



MANHOLE

C/C CENTER TO CENTER

CFM CUBIC FEET PER MINUTE

CFS CUBIC FEET PER SECOND

CE COVER ELEVATION

CG CORNER GUARD

CEM CEMENT

CH CHILLER

DK DECK

DN DOWN

DO DITTO

DPR DAMPER

DS DOWNSPOUT

DR DOOR

DL DEAD LOAD

FR FIRE RATED

FS FLOW SWITCH

FVC FIRE VALVE CABINET

FT FEET

FIBERGLASS REINFORCED PLASTIC

FD/SD COMBINATION FIRE AND SMOKE DAMPER

INSUL INSULATION

INT INTERIOR

JAN JANITOR

JST JOIST

JT JOINT

JP JOCKEY PUMP

JUNCTION BOX

LAD Project No. 090-10031-000 BOR Project No. 023-110-10 OCTOBER 15, 2010 GENERAL NOTES, SYMBOLS AND ABBREVIATIONS

G0.02

WWF WELDED WIRE FABRIC

XFMR TRANSFORMER

IF SHEET MEASURES LESS THAN 42" X 30" IT IS A

REDUCED PRINT. REDUCE SCALE ACCORDINGLY

SUSP SUSPENDED

SWGR SWITCHGEAR

SYM SYMMETRICAL

T&B TOP AND BOTTOM

TC TOP OF CURB

T&G TONGUE AND GROOVE

SW SWITCH

T TREAD

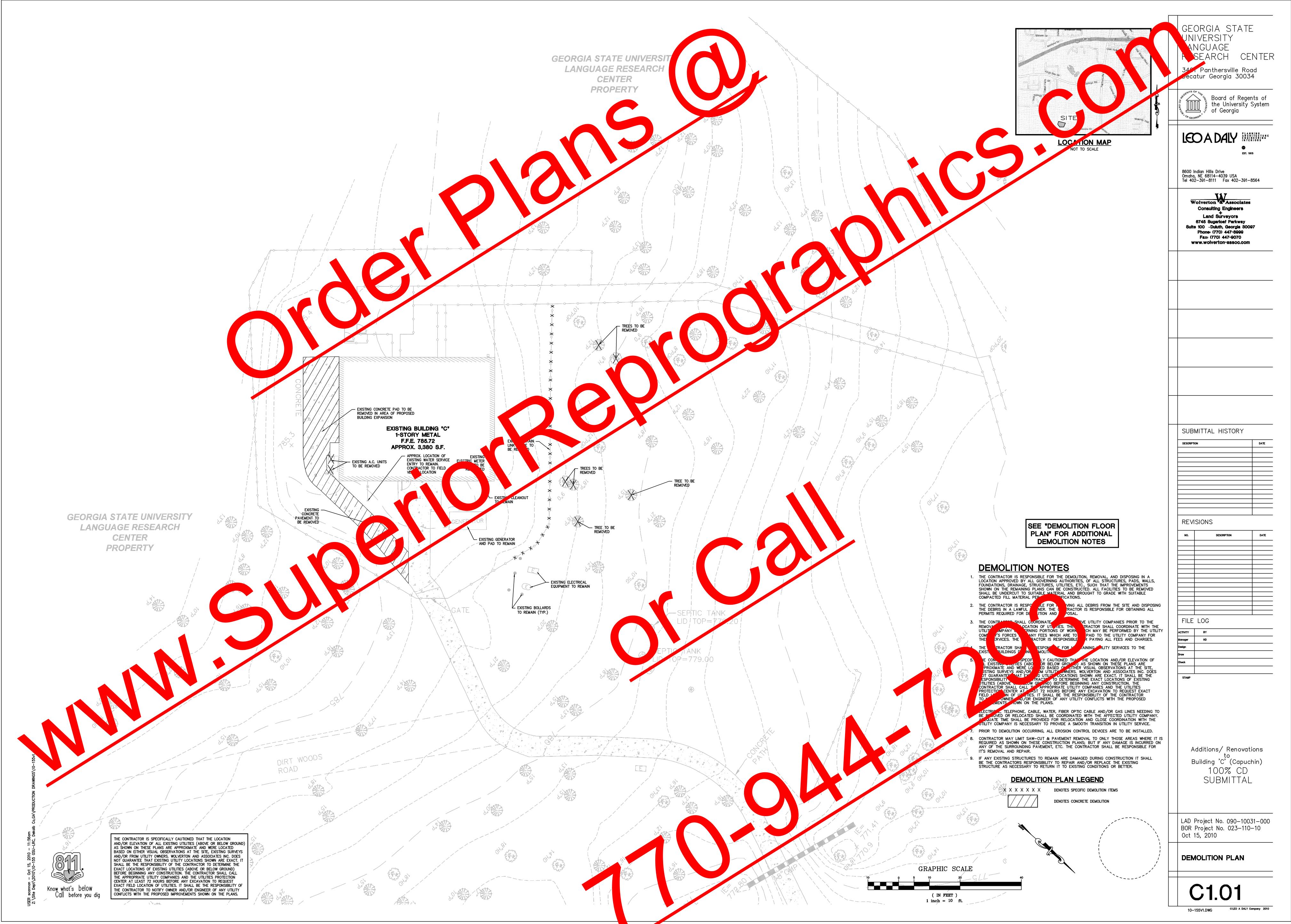
INT OF VERTICAL CURVATURE

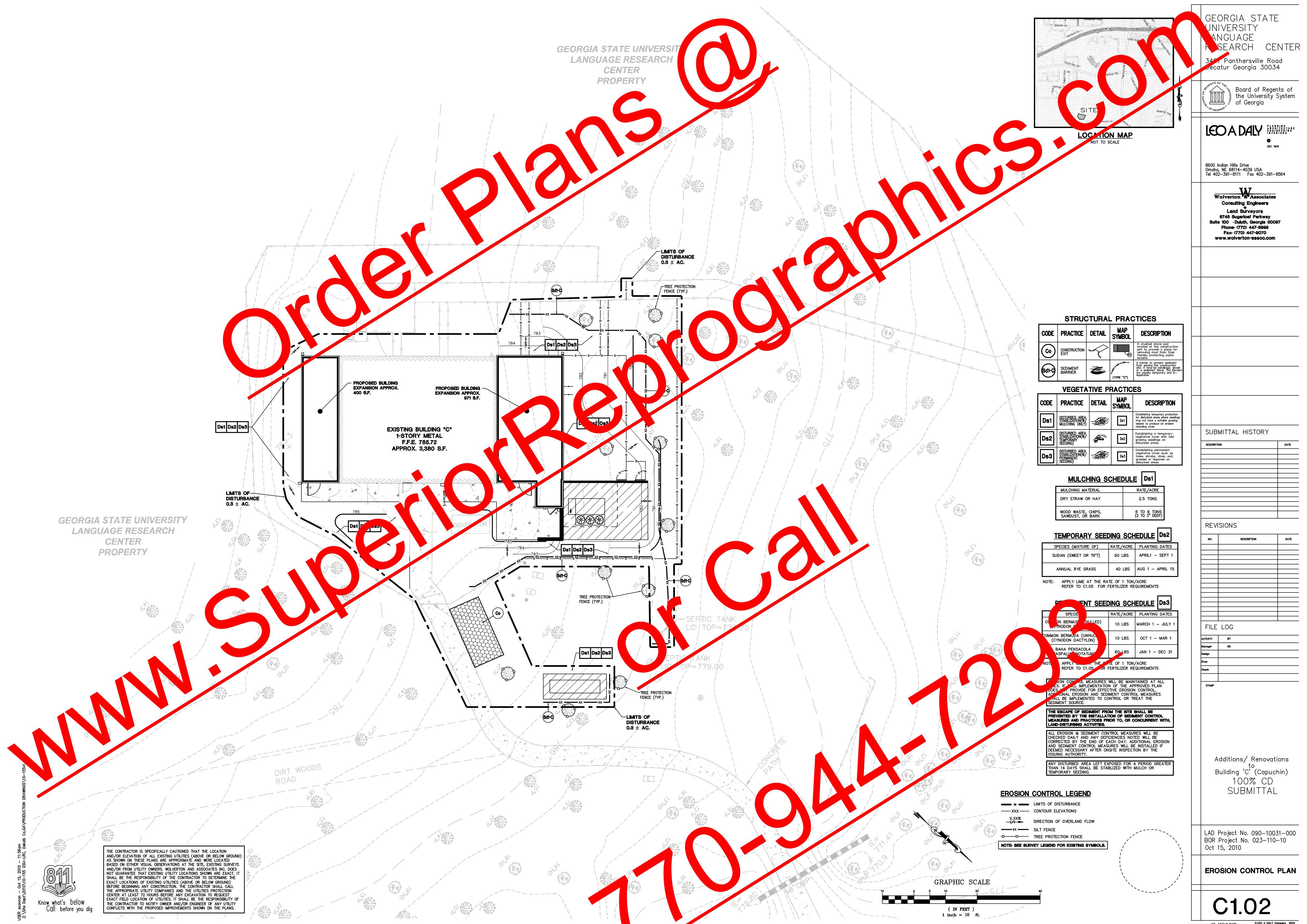
POINT OF VERTICAL INTERSECTION

POINT OF VERTICAL TANGENCY

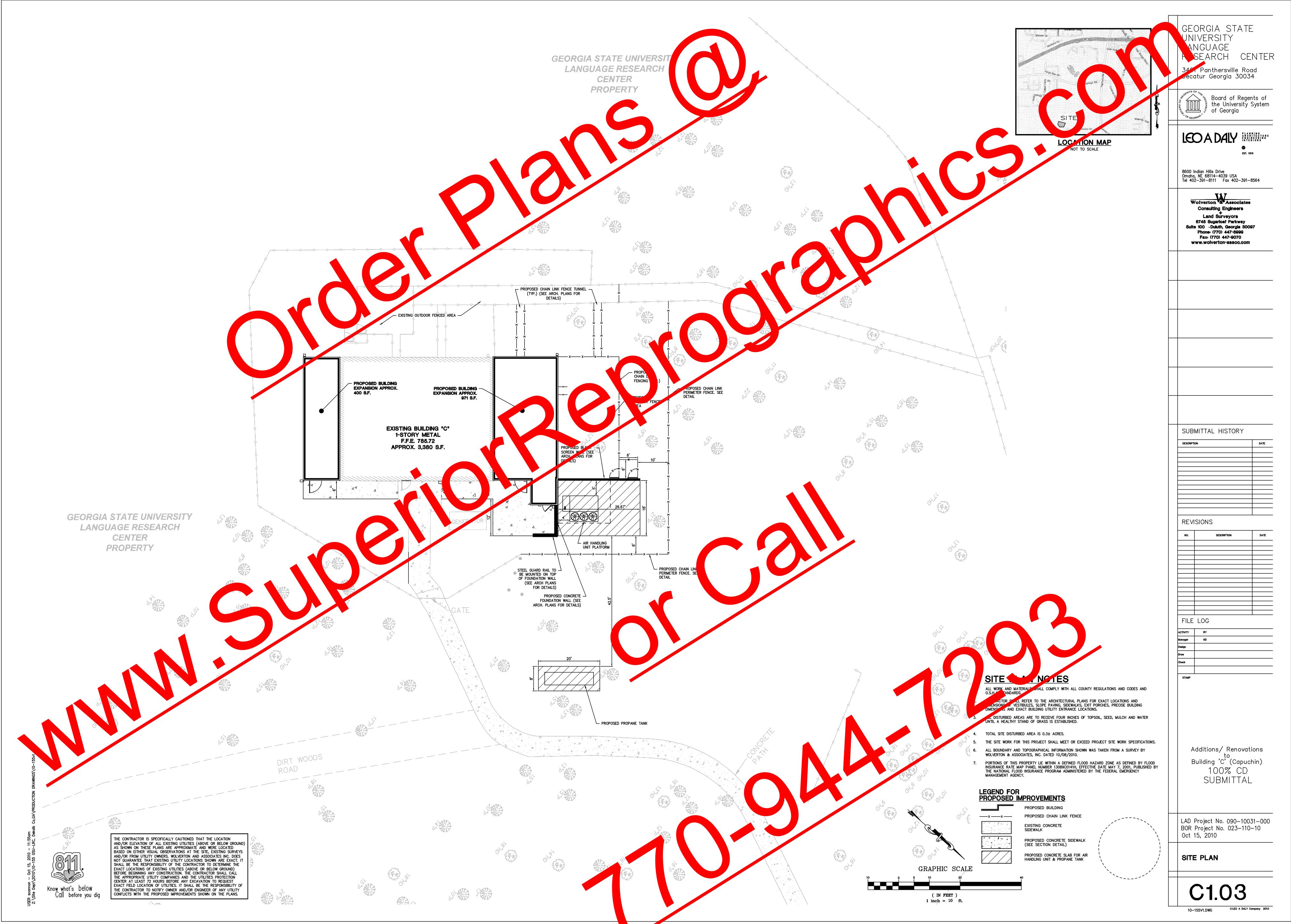
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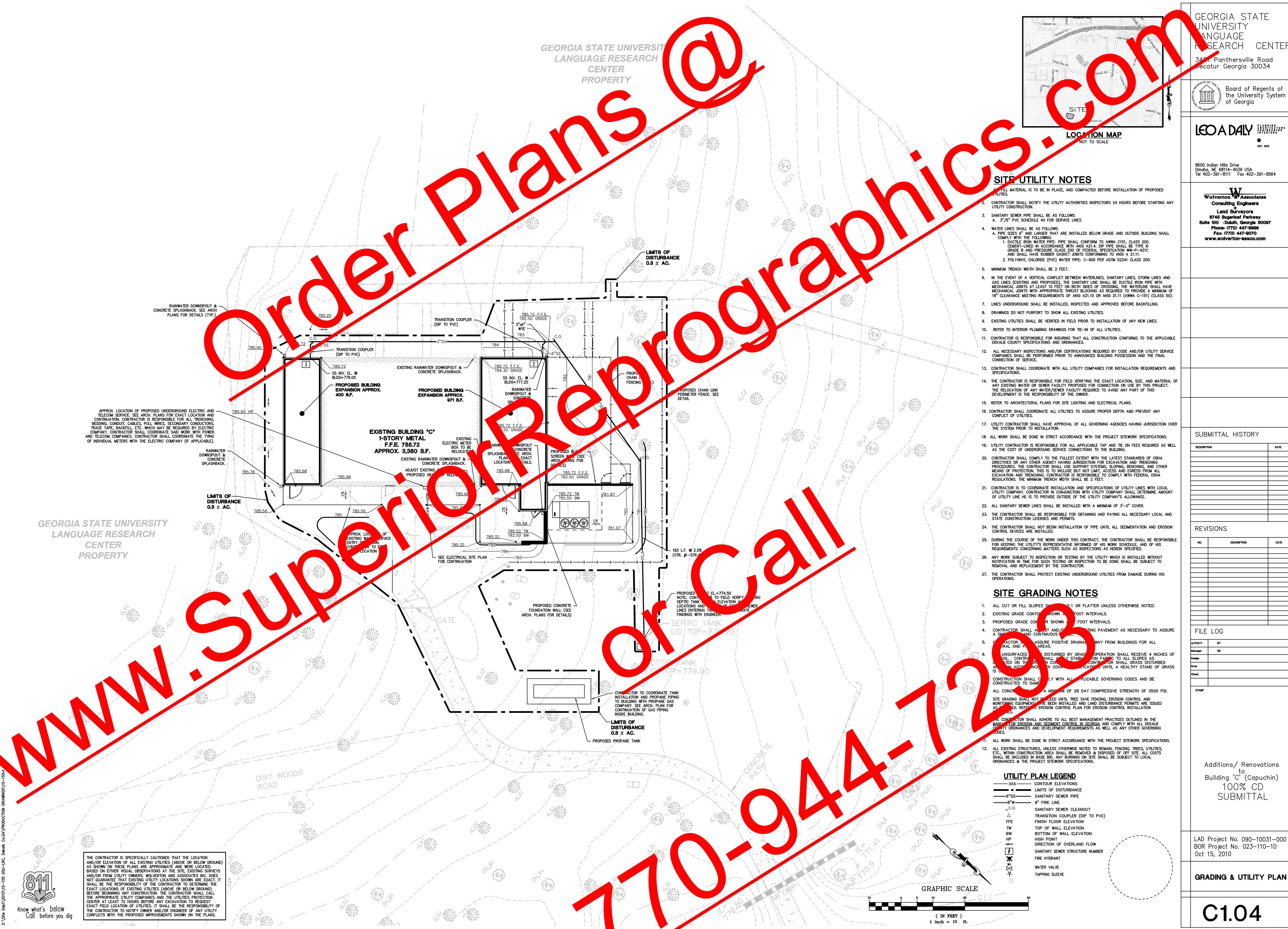






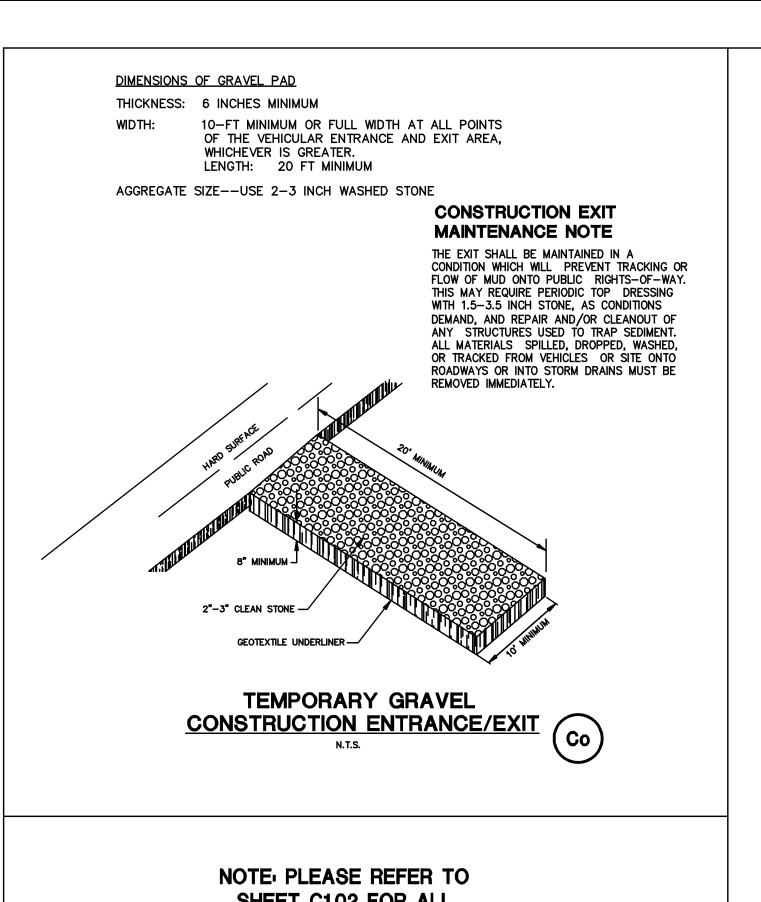
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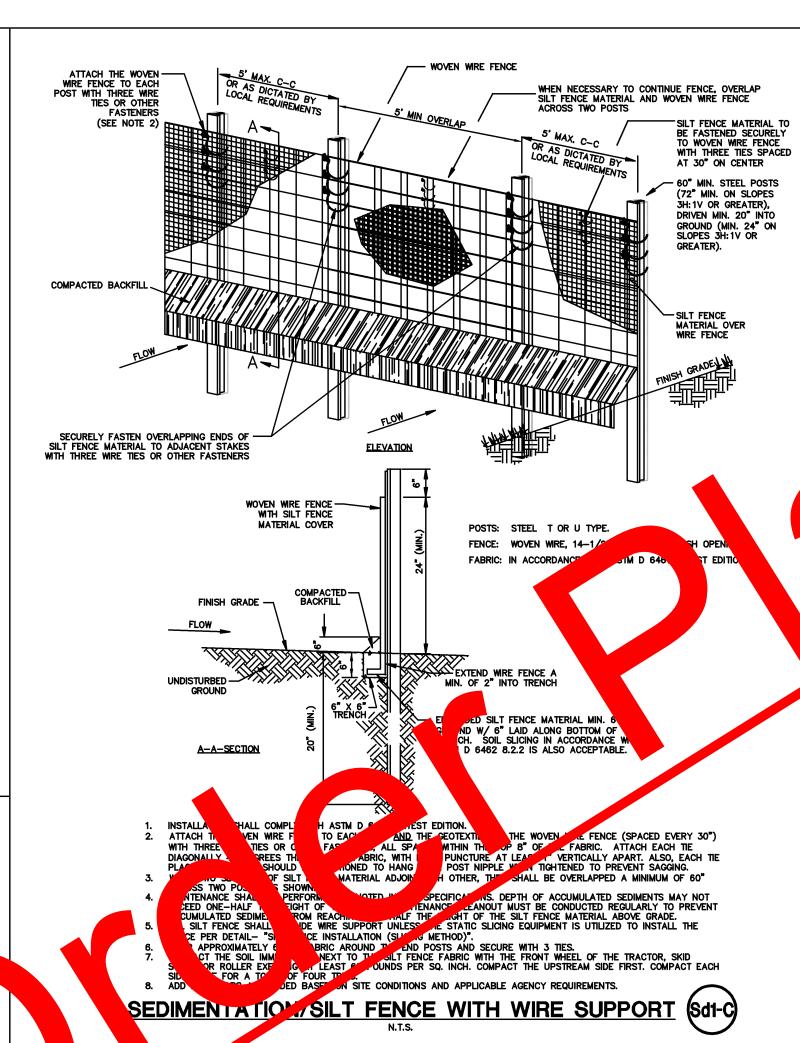


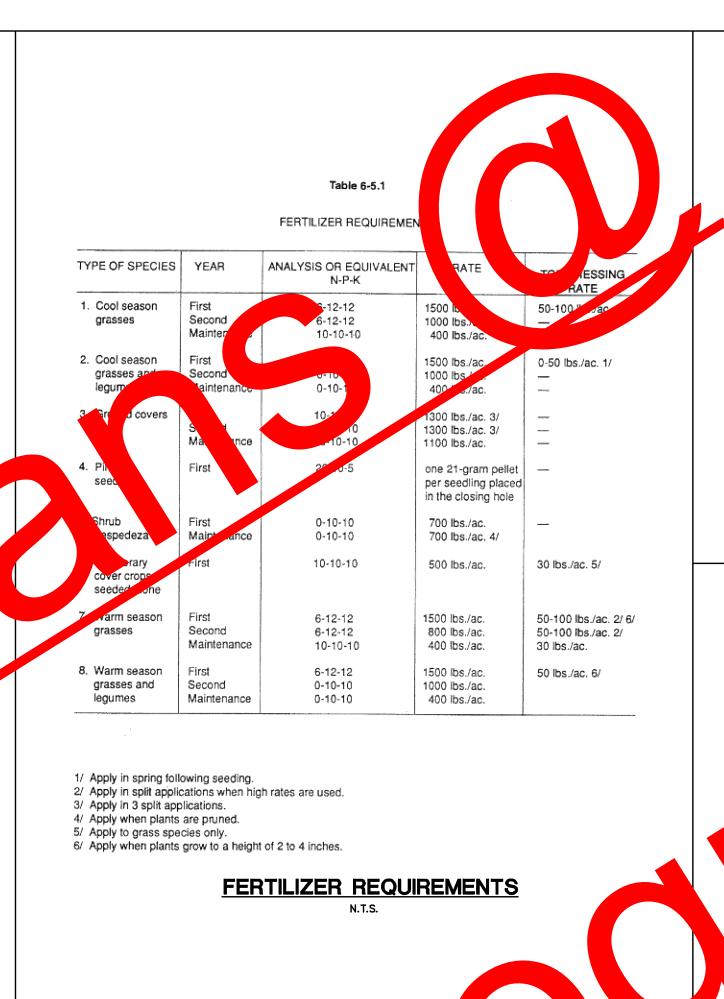
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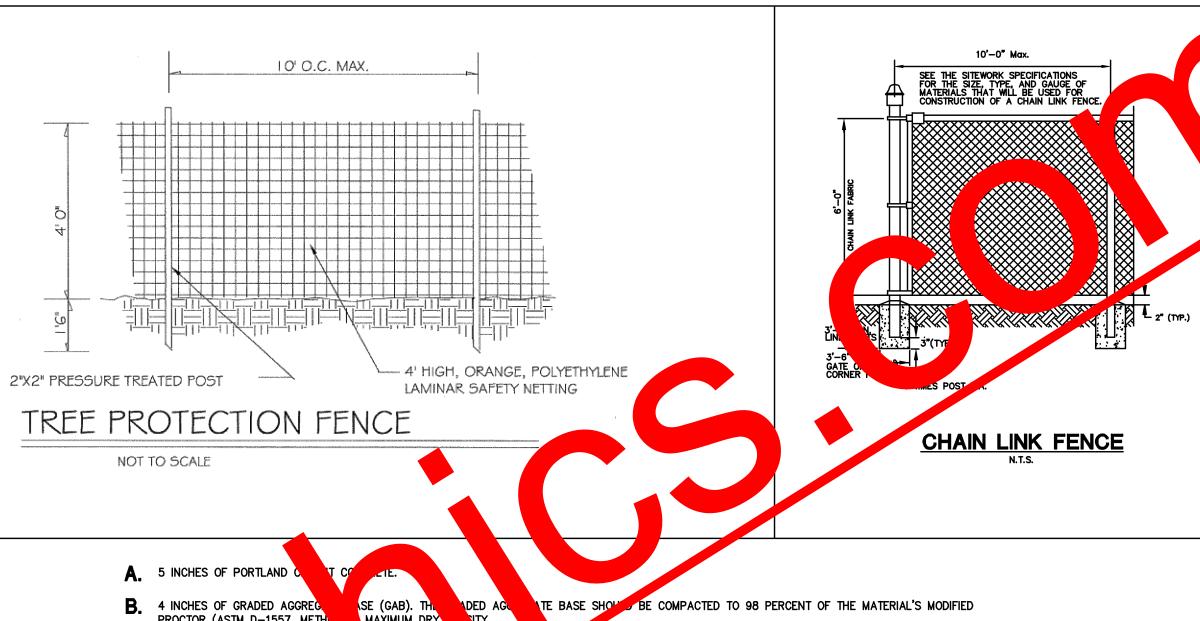


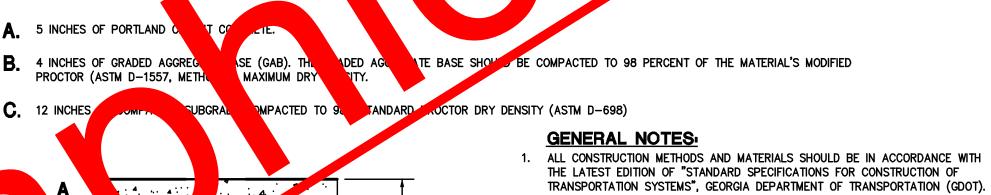


SHEET C1.02 FOR ALL | Ds1 | Ds2 | Ds3 | MULCHING AND PLANTING SCHEDULES









2. THE APPLICABLE GEORGIA DOT SPECIFICATIONS FOR THE MATERIALS AND METHODS USED ARE AS FOLLOWS: AGGREGATE BASE — SECTIONS 310 AND 815 PORTLAND CEMENT CONCRETE — SECTION 430 3. PORTLAND CEMENT CONCRETE SHOULD BE AIR ENTRAINED AND HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI. 4. CONCRETE PAVEMENT JOINTS AND REINFORCING SHOULD BE CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE AMERICAN CONCRETE INSTITUTE SPECIFICATIONS AND THE APPLICABLE SPECIFICATIONS OF THE GEORGIA DEPARTMENT OF TRANSPORTATION. A NON-WOVEN GEOTEXTILE (APPROX. 3 FEET WIDE) IS TO BE PLACED BENEATH CONSTRUCTION JOINTS.

5. SEALING MATERIAL FOR FILLING PAVEMENT JOINTS SHALL MEET THE REQUIREMENTS OF ASTM D-6990. JOINTS SHOULD BE SEALED AS SOON AS POSSIBLE IN ACCORDANCE WITH SEALANT MANUFACTURERS INSTRUCTIONS.

NCRETE PAVEMENT FOR AIR HANDLING UNIT & PROPANE TANK AREAS



REVISIONS FILE LOG

LAD Project No. 090-10031-000 BOR Project No. 023-110-10 Oct 15, 2010

Additions/ Renovations

Building 'C' (Capuchin)

100% CD SUBMITTAL

GEORGIA STATE

Panthersville Road

Board of Regents of

the University System

ecatur Georgia 30034

LEDA DALY PLANNING INTERIORS

Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564

Wolverton & Associates

Consulting Engineers

Land Surveyors

6745 Sugarloaf Parkway Sulte 100 · Duluth, Georgia 30097 Phone: (770) 447-8999

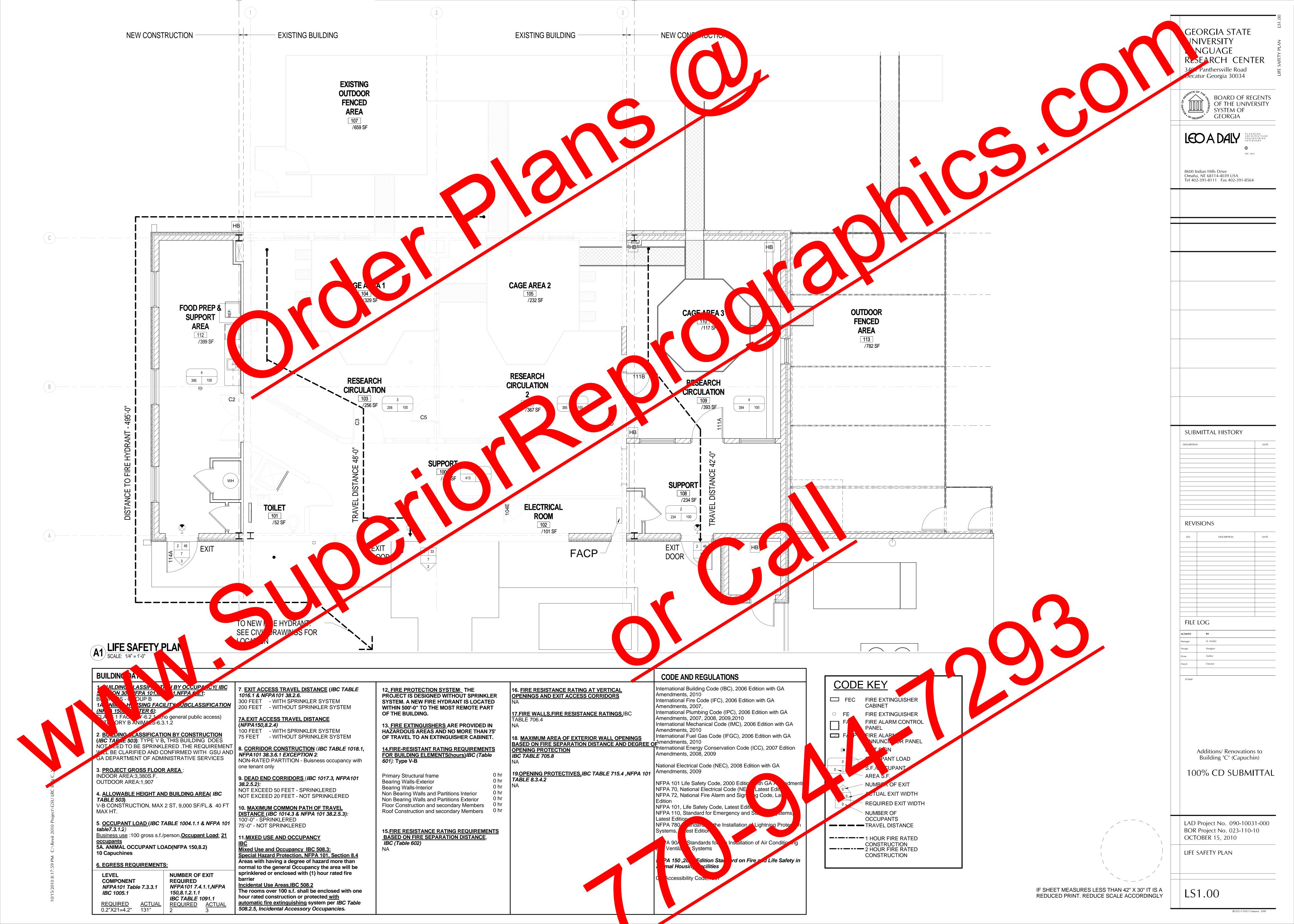
Fax: (770) 447-9070 www.wolverton-assoc.com

