHED AREAS SHALL BE SMOOTH, BRUSHED STAINLESS STEEL, NO. 302/304 FINISH. FOR RECEPTACLES WIRED TO THE EMERGENCY SYSTEM, THE PLATE SHALL BE ENGRAVED WITH "EMERGENCY" IN RED FILLED LETTERS.

##### INSTALLATION - WIRING DEVICES:

INSTALL WALL SWITCHES NEAR DOORS AT STRIKE SIDE OF DOORS AS FINALLY HUNG, 6 INCHES FROM DOOR FRAME. INSTALL SWITCHES IN 4-1/16 INCHES SQUARE BOXES WHERE POSSIBLE.

USE GANGED BOXES, 2-1/2 INCH DEEP, FOR 120 VOLT AND 277 VOLT SWITCHES AT THE SAME LOCATION WITH ISOLATING PARTITION BETWEEN 120 VOLT AND 277 VOLT SWITCHES. PROVIDE ISOLATING PARTITION BETWEEN 277 VOLT SWITCHES.

INSTALL PLUG-IN STRIPS AS INDICATED ON THE DRAWINGS. IF NOT INDICATED, INSTALL STRIPS ABOVE COUNTER 1 INCH ABOVE BACKSPASH AND STRIPS ABOVE BASEBOARD, FLUSH WITH TOP OF BASEBOARD.

### GROUNDING:

#### GROUNDING CONDUCTORS:

BARE GROUNDING CONDUCTORS: STRANDED ANNEALED COPPER (SIZE AS INDICATED ON THE DRAWINGS).

INSULATED GROUNDING CONDUCTORS: REFER TO "WIRES AND CABLES" IN THIS SPECIFICATION.

#### GROUNDING CONNECTIONS:

FOR OCCUPIED INTERIOR OF BUILDINGS, USE THE LOW EMISSION WELD PROCESS WHICH IS VIRTUALLY SMOKELESS. IGNITION SHALL BE BY MEANS OF A BATTERY POWERED ELECTRICAL IGNITION WHICH ELIMINATES ALL OPEN FLAME.

APPROVED MANUFACTURER: CADWELD "EXOLON".

COPPER COMPRESSION GROUNDING: PIPE AND CLAMP-ON CONNECTIONS SHALL BE MADE WITH APPROVED BOLT CLAMPS OF CAST BRONZE OR BRASS.

MANUFACTURERS: BURNDY, PENN UNION AND THOMAS & BETTS.

GROUNDING FITTINGS FOR BONDING A GROUND CONDUCTOR TO ITS OWN CONDUIT: BURNDY TYPE NE, OR PENN UNION TYPE BD.

#### INSTALLATION - GROUNDING:

THOROUGHLY CLEAN ALL BONDING SURFACES OF NON-CONDUCTING MATERIALS, TIN AND SWEAT CONTACT SURFACES WHILE BOLTING. DO NOT USE SOLDER TYPE CONNECTIONS.

PROVIDE SUPPLEMENTAL GROUNDING SYSTEM / RODS / MATS AS REQUIRED TO CONFORM TO NEC.

#### LIGHTING SYSTEMS:

PROVIDE LIGHTING SYSTEMS AS REQUIRED, AND ALL MATERIALS AND EQUIPMENT, INCLUDING LUMINAIRES, LAMPS, BALLASTS, POLES, ACCESSORIES AND ASSOCIATED SYSTEMS AND EQUIPMENT, AS INDICATED OR SPECIFIED.

FURNISH LUMINAIRES AND OTHER EQUIPMENT, INCLUDING ALL MODIFICATIONS THERETO AND COMPONENT ELECTRICAL PARTS, LISTED BY UNDERWRITERS' LABORATORIES AS MEETING NATIONAL ELECTRICAL CODE REQUIREMENTS AND BEARING THE UL LABEL WHERE SUCH SERVICE IS AVAILABLE FOR EQUIPMENT SPECIFIED.

NEUTRAL BUS BAR: PROVIDE NEUTRAL BUS BAR OF SUFFICIENT CAPACITY TO TERMINATE ALL THE BRANCH CIRCUIT NEUTRAL WIRES, THE SIZE OF NEUTRAL LUGS SHALL BE AT LEAST 175% OF PHASE LUGS FOR PANELBOARDS FED FROM K-RATED TRANSFORMERS, OR OTHERWISE NOTED.

CIRCUIT BREAKERS: BOLT-ON MOULDED CASE TYPE, THERMAL MAGNETIC, 1, 2 OR 3 POLES, QUICK-MAKE, QUICK-BREAK WITH COMMON TRIP FOR 2 AND 3 POLE BREAKERS, TRIP INDICATION AND MINIMUM INTERRUPTING RATING OF 10,000 RMS SYMMETRICAL AMPERES AT 120 VOLTS AC FOR SINGLE POLE BREAKERS AND AT 240 VOLTS AC FOR 2 AND 3 POLE BREAKERS. SERIES RATED BREAKERS ARE NOT ACCEPTABLE.