SUBMITTAL HISTORY

8600 Indian Hills Drive

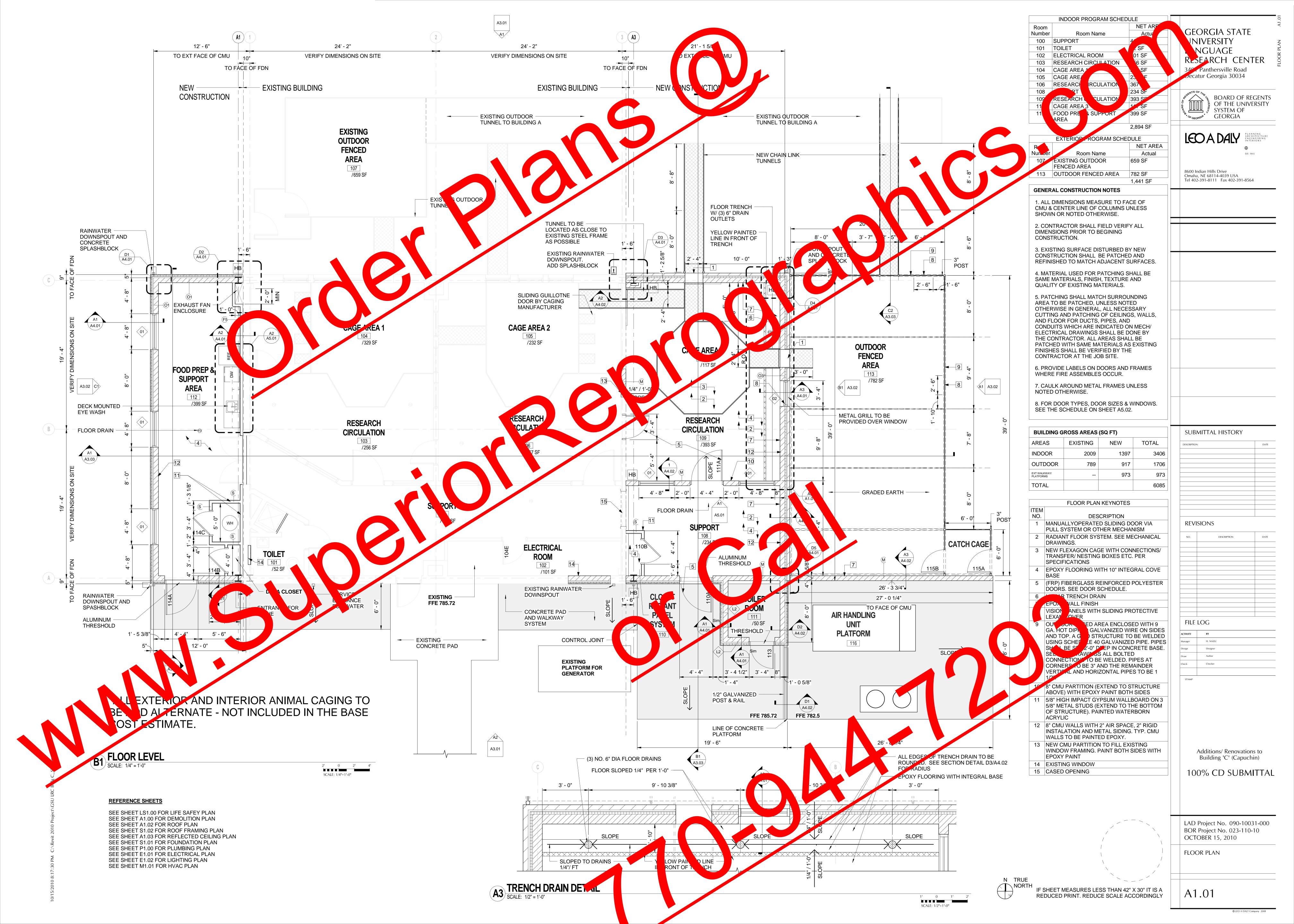
ANGUAGE

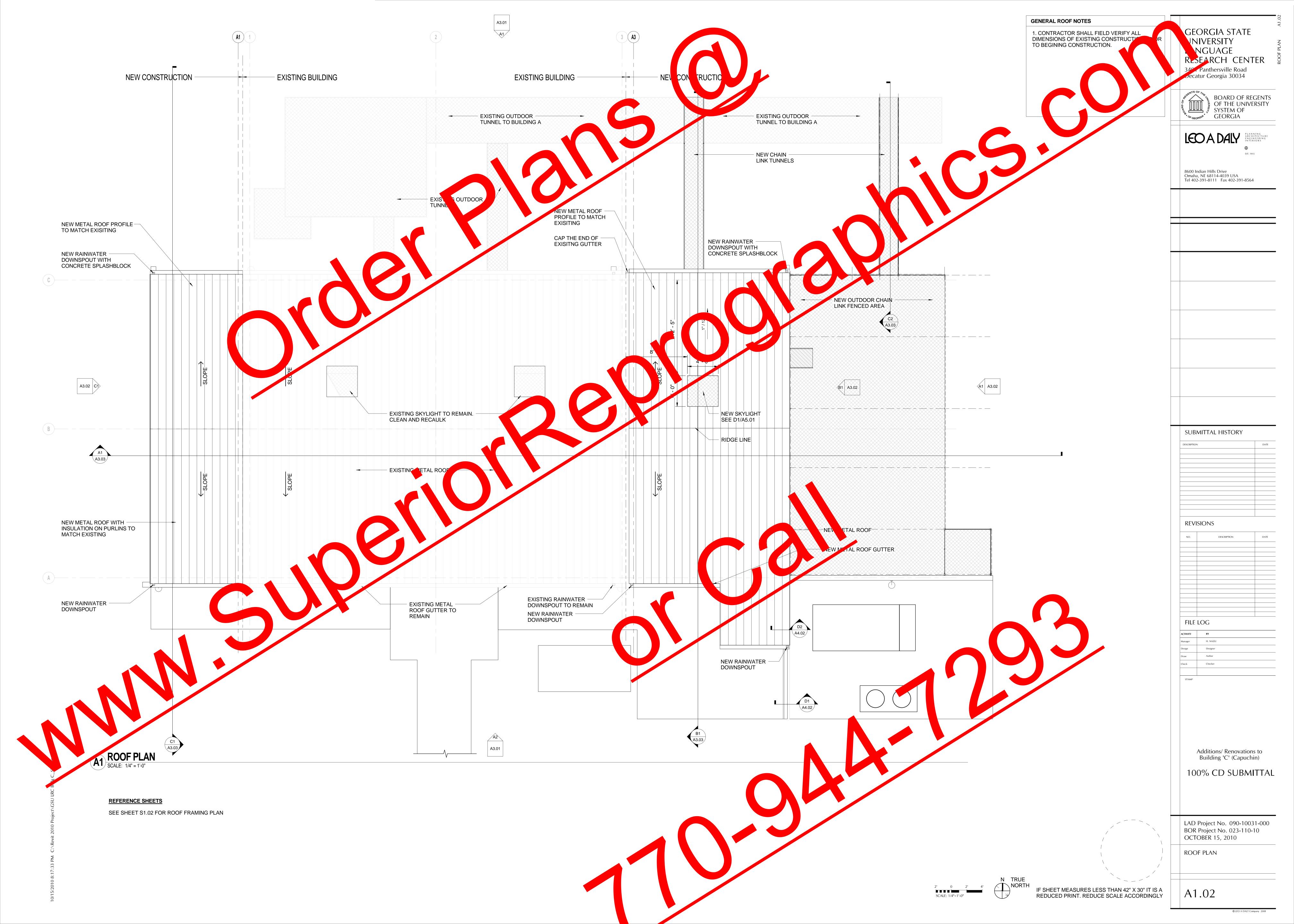
SITE DETAILS

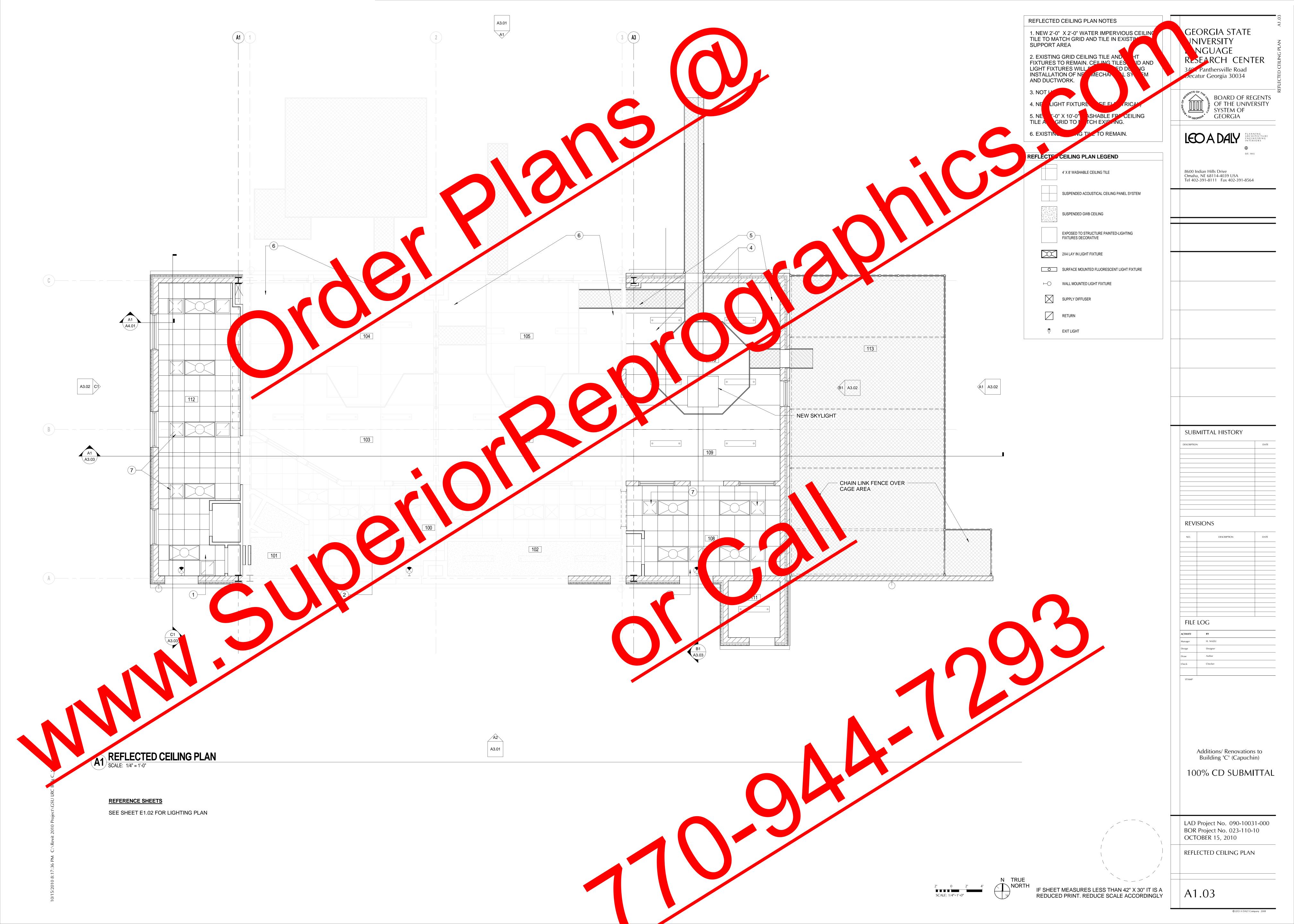


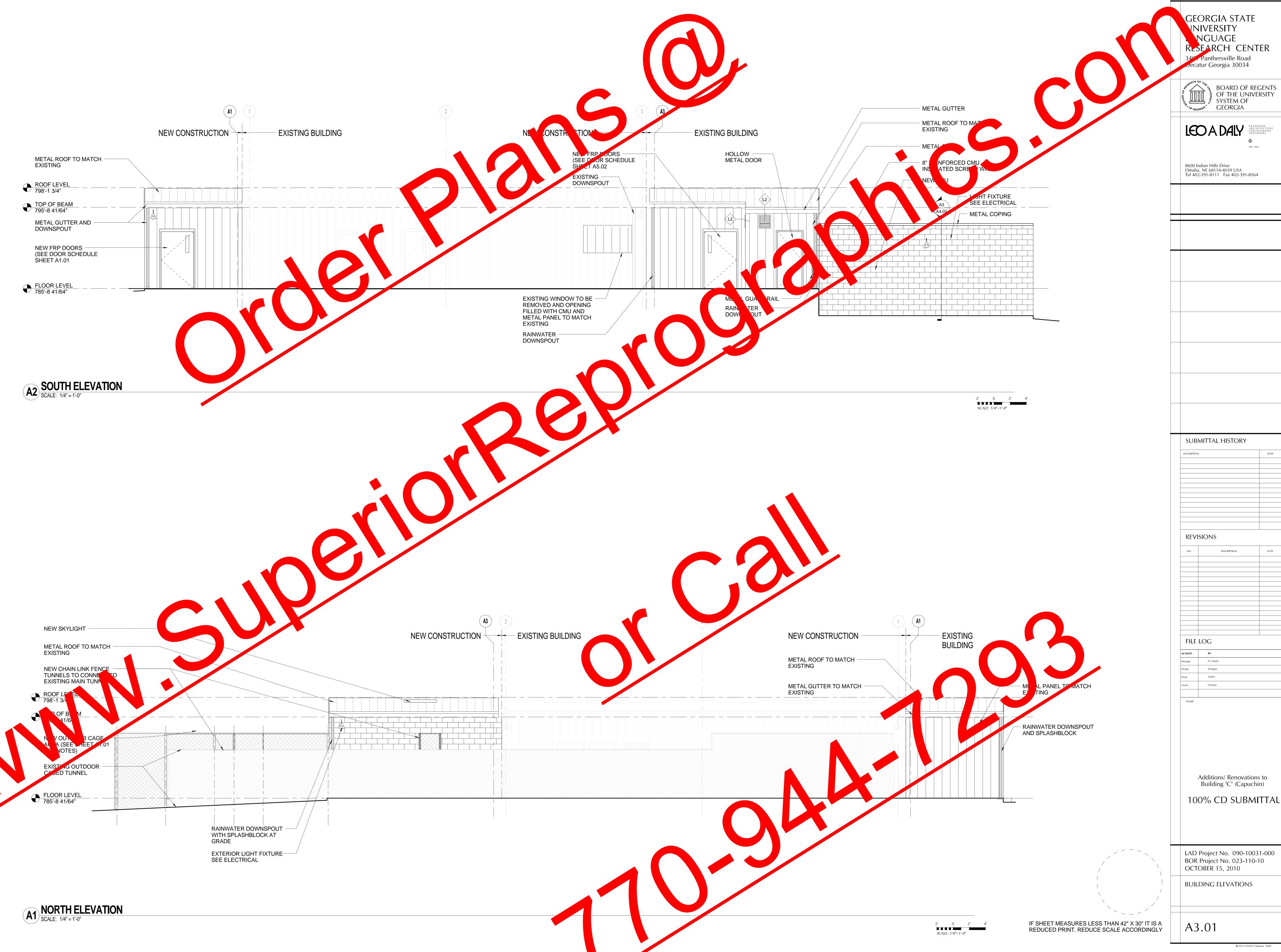








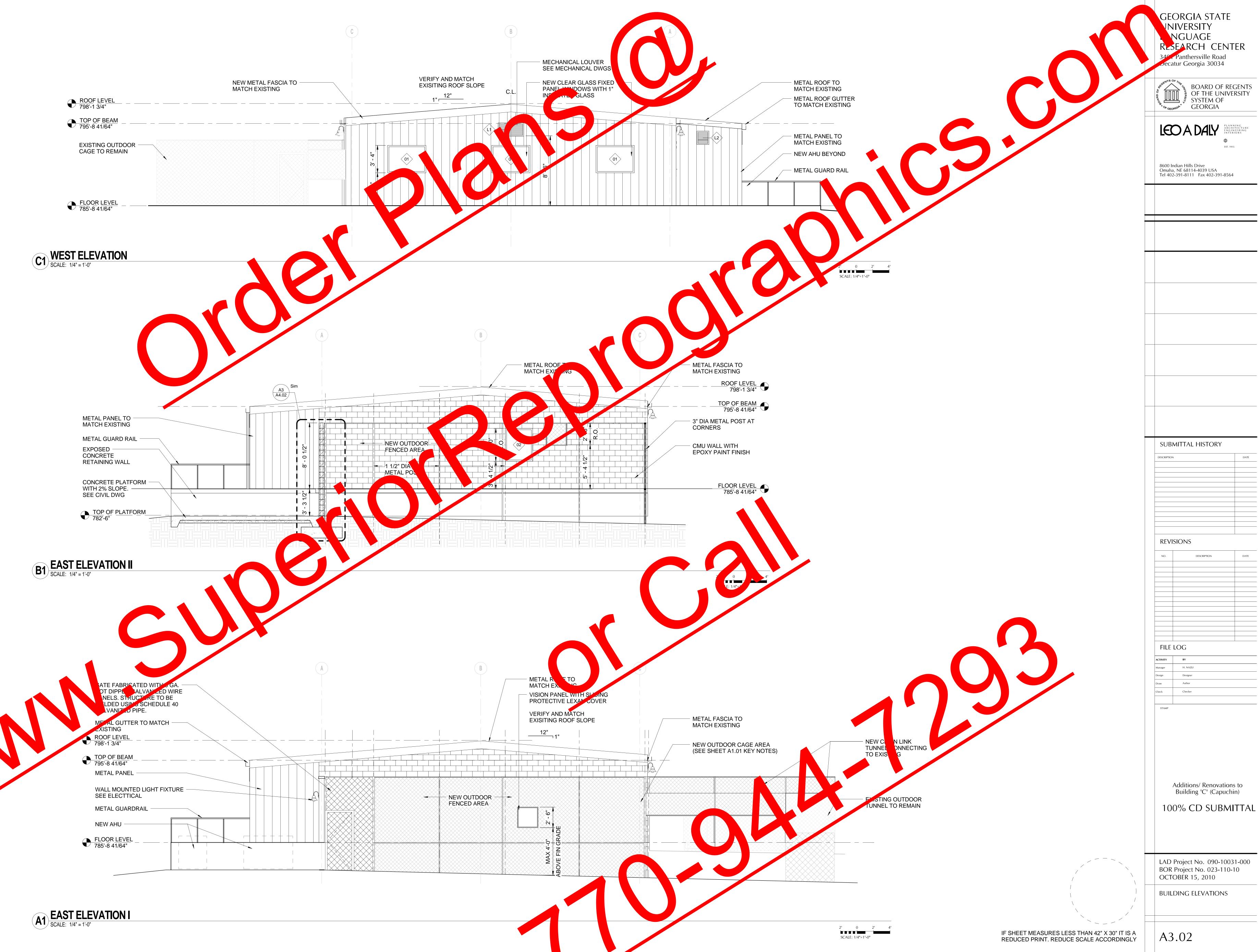




RESEARCH CENTER

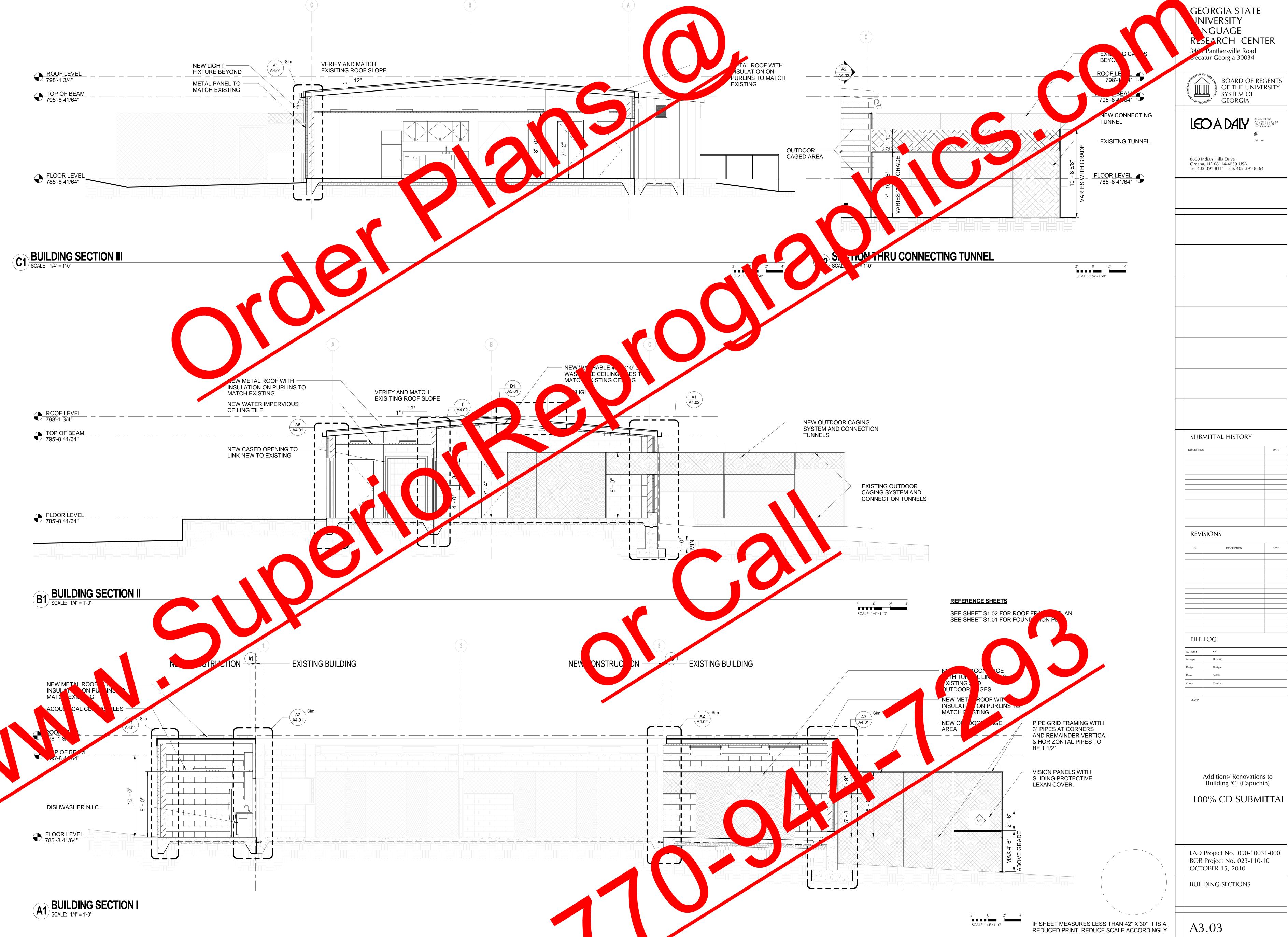
100% CD SUBMITTAL

LAD Project No. 090-10031-000

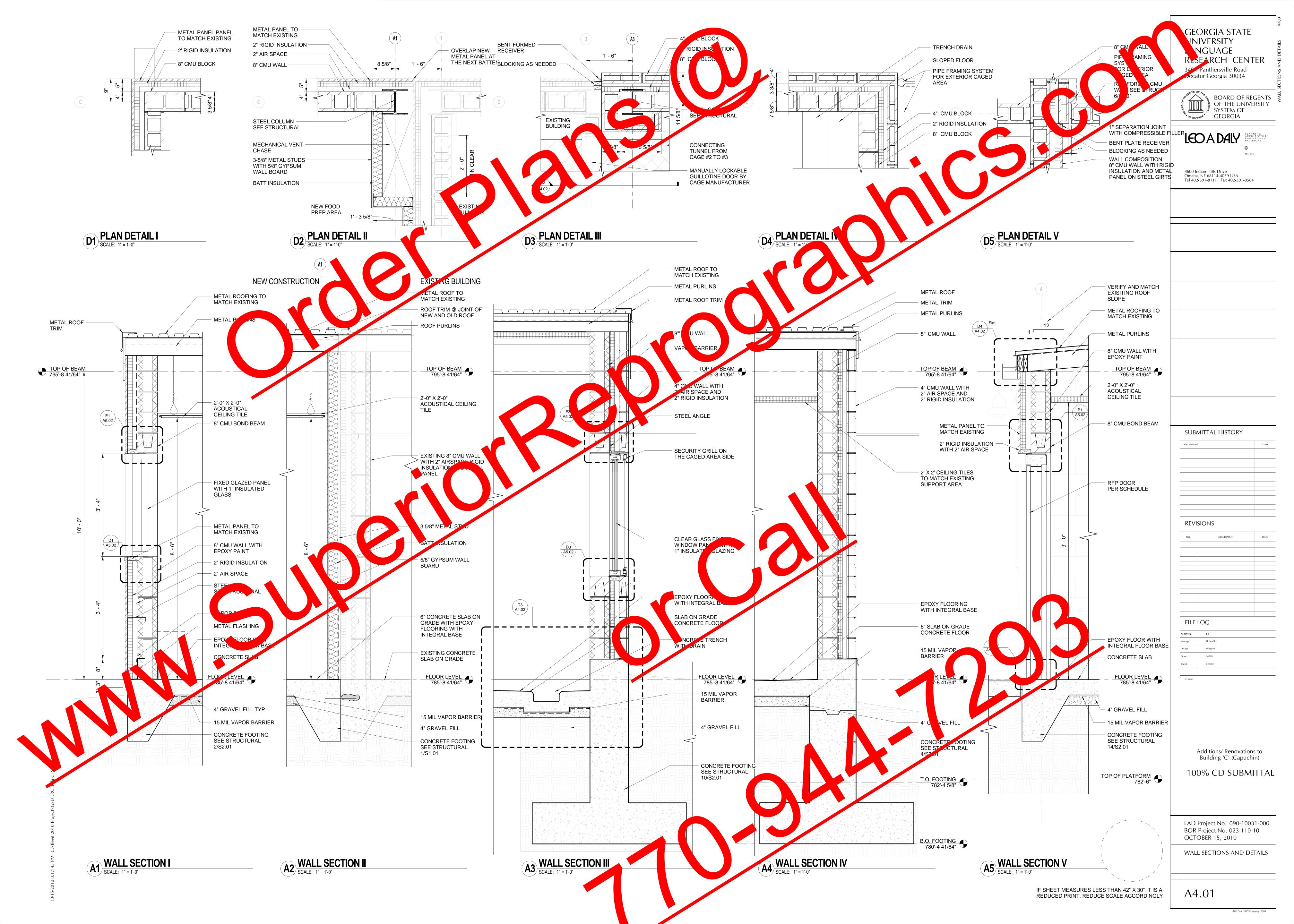


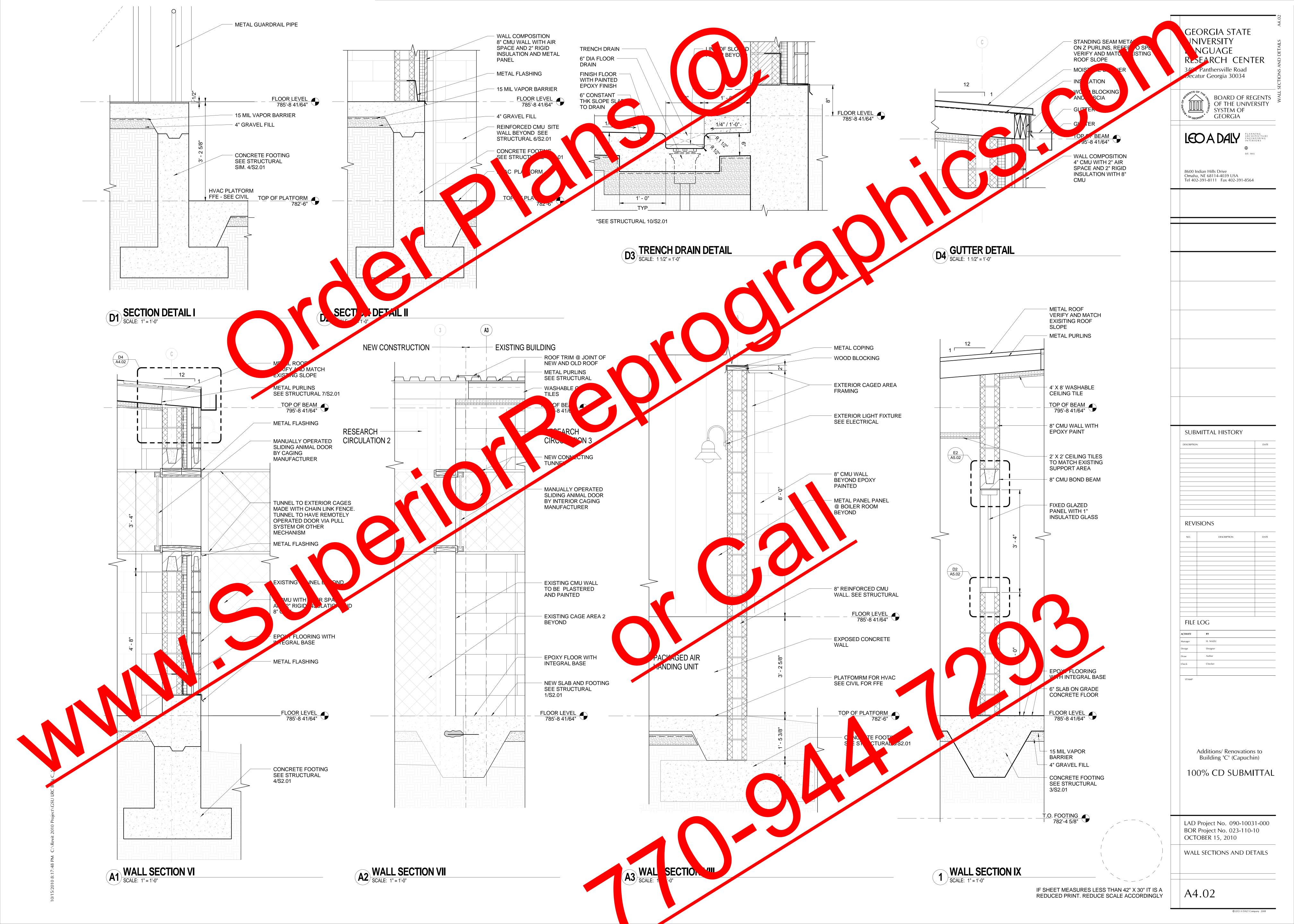
LE	LOG	
ГҮ	ВУ	
r	H. NAZLI	
	Designer	
	Author	

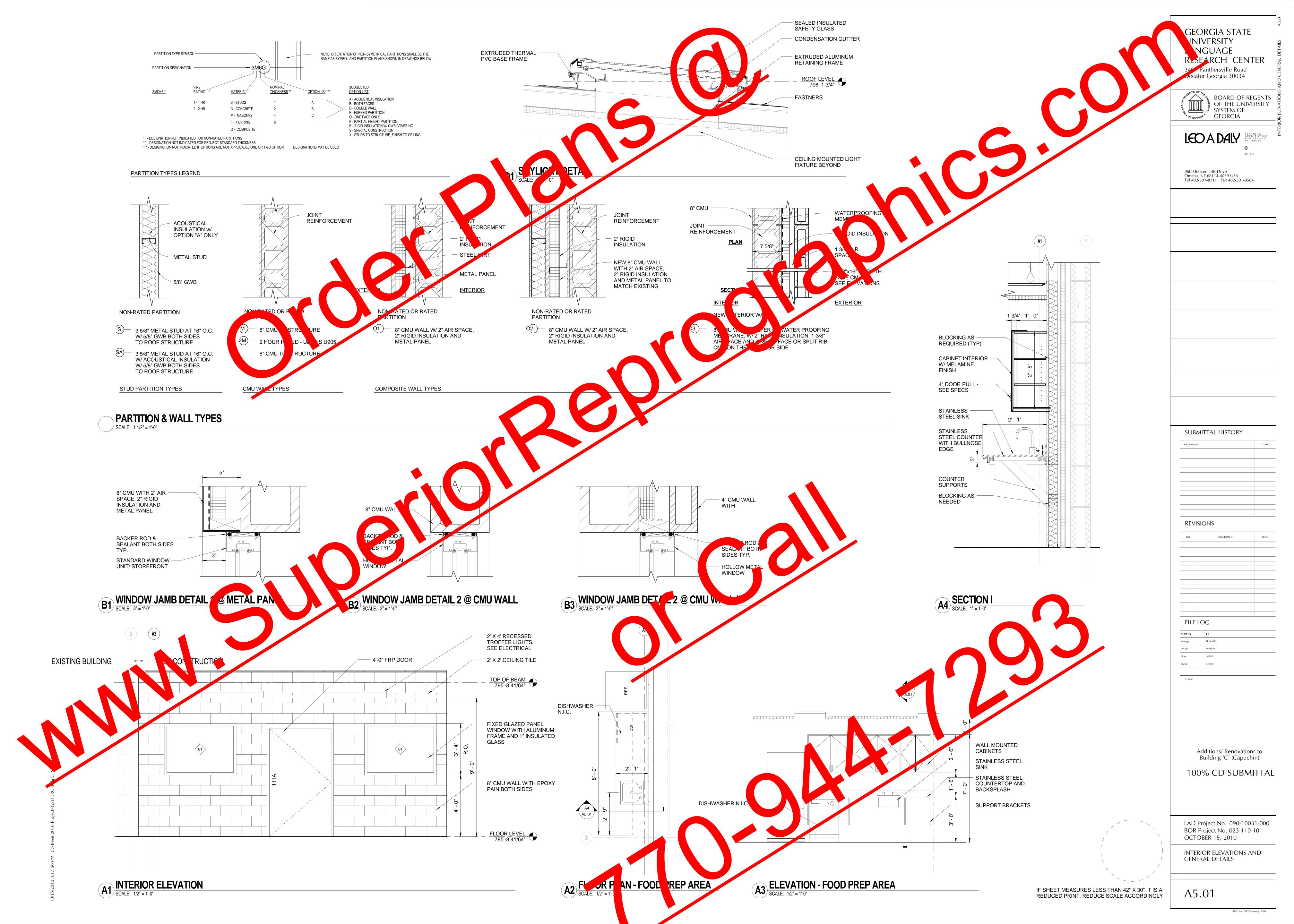
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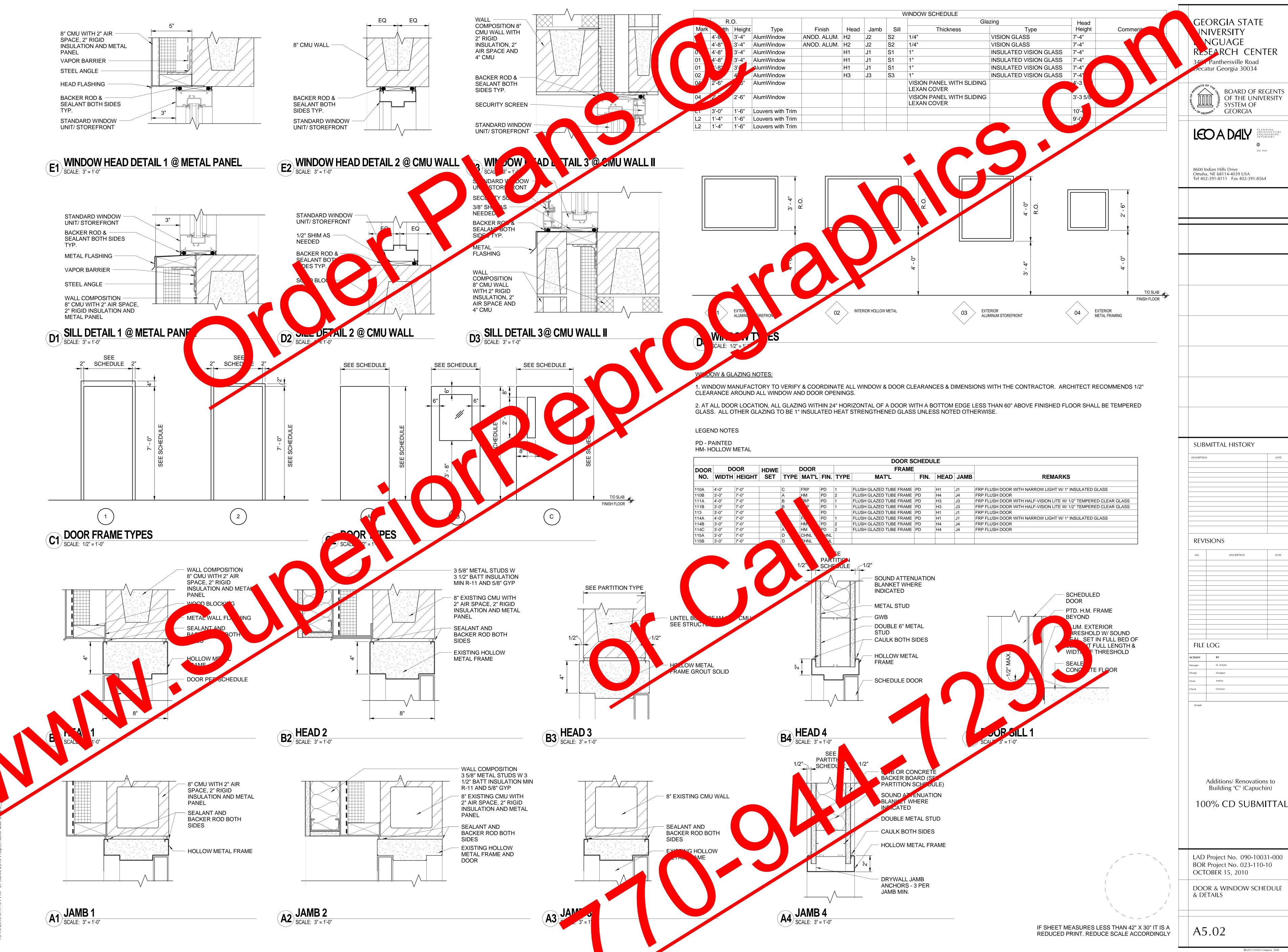


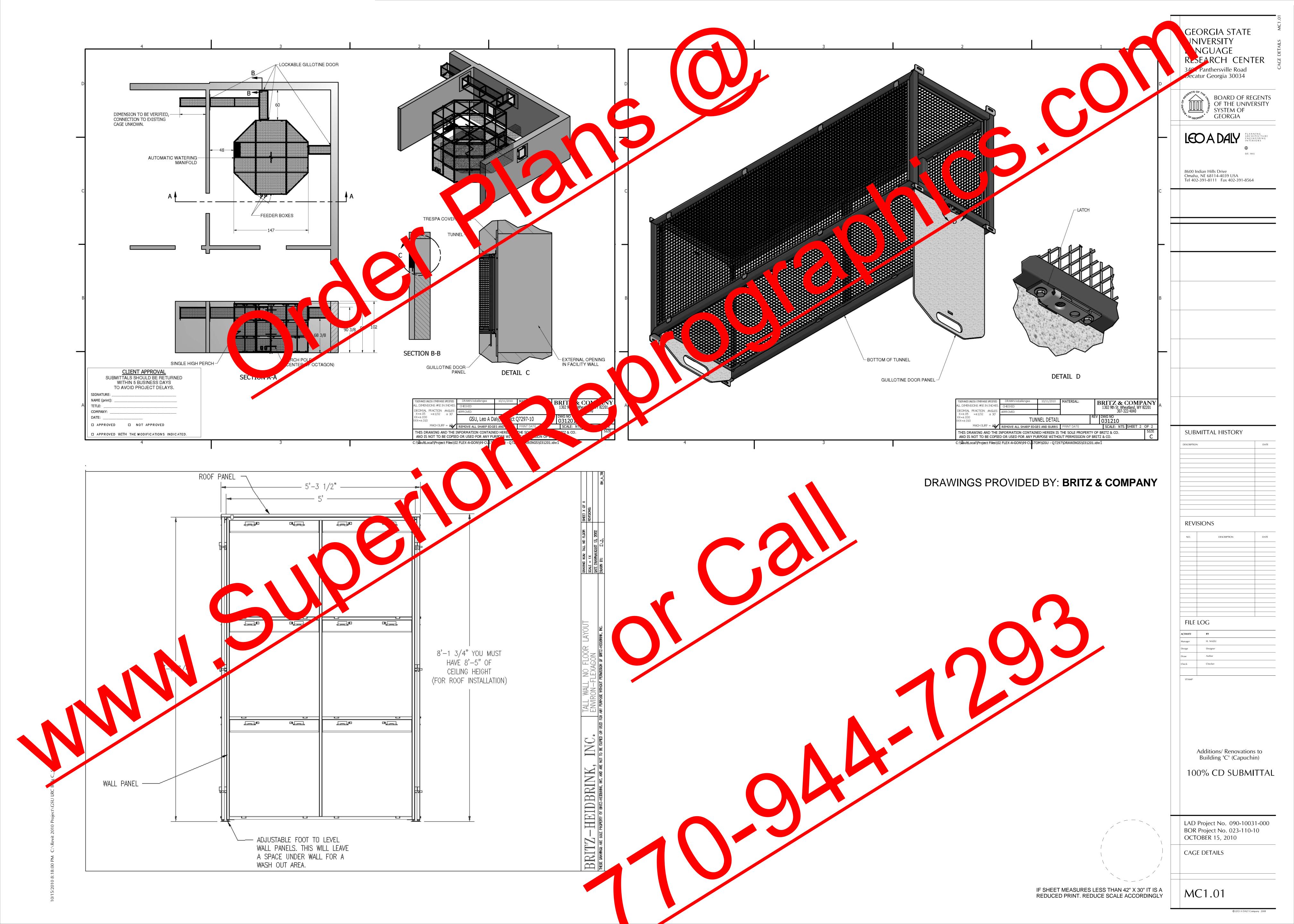
NO.	DESCRIPTION	DATE
FILE	LOG	
IVITY	ВУ	











I. DESIGN CRITERIA

A. GENERAL BUILDING CODE

The Contract Documents are based on the requirements of the State of Georgia Building Code (2006 International Building Code with the 2010 State of Georgia Amendments.

B. DEAD LOADS

1. Hanging Ceiling and Mechanical Loads. An allowance of 15 PSF has been made for hanging ceiling and mechanical equipment loads such as duct work and sprinkler pipes.

C. LIVE LOADS

1. Design live loads are based on the more restrictive of the uniform load listed below or the concentrated load listed acting over an area 2.5 feet square or, in the case of parking garages, 20 square inches, or stair treads, 4 square

CATEGORY	UNIFORM LOAD (PSF)	CONCENTRATED LOAD (LB)
Roofs Ordinary flat, pitched	20	<u>-</u>

D. WIND LOADS

1. Wind pressures are based on the American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE 7-05 and the following criteria:

- a. Basic wind speed = 90 MPH (3 second gust) b. Wind importance factor (I) = 0.87Building category = I
- d. Wind exposure category = B
- e. Internal pressure coefficient = +0.18/-0.18
- 2. Wind pressures used in the design of components and cladding are shown in the following table:

are sno	own in the lotto	wing table:	
CLADDING TYPE	LOCATION	TRIBUTARY AREA (SQ-FT)	WIND LOAD (PSF)
Wall	Interior	10	+11.6/-12.6
Wall	Interior	20	+11.1/-12.1
Wall	Interior	50	+10.4/-11.4
Wall	Interior	100	+10.0/-10.9
Wall	Exterior	100	+11.6/-15.5
Wall	Exterior	20	+11.1/-14.4
Wall	Exterior	50	+10.4/-13.1
Wall	Exterior	100	+10.0/-12.1
Parapet	Interior	100	+29.0/-20.3
Parapet	Interior	20	+26.2/-19.3
Parapet	Interior	50	+22.6/-17.9
Parapet	Interior	100	+18.6/-14.5
Parapet	Exterior	100	+39.7/-23.2
Parapet	Exterior	20	+33.7/-21.7
Parapet	Exterior	50	+25.8/-19.6
Parapet	Exterior	100	+19.8/-18.1
Roof	Interior	100	+10.0/-12
Roof	Interior	20	+10.0/-12
Roof	Interior	50	+10.0/
Roof	Interior	100	+10.0/
Roof	Edge	10	+10.0/
Roof	Edge	20	+10.0
Roof	Edge	50	+10.0/
Roof	Edge	100	+10.0/
Roof	Corner	10	+10.0/-
Roof	Corner	20	+10.0/-26
Roof	Corner	50	+10.0/-19.
Roof	Corner	100	+10.0/-13.8
Overhang	Interior	10	+10.0/-18.3
Overhang	Interior	20	+10.0/-17.9
Overhang	Interior	50	+10.0/-17.5
Overhang	Interior	100	+10.0/-17.2
Overhang	Edge	10	+10.0/-30.1
Overhang	Edge	20	+10.0/-23.6
overnang	Lago	20	10.0/-20.0

a. Width of edge/corner strip = 3 feet Component and cladding pressures act normal to the surface. Positive pressures act towards the surface and negative pressures act away from the surface. Design pressure for components and cladding shall not be less than 10 PSF acting in either direction normal to the surface. d. The effective wind area is the span length multiplied by an effective width that need not be less than onethird the span length. For cladding fasteners, the effective wind area shall not be greater than the area that is tributary to an individual fastener.

+10 0/-15 1

+10.0/-10.0

E. SNOW LOADS

Overhang

0verhang

Snow loads are based on the American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE 7-05 and the following criteria:

1. Ground snow load (Pg) = 5 PSF2. Snow exposure factor (Ce) = 0.9

Edge

3. Snow load importance factor (I) = 0.84. Thermal factor (Ct) = 1.0

F. SEISMIC DESIGN CRITERIA

The structure and components of the building have been designed in accordance with aforementioned building code with the following criteria:

0.2 sec. Spectral Acceleration (Ss) (%g):	0.22
1 sec. Spectral Acceleration (S1) (%g):	0.08
Site Class:	D
Site Coefficient, short period (Fa):	1.6
Site Coefficient, 1 sec. period (Fv):	2.4
0.2 sec Spectral Response Coeff. (Sds) (%g)	
1 sec Spectral Response Coeff. (Sd1) (%g)	.14
Occupancy Category:	I
Occupancy Importance Factor, I:	1.0
Seismic Design Category:	С
Basic Seismic-Force Resisting System:	
Ordinary Reinforced Masonry Shear Walls	
Response Modification Factor, R:	
System Overstrength Factor, Omega-o:	3
Deflection Amplification Factor, Cd:	3
Design Seismic Base Shear (kips	4_
Plan Structural Irregularity Ty	
Vertical Structural Irregularity (pe:	No.

Analytical Procedure: G. LATERAL-FORCE RESISTI

p resist later loads and derives from the complete provide 🔰 installat aphragm racing required to 11 elements during the

rocess until all of these elements are completely all designated ficrete elements (if any) have their design strength. The required

L-Force Resisting System Masonry walls upon which structural steel elements or concrete horizontal framing elements bear.

lent Lateral Force Procedure

A steel deck diaphragm that is completely attached to all roof members according to specifications and that creates a continuous element linking the lateral-load resisting system to all other

FUTURE EXPANSION

No provisions for any future expansions have been made in the

structural design

II. FOUNDATION A. GEOTECHNICAL REPORT

Foundation design is based on the geotechnical investigation report as follows: Report of Geotechnical Engineering Investigation, Wilmer Engineering Inc., Wilmer Project No. 171-3634, Dated

accuracy or applicability of such data therein.

October 14, 2010 The geotechnical report is available to the General Contractor upon request to the Owner. The information included therein may be used by the General Contractor for his general information only. The Architect and Engineer will not be responsible for the

B. SHALLOW FOUNDATION TYPE

 Spread Footing a. Design Pressures(Total Load): 3000 PSF net pressure

C SLAB-ON-GRADE

Construction Equipment Loads. The Contractor is cautioned against loading the slab-on-grade with construction equipment. The slab has not been designed for construction equipment and may require an increase in slab thickness and/or reinforcement. If the construction loading exceeds the design loads shown in the Design Criteria, the Contractor is required to submit calculations signed and sealed by a registered structural, civil, or geotechnical engineer in the state where the project is located verifying the adequacy of the slab.

D. CONSTRUCTION DEWATERING

The Contractor shall determine the extent of construction dewatering required for the excavation. The Contractor shall submit to the Geotechnical Engineer for review the proposed plan for construction dewatering, prior to beginning the excavation.

III. REINFORCED CONCRETE

A. CLASSES OF CONCRETE All concrete shall conform to the requirements as specified in the table below unless noted otherwise on the drawings:

					_	
	28 Day Comp. Max Strength Conc Size					
	Usage (PSI)	Type	Agg.	Remarks	
1.	Spread Footings	30	00	NWT	1 1/	•
2.	Plinths and Pilasters					
	a. Supporting SteelColumns	30	00	NWT	1"	
3.	Foundation Walls	30	00	NWT	1"	
4.	Retaining Walls	30	00	NWT	1"	١
5.	Slab-on-Grade	30	00	NWT	1"	
6.	Topping Over			_		
	Structural Slabs	30	00	WT	3/4"	

LWT = sand-lightweight concrete (12

HORIZOMAL CONSTRUC

approve a

NWT = normal weight concrete

M A615 Grade 60 unless e on the drawing or in these notes. noted othe hors. Hear stud anchors used in embed ns are MS D1.1 Type A studs manufactured in fication ASTM A108 with a minimum

Inforcement. Welded smooth wire nt, ASTM A185, yield strength 65,000 PSI where reinforce the drawings.

T OF WELDED WIRE REINFORCEMENT

nerever welded wire reinforcement is specified as reinforcement, it shall be continuous across the entire concrete surface and not interrupted by beams or girders and properly lapped one cross wire spacing plus 2".

E. REINFORCEMENT IN HOUSEKEEPING PADS

Provide minimum reinforcement as noted below in all housekeeping pads supporting mechanical equipment unless specified otherwise

1. Welded smooth wire reinforcement 6x6-W2.9xW2.9. F. REINFORCING STEEL COVERAGE

on the drawings.

minimum specifie

Reinforcing steel coverage should conform to the requirements specified below. Cover specified shall be considered minimums that may require increasing where reinforcing steel intersects for different member types. Cover in structural members not specified below shall conform to the requirements of ACI 318 unless specified otherwise on the drawings.

- 1 Foundation Members - 1 1/2" for #5 and smaller bar<u>s</u> a Foundation Retaining Walls 2" for #6 and larger bars
- b. Spread Footings, 3" bottom Combined Footings sides, 3 side cast Interior Slab on - 1" top cover far one Grade steel
- Grade of steel r two lav The reinforcing steel detailer sha diust rein ing steel cage sizes at inters nembers as allow clearance for

IV. CONCRETE MASONRY

as load-bearing walls d elsewhere awings. See architectural sections

REINFORCED MASONRY

d Exterior Slab on - 1 1/2"

28 Day Compressive Strength, f'm

ND BRACING OF MASONRY WALLS DURING CONSTRUCTION

All masonry walls shown on the architectural and structural drawings have been designed to resist the required code vertical and lateral forces applied to them in the final constructed configuration only assuming full bracing top, bottom, and/or side of wall as shown. It is the responsibility of the Contractor to properly and adequately brace all masonry walls at all stages during construction to resist erection loads and lateral loads that could possibly be applied prior to completion of construction.

V. STRUCTURAL STEEL

A. MATERIAL

1. Hot Rolled Structural Members. All hot rolled steel plates, shapes, sheet piling, and bars shall be new steel conforming

2. ASTM Specification and Grade. Clearly mark the grade of steel on each piece, with a distinguishing mark visible from floor surfaces, for the purpose of field inspection of proper grade of steel. Unless noted otherwise on the drawings, structural steel shall be as follows: a. W- and WT-Shapes. All W- and WT-shapes shall conform

- to ASTM A992 (ASTM A572 Grade 50 is acceptable as a substitute for A992) unless noted otherwise on the
- b. Base Plates. All base plates shall conform to ASTM A36 unless noted otherwise on the drawings. Edge Angles, Bent Plates, Angle Hangers, and Angle Kickers. All angles and bent plates shall conform to
- d Connection Material

to ASTM Specification A6.

- 1) All connection material, except as noted otherwise herein or on the drawings, including bearing plates, gusset plates, stiffener plates, filler plates, angles, etc. shall conform to ASTM A36 unless a higher grade of steel is required by strength and provided the resulting sizes are
- compatible with the connected members e. Other Steel. Any other steel not indicated otherwise shall conform to ASTM A992 or ASTM A572, Grade 50, except plates and angles that shall be ASTM A36.

B. STRUCTURAL BOLTS AND THREADED FASTENERS

1. A325 Bolts. All bolts in structural connections shall conform to ASTM A325 Type 1, unless indicated otherwise on the drawings

C. WELDING

1. Unless noted otherwise, electrodes for welding shall conform to E70XX (SMAW), F7XX-EXXX (SAW), ER70S-X (GMAW), or E7X

D. ANCHOR RODS

Unless indicated otherwise in the Column Schedule or on drawings, anchor rods shall conform to ASTM F1554 Grade the size shall be 3/4" diameter and shall embed into the foundation a distance of 1'-0" with a heavy hex nut at embedded end. Strike bolt threads at the embedded end a

VI. SUBMITTALS

A. SUBMITTAL LIST AND SCHEDULE

places below the nut.

The General Contractor shall p list and schedule of all submittal items to be s al Engineer prior to the star and revised and as the job progre submittal li all be of ized as shown

1. Shop Dr Manufact 's Literatu

mblies and

ations, Mil Certicates, and Affidavits

shall submit for Engineer review shop the **1**lowing items:

x Designs (TA) tion Joint Locations in Structural Floors, , and Slabs on Grade medded Items (Plates, Angles, Bolts, etc.) or Items

Attached to the Structural Frame for Building Cladding Attachment or for Attachment of Other Items (REC) Miscellaneous Steel Reinforcing Steel

Structural Steel, Shop and Erection Drawings (S&S)

Items marked thus shall have shop drawings sealed by a registered engineer in the state where the project is located per the project specifications. (REC) Items marked thus shall be submitted to Engineer

drawing stamp affixed. (TA) Items marked thus shall be submitted to the Owner's

for record only and will not have the Engineer's shop

(GEO) Items marked thus shall be submitted to the Construction Geotechnical Engineer for their review.

2. All shop drawings must be reviewed and stamped by the General Contractor prior to submittal.

3. Contractor shall provide the submittal in electronic portable (PDF) per the Specifications. 4. The omission from the shop drawings of any mate required by the Contract Documents to be functional relieve the Contractor of the responsibilit furnishi and installing such materials, regardless of shop drawings have been reviewed

Testing Agency for their review.

C. MANUFACTURER'S LITERATURE

Submit two copies of manufactur iterature and products used in construction the project

hop drawings shown hereon as xpense, real or

CONTRACT DOC

It is the reconsibility of the General Contractor to obtain all Control Documents and latest addenda and to submit such s to all subcontractors and material suppliers prior e submittal of shop drawings, fabrication of any ructural members, and erection in the field. The contract structural drawings and specifications represent the finished structure, and, except where specifically shown, do not indicate the method or means of

construction. The Contractor shall supervise and direct the work and shall be solely responsible for all construction means, methods, procedures, techniques, and sequence. Openings through floors, roofs, and walls for ducts, piping, and/or conduit shall be coordinated by the contractor. Contractor shall verify sizes and locations of holes and openings with the Mechanical, Electrical, Plumbing, and Fire

Protection drawings and the respective subcontractors. 4. Refer to drawings other than Structural for complete information including: Types of floor slab finishes and their locations, floor slab depressions and curbs, openings in structural walls, roofs and floors required by Architectural and MEP features, stairs, ramps, etc.

5. Where member locations are not specifically dimensioned, members are either located on columns lines or are equally spaced between located members. 6. If certain features are not fully shown or specified on the drawings or in the specifications, their construction shall

be of the same character as shown or specified in similar

conditions B. DRAWING CONFLICTS

The General Contractor shall compare the Archite Structural drawings and report any discrepancy be of drawings and within each set of drawi hitect and to the Engineer prior to the fabrication a structural members.

CONFLICTS IN STRUCTURAL REQUIREN

Where conflict exists among the 🔻 ous parts of contract documents, structural dr qs, genera specifications, the strictest requ nts, a° Engineer, shall govern

D. EXISTING CONDITIONS

1. The General Contractor shall verify all dimensions and conditions of the existing building at the job site and report any discrepancies from assumed conditions shown on the drawings to the Architect and Engineer prior to the

fabrication and erection of any members. Work shown on the drawings is New, unless noted as Existing. 3. Demolition, cutting, drilling, etc. of existing work shall be performed with great care so as not to jeopardize the structural integrity of the existing building. If any architectural, structural, or MEP members not designated for removal interfere with the new work, the Architect shall be notified immediately and approval obtained prior to removal

of those members. 4. The contractor shall verify the location of existing utilities prior to the start of construction and take care to protect existing utilities that are to remain in service. 5. The contractor shall repair all damage caused during

construction with similar materials and workmanship to

restore conditions to levels acceptable to the Architect E. ADJACENT BUILDINGS AND PROPERTY

DURING CONSTRUCTION

1. The General Contractor shall ensure that all construction methods used will not cause damage to the adjacent buildings and property. This shall include all foundation installation.

2. The General Contractor is advised to perform all photographic surveys and other documentation of the adjacent buildings before the start of and during construction.

All structural elements of the project have been Structural Engineer to resist the required co lateral forces that could occur in the fig only. It is the responsibility of the required bracing during construction to aintain t stabilit and safety of all structural elements during the c truction

RESPONSIBILITY OF THE CONTRACTOR FOR STABILITY OF THE STRUC

process until the lateral-load resisting or stability-providing system is completely installed and the structure is completely tied together.

RESPONSIBILITY OF THE CONTRACTOR FOR CONSTRUCTION LOADS

the final structure once completed and occupied. The Contractor shall not overload the structure during construction. The actor shall be responsible for checking the adequacy of the are to support any applied construction loads, including se due to construction vehicles or equipment, material dling or storage, shoring or reshoring, or any other Instruction activity. The Contractor shall submit calculations signed and sealed by an engineer licensed in the state where the project is located verifying the adequacy of the structure for any proposed construction loads that are in excess of the stated design loads. The Structural Engineer is not responsible to design or check the structure for loads applied to the structure

The structure has been designed for the loads identified within

these structural drawings that are anticipated to be applied to

H. CONTRACTOR SUBSTITUTIONS

for any construction activity.

Any materials or products submitted for approval that are different from the material or products specified in the structural contract documents will be approved only if the following criteria are satisfied: A cost savings to the Owner is documented and submitted with

the request. 2. The material or product has been approved by the International Code Council (ICC) and the ICC report is submitted with the request.

Submittals not satisfying the above criteria wil considered

I. THE STRUCTURAL ENGINEER'S ROLE DURING CONSTRUCTION

1. The Engineer shall not have control l shall not be responsible for, constructi techniques, sequences, or procedu and programs in connection wi omission of the Contractor, Su ractor, or ₹ persons performing any of the w any of them to ca accordance

Servation 2 Periodic site P. Moore and ımited site observation ral contra ive or continuous to check work, but rather periodic in o guard the Ow against defects or deficiencies

MAINT

es equire periodic maintenance to extend lifespan structural integrity from exposure to the A planned program of maintenance shall be by the building owner. This program shall include such as but not limited to painting of structural protective coating for concrete, sealants, caulked joints, expansion joints, control joints, spalls and cracks in concrete, and pressure washing of exposed structural elements exposed to a salt environment or other harsh chemicals.