CABINETS: FLUSH OR SURFACE MOUNTING TYPE AS INDICATED, WITH MINIMUM 20 INCH BOX, EXCEPT COLUMN WIDTH PANEL. PROVIDE NEMA 1 UNLESS OTHERWISE NOTED. FABRICATE CABINETS FROM CODE GAGE SHEET STEEL, GALVANIZE OR PHOSPHATIZE, AND PRIME AND FINISH PAINT SURFACES WITH MANUFACTURER'S STANDARD FINISH. GALVANIZE RECESSED BOXES. PROVIDE GUTTER SPACE TO ACCOMMODATE SIZE OF CABLE USED IN COMBINATION CATCH AND LOCK. PROVIDE A THREE-POINT COMBINATION CATCH AND LOCK WITH VAULT-TYPE HANDLE FOR DOORS MORE THAN 48 INCHES HIGH. KEY ALL LOCKS ALIKE OR TO THE EXISTING MASTER SYSTEM.

PERFORM OPERATING TESTS ON LIGHTING SYSTEMS TO PROVE THAT ALL DESIGN FUNCTIONS ARE SATISFACTORILY PERFORMED.

#### BALLASTS:

FLUORESCENT ELECTRONIC; ENERGY SAVING, HIGH POWER FACTOR, NON-PCB, CBM CERTIFIED AND CLASS "P" APPROVED, UNLESS OTHERWISE SPECIFIED IN THE FIXTURE SPECIFICATIONS. FURNISH COMMERCIAL AND RECESSED TYPE FIXTURES WITH BALLASTS HAVING A NEMA SOUND RATING OF "X" OR BETTER. ALL BALLASTS SHALL MATCH THE LAMPS SPECIFIED. GENERAL ELECTRICAL "WATT MISER" OR EQUAL BY LISTED BALLAST MANUFACTURERS.

MANUFACTURERS: ADVANCE, GENERAL ELECTRIC AND UNIVERSAL.

### FLUORESCENT LAMPS:

FLUORESCENT T-8: RAPID START, 48" LONG, 32 WATT, MEDIUM BIPIN LAMP, 2850 LUMENS, 3500K, 75 CRI (MINIMUM), UNLESS OTHERWISE NOTED OR SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE.

FLUORESCENT COMPACT: TYPE AND WATTAGE AS INDICATED IN THE LUMINAIRE SCHEDULE. PREHEAT, 3500K, 82 CRI (MINIMUM), UNLESS OTHERWISE NOTED OR SPECIFIED IN THE SCHEDULE.

#### LIGHTING CONTROL SYSTEM:

PROVIDE OCCUPANCY SENSORS AS SHOWN ON THE DRAWINGS

MANUFACTURERS: WATT STOPPER, LEVITON, SENSOR SWITCH

#### INSTALLATION - LIGHTING:

PROVIDE SUPPORTS FOR ALL LIGHTING FIXTURES AS DETAILED, AS SPECIFIED OR AS OTHERWISE REQUIRED BY THE FIXTURE SPECIFIED. SUPPORT SINGLE UNITS FROM FIXTURE STUDS IN OUTLET BOXES, IN FINISHED AREAS, PROVIDE SUPPORTS INDEPENDENT OF THE ACOUSTIC TILE OR PLASTER; SUPPORT FIXTURES FROM THE CEILING SUPPORT SYSTEM, OR FROM THE CONCRETE FLOOR OR ROOF STEEL ABOVE THE CEILING.

PROVIDE SUPPORTS FOR RECESSED FIXTURES AS RECOMMENDED BY THE FIXTURE MANUFACTURER OR AS SPECIFIED. VERIFY CEILING SUPPORT SYSTEMS AND COORDINATE FIXTURE INSTALLATION. FASTEN "LAY-IN" FIXTURES TO THE CEILING GRID.

GENERAL: DEAD-FRONT SAFETY TYPE LIGHTING AND RECEPTACLE PANELBOARDS CONSISTING OF 3 PHASE, 4 WIRE AND 1 PHASE, 3 WIRE WITH SOLID NEUTRAL AND GROUND BUS, ALL FABRICATED OF 98% CONDUCTIVITY COPPER SIZED TO LIMIT TOTAL TEMPERATURE RISE OF 55°C OVER AN AMBIENT OF 40°C AT RATED LOAD, WITH MAIN LUGS OR MAIN CIRCUIT BREAKER AS INDICATED, AND BRANCH CIRCUIT BREAKERS. ALL CIRCUIT BREAKERS USED FOR SWITCHING FLUORESCENT LIGHTING SHALL BE APPROVED FOR SUCH SWITCHING DUTY AND SHALL BE LABELED "SWD".

NEUTRAL BUS BAR: PROVIDE NEUTRAL BUS BAR OF SUFFICIENT CAPACITY TO TERMINATE ALL THE BRANCH CIRCUIT NEUTRAL WIRES, THE SIZE OF NEUTRAL LUGS SHALL BE AT LEAST 175% OF PHASE LUGS FOR PANELBOARDS FED FROM K-RATED TRANSFORMERS, OR OTHERWISE NOTED.

CIRCUIT BREAKERS: BOLT-ON MOULDED CASE TYPE, THERMAL MAGNETIC, 1, 2 OR 3 POLES, QUICK-MAKE, QUICK-BREAK WITH COMMON TRIP FOR 2 AND 3 POLE BREAKERS, TRIP INDICATION AND MINIMUM INTERRUPTING RATING OF 10,000 RMS SYMMETRICAL AMPERES AT 120 VOLTS AC FOR SINGLE POLE BREAKERS AND AT 240 VOLTS AC FOR 2 AND 3 POLE BREAKERS. SERIES RATED BREAKERS ARE NOT ACCEPTABLE.

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