DRAWING INTERPRETATION

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A. STRUCTURAL ABBREVIATIONS
     The following abbreviations may be used on the structural
     drawings:
                                               DEVELOPMENT LENGTH
            NUMBER
                                              LONG LEG BACK TO BACK
            ROUND, DIAMETER
                                        LLH
                                               LONG LEG HORIZONTAL
     ADDL
            ADDITIONAL
                                               LONG LEG VERTICAL
            ABOVE FINISHED FLOOR
                                        LONG
                                               LONGITUDINAL
      AHR
            ANCHOR
                                               LONG SIDE HORIZONTAL
                                               LONG-SLOTTED HOLE PARALLEL
     AHU
            AIR HANDLING UNIT
                                        LSLP
            ALTERNATE
                                        LSLT
                                               LONG-SLOTTED HOLE TRANSVERSE
      APPROX
            APPROXIMATE
                                               LONG SIDE VERTICAL
                                        LSV
             ANCHOR ROD
                                               LIGHTWEIGHT CONCRETE
            ARCHITECTURAL
                                               MOMENT
     BLDG
            BUILDING
                                        MAS
                                               MASONRY
                                        MAX
            BEAM
                                               MAXIMUM
            BOTTOM OF
                                               MOMENT CONNECTION
            BOTTOM
                                        MECH
                                               MECHANICAL
     BRDG
            BRIDGING
                                               MEZZANINE
     BRG
            BEARING
                                        MFR
                                               MANUFACTURE(R)
     BTWN
            BETWEEN
                                        MIN
                                               MTNTMUM
            CAMBER
                                               MISCELLANEOUS
                                        MISC
            CANTILEV
                                        MTL
                                               METAL
                                              NOT IN CONTRACT
     CIP
            CAST-IN-P
                                      NS
            CONSTRUCTION
                                               NEAR SIDE
     CJP
            COMPLETE JO
                            PENETRA
                                       NTS
                                               NOT TO SCALE
            CENTERLINE
                                       NWC
                                               NORMALWEIGHT CONCRETE
                                               ON CENTER
```

CMU OUTSIDE DIAMETER CONC CONN OPPOSITE HAND CONNECT OPENING CONSTR OPPOSITE OVERSIZED HOLE AXIAL LOAD COV POWDER ACTUATED FASTENER CPRS PARALLEL PCC PRECAST CONCRETE POUNDS PER CUBIC FOOT PERP PERPENDICULAR PLATE POUNDS PER LINEAR FOOT PJP PARTIAL JOINT PENETRATION

EFORMED WIRE ANCHOR PRELIM PRELIMINARY DRAWING PROP PROPERTY PSF POUNDS PER SQUARE FOOT EACH FACE PSI POUNDS PER SQUARE INCH EXPANSION JOINT POST-TENSION(ED) ELEVATION QTY QUANTITY ELEVATOR RADIUS, REACTION, REMAINDER ELEV EMBED EMBEDMENT RFF REFERENCE **ENGR** ENGINEER REINF REINFORCING

REQD

REV

RTU

SDS

SECT

SIM

SLBB

SPA

SPEC

REQUIRED

REVISION

SCHED SCHEDULE(D)

SECTION

SIMILAR

SPACING

SUPPORT

STANDARD

TYPICAL

VERTIC

WEIGHT

UNLESS NO

WATERSTOP

EXTRA STRONG

DOUBLE EXTRA STRONG

STIFFENER

SHEET

ROOF TOP UNIT

SELF-DRILLING SCREW

SHORT LEG BACK TO

SPECIFICATION

SLIP CRITICAL, SHEAR CONNECTOR

SHORT-SLOTTED HOLE PARALLEL

SHORT-SLOTTED HOLE TRANSVER

OTHERWISE

WELDED WIRE REINFORCEMENT

EQ EQUAL EQUIP EQUIPMENT EQUIV EQUIVALENT EACH WAY EXIST EXISTING EXP EXPANSION EXT EXTERIOR FAB FABRICATE F'c= 28 DAY CONCRETE STRENGTH

FLOOR DRAIN FDTN FOUNDATION FIN FINISH(ED) FLR FLOOR FAR SIDE FS FTG FOOTING FUT FUTURE FIELD VERIFY

YIELD STRENGTH= GALV GALVANIZE(D) GEN GENERAL GRADE HORIZONTAL REACTION HANGER HORIZONTAL

HEADED STUD AN HOLLOW STRUCTU INSIDE DIAMETE

B. DRAWING VIEWS LABELED AS "TYPICAL"

Partial plans, elevations, sections, details, or schedules labeled with "Typical" at the beginning of their title shall apply to all situations occurring on the project that are the same or similar to those specifically shown. The applicability the content of these views to locations on the plan can be determined from the title of the views. Such views shall apply whether or not they are keyed in at each location. regarding applicability of these "Typical" views determined by the Structural Engineer.

Examples of "Typical" views include: Typical Steel Beam to Column Flan

gle Shear Typical Column Tension Dever ment and Lap Typical Slab-on-Grade at F Depression

C. SYMBOLS AND NOT PLAN DETAIL

PLAN

—Number of shear studs for uniform spacing. Left end Reaction (kips) — Camber Reaction W18x40 ($\hat{2}$ 8) $\hat{c} = 1/2$ " Composite Number of shear connectors for point loading (if applicable). DETAIL Concrete Earth (refer to specifications)

Elevation Designation Existing Building Area Floor Opening Floor or Roof Slope

Floor Step in Elevation

Welded Wire Reinforcement

Work Point

Top of Steel El. Below Top of Concrete

Metal Deck Span Direction Precast Concrete or Grout

Top of Steel El From noted Top of Steel <+2 1/2"> or <-2 1/2">

EORGIA STATE VIVERSITY LANGUAGE RESEARCH CENTER Panthersville Road

Decatur Georgia 30034



8600 Indian Hills Drive Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564

WALTER P MOORE

PHONE: 404.898.9620 FAX: 404.898.9659

SUBMITTAL HISTORY

DESIGN DEVELOPMEN

100% CD SUBMITTAL 2010-10-15 REVISIONS

2010-10-01

FILE LOG

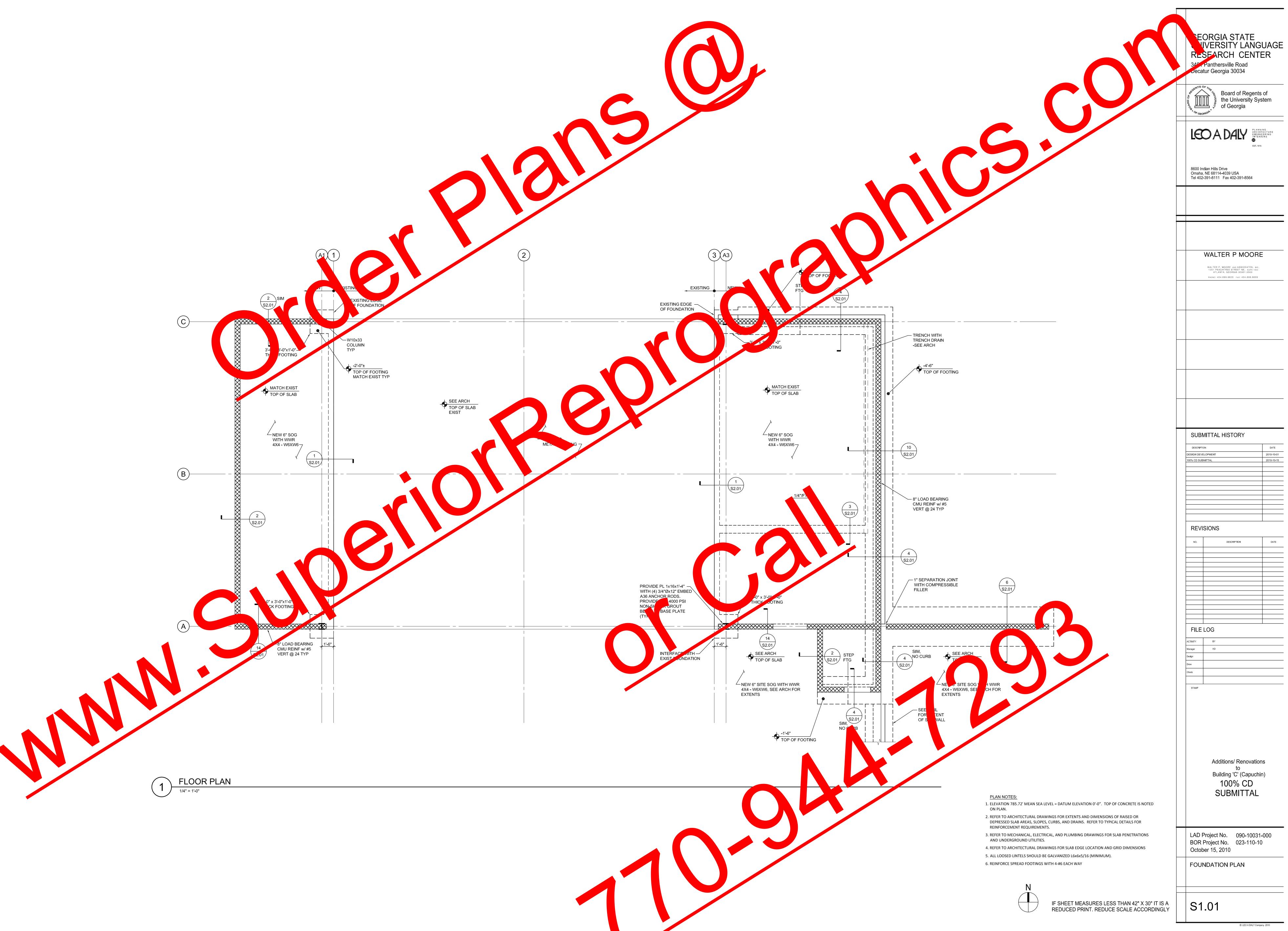
Additions/ Renovations 100% CD

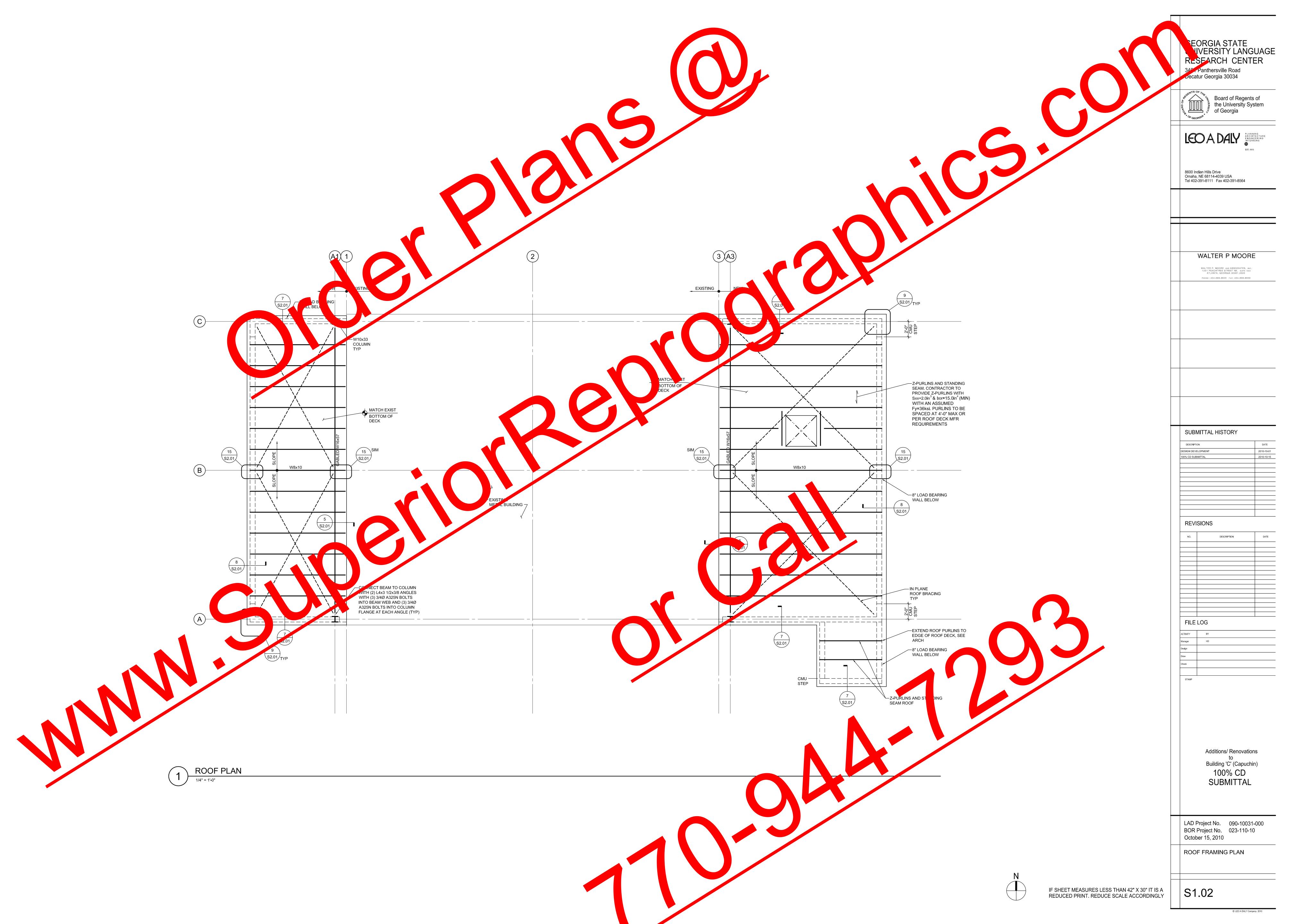
LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

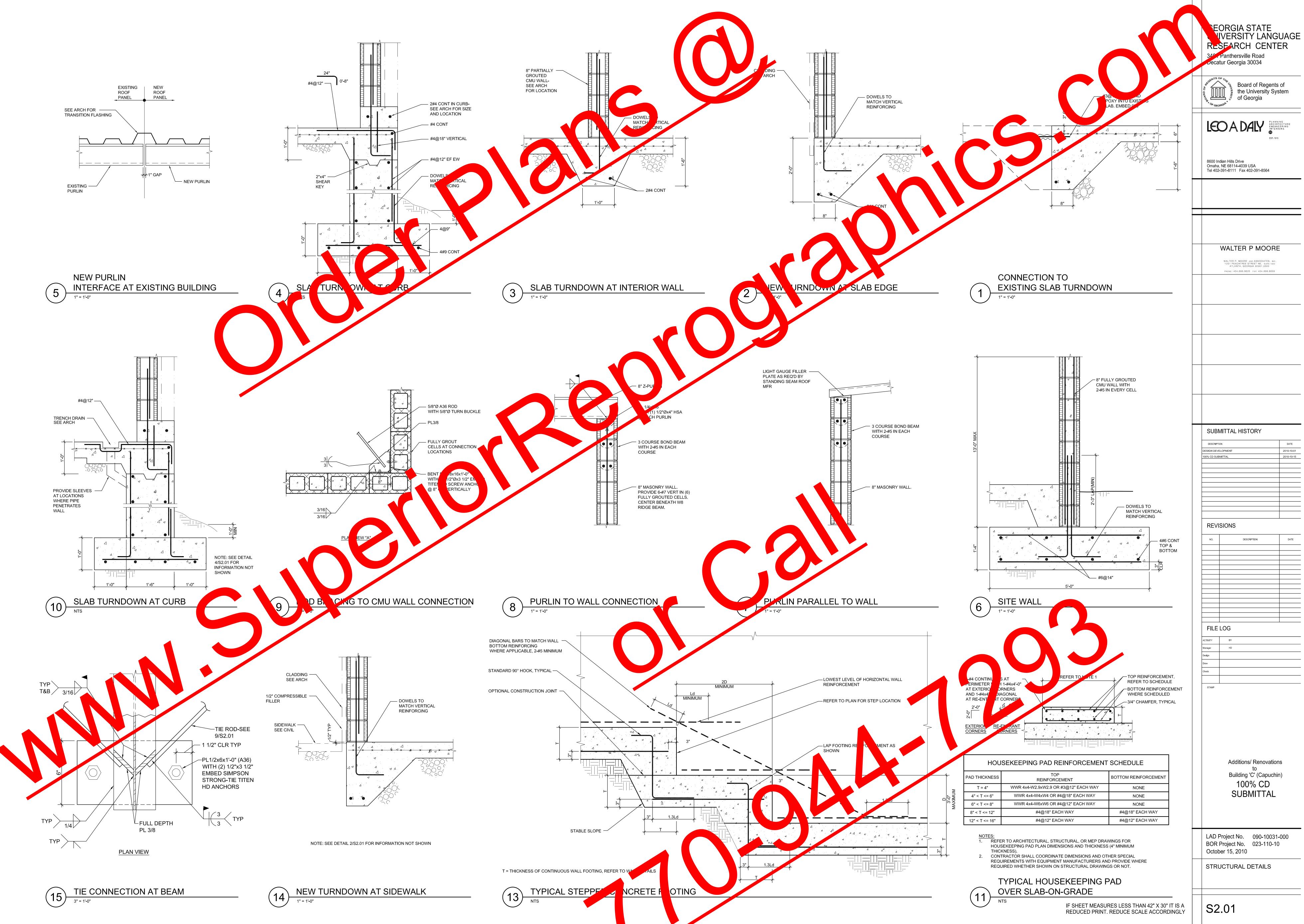
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Building 'C' (Capuchin) SUBMITTAL

GENERAL NOTES







SYMBOL DESCRIPTION DESCRIPTION PLUMBING SPECIALTIES SYMBOLS PIPING LINETYPES, VALVES, & MISC. SYMBOLS SANITARY SEWER (BELOW FLOOR) SAFETY RELIEF VALVE AIR VLI... GAS COCK BACL E - - - - - - RANITARY VENT → DCW DOMESTIC COLD WATER → DHW DOMESTIC HOT WATER BACKFLOW PREVENTOR ──DHWR── DOMESTIC HOT WATER RECIRCULATING -+ HB HOSE BIBB $\mid \longleftarrow \mathsf{G} \longrightarrow \mid \mathsf{NATURAL} \mathsf{GAS} \mid$ FIRE HYDRANT ← HWS ← HOT WATER SUPPLY (HEATING) MH MANHOLE HOT WATER RETURN (HEATING) CONDENSER WATER SUPPLY FIRE DEPARTMENT CONNECTION CONDENSER WATER RETURN WATER METER (DRAINS) FLOOR -FD ARFA-AD ├──LPR ── LOW PRESSURE CONDENSATE RETURN TRENCH -TD EQUIPMENT DRAIN CLEAN OUT ├── PIPE GUIDE GLOBE VALVE WALL CLEAN OUT SWING CHECK VALVE CENTER GUIDED SILENT CHECK VALVE FLOOR CLEAN OUT CALIBRATED FLOW MEASUREMENT VALVE — BALL VALVE GCO GRADE CLEAN OUT ----- BUTTERFLY VALVE STRAINER PLUMBING FIXTURES & EQUIPMENT SYMBOLS — UNION WATER CLOSET (TANK TYPE) —⊢—— | FLANGE —___ | CAP WATER CLOSET (FLUSH VALVE TYPE) -| BLIND FLANGE PRESSURE REGULATING VALVE AUTOMATIC, GLOBE VALVE (PNEUMATIC) AUTOMATIC, BALL VALVE (ELECTRIC) LAVATORY (WALL HUNG) B'FLY CONTROL VALVE (2—WAY PNEUMATIC) IN HOR. PLANE. NOTE: "M", WHERE SHOWN IS A MODULATING VALVE. LAVATORY (COUNTER TOP) MAKEUP WATER FLOAT VALVE (FOR COOLING TOWER) **──**₩ SERVICE SINK MAKEUP WATER FLOAT VALVE (FOR COOLING TOWER) COOLING TOWER BALANCING/ISOLATION VALVE DRINKING FOUNTAIN PRESSURE GAUGE LECTRIC WATER COOLER ☐</ SHOWER HEAD SIGHT GLASS (FLOW TYPE) STEAM TRAP TEMP BULB & CAPILLARY TUBE THERMOMETER & THERMOWELL MOP SINK TEMP. & PRESS. RELIEF VALVE FHC FIRE HOSE CABINET FIRE VALVE CABINET REFERENCING SYMBOLS COLUMN NUMBER OR LETTER PLUMBING RISER NUMBER KEY NOTE SYMBOL & ARROW

PLUMBING PIPING

CODES AND CODE AUTHORITIES.

- A. WORK IS TO BE ACCEPTABLE UNDER AUTHORITY HAVING JURISDICTION. WHERE EXISTING UTILITIES ARE SHOWN TO BE ABANDONED, REMOVED, OR CONNECTED TO, PERFORM WORK AS REQUIRED BY LOCAL
- B. WATER SERVICE SHALL BE TYPE K COPPER WITH ANNEALED TEMPER, WATER SERVICE FITTINGS SHALL BE WROUGHT COPPER SOLDER TYPE
- C. HOT AND COLD POTABLE WATER PIPING. PIPING 2 INCHES AND SMALLER SHALL BE DRAWN COPPER TUBING, TYPE L, FITTINGS FOR COPPER TUBING SHALL BE WROUGHT COPPER OR CAST BRONZE (TINNED WHEN BRAZED). FITTINGS SHALL BE STANDARD WEIGHT GALVANIZED MALLEABLE IRON SCREWED FITTINGS, OR GROOVED. EXPOSED PIPING IN FINISHED ROOMS USED IN CONNECTION WITH PLUMBING FIXTURES SHALL BE CHROMIUM—PLATED BRASS PIPE WITH PLATED CAST BRASS FITTINGS.
- D. SANITARY DRAINAGE AND VENT PIPING. ABOVE—GROUND 2-1/2 INCHES AND SMALLER SHALL BE STANDARD WEIGHT GALVANIZED STEEL PIPE WITH BLACK CAST IRON DRAINAGE FITTINGS OR COPPER DRAINAGE TUBE (DWV) WITH CAST BRONZE OR WROUGHT COPPER DRAINAGE FITTINGS. PIPING UNDERGROUND SHALL BE SERVICE WEIGHT OR HEAVIER CAST IRON SOIL PIPE AND FITTINGS. UNDERGROUND JOINTS IN CAST IRON SOIL PIPE TO BE MADE WITH PICKED OAKUM AND LEAD.
- E. CONCEAL PIPING IN FINISHED ROOM UNLESS SHOWN OR SPECIFIED OTHERWISE. INSTALL HORIZONTAL DRAINAGE AND VENT PIPING OF 3 INCH DIAMETER AND LESS WITH FALL OF NOT LESS THAN 1/4 INCH PER FOOT. INSTALL PIPING LARGER THAN 3 INCH DIAMETER WITH FALL OF NOT LESS THAN 1/8 INCH PER FOOT. WHERE CONDITION DO NOT PERMIT BUILDING DRAINS AND SEWERS TO BE INSTALLED WITH FALL AS GREAT AS THAT SPECIFIED, LESSER SLOPE MAY BE PERMITTED PROVIDED THE COMPUTED VELOCITY WILL NOT BE LESS THAN 2 FEET PER SECOND.
- F. VENT PIPES SHALL EXTEND THROUGH ROOF FULL SIZE, EXCEPT THAT NO VENT THROUGH ROOF SHALL BE LESS THAN 4 INCHES. EXTEND VENTS ABOVE ROOF MINIMUM 12 INCHES. VENTS THROUGH ROOF SHALL BE FLASHED AND COUNTER—FLASHED USING 4 POUNDS PER SQUARE FOOT SHEET LEAD FLASHING EXTENDING MINIMUM OF 10 INCHES IN ALL DIRECTIONS FROM PIPE. COUNTER—FLASHING SHALL BE TURNED DOWN INSIDE TOP OF PIPE AND OVERLAP LOWER FLASHING BY 4 INCHEST
- G. TRAPS SHALL BE INSTALLED ON FIXTURES AND INLETS TO DRAINAGE SYSTEM EXCEPTION OF TRAPS ARE INTEGRAL WITH EQUIPMENT OF FIXTURES. NO FIXTURE SHALL BE DOUBLE—TO EXPOSED OF ACCESSIBLE P—TRAPS SHALL HAVE BOTTOM CLEAN—OUT PLUGS.
- H. POTABLE WATER PIPING. CONTRACTOR SHALL RUN TEST TO PROVE PROPER CARE AND PERFORMANCE OF APPARATUS, ETC., AND SYSTEM AS A WHOLE. MAKE PRESSURE TS IN PRESSURE VALVES DISCLOSED IN PRESSURE TEST AND REPEAT TEST UNTIL RESULTS ARE SATINGED TO SATINGE THE PROPERTY OF THE PR
- I. SANITARY SEWER DRAINAGE PIPING. MAKE PRESSURE TESTS IN PRESENCE OF OWNER. TO WAR DRAINAGE PIPING BY CLOSING OPENINGS BEFORE FIXTURES APPLICATION AND FILLING ENTIRE WITH WATER, OR BY AIR PRESSURE TESTS AS REQUIRED BY
- J. HAVE LOCAL UTILITY CERTIFY POTABLE WATER SYSTEM ME. EQUIREMENTS OF LOCAL HEAL AUTHORITIES BEFORE USING FOR DOMESTIC SERVICE.

PLUMBING FIXTURES

- A. PROVIDE PLUMBING FIXTURES AND TRIM FREE OF FLAWS AND DEFECTS IN ATERIAL AND WOLLANSHIP AND REPLACE ALL OR ANY PART OF THE FIXTURES WHICH SHOW FLAW DEFECT TY MANUFACTURE OR CONSTRUCTION—RELATED DAMAGE AT NO ADDITIONAL ST TO JOWNER.
- B. PROVIDE ALL PLUMBING FIXTURES COMPLETE WITH ALL NECESSARY TRIAND ACCESSORIES TO THEIR PROPER INSTALLATION AND OPERATION. TRIM AND ACCESSORIES SUPPLY PIPES, STOPS, DRAINS, STRAINERS, TAILPIECES, AND P—TRAPS
- C. SINK AMERICAN STANDARD MODEL ROSELYN COUNTERTOP 0498—001, TLF RINGS AND FROM OVERFLOW (MARK SK—1). FAUCET AMERICAN STANDARD SELECTRONIC DXIMIT OF 6055 05 SOLID BRASS CONSTRUCTION AND SINGLE POST MOUNTING.
- D. INSTALL ALL PLUMBING FIXTURES IN A NEAT CORKMANLIKE MANNER WILL PROPER CONNECTION SUPPLY AND DRAINAGE PIPING WITH SUIT OF SUPPLIES WITH STOPS AND APS. PROVIDE ALL IN ACCORDANCE WITH THE APPLICABLE COLOR REQUIREMENTS OR MORE SUPPLIES JURISDICTION.
- E. PLUMBING FIXTURE TESTS, TURN ON TO SERVE SAND DEMONSTRATE ALL FIXTURES OPERATE

PLUMBING SPECIALTIES

- A. CLEANOUTS SHALL BE CONCEALED OR EXPOSED IN UNFINISHED AREA, JOSAM 58500-22, FINISHED WALLS, JOSAM 58710-22 WITH NICKALOY TOP AND SATIN FINISH, FINISHED FLOORS, JOSAM 58700-22 WITH NICKALOY TOP AND SATIN FINISH. INSTALL CLEANOUTS WHERE SHOWN AND AT BASE OF SOIL OR WASTE STACKS 30 INCHES ABOVE FLOOR, AT CHANGES IN DIRECTION AND EVERY 50 FEET IN HORIZONTAL PIPING. CLEANOUTS TO BE SAME SIZE AS PIPE
- B. FLOOR DRAINS ASME 112.6.3 WITH BACKWATER VALVE, SEEPAGE FLANGE, ANCHOR FLANGE, AND CLAMPING DEVICE. BACKWATER VALVE SHALL HAVE INTEGRAL ASME A112.14.1 SWING CHECK VALVE, SHALL HAVE ACID RESISTANCE ENAMEL COATING ON INTERIOR WITH TRAP PRIMER VALVE CONNECTION DEEP SEAL P—TRAP.

GEORGIA STATE
UNIVERSITY
NGUAGE
R SEARCH CENTER

3461 Panthersville Road
Decatur Georgia 30034

Board of Regents of the University System

the University System of Georgia

8600 Indian Hills Drive

Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564

SUBMITTAL HISTORY

DESCRIPTION

DATE

REVISIONS

O. DESCRIPTION

FILE LOG

ACTIVITY BY

Manager HD

Additions/ Renovations to Building 'C' (Capuchin)

100% CD SUBMITTAL

LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

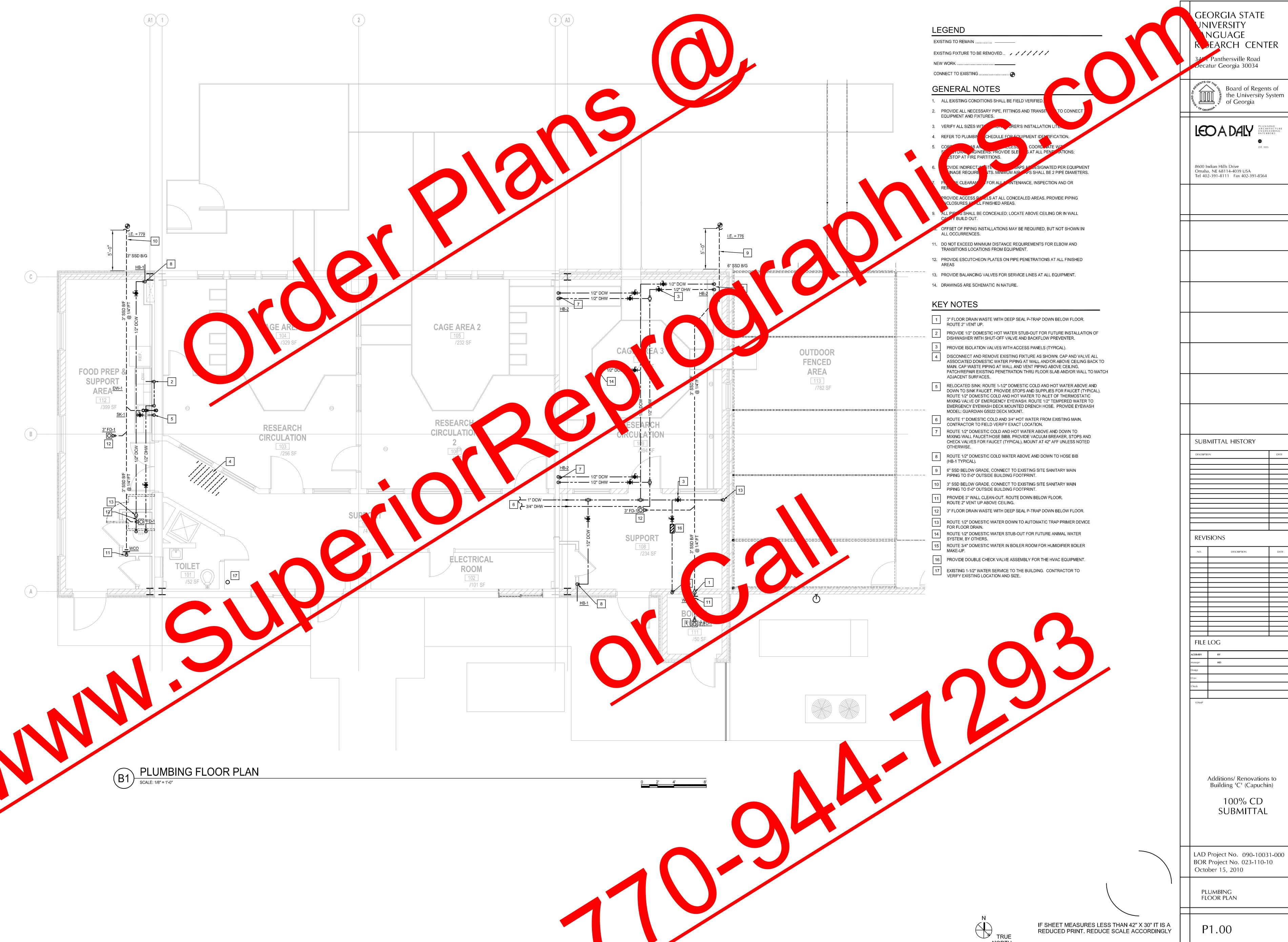
PLUMBING SYMBOL LEGEND,
ABBREVIATIONS AND GENERAL NOTES

P0.01

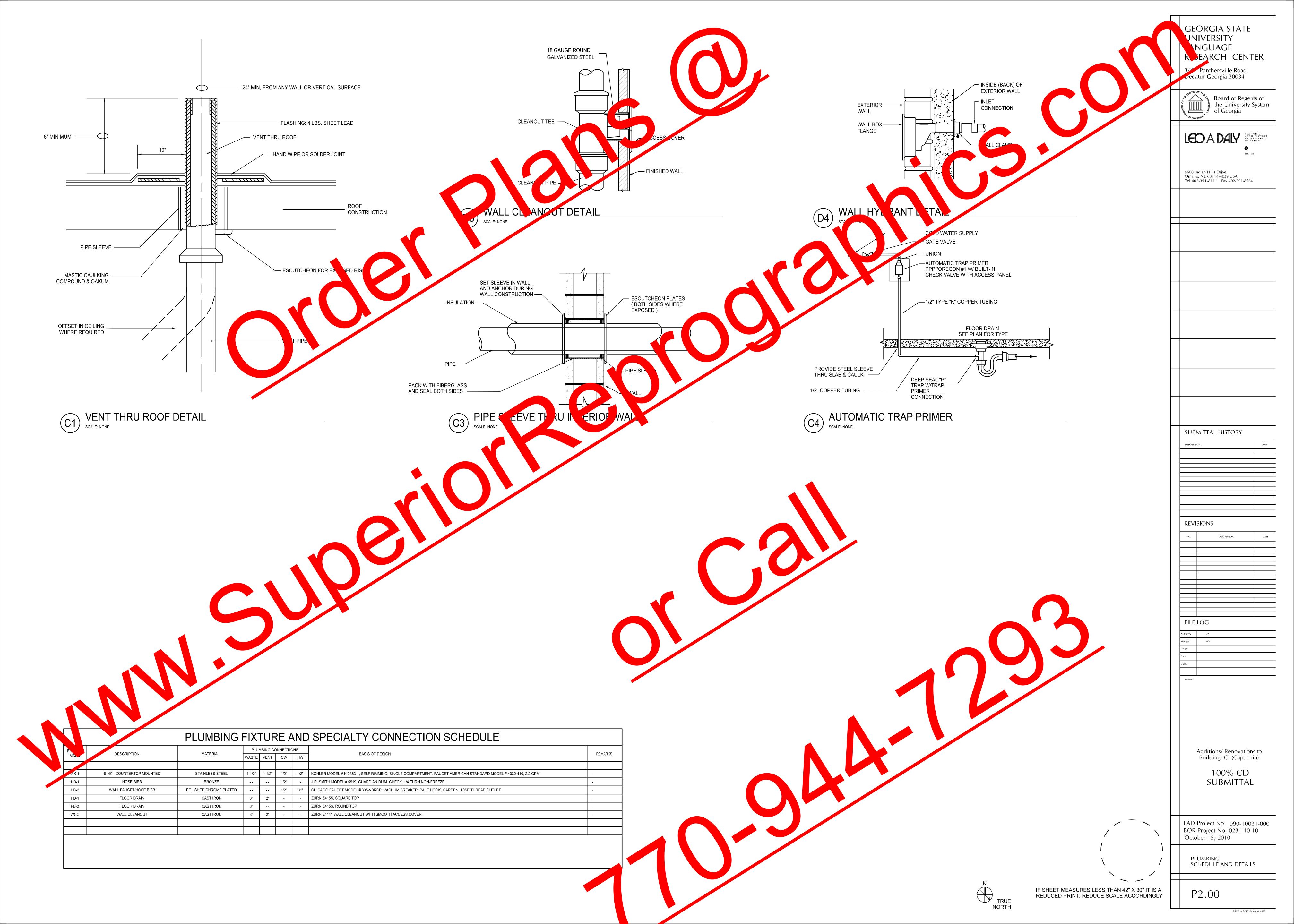
IF SHEET MEASURES LESS THAN 42" X 30" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY

STANDARD ABBREVIATIONS

	\cap						\subset		1		N /				\cap						
ANCHOR BOLT		CONDUIT	CUH	CABIN INIT HEATER	EMD	ESTIMATED MAXIMUM DEMAND	G GA	GAUGE	IC IC	INTERCOM	IVI M		0/S	ESET	Q OT	QUARRY TILE	STA	STATION		Y	
ACRYLONITRILE-BUTADIENE-STYRENE	CAB	CABINET	CWP	CHILL WATER PUMP	EMT		GALV	GALVANIZED	ID	INSIDE DIAMETER	M2	SQUARE META	073	OUNCE	_	QO/MAKI TILL	STD	STANDARD	V	T OR VENT XFM	IR TRANSFORMER
ABOVE CEILING	CB	CIRCUIT BREEFER OR CATCH BASIN			EQ.	EQUAL	GB	BRAB BAR	IE	INVERT ELEVATION	M3	CUBIC METER		331132	R		STE	STANDARD TAPERED END	VB	BASE XFR	
ALTERNATING CURRENT OR AIR CHANGES	CC	COOLING CO		VIROL LVE	EQUIP		GEN	GENERATOR	IF	INSIDE FACE	MAIN	MAINTENANCE	D		R	RISER OR REGISTER	STIFF	STIFFENER	VC	VECURVE	` ,
AIR-COOLED CONDENSING UNIT	CD	CONDENSATE	Cvv	COLP WATER	ESP		GI	GALVANIZED IRON	IN	INCH	MAR	ARBLE	ı		RA	RETURN AIR	STIR	STIRRUP	VCP	V IF CLAY	
ASBESTOS CEMENT PIPE	CE	R ELEVA	_		EW	EMERGENCY EYE WASH	GL	GLASS	INSUL	INSULATION	MAS	MRY	Р	PAINT OR PUMP OR PENDANT	RAD	RADIUS	STL	STEEL	NT.	YL POSITION III YD	YARD
AREA DRAIN	CEM	N _L	D		EWC		G	NATURAL GAS	INT	INTERIOR	MAT	MAD	PA	PROCESS AIR	RB	RESILIENT BASE	STOR	STORAGE		VERTICAL	YARD HYDRANT
ADJACENT OR ADJUSTABLE	FM	IC I REI INUTE	U	DIFFUSER	EWH		GP	GLAZED PAINT	•		MAX	MAXIMUM	PART	PARTITION	RCP	REINFORCED CONCRETE PIPE	STR	STRYTTURAL	VEST	VESTIBU	
ACCESS DOOR		C FEET COND	DBL	DOUBLE	EXH		GPM	GALLONS PER MINUTE	J		МСМ	THOUSAN CIRCULAR MILLS	PAVT	PAVEMENT	RD	ROOF DRAIN	SUSP	NDED		VERT FEET	
ABOVE FINISH FLOOR	CG	CC TR GUARD	DEPR	DEPRESSED	EXIST	EXISTING	GR	GRADE	JAN	JANITOR	MDO	MEDIUM DENSITY OVERLAY PLYWOOD	PC	POINT OF CURVATURE	REF	REFERENCE	SW	H We	VTR	THROU ROOF	
AIR HANDLING UNIT	СН		DET	DETAIL	EXP	EXPOSED	GRB	GEAR BOX	JB	JUNCTION BOX	MECH		PCF	POUNDS PER CUBIC FOOT	REFL			SV H GEAR	XWC	VINYL LL COVERING	
ALUMINUM	CI	CLET OR COST IRON	DEFL	DEFLECTION	EXPN		GRC	GLASS FIBER REINFORCED CONCRETE	JST	JOIST	MET	METAL	PED	PEDESTAL			SYM	SYTTRICAL			
ALTERNATE	CIP	CAST IRON LE	DF	DRINKING FOUNTAIN	EXT	EXTERIOR	GRP	FIBERGLASS REINFORCED PLASTIC	JT	JOINT	MFG	MANUFACTURER	PERP	PERPENDICULAR	REQD	REQUIRED	ST	ST WATER	W		
AMBIEN	Cl	CONTR JOINT	DIA	DIAMETER	_		GWB	GYPSUM WALL BOARD			MG	MOTOR GENERATOR	PF	POINT OF FROG	REV	REVERSE				WATT OR WASTE	
OX APPROX ELY	CKT	C .©UIT	DIAG	DIAGONAL	F		GYP	GYPSUM	Κ		МН	MANHOLE	PHC	PREHEAT COIL	RF	RETURN FAN	Т		W/	WITH	
APARTME	CL	CENTER LINE	DIP	DUCTILE IRON PIPE	FA	FIRE ALARM	1.1		, ,		MIN	MINIMUM	PHVAC	PLUMBING, HEATING, VENTILATING	RGS	RIGID GALVANI	•		WC	WATER CLOSET OR WALL COVERING	
CHITECT AL)	4 6	CEILING	DISC	DISCONNECT	FC	FORWARD CURVE	Н		KCJ	KEYED CONSTRUCTION JOINT	MLO	MAIN LUGS ONLY		AND AIR CONDITIONING	RH	ROOF HOOD	I	TREAL	WD	WOOD	
RIGERATION INSTATE	CLO	CLOSET	DISP	DISPENSER	FCU	FAN COIL UNIT	НВ	HOSE BIBB	KIT	KITCHEN	ММ	MILLIMETER	PI	POINT OF INTERSECTION	RHC	REHEAT COIL		TOP AN OTTOM	WDW	WINDOW	
ASPA	CLR	CLEAR	DIST	DISTRIBUTION	FCO	FLOOR CLEAN OUT	HC	HEATING COIL	KS	KITCHEN SINK	MO	MASONRY OPENING	PIV	POST INDICATOR VALVE	RM	ROOM	T&G	TONGUE AND CP JVE	WH	WATER HEATER OR WALL HYDRANT	
IR TERM NIT	СМ	CENTIMETER	DK	DECK	FD	FLOOR DRAIN	HDNR	HARDNER	KV	KILOVOLT	MOT	MOTOR	PKG	PARKING	F	ROUGH OPEN	TC	TOP OF C'AB	W/O	WITHOUT	
OUSTICAL CEILIN	СМН	CUBIC METER PER HOUR	DL	DEAD LOAD	FDN	FOUNDATION	HDW	HARDWARE	KVA	KILOVOLT AMPERE	MTG	MOUNTING OR MOUNTED	PL	PROPERTY LINE OF PLATE	F	RIGHT OF WA	TEFC	TOTAL ENCLOSED FAN COOLED	WP	WEATHER PROOF	
(ILIARY	CMP	CORRUGATED METAL PIPE	DN	DOWN	FDR	FEEDER	HDWD	HARDWOOD	KW	KILOWATTS	MULL	MULLION	PLAM	PLASTIC LAMINATE		REDUCED PR URE	TEL	LEPHONE	WPFG	WATER PROOFING	
AGE	CMT	CERAMIC MOSAIC TILE	DO	DITTO	FE	FIRE EXTINGUISHER	HK1E	HOOK ONE END	1		MW	MEMBRANE WATER PROOFING	PLAS	PLASTER		FFRIGERANT	TEM	TEMPERATURE	WS	WATER STOP	
AZIMUT	CMU	CONCRETE MASONRY UNIT	DP	DAMP PROOFING	FEC	FIRE EXTINGUISHER CABINET	HK2E	HOOK TWO ENDS	L		N 1		PLBG	PLUMBING		RIGERANT JID	rERR	TERRAZZO	WT	WEIGHT	
	CNP	CONDENSER WATER PUMP	DPR	DAMPER	FH	FIRE HYDRANT	НМ	HOLLOW METAL	LAB	LABORATORY	Ν		PLF	POUNDS PER L' FOO			TOIL	TOILET	WWF	WELDED WIRE FABRIC	
	CO	CLEANOUT	DR	DOOR	FHC	FIRE HOSE CABINET	HORIZ	HORIZONTAL	LAM	LAMINATE	NEC	NATIONAL ELECTRICAL CODE	PLYWD	PLYWOOD			TOPO	TOPOGRAPHY	WHA	WATER HAMMER ARRESTER	
BALLED AND BURLAPPED	COL	COLUMN	DS	DOWN SPOUT	FIN	FINISH	HP	HORSEPOWER	LAN	LOCAL AREA NETWORK	NO	NUMBER	PNL	PANEL		SINK	TOS	TOP OF STEEL			
BOOSTER WATER SUPPLY	COMB	COMBINATION OR COMBINE	DWG	DRAWING	FIX	FIXTURE	HPT	HIGH POINT	LAV	LAVATORY	NOM	NOMINAL	PR	PAIR		SUPPLY	TOT	TOTAL			
BOOSTER WATER RETURN	COMP	COMPRESSIBLE	DWL	DOWEL	FL	FLOOR	HR	HOUR	LBS	POUNDS	NIC	NOT IN CONTRACT	PROJ	PROJECTION	SCH	SCHEDULE	TOW	TOP OF WALL			
BOARD	CONC	CONCRETE	DWP	DOMESTIC WATER PUMP	FM	FORGE MAIN	HS	HIGH STRENGTH	LF	LINEAR FEET	NTS	NOT TO SCALE	PRV	PRESSURE REGUL	SCP	STEAM OF DENSATE PUMP	TP	TOP OF PAVEMENT			
BACKFLOW PREVENTER	COND	CONDITION			FP	FIRE PROOFING	HSG	HOUSING	LIN	LINEAR	NFWH	NON FREEZE WALL HYDRANT	PSF	POUNDS PER SQUARE FOOT	SCU	ST M CONVERTER UNIT	TRANS	TRANSVERSE			
BUILDING LINE	CONN	CONNECTION			FOC	FACE OF COLUMN	HSKPG	HOUSEKEEPING	LL	LIVE LOAD	\circ			POUNDS PER STUARE INCH	SECT	SECTION	TYP	TYPICAL			
BUILDING	CONST	CONSTRUCTION	EA	EACH	FOR	FUEL OIL RETURN	HT	HEIGHT	LLH	LONG LEG HORIZONTAL	0		PŤ	POINT OF NCY	Cr	SUPPLY FAN	1.1				
BLOCKING	CONT	CONTINUOUS	EER	ENERGY EFFICIENCY RATIO	FOS	FUEL OIL SUPPLY	HTHW	HIGH TEMPERATURE HOT WATER	LLV	LONG LEG VERTICAL	OA	OUTSIDE AIR	PTC	POST ONED CONCRETE	SHT	SHEET	U				
BENCH MARK OR BEAM	CONTR	CONTRACTOR	EF	EACH FACE OR EXHAUST RATIO	FPS	FINS PER INCH	HTG	HEATING	LONG	LONGITUDINAL	OC	ON CENTER	PTS	INTS (FOR ENERGY MGMT SYST M)	SIM	SIMILAR	UC	UNDERCUT			
BARE ROOT	CORR	CORRIDOR	EJ	EXPANSION JOINT	FT	FEET		HEATER	LPT	LOW POINT	OD	OUTSIDE CER	PTVC	IT OF VERTICAL CURVATURE	SP	SUMP PUMP	UCP	UNIT CONTROL PANEL			
BEARING	CPT	CARPET	EL	ELEVATION	FTR	FINTUBE RADIATION	HVAC	HEATING/VENTILATING/AIR CONDITIONING	LT	LIGHT	ODP	OP PROOF	PVC	VINYL CHLORIDE	SPEC	SPECIFICATIONS	UG	UNDERGROUND			
BRITISH THERMAL UNIT	CRU	CONDENSATE RETURN UNIT	ELEC	ELECTRIC (AL)	FUR	FURRED	HWCP	HOT WATER CIRCULATING PUMP	LTG	LIGHTING	OF	OUTSIDE FACE	PVI	T OF VERTICAL INTERSECTION	SQ	SQUARE	UH	UNIT HEATER			\
BELOW FLOOR	CT	CERAMIC TILE	ELEV	ELEVATOR	FVC	FIRE VALVE CABINET	HZ	HERTZ	LTHW	LOW TEMPERATURE HOT WATER	OF	OPENING	VI	NT OF MICAL TANGENCY	SS	SERVICE SINK/STAINLESS STEEL	UV	UNIT VENTILATOR			
	CTR	CENTER OF COOLING TOWER	EMBED	EMBEDMENT			HW	HOT WATER	LT WT	LIGHT WEIGHT		OPPOSITE			ST	STAIR TREAD					
									LVL	LEVEL											



/	SIONS	
	DESCRIPTION	DATE



.⊑∪ I 	RICAL SYMBOLS NOT ALL SYMBOLS	SINDICATED M	AY BE USED ON PLANS.				ECTRICAL ABBRE	=VIA I	IONS
BOL	DESCRIPTION LIGHTING	SYMBOL	DESCRIPTION RECEPTACLES AND JUNCTION BOXES	SYMBOL	DESCRIPTION FIRE ALARM SYSTEM		AMPERES	MC	METAL-
1 FL	UORESCENT LIGHT FIXTURE. STANDARD SYMBOL INDICATES SURFACE MOUNTING.		(WALL MOUNTED)	P	MANUAL PULL STATION, SEMI-FLUSH WALL MOUNTED, 48"AFF UON	AFF	ALTERN G CURREN	MCB MCC	MAIN CI MOTOR
	SYMBOL WITH DIAGONAL LINE INDICATES RECESSED MOUNTING. FULLY SHADED SYMBOL INDICATES ON EMERGENCY POWER	→	SINGLE RECEPTACLE, 20A, 125V, 2P, 3W (GROUNDED), COMMERCIAL SPECIFICATION GRADE, NEMA 5-20R, MOUNTED AT 18"AFF, UON. SHADED SYMBOL INDICATES DEVICE IS ON	0	PHOTOELECTRIC TYPE SMOKE DETECTOR, SURFACE MOUNTED ON CEILING UON.	AFG	ABOVE FILE TO GRADE AIR HANDLI UNIT	MCM MCS	THOUSA MOLDED
	CIRCUIT OR WITH EMERGENCY BALLAST(S). HALF—SHADED SYMBOL INDICATES ON 24HR NIGHT LIGHT		EMERGENCY POWER CIRCUIT.	•	RATE OF RISE/FIXED TEMPERATURE TYPE HEAT DETECTOR, SURFACE MOUNTED ON CEILING UON.	AIC	AMPERES INT JPTIN APACIT	MECH	MECHAN
a _{5.}	CIRCUIT. FULLY SHADED SYMBOL WITH THE SUBSCRIPT "NL" INDICATES	⇒	DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W (GROUNDED), COMMERCIAL SPECIFICATION GRADE, NEMA 5-20R, MOUNTED AT	© 	PHOTOELECTRIC TYPE DUCT SMOKE DETECTOR, WITH SAMPLING TUBE UON.	AL ARCI	ALUMINUM ARCHITECTU LL	MH MH	MANHOL METAL
	THE EMERGENCY FIXTURE IS ALSO ON A 24HR NIGHT LIGHT CIRCUIT.		18"AFF, UON. SHADED SYMBOL INDICATES DEVICE IS ON EMERGENCY POWER CIRCUIT.	⊠⊲ ⊛	SPEAKER AND STROBE LIGHT COMBINATION, WALL MOUNTED AT 84 AFF. CIRCULAR SYMBOL INDICATES CEILING MOUNTED DEVICE.	ASYM	AUTOMATIC TRANS CR OH	MIN MISC	MINIMUM MISCELLA
	ERIFY FIXTURE TYPES AND MOUNTING WITH FIXTURE SCHEDULE	⇒ WP	DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W (GROUNDED), COMMERCIAL SPECIFICATION GRADE, NEMA 5-20R, WEATHERPROOF,	⊠ ⊗	STROBE LIGHT ONLY, WALL MOUNT AFF. CIRCULAR SYMBOL INDICATES CEILING MC 20 DEVIGE.		AMERICAN AMERICAN	MLO	MAIN LU
	ND PLANS. 2'X4', 2'X2' OR 1'X4' AS SHOWN ON PLANS.	—— III	MOUNTED AT 24"AFF, UON.		SPEAKER ONLY, WALL MOUNT AT 90" AFF.	BATT BD	JARU	MTD MTG	MOUNTE MOUNTIN
a	I = FIXTURE TYPE = CONTROL SWITCH INDICATOR = CIRCUIT NUMBER	- ⊕ G	DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W (GROUNDED), COMMERCIAL SPECIFICATION GRADE, NEMA 5-20R, WITH GROUND FAULT CIRCUIT INTERRUPTER, MOUNTED AT 18"AFF, UON.	<u></u> Э	STROBE AND MBINATIC MOUNTED 84" AFF.	BKD	BACKBOARD BUILDING	MV	MEDIUM
IN	DUSTRIAL STRIP LINEAR FLUORESCENT FIXTURE. VERIFY FIXTURE		(SEE SUBSCRIPT NOTE BELOW)	\$\frac{\frac{1}{3}}{5}	ALARM, V SUFE ORY TAMPER SWITCH. ALAP (INKLER S) WATER FLOW SWITCH	c	CONDUIT	MV N	MERCUR NEUTRA
	PES AND MOUNTING WITH FIXTURE SCHEDULE AND PLANS. EILING OR SURFACE MOUNTED FIXTURE. VERIFY FIXTURE TYPES	#	DOUBLE DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W (GROUNDED), COMMERCIAL SPECIFICATION GRADE, NEMA 5-20R, MOUNTED AT	R	REM DDRESSABLE R (DPD) FIRE A DOOR HOLDER ORDINATE WITH DOOF LOCATION.	CAB CATV	Cabinet Cable Television	NC NC	NORMAL NURSE
-	ND MOUNTING WITH FIXTURE SCHEDULE AND PLANS. ALL MOUNTED FIXTURE. VERIFY FIXTURE TYPES AND MOUNTING	=	18"AFF, UON. SHADED SYMBOL INDICATES DEVICE IS ON EMERGENCY POWER CIRCUIT.	FAAP	FIRE ALAR CONTROL PANEL RE ALAR MOTE ANNUNCIA OR PANEL	CCTV	CLOSED CIRCUIT TELEVISION CEILING	NEC	NATIONA
W	TH FIXTURE SCHEDULE AND PLANS. EILING OR WALL MOUNTED EXIT SIGN. SINGLE OR DOUBLE FACE	-0	SINGLE RECEPTACLE, 30A, 125V, 2-POLE, 3-NEMA 5-30R AND 18"AFF, UON.	EVAC BAT	SYSTEM EVACUATION AUDIT PANEL (100W AMPLIFIER). ALARM S BATTERY PLCK AND CHARGER CABINET.	- CB	CIRCUIT BREAKER	NEMA	NATION/ MANUF/
A	ND WITH OR WITHOUT ARROWS AS SHOWN.	-	SINGLE RECEPTACLE, 30A, 250 3-WIRE		FILE ARM NON-ICATION APPLIANCE CIRCUIT (NAC) POWER SUMD INTERFAL TERMINAL CABINET.	CHWP	CHILLER CHILLED WATER PUMP	NF NIC	NON-F
FI.	OMBINATION EXIT SIGN AND EMERGENCY DUAL HEAD LAMP XTURE.		NEMA 6-30R AND 18"AFF SINGLE RECEPTACLE 125/250V, 3-1 4-WIR.	RGAP	FOTE GENERAL OR ANNUNCIATOR PANEL	СКТ	CIRCUIT	NL NM	NIGHT I
	MERGENCY DUAL HEAD LAMP FIXTURE WITH BATTERY PACK, JRFACE OR WALL MOUNTED AS SHOWN.	-	NEMA 14-30R A AFF, UON. SINGLE RECEPTACL		TELEPHONE AND DATA SYSTEM	COMM	CENTERLINE COMMUNICATION	NO NO	NORMAI
	TERIOR BUILDING MOUNTED FIXTURE. VERIFY FIXTURE TYPES ND MOUNTING WITH FIXTURE SCHEDULE AND PLANS.		JUNCTION BOX OR PUL X, M 18"AFF, UON.	∇	U.O.N. DOUBLE GANG BACKBOX-1" EMPTY CONDUIT (MIN.) TO	CONT	CONTINUED CORRIDOR	NTS OC	NOT TO
	TERIOR POLE MOUNTED FIXTURE(S). VERIFY FIXTURE TYPES ND POLE TYPES WITH FIXTURE SCHEDULE AND PLANS.	H(I)	CLOCK OUTLET, SEMI-RECL SINGLE RECEPTACLE, 20A, 125V		ABOVE HUNG CEILING SPACE OR FOR OPEN CEILING AREAS, TO 12" BELOW THE FLOOR SLAB ABOVE. CABLING, END DEVICES AND	CT	CURRENT TRANSFORMER	OH	OVERHE
	<u>SWITCHES</u>	+©	2P (GROUNDED), REFER PLANS FOR MOUNTING HEICH.		FACEPLATES TO BE FURNISHED AND INSTALLED BY OTHERS (F.&I.B.O.).	CTR	CENTER CONDENSING UNIT	P P	POLE PUMP
a	WITCH — SINGLE POLE, 20A, 125/277V, 48"AFF. = CONTROL SWITCH INDICATOR FOR MULTIPLE SWITCHES WITHIN	(J)	RFACE MOUNTED JUNCTION BO. ACCESSIBLE AREA ABOVE	₩	FLUSH WALL MOUNTED TELEPHONE (VOICE) OUTLET - 18" AFF,	CU	COPPER	PA DD	PUBLIC PUSHBI
SI	SPACE. NGLE POLE SWITCHES INDICATING 2—LEVEL SWITCHING. SWITCHING.		LING OR EXPOSED IN AREAS WILL EXPOSE CONDUIT. H, CEILING MOUNTED DUPLEX RECE TACLE, 20A, 125V, 2P,		U.O.N. DOUBLE GANG BACKBOX-1" EMPTY CONDUIT (MIN.) TO ABOVE HUNG CEILING SPACE OR FOR OPEN CEILING AREAS, TO	DC DIA	DIRECT CURRENT DIAMETER	PH PR	PHASE
Ol	JTER 2 LAMPS OF FIXTURE TOGETHER FROM SWITCH CLOSED TO DOR AND SWITCH THE INNER LAMP, OGETHER FROM LE		ROUNDED), NEMA 5-20R. FLU CEILING MOUNTED DOUBLE DUPLEX RECEPTACLE, 20A,	_	12" BELOW THE FLOOR SLAB ABOVE. CABLING, END DEVICES, FACEPLATES AND SYSTEM TELEPHONES TO BE FURNISHED AND	DISC	DISCONNECT DISTRIBUTION	PIV PNI 🚄	POST I
0	THER SWITCH.		125V, 3W, (GROUNDS), NEMA 5-20R.	\	INSTALLED BY OTHERS (F.&I.B.O.).	DN	DOWN	PSI	POUNDS
۶۱ 	WITCH - DOUBLE POLE, SINGLE THROW, 125/2 48"		(FLOOR MOUNTED METAL JUNCTION BOX.	▼	FLUSH WALL MOUNTED COMBINATION DATA & TELEPHONE OUTLET - 18" AFF, U.O.N. DOUBLE GANG BACKBOX - 1 1/4" EMPTY	DP DR	DOUBLE POLE DOOR	4	POLYVII POWER
S۱	WITCH – 3–WAY, 20A, 125/27 48"AFF.		FLUM, FLOOR MOUNTED DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W,		CONDUIT (MIN.) TO ABOVE HUNG CEILING SPACE OR FOR OPEN CEILING AREAS, TO 12" BELOW THE FLOOR SLAB ABOVE. CABLING,	DT	DOUBLE THROW	RC	REMOTI
١٤	WITCH - 4-WAY, 2 125/ /, 48"AFF.		GROUNDED), NEMA 5-20R. FLUSH, FLOOR MOUNTED DOUBLE DUPLEX RECEPTACLE, 20A, 125V,	<u>'</u>	END DEVICES, FACEPLATES AND SYSTEM TELEPHONES TO BE FURNISHED AND INSTALLED BY OTHERS (F.&I.B.O.).	DWG DWP	DRAWING DOMESTIC WAT PUMP	RCVR REC	FCEIVI EPT
.1	MTCH – KE ATED, 20A, \(\sqrt{277V}, 48"AFF	4	2P, 3W, (GROUNDED), NEMA 5–20R. POWER		CALVE AO INDIOATED ADOVE EVOEDT	EA	EACH	TQD	RIGID
S۱	MIN MOTOR ED, 20A, 125)		FLUSH MOUNTED ELECTRICAL PANEL CABINET		SAME AS INDICATED ABOVE EXCEPT: CIRCULAR SYMBOLS INDICATE FLUSH MOUNTED IN CEILING AND SQUARE SYMBOLS INDICATE FLUSH MOUNTED IN FLOOR.	F	EXHAU. N	R.	PC M
	WITCH MER - SLE POLE, INCANDESCE , 1000W, 120V,		SURFACE MOUNTED ELECTRICAL PANEL CABINET ELECTRICAL POWER PANEL, OR MOTOR CONTROL CENTER. SIZE		SQUARE SIMBOLS INDICATE FLUSH MOUNTED IN FLOOR.	.C EV	ELECTRICA ELEVATOR	RR	REMOVI ROOF 1
-	NITCH - JER - SIN POLE, FLORESCENT, 8A, 120V,		AS INDICATED ON PLANS. ELECTRICAL DISTRIBUTION PANEL, OR SWITCHBOARD. SIZE AS		CABLE TV TELEVISION OUTLET -DOUBLE GANG BACKBOX - 1"		ELECTRICAL ALLIC TUBING		SCHED
8	3"AFF.		INDICATED ON PLANS. CONTROL PANEL, INTERFACE TERMINAL CABINET OR SPECIAL	₩	CONDUIT STUB-UP TO ABOVE HUNG CEILING SPACE OF BELOW SLAB ABOVE IN OPEN CEILING SABLING.	EP	ELECTRICAL METALLIC ROOF	SF	SECURI SUPPLY
			PURPOSE ENCLOSURE. VERIFY WITH PLANS FOR REQUIREMENTS. PULL BOX, SIZED IN ACCORDANCE WITH NEC ARTICLE 314		AND FACEPLATE TO BE FURNISHED BY OTH (F.&I.B.O.)	EQ EQUIP	EQUIPMEN ²²	SFL SN	SUB FE SOLID
	PILOT SHT — SINGLE POLE, 20A, 125/277V, 48"AFF. SUBSCOLI INDICATES 3—WAY SWITCH WITH PILOT LIGHT.	PB	REQUIREMENTS OR LARGER, UON.			ER EWC	EXISTING RELOCATED LECTRIC WATER COOLER	SP	SINGLE
	WITCH DIGITAL TIME CONTROL — SIMILAR TO WATTSTOPPER LOG NO. TS-400 OR APPROVED EQUAL. 48"AFF.	100/3 —	NON-FUSED DISCONNECT SWITCH. RATING AS INDICATED. FUSED DISCONNECT SWITCH. RATING AND FUSE SIZE AS	<u>\$</u>	SOUN (STEM) CEILING MOUNT (STEM)	FWC	ELECTRIC WATER COOLER ELECTRIC WATER HEATER	SP SPEC	SUMP SPECIF
	WITCH - OCCUPANCY SENSOR - DUAL TECHNOLOGY, R/ULTRASONIC 120/277V. SIMILAR TO WATTSTOPPER CATALOG		INDICATED. MOLDED CASE CIRCUIT BREAKER MOUNTED IN AN INDIVIDUAL	SSEC	SOUND SY THE EQUIPM CABINET PLIFIER, MIX ETC.) VOLUME NTROL FOR S MOUN DEALER WITHIN	EX	existing Fused	SPKR SS	SPEAKI SERVIC
	D. DW-100 OR APROVED EQUAL. WITCH - VOLUME CONTROL TIED TO SPEAKERS WITHIN A ROOM		ENCLOSURE AND RATING AS INDICATED. MOTOR STARTER WITH NEMA SIZE AS INDICATED.	K	ROOM AREA, MOVE 48" AFF. MICROP JA CONDUIT JB UP W ABLING AS SPECIFIED	- FA	FIRE ALARM	ST	SHUNT
Ol	R AN INDICATED ZONE OF SPEAKERS, 48" AFF.		COMBINATION MAGNETIC STARTER WITH FUSED DISCO SWITCH AND RATING AS INDICATED.	KĀ	VGA INTLE LECTION BETWE CEILING PART OR AND PC - 1" CONDU. UB UP WITH LING AS PLAN BY OWNER	FACP FBO	FIRE ALARM CONTROL PANEL FURNISHED BY OTHERS	ST SW	SINGLE SWITCI
บเ	CCUPANCY SENSOR WITH DUAL TECHNOLOGY — PIR AND TRASONIC, 360° COVERAGE, CEILING MOUNTED. SIMILAR TO ATTSTOPPER CATALOG NO. DT—300 OR APPROVED EQUAL.	\bigcirc	MOTOR - SINGLE PHASE.		PROVIDED C. MOUNT ROJECTO. SPECIL CATION.	FCU	FAN COIL UNIT FEEDER	SWBD	SWITCH SWITCH
P	OWER PACK FOR OCCUPANCY SENSORS - RELAY CONTACTS	Ø	MOTOR — THREE PHASE.		SECURITY/A SESS CONTROL/CCTV	FDR FT	FEET	SWGR SYM	SYMME
A(ATED FOR 20A BALLAST OR 15A INCANDESCENT. MOUNT IN CCESSIBLE JOIST SPACE ABOVE CEILING. SIMILAR TO		MOLDED CASE THERMAL—MAGNETIC OR STATE TRIP CIT	-⟨v⟩ -⟨c⟩- -	CCTV CAMERA ARROW INDICATES AIMING, PTZ= PAN/TILT/ZOOM	FVNR G	FULL VOLTAGE NON REVERSING GROUND	tel Tele	TELEPH TELEPH
	ATTSTOPPER CATALOG NO. BZ-150 OR APPROVED EQUAL. (TERIOR MOUNTED PHOTO-CELL CONTROL.	600A,3P	BREAKER WITH TRIP RATING AS INDICATED PLANS. DRAW OUT TYPE, INSULATED CASE CIRCUIT KER WITH RATIN	-0	FUNCTIONS REFER TO SPECIFICATIONS FOR FURTHER DESCRIPTION. DOOP JCK, ELECTROMAGNETIC, FAIL SAFE OPERATION	GA	GAUGE	TFL	THRU F
			AS INDICATED. TO SIENT VOLTAGE PRESSION . W.	-(E) -(H)	DOR STRIKE, ELECTROMAGNETIC, FAIL SECURE OPERATION DOOR HOLDER, ELECTROMAGNETIC, FAIL SAFE OPERATION	GEN GFI	GENERATOR GROUND FAULT INTERRUPTER	TR	TWIST-I
		[1433]	OUITS AND CO ICTOR	1)	INFRARED/ULTRASONIC MOTION DETECTOR	GFP GND	GROUND FAULT PROTECTION GROUND	TYP	TYPICAL UNDER
	SUBSCRIPTS ON ELECTRICAL DEVICES OVE COUNTER - MOUNT DEVICE 6" ABOVE COUNTER OR 36"		CONDUIT CONCEAL OR EMBEDDED IN ING OR CONDUIT CONCEAL OR CONDUIT CONCE	-(J)	JUNCTION BOX. COORDINATE MOUNTING WITH EQUIPMENT. KEYPAD, 48"AFF.	GUH	GAS UNIT HEATER	UH	UNIT H
	F AT WORKSTATIONS. MBER INDICATES MOUNTING HEIGHT ABOVE FINISHED FLOOR TO		DUIT CEALED EMBEDDED IN OR OR BELOV SLAB.	- M > - P >	ELECTROMAGNETIC CONTACT, DOOR OR WINDOW AS INDICATED. PUSH BUTTON, 48"AFF.	H HG	HIGH HOSPITAL GRADE	UL UON	UND
	NTER LINE OF DEVICE. ATHER PROOF — PROVIDE NEMA—3R RATED DEVICE OR		EMPTY COND. 4TH PULL 3/4" CO JUIT UON.	-(R) -(S)	CARD READER, 48"AFF. SECURITY SPEAKER	HP	HORSEPOWER	UV	ULTRAV
N	CLOSURE SUITABLE FOR EXTERIOR USE.	*	ONDUIT SEAL-OF TING WITH SEAL OF COMPOUND	- Ū	CONTROL UNIT W/KEYPAD	HID HO	HIGH INTENSITY DISCHARGE HIGH OUTPUT	UPS	UNINTE POWER
0	ISTING DEVICE TO BE REPLACED WITH NEW, REUSE NNECTED TO AN EMERGENCY POWER SOURCE	##	PANELD ARD, CIRCUIT NO. AND 20 AMP, REAKER, UON. SHAPT NEUTRALS ARE NOT ALLOWED. BRANCH CIRCUITS AND CIRCUIT HOMERUNS SHOWN:	- X	EXIT PUSHBUTTON	HOA	HAND OFF AUTOMATIC	V	VU.
	PLOSION PROOF PER NEC 500 CLASS I, DIVISION STALLATION.	A-1,3.5	2 #12 & 1 #12 (G) - 3/4"C	G	GROUNDING & LIGHTNING PROTECTION - UNDERGROUND COUNTERPOISE GROUNDING CONDUCTOR.	HPF HPS	HIGH POWER FACTOR HIGH PRO	VAR	VO.
	TLET FOR TELEVISION. COORD MOUNT AGHT		4 #12 & 1 #12 (G) - 3/4°C +	— G —	ROOF CONDUCTORS EXPOSED ON ROOF — REFER TO FLOOR PLANS.	HT HTR	HEIGH	W	WIDE
	ISTING DEVICE OR EQUIPMENT OF THE DEVICE OF		10 2 #10 & 1 #10 (G) - 3/4°C 10 ## 4 #10 & 1 #10 (G) - 3/4°C	—-G—	DOWN CONDUCTOR. REFER TO DETAILS. AIR TERMINAL. REFER TO DETAILS.	HVAC	TING, VENTILATION, CONDITIONING	y	WIRES
:IF	RCUIT INTERRUPE R (GFCI) TECTION. EACH TYPE ITLET SHALL HA NDEPEND GFCI PROTECT NO FEED		10 + H 6 #10 & 1 #10 (G) - 3/4"C	•		HWP	WATER PUMP	WP	TAW h
	RU WIRING SHALL PERMIT O SERVE PLE OUTLES SINGLE GFCI OUTLET.	•	CONDUIT RISER UPWARD CONDUIT RISER DOWNWARD		GROUND ROD WITH CONNECTION TO COUNTERPOISE OR GROUNDING SYSTEM. REFER TO DETAILS.	^{ПZ}	TIMO ENGINEEDING SO	W/ W/O	WITH
10 1	ED WITH GFCI CIRCUIT CIRCUIT	— EX —	EXISTING CONDUIT AND CONDUCTORS TO REMAIN, UON.	0	GROUND CONDUCTOR RISER IN CONDUIT UP TO ROOF GROUNDING CONDUCTOR.	IES IG	ILL TING ENGINEERING SO ISOLA ROUND	XFV	TRANS
)E	DIC OUTLET OVIDL LATED GROV	-x-x-	EXISTING CONDUIT AND CONDUCTORS TO BE REMOVED. ABANDON IF EMBEDDED AND REMOVE ALL CONDUCTORS.	•	GROUND CONDUCTOR RISER IN CONDUIT DOWN TO GROUN COUNTERPOISE.	IMC	INTERMED INCHES	∧MTR	TRANSI
	DICATES SE COY STED TO SYS M.	_EX-##_	REPLACE THE CONDUCTORS FROM THE EXISTING CONDUIT,		BONDING LUG TYPE GROUNDING CONNECTION.	IR	INFRARED		
	LINE SEND F ÉQUIPMENT ON RISERS EQUIPMENT.	- EX-O	QUANTITY AS INDICATED BY HASH MARK. EXISTING SPARE CONDUIT — LEAVE THE CONDUIT IN PLACE,	■	EXOTHERMIC WELD TYPE GROUNDING CONNECTION. WALL MOUNTED GROUNDING MODULE CLIENT STAILS.	JB JP	JUNCTION BOX JOCKEY PUM		
	ING EQUIPMENT TO REMAIN. STING EQUIPMENT TO BE REMOVED.		REMOVE ALL CONDUCTORS AND PROVIDE A PULL CORD. BRANCH CIRCUIT IN GRS CONDUIT. EXPLOSION PROOF PER NEC	TT	WALL MOUNTED GROUND BUSBAY REFER TO DL	KCMIL	THOUSAND CIRCULAR MILS		
		-	500. CLASS I, DIVISION 1 INSTALLATION.			KW KVA	KILOVOLT AMPERES		
						KVAR	KILOVOLT AMPERES REACTIVE		
						KV L	KILOVOLTS LONG		
						LA LPS	LIGHTNING ARRESTOR LOW PRESSURE SODIUM		
i						LTG	LIGHTING		
l						LV MACH	LOW VOLTAGE MACHINE		
		I		1		1			
						MAU MAX	MAKEUP AIR UNIT MAXIMUM		

ELECTRICAL GENERAL NOTES:

ALL ELECTRICAL WORK SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE CODES INDICATED BELOW AND SHALL MEET ANY OTHER APPLICABLE LOCAL, STATE AND/OR FEDERAL CODES AND ORDINANCES AS REQUIRED.

INTERNATIONAL BUILDING CODE

NFPA 101 LIFE SAFETY CODE

MC METAL—CLAD

MISC MISCELLANEOUS

MLO MAIN LUGS ONLY

MV MEDIUM VOLTAGE

NURSE CALL

NIC NOT IN CONTRACT

NIGHT LIGHT NON-METALLIC

NORMALLY OPEN

PUBLIC ADDRESS

ATOR VALVE

NOT TO SCALE

EPTACLE

ROOF TOP UNIT

SUB FEED LUGS

SOLID NEUTRAL

SERVICE SWITCHBOARD

SINGLE POLE

SUMP PUMP

SWBD SWITCHBOARD

SINGLE THROW

THRU FEED LUGS

TAMPER RESISTANT

UNDERGROUND

SPEC SPECIFICATION

REMOVE AND RELOCATE

MERCURY VAPOR

NORMALLY CLOSED

NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

NATIONAL ELECTRICAL CODE

MCB MAIN CIRCUIT BREAKER

MCC MOTOR CONTROL CENTER

MCM THOUSAND CIRCULAR MILS

MCS MOLDED CASE SWITCH

METAL HALIDE

NFPA 70 NATIONAL ELECTRICAL CODE NFPA 70E STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE NFPA 72 NATIONAL FIRE ALARM CODE

- NFPA 110 STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS NFPA 780 STANDARD FOR THE INSTALLATION OF LIGHTNING PROTECTION SYSTEMS OUTLET BOXES SHALL BE STEEL, 4" SQUARE, 1 1/2" DEEP, WITH 1/2" DEVICE RING WHERE
- RECESSED. DEVICE BOXES SHALL BE MOUNTED FLUSH IN WALLS AS INDICATED ON PLANS. FLUSH SHALL BE DEFINED AS EVEN WITH THE FACE OF THE WALL, OR RECESSED NO MORE THAN 1/16".
- ALL MOUNTING DIMENSIONS GIVEN ARE TO THE CENTERLINE (CL) OF THE DEVICE ABOVE FINISHED FLOOR (AFF) OR ABOVE FINISHED GRADE (AFG) UNLESS OTHERWISE NOT
- 4. OUTLETS FOR WALL MOUNTED CONVENIENCE RECEPTACLES, TELECOMMUNIONS OR DATA SHALL BE ALIGNED VERTICALLY. PROVIDE HORIZONTAL INSTALLATION ONLY WHEN SPACE IS LIMITED, SUCH AS BETWEEN MIRRORS AND CABINET BACKSPLA
- WALL TELE/DATA & MISCELLANEOUS LOW VOLTAGE OF UN TO THE WIREWAY SYSTEM GANG DEVICE RING, AN OUTLE AND A 1" COND AND BE TERMINATED WITH AN INSULATING BUSHIN ROVIDE 4-PAIR TYPE CATEGORY 6 CABLES FROM EACH TELE/DATA OUTLETTO THE E MENT RACK IN COMM ROOM, VERIFY EXACT QUANTITY & TEMPATION W EVICE & PLAN NO
- VATE EXACT LOCATION OF LIGH
- LOCATION TORS AND EQU APPROXIMA ORDINATE EXAC
- T SWITCHES ARE MOUNTED THE HEIGHT INDICATED AND 2" DOOR FRAME THE EDGEST THE DEVICE PLATE. BACK" SHALL OFFSET TO MAINTAIN ACOUSTICAL AND FIRE
- INTEGRIT QUIPMENT AN TRANSFORMERS SHALL BE CONNECTED WITH FLEXIBLE

M AT 6" AFF, CAPABLE OF SUPPORTING ATTACHED EQUIPMENT. PLYWOOD SHALL

- T TO EXCE UP 18" IN LENGTH. LYWOOD BALLOARDS SHALL BE RIGIDLY FIXED 3/4 IN (20 MM) TYPE A-C PLYWOOD, VOID FREE, 8 FT (2440 MM) HIGH, WIDTH AS INDICATED, MOUNTED WITH
- PENETRATIONS OF FIRE RATED WALLS, CEILINGS & FLOORS SHALL BE SEALED TO MAINTAIN THEIR INTEGRITY. FOR ONE HOUR FIRE RATED WALLS, DEVICES THAT COVER A WALL AREA OVER 16 SQUARE INCHES SHALL BE PROTECTED BY ONE LAYER OF 5/8" THICK, FIRE RATED, GYPSUM BOARD. FOR TWO HOUR RATED WALLS PROVIDE TWO LAYERS OF FIRE RATED GYPSUM BOARD. DEVICES SHALL BE ENCLOSED BY THE GYPSUM BOARD, INSTALLED WITH AUXILIARY FRAMING AS REQUIRED, TO MAINTAIN FIRE RATING OF WALL. WHERE TWO ELECTRICAL BOXES WHOSE INDIVIDUAL AREAS ARE NOT OVER 16 SQ. IN. AND ARE INSTALLED LESS THAN 24" ON CENTER, ON OPPOSITE SIDES OF A FIRE RATED WALL, THEY MAY BE PROTECTED BY APPROVED INTUMESCENT PADS IN LIEU OF GYPSUM BOARD BOXING.
- 13. ALL RECEPTACLES AND SWITCHES ON NORMAL POWER SHALL BE IVORY IN COLOR, ALL RECEPTACLES AND SWITCHES CONNECTED TO THE EMERGENCY POWER SYSTEM SHALL BE RED IN COLOR. ALL WALL DEVICE COVERPLATES SHALL BE BRUSHED SMOOTH 302 STAINLESS STEEL COVERPLATES, UNLESS OTHERWISE NOTED.
- 14. THE CONTRACTOR SHALL PROVIDE COMPLETE AND SATISFACTORY OPERATING SYSTEMS AS INDICATED ON THE CONTRACT DOCUMENTS. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENTS OF SYSTEMS AND WORK. THE CONTRACTOR SHALL PROVIDE CONDUIT AND CONDUCTORS AS REQUIRED.
- THE CONTRACTOR SHALL COORDINATE THE ELECTRICAL WORK WITH THE WORK OF ALL OTHER TRADES AND EXISTING CONDITIONS SO AS TO AVOID CONFLICTS PRIOR TO ROUGH-IN. FAILURE TO PROVIDE SUCH COORDINATION PRIOR TO WORK BEING INSTALLED SHALL NOT BE CAUSE FOR ADDITIONAL COMPENSATION TO THE CONTRACTOR.
- 16. ALL MATERIALS SHALL BE NEW, SHALL BE SUITABLE FOR THE APPLICATION INTENDED, AND SHALL BEAR LABELS OR MARKINGS INDICATING THIRD PARTY TESTING AND/OR LABORATORY LISTINGS ACCEPTABLE TO THE OWNER.
- 17. COORDINATE LOCATIONS OF WIRING DEVICES IN FINISHED SPACES, MILLWORK, AND CASEWORK WITH ARCHITECTURAL DRAWINGS, DETAILS, ELEVATIONS, EQUIPMENT AND FURNITURE LAYOUTS PRIOR TO ROUGH-IN.
- 18. ALL WIRING FOR POWER AND LIGHTING SYSTEMS SHALL BE INSTALLED IN METALLIC RACEWAY SYSTEMS, UNLESS OTHERWISE NOTED. ALL CONDUCTORS SHALL BE COPPER, #12AWG MINIMUM AND SHALL HAVE 600V TYPE THHN/THWN INSULATION. ALL RACEWAYS AND CIRCUITS SHALL INCLUDE INSULATED GROUND CONDUCTORS SIZED AS INDICATED OR AS REQUIRED BY THE NEC. MINIMUM RACEWAY SIZE SHALL BE 3/4" UNLESS OTHERWISE NOTED. TYPE MC CABLE IS NOT ALLOWED.
- RACEWAYS SHALL NOT CONTAIN MORE THAN THREE PHASE CONDUCTORS, THREE NEUTRALS, AND ONE GROUND CONDUCTOR, UNLESS OTHERWISE NOTED. ALL CONDUCTORS SHALL BE COLOR CODED ACCORDING TO THE POWER SYSTEM VOLTAGE PER NFPA 70 NEC ARTICLE 200. SHARED NEUTRALS ARE NOT ALLOWED. ALL MULTIPLE CIRCUIT HOME RUNS SHALL NOT SHARE A NEUTRAL. EACH INDIVIDUAL BRANCH CIRCUIT SHALL HAVE IT'S OWN SEPARATE NEUTRAL CONDUCTOR.
- EXPOSED RACEWAY UP TO 8'-0" ABOVE FINISHED FLOOR OR GRADE ELEVATION, OR ANY RACEWAY SUBJECT TO DAMAGE, SHALL BE GALVANIZED RIGID STEEL (GRS) CONDUIT.
- ALL CONNECTIONS SHALL BE PROVIDED AS REQUIRED FOR ALL ELECTRICALLY POWERED EQUIPMENT, INCLUDING BUT NOT LIMITED TO MECHANICAL AND OWNER SUPPLIED EQUIPMENT. WHERE NOT INDICATED AS BEING PROVIDED WITH THE EQUIPMENT, ALL REQUIRED DISCONNECTING MEANS SHALL BE FURNISHED AND INSTALLED AS A PART OF THE ELECTRICAL WORK. COORDINATE LOCATIONS OF ALL EQUIPMENT AND ASSOCIATED DISCONNECTING AND CONTROLLING MEANS WITH EQUIPMENT INSTALLER TO MAINTAIN CODE AND INSTALLATION REQUIREMENTS.
- 22. ALL RACEWAY AND WIRING SHALL BE CONCEALED IN FINISHED SPACES, AND MAY BE INSTALLED EXPOSED IN UNFINISHED SPACES SUCH AS MECHANICAL AND ELECTRICAL ROOMS OR WHERE INDICATED OTHERWISE. ALL RACEWAY AND WIRING, WHETHER CONCEALED OR EXPOSED, SHALL BE RUN EITHER PERPENDICULAR OR PARALLEL TO THE BUILDING'S STRUCTURAL COMPONENTS.
- 23. PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED TO MEET CODE AND INSTALLATION REQUIREMENTS. PULL BOXES AND JUNCTION BOXES SHALL BE CONCEALED IN FINISHED SPACES AND LOCATIONS SHALL BE COORDINATED WITH THE WORK OF ALL OTHER TRADES SO AS TO AVOID CONFLICTS.
- 24. ALL CONDUCTORS SHALL BE IDENTIFIED AT EACH JUNCTION BOX, OUTLET BOX, O PULL BOX, ETC., WITH VINYL SELF-ADHESIVE TAGS INDICATING PANEL AND CIRC NUMBER, CONTROL WIRE IDENTIFICATION NUMBER, OR OTHER APPROPRIATE INFORMATION. ALL PULL BOXES AND JUNCTION BOXES SHALL BE L
- 25. ALL RECEPTACLES, LIGHT SWITCHES AND RELATED J WITH THE CORRESPONDING PANELBOARD & CIRCUIT IBER USING VIN SELF-ADHESIVE TAGS.
- ALL EQUIPMENT SHALL BE SECTION AT MED BY MEANS OF ANCHOR HANGERS, SUPPORTS, GUILLOU AY BE S, ETC., TO MAINTAIN ALIC PREVENT EQUIPMENT OF ALL E MENT LOCATED IN SEISM SECURED WITH MEANS APPROVED FOR SEISMIC CLASSIFICATION ONES SHALL
- 27. ALL CONDUCTORS SHALL BE IDENTIFIED CH JUNCTION BOX, O CABINET, PULL BOX, ETC., WITH VINYL SELECTION HESIVE TAGS INDICATED CIRCUIT NUMBER, CONTROL WIRE IDENTIF ON NUMBER, OR OTHER APPRO INFORMATION. ALL PULL BOXES AND JUNC BOXES SHALL BE LABEL

26. ALL EQUIPMENT SHALL BE SEC

(ELECTRICAL) AND NFPA 70E.

- SWITCHES AND RELACT JUNCTIN BOXES SHALL BE RRESPONDING PANELBOARD & CUIT NUMBER USING VINYL
- NT SHALL BE SECURELY FOR TENED BY MEANS OF ANCHORS, RODS, PPORTS, GUIDES, SWILL BRACES, ETC., TO MAINTAIN ALIGNMENT AND MENT MOVEMENT. ALL EQUIPMENT LOCATED IN SEISMIC ZONES SHALL BE SECURED THE MEANS PPROVED FOR THE SEISMIC CLASSIFICATION ENCOUNTERED.
- PROVIDE CORFUILL HOLES FOR CONDUIT PENETRATION AS REQUIRED. ALL PENETRATIONS OF FIRE OR SMOKE RATED CONSTRUCTION SHALL BE SEALED WITH PPING MATERIALS APPROVED AND LISTED FOR THE RATING OF THE TRUCTION TO BE PENETRATED.
- MOISTURE PROOF CONSTRUCTION SHALL BE SEALED WITH APPROPRIATE SEAL FITTINGS OR SEALED CONSTRUCTION TO PREVENT THE INTRODUCTION OF MOISTURE INTO THE

ALL PENETRATIONS OF ROOFS, EXTERIOR WALLS, FOUNDATIONS, OR OTHER WATER OR

- 32. ALL SPARE CONDUITS SHALL BE LABELED AT BOTH ENDS AND FITTED WITH NYLON PULL STRINGS FOR FUTURE USE.
- 33. REFER TO TABLES ON DRAWING #E3.01 FOR MINIMUM BRANCH CIRCUIT WIRE SIZING. 34. TO PREVENT PERSONNEL INJURY AND POTENTIAL SYSTEM FAILURE, ALL ELECTRICAL
- WORK SHALL BE PERFORMED ONLY ON DE-ENERGIZED SYSTEMS AND DE-ENERGIZED EQUIPMENT. 35. FOR WORK REQUIRED TO BE PERFORMED ON LIVE OR ENERGIZED EQUIPMENT, (ARC FLASH
- OR ELECTRICAL HAZARD CONDITION), THE CONTRACTORS MUST WEAR PROPER PERSONAL PROTECTION EQUIPMENT (PPE) IN COMPLIANCE WITH THE OSHA STANDARD 20-CFR, PART 1910 OCCUPATION SAFETY AND HEALTH STANDARDS, 191 SUB PART S REDUCED PRINT. REDUCE SCALE ACCORDINGLY

ELECTRICAL DEMOLITION NOTES:

1. IN CONNECTION WITH THE ALTERATIONS TO THE EXISTING BUILDING, THERE WILL BE CERTAIN REMOVALS AND RELOCATIONS OF THE EXISTING ELECTRICAL WORK NECESSARY FOR THE SATISFACTORY PERFORM THE GENERAL WORK. THESE CHANGES CANNOT BE COMPLETLY THE DRAWINGS, BUT SHOULD BE TAKEN INTO CONSIDERATION CONTRACTOR IN PREPARING HIS PROPOSAL FOR THIS WOR AREAS CONTRACTOR SHALL VISIT AND EXAMINE CAREFULLY THE EXI RITIONS AFFECTED BY THIS WORK TO BECOME FAMILIE EXISTING AND WITH DIFFICULTIES THAT WILL AT CONTRACTOR SHALL PERFORM THIS SUBMISSION OF A PROPOSAL WILL ONSTRUED AS I AN EXAMINATION HAS BEEN MADE LATER CLAIMS W AMENT OR MATERIA RECOGNIZED FOR BECAUSE OF D WHICH COULD JUCH AN EXAMINATION

OR TO BID FOR CLARIFIC

FORESEEN #

TO THE A/E

ITEMS INSTALLEL VALLS, FLOORS, OR C INGS THAT ARE 2. ALL ELECT TO BE DEMO ED SHALL BE REN D IN THEIR ENTIR Y. UNLESS OTHERWISE OR REQUIRED NONS IN THESE DOCUMENTS. TO THE FLOOR, WALL OR LED CONDUITS MADE CEILING AND PLU OBSOLETE BY THIS ALTERATION. EXCESED CONDUITS, WIREWAYS, PULL BOXES, HANGERS, ETC., MADE SOLETE BY THE ALTERATION WORK SHALL BE REM UNLESS OF ARWISE NOTED. SEE DRAWINGS OF ALL OTHER TRADES A EXTENT DEMOLITION WORK. ELECTRICAL ITEMS SHALL NCLUDE POWER JOHTING, AND SPECIAL SYSTEMS. REFER ALL QUESTIONS TO THE A/E PRICE TO BID FOR CLARIFICATION. ANY FIELD DECISIONS BY THE A/E

EN MADE. REF

- PHASING OF ELECTRICAL DEMOLITION SHALL FOLLOW THAT OF THE GENERAL CONTRACTOR. COORDINATE REMOVAL OF ELECTRICAL WORK WITH OTHER CONSTRUCTION ACTIVITIES AND THE REQUIREMENTS OF THE OWNER.
- THE OWNER SHALL HAVE SALVAGE RIGHTS TO ANY ITEMS THAT ARE TO BE DEMOLISHED. ITEMS THAT THE OWNER WISHES TO SALVAGE SHALL BE CAREFULLY REMOVED BY THE CONTRACTOR AND STORED IN A LOCATION AS DIRECTED BY THE OWNER. ALL OTHER ITEMS OF DEMOLITION SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
- WHERE DEMOLITION WORK WILL INTERRUPT CIRCUIT CONTINUITY TO AREAS OF THE FACILITY THAT ARE TO REMAIN IN OPERATION, PROVIDE RACEWAYS AND WIRING AS APPROPRIATE TO MAINTAIN CIRCUITRY TO THESE AREAS. PROVIDE TEMPORARY CONNECTIONS AS REQUIRED. COORDINATE ANY INTERRUPTIONS WITH THE OWNER AT LEAST TWO WEEKS PRIOR AND ACCOMMODATE THE OWNER'S NEEDS AS REQUIRED.
- ELECTRICAL CIRCUITS THAT ARE TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY. CONDUCTORS SHALL BE COMPLETELY REMOVED FROM THE ITEM TO BE DEMOLISHED BACK TO THE SOURCE OVERCURRENT DEVICE. EXISTING CONDUCTORS SHALL NOT BE REUSED UNLESS OTHERWISE NOTED. RACEWAYS WHICH ARE INSTALLED IN OR BELOW FLOORS, SLABS, OR WITHIN WALLS MAY BE REUSED OR ABANDONED AS APPROPRIATE. ALL OVERHEAD OR EXPOSED RACEWAYS SHALL BE REMOVED. EXPOSED RACEWAYS THAT ARE TO BE ABANDONED SHALL BE REMOVED AND CUT OR CHISELED AT LEAST 2" INTO THE WALL OR FLOOR AND THE OPENING SHALL BE GROUTED SMOOTH.
- WHERE EXISTING DEVICE OR JUNCTION BOXES MUST REMAIN IN EXISTING WALLS OR CEILINGS (SUCH AS FOR CIRCUITS THAT MUST BE MAINTAINED TO SERVE OTHER AREAS), THEN THEY SHALL BE FITTED WITH BLANK COVERPLATES.
- 8. WHERE DISTRIBUTION OR BRANCH CIRCUIT EQUIPMENT (PANELBOARDS, SWITCHBOARDS, ETC.) IS TO BE REMOVED, THEN ALL FEEDERS OR BRANCH CIRCUITS WHICH SERVE ITEMS TO REMAIN SHALL BE RECONNECTED TO NEW DISTRIBUTION OR BRANCH CIRCUIT EQUIPMENT AS INDICATED. REFER ALL QUESTIONS TO THE A/E FOR ANY CLARIFICATION.
- 9. THE EXISTING FIRE ALARM SYSTEM SHALL REMAIN IN OPERATION THROUGHOUT CONSTRUCTION IN ACCORDANCE WITH THE APPROVED FIRE SAFETY PROCEDURES OF THE OWNER AND THE LOCAL FIRE MARSHALL. ALL DEVICES SHALL BE PROTECTED FROM DUST AND DIRT ACCUMULATION BY REMOVING THE DEVICE FROM ITS BASE DURING THOSE TIMES WHEN THE SYSTEM IS ALLOWED TO BE OUT OF OPERATION.
- 10. IF HAZARDOUS MATERIALS (I.E. ASBESTOS, PCBs, ETC.) ARE ENCOUNTERED AT ANY TIME DURING CONSTRUCTION IN THE WORK AREA, STOP WORK IMMEDIATELY AND CONTACT THE A/E OR THE OWNER.
- 11. DE-ENERGIZE ALL EXISTING ELECTRICAL EQUIPMENT PRIOR TO PERFORMING ANY DEMOLITION WORK.
- 12. REMOVE CONDUCTORS BACK TO THE SOURCE FOR ALL EQUIPMENT AND OUTLETS BEING REMOVED. EXISTING CONDUCTORS SHALL NOT BE REUSED.

GEORGIA STATE UNIVERSITY NGUAGE REARCH CENTER Panthersville Road ecatur Georgia 30034 Board of Regents of the University System ≝ of Georgia 8600 Indian Hills Drive Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564 SUBMITTAL HISTORY

REVISIONS

FILE	LOG	
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Additions/ Renovations to Building 'C' (Capuchin)

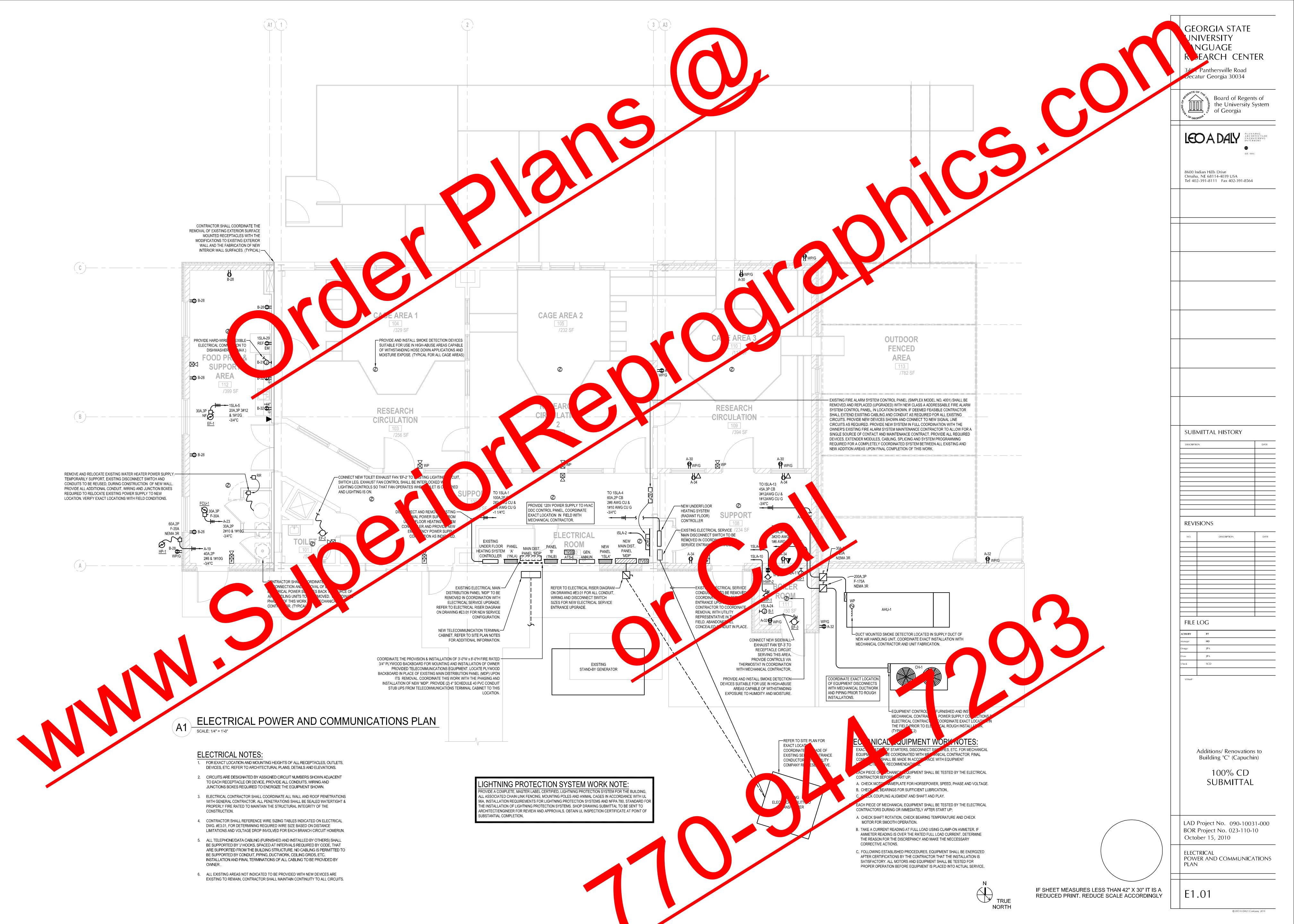
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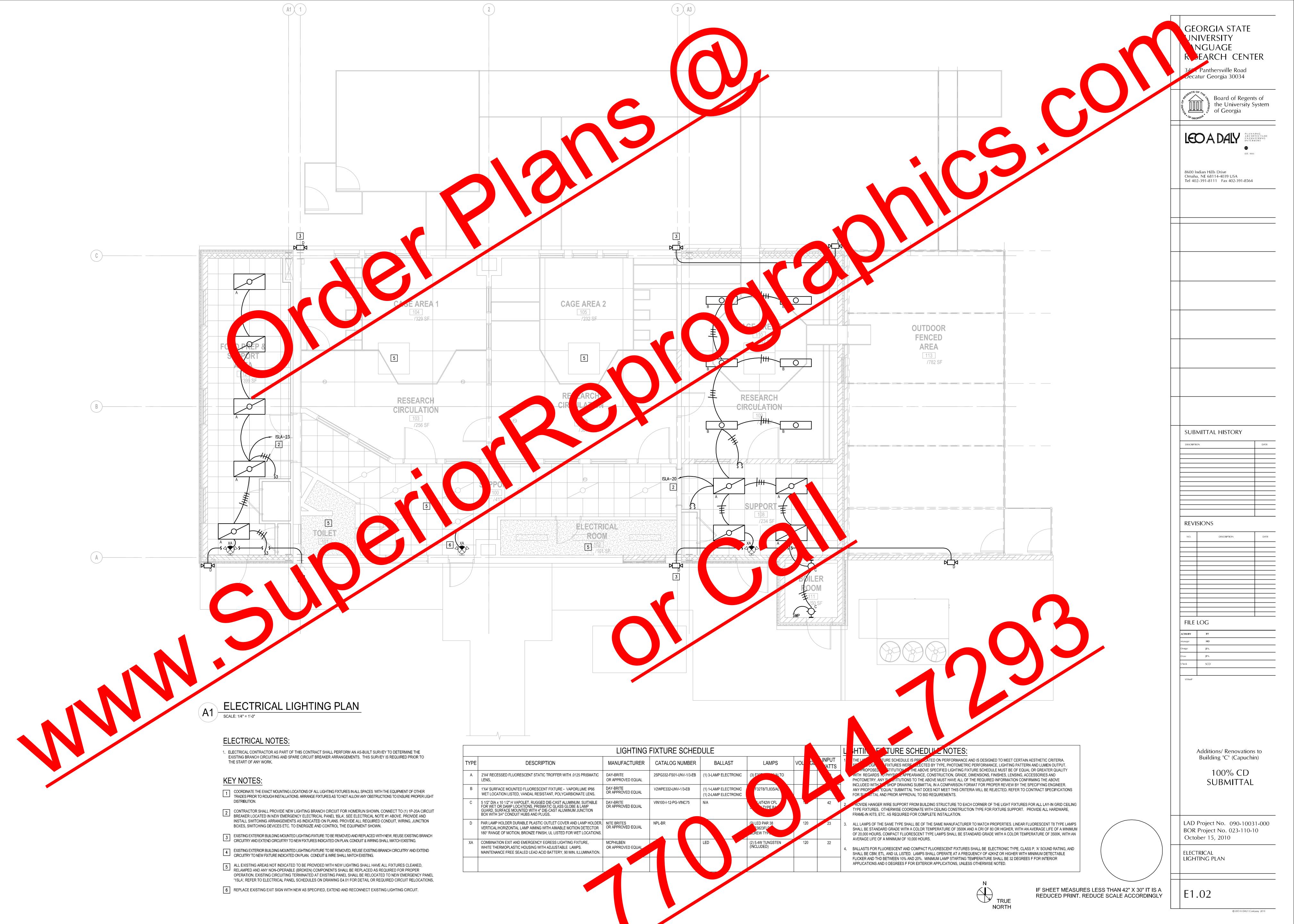
LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

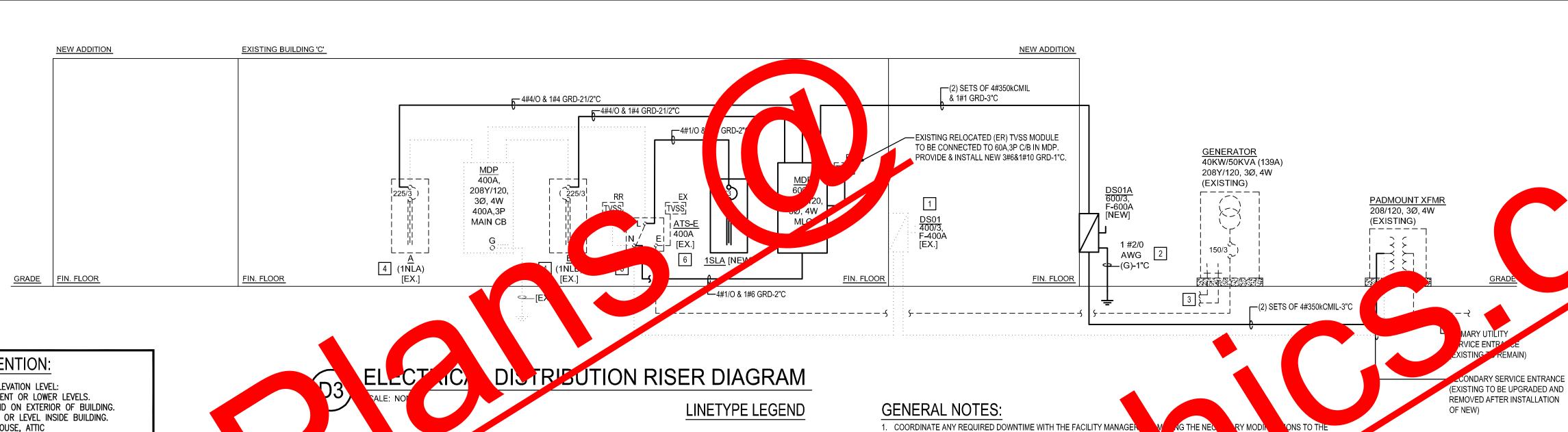
ELECTRICAL SYMBOL LIST, ABBREVIATIONS, GENERAL AND DEMOLITION NOTES

IF SHEET MEASURES LESS THAN 42" X 30" IT IS A









PANELBOARD NAMING CONVENTION: FLOOR LOCATION / ELEVATION LEVEL: B, B1,... = BASEMENT OR LOWER LEVELS. = GROUND ON EXTERIOR OF BUILDING. 1, 2, 3,... = FLOOR OR LEVEL INSIDE BUILDING. P, A = PENTHOUSE, ATTIC = OPERATING ROOM, OTHER LOCATION. - FOR PROJECTS WITH EMERGENCY SYSTEMS: = NORMAL POWER = EMERGENCY CRITICAL = EMERGENCY LIFE SAFETY = EMERGENCY EQUIPMENT = EMERGENCY STANDBY = EMERGENCY STANDBY THROUGH UPS FOR DISTRIB 1 N H A

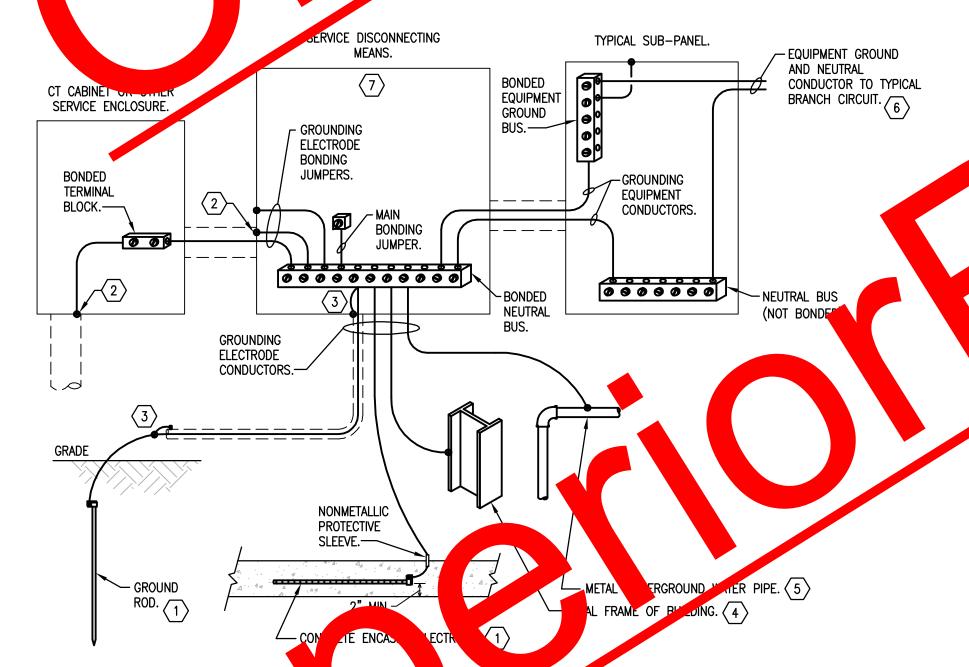
EXISTING TO REMAIN OR BE RELOCATED -----DEMOLISH

- EXISTING SERVICE ENTRANCE, NORMAL AND EMERGENCY POWER DIST
- ER DISRUPTION 2. PROVIDE ANY TEMPORARY CONNECTIONS AS MAY BE REC
- 3. PROVIDE SHORT CIRCUIT CALCULATION, COORDINA O GROUND FAULT TRIP SE
- R AND THE UTILIT TO THE BUILING, SHALL BE PROVIDED IN A 4. ALL UNDERGROUND CONDUITS FROM THE GEN CONCRETE ENCASED DUCTBAN

- UND REFE E GROUNDING ELECTRODE SYSTEM DETAIL ON THIS SHEET. DE NEW SERVICE GENERATOR
- ECTRICAL PANEL TO REMAIN. REUSE SPARE CIRCUIT BREAKERS AND SPACES TO ACCOMODATE NEW LOADS.

ING OF THIS WORK WITH THE INSTALLATION OF THE NEW 600A ELECTRICAL SERVICE

- LECTRICAL CONTROL TO BE REMOVED. REMOVAL TO INCLUDE EXISTING 400A MAIN DISTRIBUTION PANEL AND ALL COCIATED LECTRIC CONNECTIONS, COMPONENTS, CONDUITS, AND WIRING BACK TO UTILITY SOURCE. COORDINATE THE
- JA AUTOMATIC TRANSFER SWITCH 'ATS-E' TO REMAIN.



DETAIL KEY NOTES:

- PROVIDE SUPPLEMENTAL GROUND BLE GROUNDING ELECTRODES IN THE BUILDING OR STRUCTURE TO FORM THE LECTROPE SHALL INCLUDE EITHER A 10'-0" x 3/4" COPPER CLAD GROUND ROD FOR AN OF 2 FEET OF 1/2" OR LARGER CONCRETE ENCASED REBAR FOR AN INTERIOR MAIN SERVICE GROUNDING ELECTRODE SYSTEM P S. IN REMODEL PROJECTS THAT WILL NOT HAVE NEW FOOTINGS INSTALLED, THIS SUPPLEMENTAL ELECTRODE SHALL BE COPPER CLAD GROUND ROD INSTALLED PER CURRENT NEC REQUIREMENTS. SERVICE SINDUCTORS SHALL BE FITTED WITH A "BONDING BUSHING". SIZE THE JUMPER PER NEC.
- 3) ALL METAL CONTES ENCLOSING ANY SKOUNDING ELECTRODE CONDUCTOR SHALL BE FITTED WITH A "BONDING BUSHING" AT EACH END. SIZE JUMPER PER NEC.
- 4 IF STRUCTUR EEL MEMPER IS AVAILABLE, BOND IT TO THE SERVICE USING A UL LISTED IRREVERSIBLE CLAMP OR WELDED LUG.
- AL WATER PIPING SHALL BE LOCATED WITHIN THE FIRST 5 FEET OF POINT OF ENTRANCE OF THE INTERIOR METAL WATER PIPE,
- ELECTRODE CONDUCTOR TO EACH DISCONNECTING MEANS. SIZE THIS TAP BASED ON THE LARGEST SERVICE CONDUCTOR IN THAT SERVICE DISCONNECT

TYPICAL ELECTRICAL SERVICE GROUNDING ELECTRODE SYSTEM DETAIL

C/B TRIP			3V, 3P, 208V, 3		208V, 2P, 2W 120/208V, 2P, 3W						120V,	1P, 2W	1	
15	DISTANCE IN FEET MINIMUM WIRE SIZE	109 12	173 10	275 8	94 12	150 10	238 8	379 6	54 12	87 10	138 8	219 6	348 4	449 3
20	DISTANCE IN FEET MINIMUM WIRE SIZE	82 12	130 10	207 8	71 12	112 10	179 8	284 6	41 12	65 10	103 8	164 6	261 4	329 3
30	DISTANCE IN FEET MINIMUM WIRE SIZE	87 10	138 8	219 6	75 10	119 8	190 6	301 4	43 10	1	109 6		219 3	277 2
40	DISTANCE IN FEET MINIMUM WIRE SIZE	103 8	164 6	261 4	89 8	142 6	226 4	285 3	52 8	82 6		164 3	7	262 1
50	DISTANCE IN FEET MINIMUM WIRE SIZE	83 8	131 6	209 4	72 8	114 6	181 4	225	8		104 4	.5	166 2	79
60	DISTANCE IN FEET MINIMUM WIRE SIZE	109 6	174 4		95 6	4	190 3	, o 2		87 4	10	138 2	.74 1	
70	DISTANCE IN FEET MINIMUM WIRE SIZE	149 4	188 3	237 2	129 4	163 3	205	259 1	75	0	119 2	1		
80	DISTANCE IN FEET MINIMUM WIRE SIZE	131 4	165 3		113 4	143 3	18	227 1	65	3	104 2	131 1		
90	DISTANCE IN FE	146 3	184 2	233 1	3	2	201		73 3	92 2	116 1			
100 ES	WITH VIRE SIL	132 3	166 2	209 1	114	144 2	181 1		66 3	83 2	105 1			

CENTER OF CONCENTRATED LOAD SUCH AS OPEN OFFICE LIGHTING OR THE MIDPOINT OF DISTRIBUTED LOS SUCH AS CORRIDOR LIGHTING.

NOTES	TO	PANEL	.BOARE	SCHE	DULES	AND
BRANCE	1 C	IRCUIT	WIRF	SIZING	TABI F	<u>s</u>

DATA/COMP. CIRCUIT HOMERUNS

UNLESS OTHERWISE INDICATED, MINIMUM WIRE AMPACITY SHALL BE GREATER THAN OR EQUAL TO THE BRANCH CIRCUIT TRIP BASED ON COPPER CONDUCTOR WITH 90-DEGREE C THHN INSULATION.

REFER TO THE BRANCH CIRCUIT WIRE SIZING TABLES FOR DISTANCE LIMITATIONS FOR THE MINIMUM WIRE SIZE AND FOR SELECTING THE PROPER WIRE SIZE FOR THE DISTANCE AND VOLTAGE DROP INVOLVED.

NUMBER OF QUANTITIES OF CIRCUIT AS FO	WIRES SHALL		N AN INDIVIDUAL	HOMERUN FOR
	PHASE CONDUCTOR	FULL CIRCUIT SIZE NEUTRAL CONDUCTOR	FULL CIRCUIT SIZE EQUIPMENT GROUNDING CONDUCTOR	FULL CIRCUIT SIZE ISOLATED GROUND CONDUCTOR
1 POLE CIRCUIT	1	1	1	0
1 POLE DATA/ COMPUTER CIRCUIT	1	1	1	1
2 POLE CIRCUIT	2	1	1	0
3 POLE CIRCUIT	3	1	1	0
3 POLE MOTOR CIRCUIT	3	0	1	0
TWO 1 POLE HOMERUNS	2	2	1	0
TWO 1 POLE DATA/COMP. CIRCUIT HOMERUNS	2	2	1	1
THREE 1 POLE HOMERUNS	3	3		0
TUDEE	7		4	4

RACEWAY SIZING ALL RACEWAYS SHALL BE SIZED IN ACCORDANCE WITH THE CURRENT NATIONAL ELECTRICAL CODE IN EFFECT AS A MINIMUM SIZE. THE MORE COMMON SIZES ARE INCLUDED HERE FOR THE CONTRACTOR'S CONVENIENCE.

WIRE SIZE	NO. OF CONDUCTORS	MINIMUM CONDUIT SIZE	
12	3	3/4"	
12	4	3/4"	
12	5	3/4"	
12	6	3/4"	
12	7	3/4"	
12	8	3/4"	
10	3	3/4"	
10	4	3/4"	
10	5	3/4"	
10	6	3/4"	
10	7	3/4"	
10	8	3/4"	
8	3	3/4"	
8	4	3/4"	
8	5	1"	
8		1"	
8		1"	
8	8	1"	
6	3	'4"	
6	4		
6	5	1	
	6	1-1	
A	7	1-1	
6	δ	4"	

Additions/ Renovations to Building 'C' (Capuchin)

SCD

GEORGIA STATE

REARCH CENTER

Board of Regents of

the University System

Panthersville Road

ecatur Georgia 30034

of Georgia

8600 Indian Hills Drive

Omaha, NE 68114-4039 USA

SUBMITTAL HISTORY

REVISIONS

FILE LOG

Tel 402-391-8111 Fax 402-391-8564

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LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

ELECTRICAL DISTRIBTION RISER DIAGRAM, DETAILS AND NOTES

E3.01

IF SHEET MEASURES LESS THAN 42" X 30" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY

PANEL NAME:		MI)P	NE	W		SF	RVIC	E VOLTAGE:	120/208Y-3Ø,4W
MAINS TYPE:		MI	.O.]	MOUNTING:	SURFACE
MAINS RATING:		60	00	Amps				FED I	FROM ITEM:	SERVICE
BUS RATING:		60	00	Amps]	FED FI	ROM NAME:	UTILITY
AIC RATING:		22	2	kAIC						
			kVA	•	CKT		FRA	AME	BREAKER	
LOAD DESCRIPTION	A	4	В	С	N0.	P	SI	ZE	TRIP	NOTES
PANEL B (1NLB)	13	3.5	11.6	8.1	1	3	2	25	225	
PANEL A (1NLA)	13	3.5	12.6	8.1	2	3	2	25	225	
PANEL 1SLA (VIA ATS)	12	2.7	16.7	11.1	3	3	2	25	150	NORMAL FEED TO ATS
CH-1 (143 MCA)	17	7.2	17.2	17.2	4	3	2	25	175	
TVSS	0	.0	0.0	0.0	5	3	1	00	60	
SPARE	0	.0	0.0	0.0	6	3				
SPARE	0	.0	0.0	0.0	7	3				
SPARE	0	.0	0.0	0.0	8	3				
SPARE	0	.0	0.0	0.0	9	3				
SPARE	0	.0	0.0	0.0	10	3				
SPARE	0	.0	0.0	0.0	11	3				
SPARE	0	.0	0.0	0.0	12	3				
SPARE	0	.0	0.0	0.0	13	3				
SPARE	0	.0	0.0	0.0	14	3				
SPARE	0	.0	0.0	0.0	15	3				
SPARE	0	.0	0.0	0.0	16	3				
SPARE	0	.0	0.0	0.0	17	3				
SPARE	0	.0	0.0	0.0	18	3				
SPARE	0	.0	0.0	0.0	19	3				
SPARE	0	.0	0.0	0.0	20	3				
SPACE	0	.0	0.0	0.0	21	3				
CONNECTED LO	OAD (k	VA):			TOT	'AL(kVA)	TOT	TAL (AMPS)	
	ØA	ØB	ØC		A	+ B +	-C	VA	VOLTAGE	
	57	58	45			159.:	5		442.7	
LOAD TYPES	ØA	ØB	ØС	Total kVA	_	ultip		De	mand kVA	
Existing	27	24	16	67.4		1.25			84.3	
HVAC (Seasonal)	17	17	17	51.6		1.00			51.6	
Motors	0	0	0	0.0		1.00		4	0.0	
Other Load	0	0	0	0.0		1.00			0.0	
Subfed Panels	13	17	11	40.5		0.00			0.0	
kVA of Largest Motor:			>	0.0		0.25	i		0.0	
				Total Dei		VA		7	I.	
				Total Der		ps			377	
				Future Lo		₩th			25%	
				Min. Pa	in	g (Aı	mp		471.4	
COMMENTS:	1)									
	2)									
						T				

PANEL NAME:		1S					ÃW				ERVIC	E VOL	TAGE:	
MAINS TYPE:	M	IAIN BI	REAKE	R	ST	MD-	BYI	EMEI	RG.			MOUN	TING:	SURFACE
MAINS RATING:		15	0		An	ips					FED I	ROM	ITEM:	GENERATOR
BUS RATING:		22	2.5		An	ps]	FED F	ROM N	NAME:	ATS
AIC RATING:		1	0		kA	IC								
		kVA				CKT		CKT				kVA		
LOAD DESCRIPTION	A	В	С	BKR	P	NO.		N0.	P	BKR	A	В	С	LOAD DESCRIPTION
EXIST. U.H.S.	7.5			100	2	1		2	1	20	0.5			FIRE ALARM PANEL
RADIANT FLOORING		7.5				3		4	2	60		5.0		U.H.S1
EF-1 (1.5 HP)			0.8	20	3	5		6					5.0	RADIANT FLOORING
-	0.8					7		8	1	20	0.2			HWP-1 (.25 HP)
-		0.8				9		10	1	20		0.2		HWP-2 (.25 HP)
HU-1			0.8	20	1	11		12	1	20			_	SPARE
AHU-1 (5 HP)	2.0		0.0	45	3	13		14	1	20	_			SPARE
-	2.0	2.0		15		15		16	1	20		 		SPARE
		2.0	2.0			17		18	1	20			_	SPARE
- RELOCATED LIGHTING CKT.	0.6		2.0	20	1	19		20	1	20	1.1		 	NEW LIGHTING
RELOCATED LIGHTING CKT.	0.0	0.6		20	1	21		22	1	20	1.1	0.6		NEW LIGHTING
NEW LIGHTING CKT.		0.0	0.5	20	1	23		24	1	20		0.0	0.5	
SPARE	0.0		0.3	20	1	25		26	3	20	0.0		0.3	B-1 (CONTRO) SPARE
SPARE SPARE	0.0	0.0		20	1	25		28	3	20	0.0	0.0		STAKE
		0.0	1.5		1							0.0	0.0	-
NEW REFRIGERATOR			1.5	20	1	29		30	1				0.0	
SPACE	-				1	31		32	1		-			SPAC
SPACE		-			1	33		34	1			-		SPAC
SPACE			-		1	35		36	1				-	E
SPACE	-				1	37		38	1		_ `			JPACE
SPACE		-			1	39		40	1	\forall A				SPACE
SPACE			-		1	41		42						DACE
CONNECTED I	AD (I-	T 7 A) •						OT	AT.	(1)	ТОТ	AT	IPS)	
CONNECTED LO	ØA ØA	ØB	ØC						AL(+B-			VOJ	GE	
(SEC-I only)		16.7	11.1						10 .5		VA	1	IGE	
(SEC-1 Only)	12.7	10	1.1						<u> </u>	3		•		
LOAD TYPES	Ø	ØB	Øc		ſ	kV	7.4	M		ier		mo	VA	
		0.0	0.0		1	K V	/A	Mi					XVA	
Existing LIVA C. (See See See See See See See See See Se	-		0.0			2			00			0.0		
HVAC (Seasonal)	+	15.5	9	`		35			1.25			4.3		
Lighting	0.5		0.0			3.4			4					
Receptacles Matara	0.5	0.0	0.0			0.5			1.00			0.5		
Motors Vitabor	0.0	0.0	0.0			0.0			1.00			0.0		
Kitchen	0.0	0.0	0.0			0.0			1.00			0.0		
Other Load	0.0		0.0			0.0			1.00			0.0		
Subfed Panels	0.0	0.6				0.0			$\frac{1.00}{0.24}$			0.0		
kV Largest tor:	_	·	>			0.0			0.25)		0.0		
No. Equip. ms:	_0_								7.			20.5		
						Total l						39.9		
								and A				110.6		
						Future						10%		
						Min. F	Panel	l Rating	g (A	.mps)		121.7		
COMM TS:	1)													
	2)													
					_					_				

PANEL NAME:		(1NLB	<u>B)</u>]	EXIST	ING		SE		E VOL		•	120/208Y-3Ø,4W	_	PANEL NAME:		A (11				EXIST	ING	S	ERVIC	
MAINS TYPE:		MLO									MOUN			SLIDEACE	<u> </u>	MAINS TYPE:		M								MOU
MAINS RATING:		225			Amps			_		FED F				TAINE.	_	MAINS RATING:		22			Amp				FED F	
BUS RATING:		225			Amps				F	ED FR	ROM N	AMF		MDP	_	BUS RATING:			25		Amp				FED FI	ROM
AIC RATING:		10		k	AIC											AIC RATING:			.0	T	kAI(
	kV		~			KT	CKT			. 1	kVA							kVA	T ~			CKT	CKT		<u> </u>	kVA
LOAD DESCRIPTION	AI	3 (C	BKR	PN	0.	NO.	P	BKR	A	В		L	DESC. TION		LOAD DESCRIPTION	A	В	C	BKR	P	N0.	NO.	P BKR	A	В
EXISTING GFI RECEPT.	0.6			20	1	1	2	1	20	0.6				TING GFI EPT		EXIST. LTG-RELOCATED TO EM.	0.0			20	1	1	2	1 20	0.0	
EXISTING RECEPTACLE	0.	6		20	1 3	3	4	1	20		0.6		E	TING RECI		EXIST. LTG-RELOCATED TO EM.		0.0		20	1	3	4	1 20		0.0
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EXISTING RECEPTACLE	0.6			20	1 ′	7	8	1	20	0.6			EXI	PTACIF		EXISTING RECEPT.	0.6			20	1	7	8	1 20	0.6	
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EXISTING RECEPTACLE	0.			20		5		1	20		0.6			GGFI RECEPT.		-		2.3				15	16	1 20		0.6
EXISTING RECEPTACLE		0	.6	20		7			-			0.6		TING RECEPTACLE		EXIST. EXT. LIGHTING			0.6	20	1	17	18	2 100		
EXISTING RECEPTACLE	0.6			20	4		20	2	40	2			EXIS	TING EQUIP.	_	NEW HP-1	3.0			40	2	19	20		0.0	
EXISTING GFI RECEPT.	0.			27	1 2		22				2.9		-		_	-		3.0				21	22	2 30		2.2
SEPTIC TANK PUMP		3.	.3			.3	24					0.6	_	TING RECEPTACLE		NEW FCU-1			2.5	30	2	23	24			
_	3.3				_	5	6	1	20	0				TING RECEPTACLE	_	NOTE 1	2.5					25	26	2 30	2.5	
-		_ `			2			1	20		1.2			RECEPTNOTE 1		EXIST. LOAD REMOVED)	0.0		60	2	27	28			5
GENERATOR TERY				20	2		30	1	20			0.0		RE - NOTE 1	_	RELABEL - SPARE			0.0			29	30	1 1		_
NEW DISHWAS R				20		1	32	1	20	1.0				RECEPT NOTE 1		EXISTING GFI RECEPT.	0.6			20	1	31	32	1	0.8	
SPAP				20	1	3	54	1	20				SPAI	RE	_	SPARE - NOTE 1		0.0		20	1	33		1		0.8
- CHE					1 3	5	36	1	20				SPAI	RE		SPARE - NOTE 1				20	1	35	3	1 2		
JPACE					1	7	38	1					SPAC	CE		SPACE					1		38			
SPACE					1 3	9	40	1					SPAC			SPACE						37	40			
SPACE					1 4	-1	42	1					SPAC	CE		SPACE				lacksquare	1	41	42	1		
															<u> </u>											
CONNECTED LO	OA (kVA)						TOT	AL(k	VA)	TOT	AL (AN	MPS)				CONNECTED L	OAD (ŀ	(VA):					7	AL(kVA)	Tr	AL (A
	ØA Ø	B Ø	OC				A	+B+C	7	VA/	VOLTA	AGE					ØA							В+С	VA/	VOL 1
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LOA YPES	ØA Ø	R Ø	OC		Total	kVA	Mı	ıltipli	er	Der	mand k	VA				LOAD TYPES	Ø _A	ØB	ØC		Tot	XVA	M	ltiplier	De	mand
Existi	11.0 10		1.1		29			1.25		Dei	37.0	. • 1 •				Existing	7.2					20.5		1.25		25.6
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P ceptacles	2.5 1.		0.0			.7		1.00			3.7					R acle	.0	0.8	1.0			2.6	_	1.00		2.6
Motors	0.0 0.		0.0			.0		1.00			0.0					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		0.0	1.0			0.0	_	1.00		0.0
Kitchen	0.0 0.		0.0			.0		1.00			0.0					chen	+	0.0	+ -			0.0	_	1.00		0.0
Other Load	0.0 0.		0.0			.0		1.00			0.0					er Load	0.0	0.0				0.0		1.00		0.0
Subfed Panels	0.0 0.		0.0			.0		1.00			0.0						0.0	0.0	0.0			0.0		1.00		0.0
kVA of Largest Motor:	0.0 0.					.0		0.25	_		0.0					St. 1 Panels kVA Largest Motor:		0.0				0.0		0.25		0.0
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1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					То	tal Den	and k	VΑ			40.7					11					7	otal Der	nand kV	⁷ A		39.2
					То	tal Den	and A	mps			112.9											Total Der				108.9
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COMMENTS:	1) PROVII	DE NEV	W C	RCUI	T BRI	EAKEI	RINE	XIST	ING E	EMP	V.	Е ТО	T(CH EXISTI		MMENTS:	1) PR	OVIDE	NEW (CIRCU	IT BI	REAKE	RINE	XISTING	EMPT	Y SPA
	AIC RATI	NC &	TRI	рсна	DAC	redic	rics ()E E Z	дсти	VC C		L ELE		C SERIES PANEL										F EXIST		

120/208Y-3Ø,4W SURFACE PANEL M NAME: MDP C LOAD DESCRIPTION SPARE
EXIST. LTG-RELO CATED TO EM. 0.6 EXIST. EXT. RECEPT. EXIST. EXT. RECEPT.

1.6 EXISTING GFI RECEPT 0.6 EXISTING WASHER EXIST. EXT. RECEPT

EXIST. LOAD REMO

AREL - SPARE BEL - SPARE
EXISTING UNIDENTIFIED (AMPS) DLTAGE and kVA

1) PROVIDE NEW CIRCUIT BREAKER IN EXISTING EMPTY SPACE TO MATCH EXISTING

AIC RATING & TRIP CHARACTERISTICS OF EXISTING GENERAL ELECTRIC SERIES 'A' PANEL.

GEORGIA STATE UNIVERSITY
NGUAGE
REARCH CENTER

3461 Panthersville Road Decatur Georgia 30034

Board of Regents of the University System of Georgia

8600 Indian Hills Drive Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564

SUBMITTAL HISTORY

REVISIONS

FILE	LOG	
CTIVITY	ВҮ	
anager	HD	
esign	JPA	
aw	JPA	
heck	SCD	
STAMP		

100% CD SUBMITTAL

LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

ELECTRICAL PANEL SCHEDULES

© LEO A DALY Company 2010

IF SHEET MEASURES LESS THAN 42" X 30" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY

N	
TRUE	
1 IRUE	
NORTH	

MEC	NICAL SYMBOLS ME	CHANICAL
SYMBOL X" D1 X D1 XXX R1 CFM XXX G1 CFM	DESCRIPTION CFM CW PPLY AIR DIFFUSER. TOP NUMBER X" DESIGNATES NECK SIZE D BOTTOM NUMBER X DESIGNATES CFM. RA SA SF TURN AIR REGISTER. TOP NUMBER XXX DESIGNATES SQUARE CK SIZE AND BOTTOM NUMBER X DESIGNATES CFM. PPLY AIR / RETURN AIR GRILLE. TOP NUMBER XXX DESIGNATES ME SIZE SIZE AND BOTTOM NUMBER X DESIGNATES CFM.	CUBIC FEET PER MIDOMESTIC COLD WATER TURN AIR SUPPLY AIR SQUARE FEET TYPICAL OF VOLUME DAMPER

HANICAL ABBREVIATIONS | MECHANICAL DEMOLITION NOTES

IN CONNECTION WITH THE ALTERATIONS TO THE EXISTING BUILDING, THERE WILL BE CERTAIN REMOVALS AND RELOCATIONS OF THE EXISTING MECHANICAL WORK NECESSARY FOR THE SATISFACTORY PERFORMANCE OF THE GENERAL WORK. THESE CHANGES CANNOT BE COMPLETLY DETAILED ON THE DRAWINGS. BUT SHOULD BE TAKEN INTO CONSIDERATION BY THE CONTRACTOR IN PREPARING HIS PROPOSAL FOR THIS WORK, MECHANICAL CONTRACTOR SHALL VISIT AND EXAMINE CAREFULLY THE EXISTING AREAS AFFECTED BY THIS WORK TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND WITH DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. CONTRACTOR SHALL PERFORM THIS, PRIOR TO SUBMITTING HIS PROPOSAL, SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE. REFER ALL QUESTIONS TO THE A/E PRIOR TO BID FOR CLARIFICATION.

ARE TO BE DEMOLISHED SHALL BE 2. ALL MECHANICAL ITEMS INS UNLES SHALL BY OTHER CONDITIONS IN THESE REMOVED IN THEIR ENTIRET THERWISE DOCUMENTS. THE CONTRACT BACK LL OR CEILING AND SHALL REMOVE DUCTWORK MADE OBSOLETE BY THIS ALT S, PULL BOXES, HANGERS, ETC., MADE OBSOLETE BY THE ALTERATION LESS OTHERWISE NOTED. SEE DRAWINGS OF ALL DES FOR EXTENT OF MOLITION WORK. AL ITEMS SHALL INCLUDE DUCTWORK, PIPING, ALL QUESTIONS TO THE A/E PRIOR TO BID FOR LUMBING, SANITARY, AND WASTE CLARIFICATION. ANY FIELD DECISIONS

SHALL FOLLOW THAT OF THE GENERAL CONTRACTOR. COORDINATE REMOVAL OF ANICAL DEMOLITION ANICAL W WITH OTHER NSTRUCTION ACTIVITIES AND THE REQUIREMENTS OF THE OWNER.

OWNER 4. THE OWNER SHALL HAVE SALVAGE RIGHTS TO ANY ITEMS THAT ARE TO BE DEMOLISHED. ITEMS THAT WISHES TO SALVAGE SHALL BE CAREFULLY REMOVED BY THE CONTRACTOR AND STORED IN A LOCAT AS DIRECTE BY THE OWNER. ALL OTHER ITEMS OF DEMOLITION SHALL BECOME THE PROPERTY OF THE CONTRACT AND SHALL BE REMOVED FROM THE SITE.

WHERE DEMOLITION WORK WILL INTERRUPT HVAC/PLUMBING SERVICE TO AREAS O 4E FACILITY THAT REMAIN IN OPERATION, COORDINATE ANY INTERRUPTIONS WITH THE OWNER AT LE TWO WEEKS PRIOR ACCOMMODATE THE OWNER'S NEEDS AS REQUIRED.

IF HAZARDOUS MATERIALS (I.E. ASBESTOS, PCBs, ETC.) ARE ENCOUNTERED AT ANY DURING C THE WORK AREA, STOP WORK IMMEDIATELY AND CONTACT

MECHANICAL GENERAL NOTES

ALL MECHANICAL WORK SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE APPLICABLE

IN THE WORKPLACE NFPA 72 NATIONAL FIRE ALARM CODE NFPA 101 LIFE SAFETY CODE

COORDINATE EXACT LOCATION OF CEILING DEVICES (DIFFUSERS, REGISTERS, AND GRILLES) WITH ARCHITECTURAL REFLECTED CEILING PLANS AND

LOCATIONS OF MOTORS AND EQUIPMENT AS SHOWN ON THE DRAWINGS ARE APPROXIMATE COORDINATE EXACT LOCATIONS WITH INSTALLED

FLOORS SHALL BE SEALED TO MAINTAIN THEIR DEVICES THAT COVER A WALL AREA OVER 16 SQUARE INCHES SHALL BE PROTECTED BY ONE LAYER OF 5/8" THICK, FIRE RATED, GYPSUM TWO LAYERS OF FIRE RATED GYPSUM BOARD. DEVICES SHALL BE ENCLOSED BY THE GYPSUM BOARD, INSTALLED WITH AUXILIARY FRAMING AS REQUIRED, TO MAINTAIN FIRE RATING OF WALL.

THE CONTRACTOR SHALL COORDINATE THE MECHANICAL WORK WITH THE WORK OF ALL OTHER TRADES AND EXISTING CONDITIONS SO AS TO AVOID CONFLICTS PRIOR TO ROUGH-IN. FAILURE TO PROVIDE SUCH COORDINATION PRIOR TO WORK BEING INSTALLED SHALL NOT BE CAUSE FOR ADDITIONAL COMPENSATION TO THE CONTRACTOR.

ALL MATERIALS SHALL BE NEW, SHALL BE SUITABLE FOR THE APPLICATION INTENDED. AND SHALL BEAR LABELS OR MARKINGS INDICATING THIRD PARTY TESTING AND/OR LABORATORY LISTINGS ACCEPTABLE TO THE GOVERNMENT.

REQUIRED FOR ALL ELECTRICALLY POWERED EQUIPMENT, WHERE NOT INDICATED AS BEING PROVIDED WITH THE EQUIPMENT, ALL REQUIRED COORDINATE LOCATIONS OF ALL EQUIPMENT AND ASSOCIATED DISCONNECTING AND CONTROLLING MEANS WITH EQUIPMENT INSTALLER TO MAINTAIN

ALL DUCTWORK SHALL BE CONCEALED IN FINISHED SPACES, AND MAY BE INSTALLED EXPOSED IN UNFINISHED SPACES SUCH AS MECHANICAL AND ELECTRICAL ROOMS OR WHERE INDICATED

ALL EQUIPMENT SHALL BE SECURELY FASTENED BY MEANS OF ANCHORS, RODS, HANGERS, SUPPORTS, GUIDES, SWAY BRACES, ETC., MAINTAIN ALIGNMENT AND PREVENT EQUIPMENT ZONES SHALL BE SECURED WITH MEANS APPROVED FOR THE SEISMIC CLASSIFICATION ENCOUNTERED.

PROVIDE CORE DRILL HOLES FOR MECHANICAL SEALED WITH FIRE-STOPPING MATERIALS CONSTRUCTION TO BE PENETRATED. PROVIDE DOCUMENTATION ON ALL SUCH PENETRATION

ALL PENETRATIONS OF ROOFS, EXTER TER OR FOUNDATIONS, OR OTHER PROOF CONSTRUCTION APPROPRIATE SEALIN ITTING CONSTRUCTION TO P MOISTUR INJURY AND SYSTEM CAL WORK S ZED SYSTEMS ONLY

SYSTEMS WILL TION OF SERVICE FACILITY. A PERFORMEL

URING PEENERGIZED EQUIPMENT CONDITION KK PERFORMED ON LIVE OR ENERGIZEI MENT, (ARC FLASH OR ELECTRICAL HAZARD CONDITION), THE CONTRACTORS MUST WEAR PROPER PERSONAL PROTECTION EQUIPMENT (PPE) IN COMPLIANCE WITH THE OSHA STANDARD 20-CFR, PART 1910 OCCUPATION SAFETY AND HEALTH STANDARDS, 191 SUB PART S

5. CONTRACTOR SHALL X—RAY EXISTING CONCRETE SLAB (FLOOR/CEILING) PRIOR TO CORE DRILLING OR CUTTING OF ANY NEW SLAB PENETRATIONS TO INSURE THAT NO EXISTING SERVICES ARE AFFECTED BY THIS WORK.

MECHANICAL SPECIFICATIONS

DUCTWORK

PART 1 GENERAL

INTERNATIONAL BUILDING CODE

NATIONAL FIRE PROTECTION ASSOCIATION NFPA 70 NATIONAL ELECTRICAL CODE NFPA 70E STANDARD FOR ELECTRICAL SAFETY

WALL ELEVATIONS.

FIELD CONDITIONS.

PENETRATIONS OF FIRE RATED WALLS, CEILINGS & INTEGRITY. FOR ONE HOUR FIRE RATED WALLS, BOARD. FOR TWO HOUR RATED WALLS PROVIDE

THE CONTRACTOR SHALL PROVIDE COMPLETE AND SATISFACTORY OPERATING SYSTEMS AS INDICATED ON THE CONTRACT DOCUMENTS. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENTS OF SYSTEMS AND WORK.

COORDINATE LOCATIONS OF MECHANICAL DEVICES WITH ARCHITECTURAL DRAWINGS, DETAILS, ELEVATIONS, EQUIPMENT AND FURNITURE LAYOUTS PRIOR TO ROUGH-IN.

ALL CONNECTIONS SHALL BE PROVIDED AS DISCONNECTING MEANS SHALL BE FURNISHED AND INSTALLED AS A PART OF THE MECHANICAL WORK. CODE AND INSTALLATION REQUIREMENTS.

OTHERWISE.

MOVEMENT. ALL EQUIPMENT LOCATED IN SEISMIC

PENETRATION AS REQUIRED. ALL PENETRATIONS OF FIRE OR SMOKE RATED CONSTRUCTION SHALL BE APPROVED AND LISTED FOR THE RATING OF THE SEALING SYSTEMS FOR VERIFICATION A PROPER INSTALLATION.

WORK SHALL E APPROVED BY THE OWNER. MECHANICA WORK SHALL BE PERFORMED

(ELECTRICAL) AND NFPA 70E.

2.01 MATERIALS A. ALL HANGERS, SUPPORTS, ANCHORS, AND GUIDES SHALL BE IN ACCORDANCE WITH THE AMERICAN

1.01 DESCRIPTION OF WORK

A. THIS SECTION INCLUDES FURNISHING AND INSTALLING ALL MATERIAL FOR THE COMPLETE INSTALLATION OF THE FOLLOWING: ALL DUCTWORK SHOWN ON THE DRAWINGS FOR THE COMPLETE HEATING, AIR CONDITIONING, EXHAUST, AND VENTILATING SYSTEMS ALL FLEXIBLE DUCT

B. RELATED WORK SPECIFIED ELSEWHERE: REFER TO SECTION 15010 AND DIVISION 0. CONTRACT REQUIREMENTS AND DIVISION 1, GENERAL REQUIREMENTS. 2 FOR HIGH VELOCITY DUCT ISOLATION HANGERS, SEE SECTION 15070, VIBRATION ISOLATION EQUIPMENT.

1.02 QUALITY ASSURANCE

REFERENCE STANDARDS: NATIONAL FIRE PROTECTION ASSOCIATION (NFPA).

a. NFPA NO. 90-A, "AIR CONDITIONING AND VENTILATING 2. SHEET METAL AND AIR CONDITIONING CONTR NATIONAL ASSOCIATION, INC. (SMACNA)

"BALANCING AND ADJU SPECIFICATION SHALL M THE "MANUAL FOR THE BA OF AIR DISTRIBUTION SY "SEISMIC RESTRAINT MANU SHALL MEAN THE FIRST EDITION RESTRAINT MANUAL GUIDELI

2.01 MATERIALS A. DUCTWORK

PART 2 PRODU

 GENERAL. STANDARD 90-A AND THE HVAC OUCTS SHALL BE CONSTRUCTED OF STEEL UNLESS OTHERWISE SPECIFIED WN ON THE DRAWINGS b. THE SIZE OF THE DUCTS INDICATED ON THE

DRAWINGS SHALL BE NET INSIDE DIMENSIONS. c. THE DUCT PRESSURE CLASS DESIGNATED SYMBOLS SHOWN ON THE DRAWINGS ARE EXPLAINED IN FIGURE 1-1 OF THE HVAC DUCT MANUAL d THE PRESSURE CLASSIFICATION FOR DUCTWORK IS SHOWN IN TABLE 1-1. MINIMUM DUCTWORK SYSTEM PRESSURE CLASSIFICATIONS SHALL BE AS FOLLOWS: SUPPLY AIR DUCTWORK FROM THE AIR

HANDLING DISCHARGE TO AIR TERMINAL UNITS OR AIR CONTROL VALVES SHALL BE CONSTRUCTED TO A POSITIVE 4.0 INCH WG PRESSURE CLASS. 2) SUPPLY AIR DUCTWORK DOWNSTREAM OF AIR FERMINAL UNITS OR AIR CONTROL VALVES SHALL BE CONSTRUCTED TO A POSITIVE 1.0 INCH WG PRESSURE CLASS

3) RETURN AIR DUCTWORK FROM THE RETURN REGISTER OR GRILL TO A FIRE DAMPER OR CONSTRUCTED TO A NEGATIVE 1.0 INCH WG PRESSURE CLASS

4) ALL REMAINING RETURN AIR DUCTWORK SHALL BE CONSTRUCTED TO A NEGATIVE 4.0 INCH WG PRESSURE CLASS 5) RELIEF AIR DUCTWORK SHALL BE CONSTRUCTED TO A POSITIVE 4.0 INCH WG PRESSURE CLASS.

6) LABORATORY EXHAUST AIR DUCTWORK SHALL BE CONSTRUCTED TO NEGATIVE 6.0 WG INCH PRESSURE CLASS GENERAL PURPOSE EXHAUST AIR DUCTWORK SHALL BE CONSTRUCTED TO A NEGATIVE 2.0 INCH WG PRESSURE CLASS.

E. ALL DUCTWORK SHALL BE SUBSTANTIALLY AND NEATLY SUPPORTED SO THAT HORIZONTAL DUCTS ARE WITHOUT SAG OR SWAY, VERTICAL DUCTS ARE WITHOUT BUCKLE AND ALL DUCTS ARE FREE FROM THE POSSIBILITY OF DEFORMATION, COLLAPSE, OR VIBRATION. DO NOT SUSPEND DUCTWORK FROM

1-1/2-INCH METAL ROOF DECK. SEISMIC RESTRAINTS FOR DUCTWORK. ALL DUCTWORK SYSTEMS SHALL BE INSTALLED WITH LATERAL AND LONGITUDINAL REST REQUIRED FOR SEISMIC LEVEL B IN WITH GUIDELINES SET FORTH IN THE

SUPPORTS

STRAINT MANUMOR SPECIFIC DE

RK SPECIFIED ELSEWHERE:

CONTRACT REQUIREMENTS, AND DIVISION 1

VIBRATION ISOLATION HANGERS AND

SECTION 15070, VIBRATION ISOLATION

PIPING INSTALLATION IS SPECIFIED IN SECTION

CONTRACTORS NATIONAL ASSOCIATION, INC

(SMACNA), 4201 LAFAYETTE CENTER DRIVE,

"SEISMIC RESTRAINT MANUAL" IN THIS

SPECIFICATION SHALL MEAN THE FIRST

EDITION OF THE "SEISMIC RESTRAINT

MANUAL GUIDELINES FOR MECHANICAL

GENERAL REQUIREMENTS.

15100, PIPE AND PIPE FITTINGS.

SHEET METAL AND AIR CONDITIONING

CHANTILLY, VIRGINIA 22021

FR TO SECTION 15010 AND DIVISION 0.

ACOUSTICAL WALL SLEEVES ARE SPECIFIED IN

PART 1 GENERAL

1.02 QUALITY ASSURANCE

PART 2 PRODUCTS

REFERENCE STANDARDS.

g. DUCT SEALANT SHALL BE WATER RESISTANT, COMPOSITE FIRE AND SMOKE HAZARD RATINGS MAXIMUM 25 FOR FLAME SPREAD AND 50 FOR SMOKE DEVELOPED, COMPATIBLE WITH MATING MATERIALS SEALANT SHALL BE UNITED DUCT SEALER OR

EQUIVALENT. h. DUCT SEALING REQUIREMENTS. DUCT SEAL CLASSES ARE DEFINED IN TABLE 1-2. (ALL DUCTWORK SH SEAL CLASS A) (ALL DUCTWORK SHALL BE SEA ACCORDANCE WITH TABLE 1-2).

RECTANGULAR DUCTWORK. a. DUCTS SHALL BE CONSTRUCTED AND RI SECTION 15820, DUCTWORK ACCESSORIES.

ACCORDANCE WITH TABLES 1-3 THROUGH WITH FIGURE ALUMINUM ACCORDAN H TABLES 1-2

OMPONENTS S. OR WARD.

. 2-6 ARE NOT PERMITTED. RANCH CONNECTIONS TO R MAIN DUCTS SHALL BE 45 NTRIES AS SHOWN IN FIGURE 2-8 GHT TAPS ARE NOT PERMITTED ROUND RANCH CONNECTIONS TO RECTANGULAR MAIN DUCTS SHALL BE EITHER CONICAL OR BELLMOUTH FITTINGS OR RECTANGULAR-TO-ROUND HIGH EFFICIENT

AKEOFFS MANUFACTURED BY SHEET METAL CONNECTORS, INC., 5850 MAIN ST., N.E., MINNEAPOLIS, MN 55432. DUCT ACCESS DOORS SHALL BE IN ACCORDANCE WITH FIGURES 2-10 AND 2-10M. DOORS SHALL BE ADEQUATELY SIZED FOR EASE OF MAINTENANCE OF CONCEALED ITEMS. INSULATE ACCESS DOORS WHERE DUCTS ARE INSULATED WITH SAME INSULATION AS ON

 VOLUME DAMPERS SHALL BE IN ACCORDANCE WITH FIGURES 2-12 AND 2-13. 4) GRILLE, REGISTER, AND DIFFUSER CONNECTIONS SHALL BE IN ACCORDANCE WITH FIGURES 2-14 THROUGH 2-15. 5) FLEXIBLE CONNECTIONS AT FANS SHALL BE IN ACCORDANCE WITH FIGURE 2-17

6) DISH WASHER VAPOR EXHAUST SHALL BE IN ACCORDANCE WITH FIGURE 2-18. f. FLEXIBLE DUCT LINER SHALL BE INSTALLED IN ACCORDANCE WITH FIGURES 2-19 THROUGH 2-22 ROUND AND OVAL DUCTWORK a. ROUND DUCTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH TABLES 3-2 AND 3-3. 1) SEAMS AND JOINTS SHALL BE IN ACCORDANCE WITH FIGURES 3-1 AND 3-2.

2) FITTINGS SHALL BE IN ACCORDANCE WITH TABLE 3-1, FIGURE 3-3 AND THE FOLLOWING LIST OF APPROVED FITTINGS SHOWN ON FIGURE 3-4: 90 DEG TEE FITTING, 90 DEG TAP, 90 DEG SADDLE TAP, 90 DEG TEE WITH OVAL TO ROUND TAKE DEGLATERAL FITTING, 45 DEGLATERAL DEG LATERAL SADDLE TAP: AND FIGURE 3 CONICAL TEE FITTING, CONICAL TAP, CONICAL SADDLE TAP, WYE FITTING, CONICAL TEE AND

REDUCER FITTING, AND ALTERNATE ARRANGEMENT FLAT OVAL DUCTWORK CONSTRUCT BE IN ACCORDANCE WITH TABLES SHALL BE IN ACCORDANCE W HANGERS AND SUPPORTS a. RIGID ROUND, RECTANGULAR AND FLA

DUCTS SHALL BE IN ACCORDA

DUCTS AND 7 WORK SHALL BE OF SPIRA FABRIC WITH A METAL PIRAL AND A CO JCT CONNECTORS SHALL BE AVE A FLAME SPREAD RATING AD A SMOKE DEVELOPED RATING NO FRATING TEMPERATURE RANGE SHALL BE

STANDARD CODE FOR PRESSURE PIPING ANSI B-31

DIELECTRIC PROTECTION. FURNISH ACCEPTABLE

BETWEEN FERROUS AND NONFERROUS METAL PIPE

HORIZONTAL PIPE SUPPORTS (EXTERIOR ON ROOF)

SHALL BE SUPPORTED USING NON-PENETRATING,

PROVIDED AS REQUIRED BY NUMBER AND SIZES OF

POLYPROPYLENE PLASTICS AND OTHER ADDITIVE

FOR UV PROTECTION. ROLLER ASSEMBLY HANGERS

SHALL BE PROVIDED FOR ALL STEAM AND STEAM

UTILIZED FOR DRAIN PAN AND OTHER CONDENSATE

METAL PROTECTION SURROUNDING THE INSULATION

PROVIDE SADDLES EXTENDING FOR A MINIMUM OF 10

IN EITHER DIRECTION OF THE SUPPORT. SUPPORTS

SHALL CONSIST OF HOT-DIPPED GALVANIZED STEEL

BE MANUFACTURED FROM 1-5/8" B22TH STRUT AND

THE COMPLETED ASSEMBLY SHALL PERMIT BOTH

1. PROVIDE ONE OF THE FOLLOWING TYPES OF

MANUFACTURED BY GRINNELL OR CARPENTER

HEREINAFTER, PROVIDE CLEVIS TYPE,

a. EXCEPT AS OTHERWISE SPECIFIED

HANGERS FOR HORIZONTAL PIPING

VERTICAL AND HORIZONTAL ADJUSTMENT

D HORIZONTAL PIPING HANGERS (INTERIOR

AND PATTERSON.

ALL PIPE EXCEPT COPPER:

APPLICATIONS):

CHANNEL TRACK, FITTINGS, WASHERS AND NUTS, AND

ROLLERS AND OTHER HANGER TYPES, FRAMES SHALL

I-7/8" BTS22TH STRUT .125-250W WHEN TELESCOPE

RETURN/CONDENSATE, HOT WATER AND CHILLED

WATER PIPING, CLEVIS TYPE SUPPORTS CAN BE

PIPING FOR ALL PIPING NOT HAVING ADEQUATE

TELESCOPING PS TYPE PIPE SUPPORTS AS

MANUFACTURED BY PORTABLE PIPE HANGERS

COMPANY, SPECIFIC MODEL AND REQUIRED

ACCESSORIES (I.E., HANGER TYPES) SHALL BE

PIPES SUPPORTED, PER MANUFACTURER'S

RECOMMENDATIONS. BASES SHALL BE

MANUFACTURED FROM HIGH DENSITY

ALL PIPING TO BE INSTALLED OUTSIDE ON THE ROOF

PROTECTION OR COPPER PLATED HANGERS

AND HANGERS ON ALL WATER PIPING.

FES F (-18 TO 93 DEGREES C.), OPERATING

SHALL BE NEGATIVE 0.5 INCH TO POSITIVE 10

WHERE EITHER ACOU

SULATION IS SHO ECIFIED FOR ROVIDE FACTO SULATED MATERIA THE SYSTEM CONSIST G BONDED TO THE INTERIOR ICK. 0.75 POUNDS/CUBIC FOOT (S/CUBIC METER) FIBERGLASS INSULATION AN VAPOR BARRIER JACKET CONSISTING

REINFORCED METALIZED FILM OR M. FURNISH PORTER PORT X TYPE M-KC. PROVIDE EXIBLE DUCT FO STEMS NOT R EXTERIOR INSULATION, THERMAFLEX TYPE S-TL, OR

AL BE SUPPORTED IN ACCORDANCE FLEXIBLE DUCT 3-9 AND 3-10 OF THE HVAC DUCT MANUAL WITH FIGUR LL GENERAL SERVICE LABORATORY EXHAUST DUCTWORK SHALL BE MINIMUM 18 GAGE GALVANIZED STEEL CONSTRUCTION WITH SCREWED AND SEALED SEAMS AND

WIREMOLD TYPE 57

ALL FUME HOOD, DOWNDRAFT TABLE, AND OTHER SPECIALIZED EXHAUST AS NOTE DON DRAWINGS SHALL BE 18 GAGE 304L STAINLESS STEEL. ALL SEAMS AND JOINTS SHALL BE WELDED. EXPOSED DUCTWORK BELOW FINISHED CEILINGS SHALL BE AINIMUM 18 GAGE TYPE 304L STAINLESS STEEL. ALL SEAMS AND JOINTS SHALL BE WELDED WITH THE SEAMS AND JOINTS GROUND SMOOTH. EXPOSED DUCTWORK SHALL BE

4 ROOF PENETRATIONS ALL DUCTWORK SHALL PENETRATE THE ROOF THROUGH ROOF CURBS. THE ROOF CURBS SHALL BE FURNISHED BY THE CUSTOM ENGINEERED DUCTWORK MANUFACTURER TO THE CONTRACTOR FOR INSTALLATION AND SHALL MEET THE STANDARD SPECIFICATIONS OF THE REST OF THE JOB. THE DUCTWORK CURB AND PROVIDE FOR ATTACHMENT OF INTERIOR

PART 3 EXECUTION

A. DUCTWORK CONSTRUCTION - GENERAL. ADHERE TO DRAWINGS AS CLOSELY AS POSSIBLE. THE CONTRACTOR MAY VARY RUN AND SHAPE OF DUC

MAKE OFFSETS DURING PROGRESS OF WORK BY STRUCTURAL OR OTHER INTERFEREN INSTALL DUCTWORK IN ADHERENCE SCHEDULES INDICATED. CONSU THER TRADES. AND IN CONJUNCTION WITH THEI LISH NECESSARY SPACE REQUIREMENTS FOR EACH MAINTAIN REQUIRED CLEARANCES HEIGHT IS STATED, DUCTWORK SHALL HIGH AS POSSIBLE WITH A MINIMUM C

8 INCHES (2.95 M). B. DUCTWORK CONSTRUCTION SYSTEM COMPONEN BE INSTALLED A RECOMMENDED BY M MANUFACTUR

ANCING AND ADJU PRIOR TO THE AIR STARTING WORK P

DISTRIBUTION SYS

EADY TO BE BALA

EXAMINE TH TO SEE THA TIONS. DETERMINE GISTERS ARE OPEN THA UBRICATED THAT NEW CLEAN N INSTALLED AND PERFORM OTHER D MAINTENANCE ACTIVITIES FOR PROPER OPERATION OF THE

FMONSTRATE THAT THE AIR HANDLING EQUIPMENT PERFORMS AS SPECIFIED. ADJUST VARIABLE TYPE PULLEYS, VOLUME AND CONTROL DAMPERS, WHERE NECESSARY TO STABILIZE SYSTEMS OPERATION. MAKE ADJUSTMENTS OF THE MECHANICAL EQUIPMENT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND AS DIRECTED BY THE AIR BALANCE AND TESTING AGENCY I IT IS FOUND THAT ANY PORTION OF THE WORK HAS NOT BEEN PROPERLY INSTALLED FOR ACCOMPLISHING THE TESTING AND BALANCING AS CALLED FOR IN THE

CONCRETE PIERS OR UNISTRUT RACK AND

LOCATED CLOSE TO WALL, UP TO 3 INCH

FURNISH LIGHT WELDED-STEEL BRACKE

WITH HOLE FOR ONE ROD, 3/4 INCH (19 MM)

FOR PIPE-ROLL STAND SUPPORT, FURNISH

WELDED-STEEL BRACKET, LIGHT FOR 700

GRINNELL FIGURE 191, MEDIUM FOR 1500

FIGURE 194 HEAVY FOR 3000 POUND (1120

(75 MM) PIPE. ELCEN FIGURE 46.

POUND (280 KG) MAXIMUM LOADING.

DIAMETER, GRINNELL FIGURE 191.

POUND (260 KG) MAXIMUM LOADING,

POUND (560 KG) MAXIMUM LOADING

KG) MAXIMUM LOADING FIGURE 199.

a. VERTICAL PIPE SUPPORTS SHALL BE

STEEL EXTENSION PIPE-CLAMPS

GRINNELL FIGURE 261. REFER TO

CLAMP SECURELY TO PIPE, RESET

a. FOR UNINSULATED VERTICAL LINES

NON-"C-STYLE" BEAM CLAMPS SHALL BE

BEAM CLAMP, GRINNELL FIGURE 228 FOR

HANGER ROD UP TO 1-1/2 INCH (38 MM).

MANUFACTURER'S RATED MAXIMUN

LOADING FOR EACH SIZE PIPE. BOLT

CLAMP-END EXTENSION ON BUILDING

PROVIDE COPPER FINISHED STEEL RISER

CLAMP, GRINNELL FIGURE CT-121 OR

PLASTIC COATED STEEL RISER CLAMP

MALLEABLE IRON, GRINNELL FIGURE 229 FOR 3/8

INCH (9.5 MM) HANGER RODS, FORGED-STEEL

"C-STYLE" BEAM CLAMPS SHALL BE ADJUSTABLE HANGER ROD TYPE, MALLEABLE IRON WITH SET

SCREW, JAM NUT, RETAINING CLIP, FM AND UL

APPROVED, GRINNELL FIGURE 61, 92, OR 93.

ALLOW HORIZONTAL MOVEMENT OF C-CLAMP

POSITIONED, RETAINING CLIPS MAY BE OMITTED.

FORMS. PROVIDE REINFORCING RODS FOR PIPE

BLACK MALLEABLE IRON UNIVERSAL TYPE FOR

ADJUSTMENT, GRINNELL FIGURE 282 FOR PIPE

EQUIVALENT GROUP OF PIPES ON TRAPEZE, USE

WHERE BEAM CONFIGURATION DOES NOT

FURNISH AND SET INSERTS IN CONCRETE

SIZES OVER 3 INCH (75 MM) OR FOUIVALENT

CONCRETE INSERTS SHALL BE AS FOLLOWS

THREADED CONNECTIONS WITH LATERAL

SIZES UP TO 8 INCH (200 MM).

EXCEEDING MAXIMUM LOADING.

3. FOR PIPES 8 INCH (200 MM) AND OVER OR

TWO OR MORE INSERTS TO PREVENT

WHEN SET SCREW AND JAM NUT ARE

VERTICAL PIPING SUPPORTS:

ALL PIPE EXCEPT COPPER:

STRUCTURE

COPPER TUBING SUPPORT.

F BEAM CLAMPS

GRINNELL CT 121 C.

FOR HANGER SUSPENSION WITH 750

WALL SUPPORTS. PROVIDE ONE OF THE

a. FURNISH STEEL J-HOOK FOR PIPE

FOLLOWING MEANS OF SUPPORTING

HORIZONTAL PIPING FROM WALL

B. CLEAN ALL DUCT INTERIORS OF ALL DEBRIS.

SPECIFICATIONS.

GRINNELL FIGURE 260 OR FIGURE 300 AS

REQUIRED TO KEEP THE CLEVIS NUT

ADJUSTABLE SWIVEL RING STEEL BAN

HANGERS FOR PIPING 3 INCHES (75 MM

AND BELOW IN LIEU OF CLEVIS HANGERS,

WHERE PIPE EXCEEDS MAXIMUM LOADING

HANGERS, FURNISH STEEL PIPE CLAMP,

RECOMMENDED FOR CLEVIS TYPE

LARGER, AND WHERE PROVISION FOR

REQUIRED, PROVIDE SINGLE PIPE-ROL

ADJUSTABLE SOCKETS, GRINNELL FIGURE

71, OR FOR PIPE 12 INCHES (300 MM) AND

SMALLER, ADJUSTABLE SWIVEL PIPE-ROLL

WITH ONE ROD, GRINNELL FIGURE 174.

PARALLEL AND AT THE SAME LEVEL, AND

FABRICATE FROM STRUCTURAL STEEL

SHAPES. USE ROLLER CHAIRS GRINNE

SPACING SHALL NOT BE FARTHER

THAN THE CLOSEST INTERVAL

REQUIRED FOR ANY SIZE PIPE

WHEN TRAPEZE HANGERS ARE NO

DOUBT OF THE STRUCTURAL

COPPER PLATED HANGERS, SPLIT-RING

EXTENSION HANGER, GRINNELL FIGURE

FURNISH SAME AS SPECIFIED FOR STEEL

FLOOR, FURNISH CAST-IRON PIPE RESTS

1 FOOT-6 INCHES (460 MM) ABOVE FINISH

PIPE-ROLL STANDS GRINNELL FIGURE 271

WITHOUT VERTICAL ADJUSTMENT, OR

ADJUSTMENT AS REQUIRED. PROVIDE

GRINNELL FIGURE 274 WITH VERTICAL

FLOOR AND/OR WHERE PROVISION FOR

EXPANSION IS REQUIRED. FURNISH

GRINNELL FIGURE 258, WITH PIPE NIPPLES

LOADS.

a. HANGERS TOUCHING PIPE. PROVIDE

b. HANGERS ON OUTSIDE OF INSULATION.

 a. WHERE BOTTOM OF PIPING IS LESS THAN FOOT-6 INCHES (460 MM) ABOVE FINISH

TO SUIT. FASTEN TO FLOOR.

b. WHERE BOTTOM OF PIPE IS HIGHER THAN

4 FLOOR SUPPORTS PROVIDE ONE OF THE

FOLLOWING MEANS OF SUPPORTING

HORIZONTAL PIPING FROM FLOOR

COPPER TUBING SUPPORT.

CAPACITY FOR CONCENTRATED

UPPORTED THEREBY, OR AS

ECESSARY TO PREVENT DAMAG

OR FAILURE TO THE STRUCTURE.

SHOWN, FURNISH SHOP DRAWINGS

GRINNELL FIGURE 271 WHERE PROVISION

FIGURE 175 OR PIPE-ROLL STANDS

FOR EXPANSION IS REQUIRED.

PROVIDE TRAPEZE HANGERS WHERE

SEVERAL PIPES CAN BE INSTALLED

EXPANSION AND CONTRACTION IS

SUPPORT WITH TWO RODS AND

OUTSIDE THE INSULATION.

GRINNELL FIGURE 69.

GRINNELL FIGURE 216.

d. FOR PIPES 8 INCHES (200 MM) AND

b. AT CONTRACTOR'S OPTION, PROVIDE

ACCESSORIES **TEST AND BALANCE**

LUME DAMPERS (MARK VD) SHALL BE PROVIDED A TAKE OFF FOR FLEX DUCT AND WHERE SHOWN ON DRAWINGS. VOLUME DAMPERS SHALL BE TWO GAGES

HEAVIER THAN DUCT AND REINFORCED TO PREVENT VIBRATION AND NOISE. VOLUME DAMPERS OCCURRING IN CONCEALED DUCTWORK, EXCEPT THOSE ABOVE REMOVABLE CEILINGS, SHALL BE INSTALLED WITH SHAFTS VERTICAL IN DUCTS OVER 14 INCHES IN WIDTH WITH VERTICAL SHAFTS, USE MULTILOUVERED OPPOSED BLADE DAMPERS, TYPE F_18 BY AMERICAN FOUNDRY AND SYSTEMS AS HEREIN SPECIFIED. FURNACE COMPANY, AIRSTREAM PRODUCTS OR RUSKIN B THIS SECTION CONTAINS REFERENCE TO WORK THAT FOR OTHER DAMPERS USE YOUNG NO. 403 DAMPER REGULATORS AND NO 656 END BEARINGS DAMPERS IN

SHALL HAVE YOUNG NO. 301A CONCEALED DAMPER B. FIRE DAMPERS (MARK F.D.) SHALL BE PROVIDED IN DUCT OPENINGS THROUGH FIRE_ RATED PARTITIONS LOORS AND ROOFS AS SHOWN ON DRAWINGS. DAMPERS SHALL BE INSTALLED IN CONFORMANCE WIT NFPA 90A. AIRTIGHT, HINGED ACCESS DOOR SWITCH CATCHES SHALL BE INSTALLED FOR MAINTENANCE OF DAMPERS CONTRACTOR SHALL NOT OBSTRUCT ACCESS DOORS WITH PIPING, ETC. PROVIDE REQUIRED CEILING

ROOMS WITH OTHER THAN REMOVABLE TYPE CEILINGS

ACCESS DOORS IN AREAS WITH OTHER THAN REMOVABLE TYPE CEILING. DAMPERS SHALL BE UL LABELED AND COMPLY WITH UL 555. 1. EACH DAMPER SHALL BE PLACED INTO A 14 GAGE STEEL SLEEVE WHICH IN TURN SHALL BE PLACED INTO PARTITION, FLOOR OR ROOF. EACH SLEEVE SHALL EXTEND THROUGH PARTITION, FLOOR OR ROOF FAR ENOUGH ON EITHER SIDE FOR PROPER BREAKAWAY DUCT CONNECTION IN ACCORDANCE WITH S.M.A.C.N.A. RECOMMENDATIONS. NO SHEET

METAL DUCT SHALL PASS THROUGH A FIRE_RATED 2. FIRE DAMPERS SHALL BE SO ARRANGED THAT FUSIBLE LINK, CLIP ASSEMBLY OR FIRESTAT CONTROLLER SHALL BE ACCESSIBLE. 3. DAMPERS SHALL HAVE A FREE AREA EQUAL TO DUCT TO WHICH THEY ARE INSTALLED. 4. FIRE DAMPERS SHALL EMPLOY GRAV AND LATCH CLOSURE PRINCIPL

5. FIRE DAMPERS SHALL USE U LINKS WITH ACTIVATION DEGREES F. UNLESS SHALL BE UL CLASSI 6. FIRE DAMPERS SHALL

IPING AND ON ALL DO

FIGURES 351 THRU 35

FIGURES 160 THR

b COOLING PIPING

PART 3 EXECUTION

FOR ALL PIPING INSTALLED ON

ROLLER SUPPORTS USE THE SAME

SADDLES AS LISTED ABOVE EXCEP

CLEVIS OR RING SUPPORTS PROVID

ROLLER SUPPORTS PROVIDE PIPE

USE PIPE SHIELDS MODEL CSX.

FOR ALL PIPING INSTALLED ON

PIPE SHIELDS MODEL CS-CW.

FOR ALL PIPING INSTALLED ON

NSULATION IN ALL AREAS WHERE

PROTECT INSULATION AT AREAS OF

b. PROVIDE GRINNELL FIGURES 167 OR 168

CONTACT WITH HANGERS AND SUPPORTS

SADDLES ARE NOT SPECIFIED TO

a. PROVIDE SHIELDS TO PROTECT

3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. PROVIDE HANGERS TO SUPPORT THE REQUIRED

LOADS. WHERE NECESSARY, SUPPORTS SHALL BE

AND CONTRACTION WHERE DRAWINGS SHOW

CONFORM TO REQUIREMENTS OF THIS SECTION.

WITH THE PIPE FOR INSULATED PIPING NOT

WHERE PIPE SADDLES ARE SPECIFIED. SIZE

HANG PIPE FROM SUBSTANTIAL BUILDING

A MEANS OF VERTICAL ADJUSTMENT AFTER

ERECTION. DO NOT SUSPEND PIPE FRO

PIPE SADDLES.

D. "C" CLAMPS SHALL BE INST

WHERE NON

MANUFACTURER'S RECOM

REQUIRING A VAPOR BARRIER EXCEPT ON PIPES

DESIGNED TO PERMIT MOVEMENT DUE TO EXPANSION

DETAILS OF SUPPORTS AND ANCHORS, CONFORM TO

DETAILS SHOWN. WHERE DETAILS ARE NOT SHOWN.

SUPPORT PIPING WITH HANGERS IN DIRECT CONTACT

HANGERS TO FIT ON THE OUTSIDE OF INSULATION

REQUIRING A VAPOR BARRIER AND ON PIPES HAVING

STRUCTURE. PIPING SHALL NOT BE HUNG FROM

PIPES IN WHICH VIBRAT

ROUGH WALLS, FLOORS, O

PIPE WITHIN ACOUSTICAL

OTHER PIPING. ALL RIGID HANGERS SHALL PRO

SHIELDS MODEL CSX-CW.

PIPING WHERE WATE

E EXCEEDS 140 D

RDS OF "NATIONAL ENVIRONMENTAL BALANCE COUNCIL"

TRAINING, AND QUALIFICATIONS

FORMS PROPOSED FOR USE. SECOND: AT LEAST 60 DAYS PRIOR TO STARTING FIELD WORK, SUBMIT 3 COPIES OF: A SET OF REPORT FORMS FILLED OUT AS TO THE DESIGN FLOW VALUES AND THE INSTALLED

EQUIPMENT PRESSURE DROPS, AND THE REQUIRE CFM FOR AIR TERMINALS A COMPLETE LIST OF INSTRUMENTS PROPOSED TO BI USED, ORGANIZED IN APPROPRIATE CATEGORIES.

a. MANUFACTURER AND MODEL NUMBER DESCRIPTION AND USE WHEN NEEDED TO FURTHER IDENTIFY THE INSTRUMENT SIZE OR CAPACITY RANGE LATEST CALIBRATION DATE ARCHITECT WILL REVIEW SUBMITTALS FOR COMPLIANCE WITH CONTRACT DOCUMENTS, AND WILL

RETURN ONE SET MARKED TO INDICATE: AND CONTRACT DOCUMENTS. b. ADDITIONAL, OR MORE ACCURATE INSTRUMENTS REQUIRED.

DATA TO THE CONTRACTOR FOR FORWARDING T THE ARCHITECT, FO INCLUDE ALL IT

SHALL REVIEW THE PROJECT DESIGN AND/OR DU SHOP DRAWINGS, AND ADVISE T CONTRACTO OVIDE AND INSTALL (AT NO **ADDITIONAL** HE OWNER) ADDITIONAL, OF RELOCATE BAI DEVICES, DEEMED NECESSA THE TESTING A ENABLE CORRECT BALANC

PRIOR TO START OF TESTING, ADJUSTING AND BALANCING, VERIFY THAT REQUIRED "JOB CONDITIONS" ARE MET: SYSTEMS INSTALLATION IS COMPLETE AND IN FULL

1.01 DESCRIPTION OF WORK 2. OUTSIDE CONDITIONS ARE WITHIN A REASONABLE A. PROCURE THE SERVICES OF AN INDEPENDENT AIR RANGE RELATIVE TO DESIGN CONDITIONS BALANCE AND TESTING AGENCY (TESTING AGENCY), WHICH LIGHTS ARE TURNED "ON" WHEN LIGHTING IS SPECIALIZES IN THE BALANCING AND TESTING OF HEATING INCLUDED IN THE COOLING LOAD. SPECIAL EQUIPMENT SUCH AS COMP BALANCE, ADJUST, AND TEST AIR MOVING EQUIPMENT AND

LABORATORY EQUIPMENT, AND AIR DISTRIBUTION SYSTEMS, WATER SYSTEMS OR STEAM EQUIPMENT ARE IN FULL OPER C. COORDINATION: COORDINAT SHALL BE CARRIED OUT BY THE CONTRACTOR, OTHER THAN

CIENCIES NO RELATED WORK SPECIFIED ELSEWHERE: REFER TO SECTION 15010 AND DIVISION 0, CONTRACT REQUIREMENTS AND DIVISION 1, GENERAL NOTED, S DEFICIENC

1.02 QUALITY ASSURANCE

REQUIREMENTS.

PART 1 GENERAL

A. TESTING AGENCY: QUALIFICATIONS. THE INDEPE AGENCY SHALL PROVIDE PRO SUCCESSFULLY COMPLETE PROJECTS OF SIMILAR SIZE BE CURRENTLY CERTIFIED BALANCE COUNCIL" (AABC)) HE "NATIONAL DONE UNDER

THAT REQUIRED TO BE COMPLETED BY THE TESTING

TIFIED SUPER RUMENTS USE CCURATELY CALIBRA ORKING ORDER. IF RE THE TESTS SHALL ONDUCTED IN THE

SERVICES - ATLANTA G MAS BALANCING SERVICES - MACO ITH APPLICABLE PROCEDURES AND

- ATLANTA GA; TAB

SUBMIT 3 COPIES OF DOCUMENTATION TO CONFIRM COMPLIANCE WITH QUALITY ASSURANCE PROVISIONS ORGANIZATION, SUPERVISOR AND PERSONNEL SPECIMEN COPY OF EACH OF THE REPORT

WITH DATA SHEETS FOR EACH. SHOW:

a. DISCREPANCIES NOTED BETWEEN DATA SHOWN

REQUESTS FOR RE-CALIBRATION OF SPECIFIC NSTRUMENTS. THIRD: THE TESTING AGENCY SHALL PERFORM THE DATA, AND SUBMIT 7 COPIES OF THE COMPLETE TEST

1.04 JOB CONDITIONS

BE COMPLETE

STRAINTS FOR PIPING. ALL PIPING

MS SHALL BE INSTALLED WITH LATERAL AND

GITUDINAL RESTRAINTS AS [REQUIRED FOR

SEISMIC LEVEL B IN ACCORDANCE WITH GUIDELINES

SET FORTH IN THE SEISMIC RESTRAINT MANUAL.

SUPPORT HORIZONTAL PIPING ON THREADED HO

ROLLED STEEL ROD. THREADED ROD SHALL NOT BE

REDUCED TO SIZES SMALLER THAN PROVIDED FOR IN

MAXIMUM SPACING BETWEEN SINGLE PIPE

1/2 3/4 1 1-1/4 1-1/2 2 2-1/2 3

1.5 1.8 2.1 2.1 2.7 3.0 3.4 3.7 4.3 4.9 51.

NOMINAL PIPE SIZE, INCHES

5 6 8 10 12

MAXIMUM SPAN, FEET

19 20 20

5.8 6.1 6.1

MAXIMUM SPAN, METRES

3.02 HORIZONTAL PIPING SUPPORT SCHEDULE

SUPPORT THREAD SIZES.

SUPPORTS:

STEEL PIPE.

2 PRODUCTS (NOT USED) PART 3 EXECUTION 3.01 INSPECTION

THIS PERIOD OF TIME.

THE TESTING AGENCY SHALL PREPARE THE WATER SYSTEMS FOR BALANCING IN THE FOLLOWING MANNER AFTER COMPLETION OF THE AIR BALANCE OPEN ALL VALVES TO FULL OPEN POSITION SET MIXING VALVE TO FULL SYSTEM FLOW. EXAMINE WATER IN SYSTEM AND DETERMINE IF WATER HAS BEEN TREATED AND CLEANED.

HAVE CONTRACTOR REMOVE AND CLEAN ALL

PREPARATION OF WATER SYSTEMS FOR BALANCING:

CLUDE AN EXTENDED

DURING WHICH TIME THE ARCHITECT AT

ON MAY REQUEST A RECHECK, OR RESETTING

JTLET, SUPPLY AIR FAN, RETURN/EXHAUST FAN

AGENCY SHALL PROVIDE TECHNICIANS TO ASSIST THE

ARCHITECT IN MAKING ANY TESTS HE MAY REQUIRE DURING

S. AFTER COMPLETION OF TEST AND

PERFORM AIR PATTERN TESTS WITH SMOKE CHECK PUMP ROTATION. CHECK EXPANSION TANKS TO DETERMINE THEY ARE NOT AIR BOUND AND THE SYSTEM IS COMPLETELY FULL OF WATER WITH NO AIR POCKETS BLOCKING WATER FLOW. SET ALL TEMPERATURE CONTROLS SO ALL COOLING COILS ARE CALLING FOR FULL

COOLING. USE SAME PROCEDURE WHEN BALANCING HEATING COILS. SET ON FULL CHECK OPERATION OF ALL AUTOMATIC VALVES CHECK AND SET OPERATING TEMPERATURE OF

BOILERS AND CHILLER TO DESIGN REQUIREMENTS AND VERIFY. 3.02 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A TESTING PROCEDURE FOR AIR SYSTEMS. THE TEST ENCY SHALL PERFORM LEAKAGE TWORK OF 4 INCH WG CLASS AND HALL BE IN ACCORDANCE WITH ES. NO AUDIBLE OR VISUAL

FREORM THE CE SYSTEM IN WING REQUIREMENTS IM MOTOR REQUIREMENTS

DISCHARGE DUCT: TEM FOR DESIGN UST SYSTEM FOR DESIGN CFM AIR MINIMUM AND MAXIMUM T AND RECORD ENTERING AIR EMPERATURES. (D.B. HEATING AND COOLING.)

TEST AND RECORD ENTERING AIR TEST AND RECORD LEAVING AIR EMPERATURES. (D.B. HEATING AND COOLING.) TEST AND RECORD ENTERING AND LEAVING AIR EMPERATURES (D.B.) ACROSS REHEAT AND TERMINAL HEATING COILS. AT MAXIMUM DESIGN WATER FLOW (RECORD CFM, AIR AND WATER

TEMPERATURES).

BY PIPE MANUFACTURER.

CAST IRON PIPE SHALL BE SUPPORTED AT EACH HUB. SUPPORT "DURIRON" OR "CORROSIRON" AT A MINIMUM OF TWO POINTS PER LENGTH WITH ONE POINT AT THE HUB. USE HANGERS RECOMMENDED

H. TRAPEZE HANGER, SPACING SHALL NOT BE FARTHER

THAN THE CLOSEST INTERVAL REQUIRED FOR ANY

SIZE PIPE SUPPORTED THEREBY, OR AS NECESSARY

STRUCTURE. PROVIDE ADDITIONAL FRAMING AS REQUIRED TO TRANSFER LOADS TO ADEQUATE SUPPORTING RODS SHALL BE ATTACHED TO CONCRETE BY INSERTS PLACED BEFORE CONCRETE

J. SUPPORTING RODS OVER 18 INCHES (460 MM) LONG

RISER CLAMPS. MAKE ADEQUATE I

EXPANSION, CONTRACTION, AND L

SHALL BE BRACED AT EVERY FOURTH HANGER WITH

TO PREVENT DAMAGE OR FAILURE TO THE

DIAGONAL BRACING ATTACHED TO THE STRUCTURE. 5 6 7 7 9 10 11 12 14 16 17 3.03 VERTICAL PIPING SUPPORT SUPPORT VERTICAL PIPING WITH W

B SUPPORT STEEL PIPE AT A MINIM MINIMUM ROD, INCHES LOOR AS REQUIRED TO F 1/4 1/4 3/8 3/8 3/8 3/8 1/2 1/2 5/8 5/8 5/8 MINIMUM ROD, MILLIMETRES CEILING BELOW, 6.46.4 9.5 9.5 9.5 9.5 13 13 16 16 16

C. COPPER TUBING. MAXIMUM SPACING BETWEEN SUPPORTS NOMINAL TUBING SIZE, ! 1/2 3/4 1

AS NECESSARY SO

RER'S MAXIMUM

NOT EXCEEDED.

OAD VALUES IN ACCORDANCE

MAXIMUM SPAN, FEET MAXIMUM SPAN, METRES 1.5 1.8 2.1 2.4 2.4 2.7 3.0 3.7 4.2

I MINIMUM RO

STEEL PIPE. 4 INCHES AND LARGER AT 20 RVALS OR LESS TO INSURE EVEN LOADING ON STRUCTURAL L PIPE SIZES ABOVE 12 INC MEMBERS ▲ INCHES (38 MM). SIZE SHALL

WITH ANSI B 2

RÉTURN AIR SUPPLY, I TEST AND

7. DE-ENERGIZE ALL EXISTING MECHANICAL EQUIPMENT

REGISTER TO REQUIREMENTS TER SHALL BE EACH DIFFUSER, AND B TION AND AREA. NTIFIED AS TO ANUFACTURER OF GISTERS, AND ALL TESTED SHALL BE IDENTIFIED AND LISTED

TURER'S RATINGS ON ALL EQUIPMEN ALL BE USED TO MAKE REQUIRED READINGS AND TESTS OF DIFFUSERS AND REGISTERS SHALL INCLUDE REQUIRED FPM VELOCITY AND TEST RESULTANT VELOCITY REQUIRED CFM AND TEST RESULTANT CFM AFTER ADJUSTMENTS. IN COOPERATION WITH THE TEMPERATURE CONTROL MANUFACTURER'S REPRESENTATIVE,

THE SETTING ADJUSTMENTS OF AUTOMATICALLY OPERATED DAMPERS SHALL BE SET TO OPERATE AS SPECIFIED, INDICATED AND/OR NOTED. THE AIR BALANCE AND TESTING AGENCY SHALL CHECK ALL CONTROLS FOR PROPER CALIBRATIONS AND LIST ALL CONTROLS REQUIRING ADJUSTMENT BY CONTROL INSTALLERS. ALL DIFFUSERS AND REGISTERS SHALL BE ADJUSTED TO MINIMIZE DRAFTS IN ALL AREAS ALL FANS THAT ARE CONNECTED TO HEADERS

ONLY FOR FUTURE USE SHALL BE SET TO DELIVER THE DESIGN CFM AT THE DESIGN CONDITIONS SHOWN IN THE SCHEDULE. SYSTEM STATIC SET POINT SHALL BE STATIC PRESSURE LOSS, AT DESIGN AIRFLOW, SHALL BE MEASURED AND RECORDED ACROSS EACH COMPONENT, IN EACH SYSTEM (I.E. FILTERS, DAMPERS, COILS, ETC).

ALL FANS SHALL BE TESTED AND ADJUSTED T

WITH ACTUAL AIRFLOW, AT A MINIMUM OF 2

FLOW LEVELS (I.E. 50 AND 90 PERCENT).

MEET THE DESIGN REQUIREMENTS AND FINAL AMPERE READINGS SHALL BE TAKEN. AS A PART OF THE WORK OF THIS CONTRACT THE CONTRACTOR SHALL MAKE ANY ADJUSTMENTS TO THE PULLEYS, BELTS, AND DAMPERS (OR THE ADDITION OF DAMPERS RECOMMENDED BY THE TESTING AGENCY, AT NO ADDITIONAL COST TO OWNER. VERIFY AIR FLOW AND FLOW STATION READOUT

BOMBS IN AREAS REQUESTED BY THE aa. LOCK ALL BALANCING DAMPERS AFTER FINAL SETTING, AND MARK LOCATION. B. INITIAL TEST AND BALANCE PROCEDURE FOR WATER

> THE TESTING AGENCY SHALL PERFORM THE a. SET CHILLED WATER PUMPS AND HOT WATER PUMPS TO PROPER GALLONS PER MINUTE (LITERS PER SECOND) DELIVERY ADJUST CHILLED WATER FLOW TO THE BUILDING AND THROUGHOUT THE SYSTEM ADJUST HOT WATER FLOW TO THE BUILDING AND THROUGHOUT THE SYSTEM. CHECK WATER TEMPERATURE ENTERING AND LEAVING THE EXISTING BUILDING MAINS

> > OF COOLING COILS. NOTE RISE OR DROP OF

TEMPERATURES FROM SOURCE.

PROCEED TO BALANCE EACH CHILLED WATER AND HOT WATER COIL AFTER BALANCING MULTIPLE COIL SECTIONS FOR EVEN WATER DISTRIBUTION THROUGH TUBES. UPON COMPLETION OF FLOW READINGS AND ADJUSTMENTS AT COILS, MARK ALL SETTINGS LOCK SET POINTS ON ALL BALANCING VALVES, AND RECORD DATA.

FINAL TEST AND BALANCE PROCEDURE FOR WATER THE TESTING AGENCY SHALL PERFORM THE FOLLOWING TESTS AND ADJUSTMENTS UPON COMPLETION OF PREPARATION AND INITIAL TEST INSTALL PRESSURE GAGES ON COILS REA PRESSURE DROP THROUGH COILS AT SET FLOW RATE ON CALL FOR FULL COOLING OR HEATING SET PRESSURE DROP ACROSS BYPASS VALVE TO MATCH COIL FULL FLOW PRESSURE DROP

HIS PREVENTS UNBALANCED FLOW CONDITIONS WHEN COILS ARE ON FULL BYPASS RECORD AND CHECK THE FOLLOWING ITEMS AT THE FOLLOWING LOCATIONS LEAVING AND ENTERING WATER TEMPERATURES AT COILS. (2) PRESSURE DROP OF EACH COIL WITHIN

SCOPE OF WORK

PRESSURE DROP ACROSS CONTROL

(3) GPM AT EACH COIL

VALVES. RECORD WATER METERING DEVICE READINGS. TESTING PROCEDURE FOR STEAM AND CONDENSATE CHECK ALL CONTROL VALVES FOR OPERATION FROM FULL OPEN TO CLOSE, RECORD PRESSURES. CHECK AND RECORD PRESSURES AT PRESSURE REDUCING STATION. CHECK AND RECORD STEAM FLOW METER READINGS.

CHECK ALL HUMIDIFIER VALVES FOR OPERATION FROM FULL OPEN TO FULL CLOSE. RECORD HUMIDITY. DOMESTIC HOT WATER. MEASURE AND RECOR WATER AND TEMPERED WATER TEMPERATUR

ONIC PIPING PART 1 GENERAL

NOR TO PERFORMING ANY DEMOLITION WORK

1.01 DESCRIPTION OF WORK

A. THIS SECTION INCLUDES CHILLED, CONDENSER AND HOT WATER HEATING PIPING FOR B. RELATED WORK SPECIFIED ELSEWHERE: REFER TO SECTION 15010 AND DIVISION 0, CONTRACT REQUIREMENTS AND

DIVISION 1, GENERAL REQUIREMENTS. SECTION 15060, PIPE SUPPORTS, HANGERS AND ANCHORS SECTION 15100 PIPE AND PIPE FITTINGS SECTION 15110, VALVES SECTION 15120, PIPING SPECIALTIES

PART 2 PRODUCTS

 A. CHILLED WATER PIPING. PIPE SHALL BE TYPE L DRAWN COPPER FOR PIPE SIZES 2 INCHES (50 MM) AND SMALLER. PIPE 2-1/2 INCHES (65 MM) AND LARGER SHALL BE EITHER TYPE L DRAWN COPPER OR BLACK STEEL STANDARD WEIGHT 2. FITTINGS FOR COPPER PIPING SHALL BE WROUGHT COPPER, SAME WEIGHT AS PIPE, SWEAT TYPE OR CAST BRONZE (TINNED WHEN BRAZED). A) FITTINGS ON PIPE 2 INCHES (50 MM) AND SMALLER SHALL BE THREADED

MALLEABLE IRON. B) FITTINGS ON PIPE 2-1/2 INCHES (65 MM) AND LARGER SHALL BE STEEL WELDING THERMACOR SPRIAL THERM 406 PREFABRICATED PIPING SYSTEM MAY BE USED FOR EXPOSED PIPING ON THE ROOF. IF USED THE SYSTEM SHALL HAVE INTEGRATED HEAT TRACE AND LEAK DETECTION, AND BE FULLY COORDINATED WITH THE CONTROLS CONTRACTOR AND DIVISION 16.

1 PIPE SHALL BE TYPE L. DRAWN COPPER FOR PIPE SIZES 2 INCHES (50 MM) AND SMALLER. PIPE 2-1/2 INCHES (65 MM) AND LARGER SHALL BE EITHER TYPE L DRAWN COPPER OR BLACK STEEL PIPE STANDARD WEIGHT. FITTINGS FOR COPPER PIPING SHALL BE WROUGHT COPPER OR CAST BRONZE (TINNED WHEN BRAZED), SAME WEIGHT AS PIPE SWEAT TYPE. FITTINGS FOR STEEL PIPE SHALL BE WELDING TYPE FITTINGS.

HUMIDIFIER DRAIN PIPING PIPE SHALL BE TYPE L, DRAWN COPPER. FITTINGS FOR COPPER PIPING SHALL BE WROUGHT COPPER, SAME WEIGHT AS PIPE SWEAT TYPE OR CAST BRONZE (TINNED WHEN BRAZED).

PART 3 EXECUTION

B HOT WATER HEATING PIPING

3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

MAINS SHALL BE RUN AS SHOWN ON DRAWINGS AND SHALL BE EVENLY PITO 1 INCH IN 50 FEET (25 MM IN 15 M) (0.2 PERCENT) TO LOW POINTS. ALLOWANCE FOR EXPANSION SHALL BE MADE IN THE INSTALLATION OF ALI PIPING SO THE USUAL VARIATION IN TEMPERATURE WILL NOT CAUSE UNDUE STRESS AT ANY POINT. PIPES SHALL BE SECURELY ANCHORED WHERE NECESSARY TO PROPERLY DISTRIBUTE EXPANSION STRESSES. SYSTEM SHALL BE ARRANGED FOR COMPLETE DRAINAGE WITH 3/4 INCH (19

HOSE VALVES AT LOW POINTS 4. ECCENTRIC FITTINGS SHALL BE USED FOR ALL CHANGES IN PIPE SIZES OF SUPPLY AND RETURN LINES ARRANGED TO PREVENT TRAPPAGE OF AIR, EXC WHERE REDUCING TEES ARE USED 5. FLANGED ELBOWS SHALL BE INSTALLED FOR WATER CONNECTIONS TO EQUIPMENT WITH HEAT EXCHANGERS TO ALLOW EASY REMOVAL OR SERVICE NO OBSTRUCTION SHALL BE PLACED IN SPACE REQUIRED FOR REMOVAL OR SERVICE OF THE HEAT EXCHANGER

6. CONCEALED HIGH POINTS SHALL HAVE AIR CHAMBERS WITH 1/4 INCH (6.35 M

COPPER TUBE VENT LINE AND STOP COCK CARRIED TO ACCESSIBLE POINT. COPPER JOINTS SHALL BE MADE WITH 95-5 TIN-ANTIMONY SOLDER, STAY-BR SOLDER BY J.W. HARRIS CO., INC., OR BY CADMIUM FREE BRAZING. B. VALVES AND STRAINERS GENERAL. PROVIDE VALVES AT EACH PIECE OF EQUIPMENT TO PROVIDE ISOLATION OF THE EQUIPMENT FROM ITS CONNECTED SYSTEM. LOCATE STRAINERS AND VALVES AS NECESSARY TO PROVIDE EASY ISOLATION AND CLEANING OF STRAINERS EQUIPMENT WITH AUTOMATIC CONTROL VALVES IN SUPPLY LINES SHALL HAV

COCK IN THE RETURN LINE. PROVIDE "ECCENTRIC PLUG VALVES" FOR BALANCING VALVES AND/OR BALANCING COCKS SHOWN. PROVIDE THE FOLLOWING WHERE SHOWN ON DRAWINGS OR SPECIFIED:

THERMOMETERS

3.02 FIELD QUALITY CONTROL

 a. FLOW INDICATORS. THERMOMETERS EXPANSION JOINTS IN-LINE FLEXIBLE PIPE ISOLATORS. PRESSURE GAUGES

A GATE VALVE INSTALLED AHEAD OF THE CONTROL VALVE AND A BALANCING

A. PIPING SYSTEM LEAK TESTS: MAKE PRESSURE TESTS IN THE PRESENCE OF ARCHITECT. COOLING PIPING. PRESSURE TEST AT 125 PSIG (860 KPA) OR 150 PERCENT O OPERATING PRESSURE, WHICHEVER IS GREATER. IF FOUND THAT ANY PORTIC OF THE SYSTEM DOES NOT FUNCTION PROPERLY, THE CONTRACTOR SHALL

FILE LOG

SUBMITTAL

LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

REDUCED PRINT. REDUCE SCALE ACCORDINGLY

TF SHEET MEASURES LESS THAN 42" $\overline{\mathrm{X}}$ 30" IT IS A

8600 Indian Hills Drive Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564 SUBMITTAL HISTORY REVISIONS Additions/ Renovations to Building 'C' (Capuchin)

GEORGIA STATE

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ecatur Georgia 30034

EARCH CENTER

of Georgia

Board of Regents of

the University System

DEMOLITION NOTES

HVAC SYMBOL LEGEND, ABBREVIATIONS, GENERAL AND

			NATOLIANIO AL DENACLITICNI NICETO		
SYMBOL X" D1	DESCRIPTION SUPPLY AIR DIFFUSER. TOP NUMBER X" DESIGNATES NECK SIZE AND BOTTOM NUMBER X DESIGNATES CFM.	CFM CUBIC FEET PER MINUTE CW DOMESTIC COLD WATER HWS DOMESTIC HOT WATER RA RETURN AIR	1. IN CONNECTION WITH THE ALTERATIONS TO THE EXISTING BUILDING, THERE WILL BE CERTAIN REMOVALS AND RELOCATIONS OF THE EXISTING MECHANICAL WORK NECESSARY FOR THE SATISFACTORY PERFORMANCE OF THE GENERAL WORK. THESE CHANGES CANNOT BE COMPLETLY DETAILED ON THE DRAWINGS, BUT SHOULD BE TAKE INTO CONSIDERATION BY THE CONTRACTOR IN PREPARING HIS PROPOSAL FOR THIS WORK. MECHANICAL CONTRACTOR		4. THE OWNER SHALL HAVE SALVAGE RIGHTS TO ANY ITEMS THAT ARE TO BE DEMOLISHED. ITEMS THAT & OWNER WISHES TO SALVAGE SHALL BE CAREFULLY REMOVED BY THE CONTRACTOR AND STORED IN A LOCAT BY THE OWNER. ALL OTHER ITEMS OF DEMOLITION SHALL BECOME THE PROPERTY OF THE CONTRACT AND SHALL BE REMOVED FROM THE SITE.
CFM	RETURN AIR REGISTER. TOP NUMBER XXX DESIGNATES SQUARE NECK SIZE AND BOTTOM NUMBER X DESIGNATES CFM. SUPPLY AIR / RETURN AIR GRILLE. TOP NUMBER XXX DESIGNATES FRAME SIZE SIZE AND BOTTOM NUMBER X DESIGNATES CFM.	SA SUPPLY AIR SF SQUARE FEET TYP TYPICAL OF VD VOLUME DAMPER S	SHALL VISIT AND EXAMINE CAREFULLY THE EXISTING AREAS AFFECTED BY THIS WORK TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND WITH DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. CONTRACTOR SHA PERFORM THIS, PRIOR TO SUBMITTING HIS PROPOSAL. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTLABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE. REFER ALL QUESTIONS TO THE A/E PRIOR TO BID FOR CLARIFICATION.	CLARIFICATION. ANY FIFLD DECISIONS BY THE PARTY OF BINDING.	 5. WHERE DEMOLITION WORK WILL INTERRUPT HVAC/PLUMBING SERVICE TO AREAS OF HE FACILITY THAT A TO REMAIN IN OPERATION, COORDINATE ANY INTERRUPTIONS WITH THE OWNER AT LET TWO WEEKS PRIOR ACCOMMODATE THE OWNER'S NEEDS AS REQUIRED. 6. IF HAZARDOUS MATERIALS (I.E. ASBESTOS, PCBs, ETC.) ARE ENCOUNTERED AT ANY THE WORK AREA, STOP WORK IMMEDIATELY AND CONTACT. THE OWNER.
L	VOLUME DAMPER				7. DE-ENERGIZE ALL EXISTING MECHANICAL EQUIPMENT FROM TO PERFORMING ANY DEMOLITION WORK.
MEC	HANICAL GENERAL NOTES	MECHANICAL SPECIFICATIONS			
STRIC EDITIO	MECHANICAL WORK SHALL BE PROVIDED IN OT ACCORDANCE WITH THE APPLICABLE	MECHANICAL INSULATION NSULATION	b. High Temperature Adhesive: PC @ HI-Temp RTV of vapor barrie and fittings. c. Joint Sealant: PITTSEAL 444N d. Coatings: PITTCOTE 300 (asphaltic mastic vapor barrier) PART 1 GENE 1.01 DESC	B. THE WOLLD	HALL BE SUCTION, VERTICATIONS AND SHALL SHALL MEET EPACT 92 REQUIREMENTS AND NEMA SPECIFICATIONS AND SHALL
NATIC	NAL FIRE PROTECTION ASSOCIATION NFPA 70 NATIONAL ELECTRICAL CODE NFPA 70E STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE NFPA 72 NATIONAL FIRE ALARM CODE	MECHANICAL INSULATION PART 1 GENERAL .01 DESCRIPTION OF WORK	e. Underground & Direct Bury System Waterproof Membrane Jacketing: PITTWRAP (125 mil heat sealable political price pric	A. THE MANUFACTURER SHALL BE FULLY CERTIFIED BY THE INTERNATIONAL STANDARDS ORGANIZATION PER ISO 9001. PROOF OF THIS CERTIFICATION SHALL BE FURNISHED AT TIME OF SUBMITTAL. ACTUAL OF SUBMITTAL. A. THE MANUFACTURER SHALL BE FULLY CERTIFIED BY THE INTERNATIONAL STANDARDS ORGANIZATION PER ISO 9001. PROOF OF THIS CERTIFICATION SHALL BE FURNISHED AT TIME OF SUBMITTAL. B. EACH PUMP SHALL BE FACTORY TESTED PER HYDRAULIC INSTITUTE STANDARDS PRIOR TO SHIPMENT AND SHALL CONFORM TO ANSI/HI 1.1 - 1.5 1994 SECTION 1.4.6.1.1 FOR RECOMMENDED ACCEPTABLE UNFILTERED FIELD VIBRATION LIMITS. C. ALL PUMPS SHALL BE OBTAINED FROM THE SAME MANUFACTURER A. THE MANUFACTURER SHALL BE FULLY CERTIFIED BY THE INTERNATIONAL STANDARD SOUTH STANDARD SHALL BE FULLY CERTIFIED BY THE INTERNATIONAL STANDARD SHALL BE FULLY CERTIFIED BY THE INTERNATION SHALL BE FULLY STANDARD SHALL BE FULLY CERTIFIED BY THE INTERNATION SHALL BE FULLY STANDARD SHALL BE FULLY STA	APPLICATIONS SHALL HAVE GALVANIZED DRIP PANS. ID CA HALL BE S OFF BY AN INTERNATION FLUSHED MECHANICAL CRANE 21 OR TYN WITH CERAMIC SEAL SEAT AND CARBON SEAL ABLE FOR TINUOUS OF ACTION AT 21 DEGREE F. THE SEALS AND SHALL BE ABLE OF BEING SERVIND WITHOUT DISCONNECTING THE PUMP PART 3 EXECUTION
2. COOF (DIFF ARCH	NFPA 101 LIFE SAFETY CODE RDINATE EXACT LOCATION OF CEILING DEVICES USERS, REGISTERS, AND GRILLES) WITH IITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS.	A. This Section includes of materials required for the insulation of all mechanical equipment. Locations of insulation and acoustical duct liner are specified in this Section. B. Related Work Specified Elsewhere: 1. Refer to Section 15010 and Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.	g. Outdoo Ve- Groun eting: 4.0.016-inch (0.41 m thickness h alumin and seals wilders Proc High Press/Temp.306-450 1.5 2.5 2.5 3 3.5 3.5	AMERICAN NATIONAL STANDARDS INSTITUTE/HYDRAULIC INSTITUTE 2 - ENERGY PROTECTION ACT OF 1992 A. SUBJECT TO COMPLIANCE WITH THE TOTAL PROTECTION ACT OF 1992 A. SUBJECT TO COMPLIANCE WITH THE TOTAL PROTECTION ACT OF 1992 A. SUBJECT TO COMPLIANCE WITH THE TOTAL PROTECTION ACT OF 1992 A. SUBJECT TO COMPLIANCE WITH THE TOTAL PROTECTION ACT OF 1992	A STUME BOX MECHANICAL SEAL DESIGN WITH LONGER SPAN BETWEEN 3.01 INSTALLATION
SHOV COOF FIELD	TIONS OF MOTORS AND EQUIPMENT AS VN ON THE DRAWINGS ARE APPROXIMATE. RDINATE EXACT LOCATIONS WITH INSTALLED CONDITIONS. TRATIONS OF FIRE RATED WALLS. CEILINGS &	under UL 723 not exceeding (unless otherwise specified):	Low Press/Temp201-250 1 1.5 1.5 2 2 3.5 Heating Hot Water120-200 0.5 1 1 1.5 1.5 1.5 1.5 D. NEMA gh-Corning lation FOAMGLA? Low Press/Temp201-250 1 1.5 1.5 2 2 3.5 Heating Hot Water120-200 0.5 1 1 1.5 1.5 1.5 1.5 D. NEMA Steam CondensateAny 1 1 1.5 2 2 2 2 1.03 SUBM erground bury in trench) piping, provide a document of the provided and provided a document of the provided and p	E. F. O. SVISION ALS ALS (3) AUF (1) ITT BELL & GOSSET CUES VSC (2) PACO (3) AUF	RINGS SHALL BE REGREASEABLE CAMLOCK BALL BEARING TYPE WITH PURGING OR FLUSHING THROUGH THE BEARING SURFACE, AND CAPABLE ISPECTED BY REMOVING THE BEARING COVERS. THE SHAFT SHALL BE OF 18-8 STEEL ON STANDARD MECHANICAL SEAL MODELS. LE TYPE, CENTER DROP-OUT DESIGN COUPLER, CAPABLE OF ABSORBING VIBRATION, SHALL BE EMPLOYED BETWEEN THE PUMP AND MOTOR. HALL BE SHIELDED BY A SUITABLE COUPLER GUARD SECURELY FASTENED TO C. PULL AND TRIM THE PUMP IMPELLER AFTER A PROPORTIONAL BALANCE HAS BEEN DONE BY THE BALANCE CONTRACTOR. HYDRONIC SYSTEMS SHALL BE BALANCED IN A MANNER TO FIRST MINIMIZE THROTTLING LOSSES; THEN THE PUMP IMPELLER SHALL BE TRIMMED. A BALANCE REPORT FROM THE INSTALLER SHALL BE FURNISHED TO THE CODE ENFORCEMENT OFFICIAL AND A COPY INCLUDED IN THE OPERATING AND MAINTENANCE MANUAL.
FLOO INTEG DEVIC SQUA LAYEI BOAR	RS SHALL BE SEALED TO MAINTAIN THEIR SRITY. FOR ONE HOUR FIRE RATED WALLS, CES THAT COVER A WALL AREA OVER 16 RE INCHES SHALL BE PROTECTED BY ONE R OF 5/8" THICK, FIRE RATED, GYPSUM D. FOR TWO HOUR RATED WALLS PROVIDE	Flamespread Smoke F 1. It is such as adhesive cements, and flame Lant cloth for fittings shall have the comporting as Led above. Comporting the comporting as comporting as comporting as comporting the co	pact insult of the provide and around piet and fittings as per the ufacturer's an additions and is a citions. Installation shall, when complete a class the intrusion of a ground water from entering the attion of the provide attions of the provide attion of the provide attions of the provide attion	(5) APP APP ED EQUAL	
TWO DEVICE BOAR REQUE 5. THE	LAYERS OF FIRE RATED GYPSUM BOARD. CES SHALL BE ENCLOSED BY THE GYPSUM D, INSTALLED WITH AUXILIARY FRAMING AS IIRED, TO MAINTAIN FIRE RATING OF WALL. CONTRACTOR SHALL PROVIDE COMPLETE AND	B. Prote and Handling of Materials. Section perglass insulation A. The induct line have been subjected to water age in whole or a cate such any time of collowing installation ceptable. So insulation important	OUTDOOR AIR HAND TION/APPLICATION/PERFORMANCE ERECTION Chilled Water 40-55 3/4 1 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	AND FIELD-INSTAL STRUCTURAL INTEGRAL REFRAME IN THE SAME MANNER AS PANELS, ROOF, AND SHOWN OF PORT MOTOR ELEC. FLOORS. STRUCTURAL SUPPORT CHANNELS. THESE CHANNELS SHALL SPAN THE AHL FLOOR AND FLOORS. MOLINT DIRECTLY OT THE AHL FLOOR AND MOLINT DIRECTLY OT THE AHL SHALL SPANE.	IGITAL
ON T ARE ARRA 6. THE	CONTRACTOR SHALL COORDINATE THE	shall be reministed in any position of the heating surface in the completed Work and in any position of the Owner. PART 2 PRODUCTS B. Install 1.	ng surfaces and piping shall not be applied until such times as those ces are sufficiently heated to properly dry out the insulation. ation shall not be applied until the system is tested as required. d. Plumbing Systems. Insulation shall be fiberglass or flexible elastomeric, Type 1 or 2, thickness as scheduled below. Ilation: Wherever vapor barriers are specified, all portions of the covering at joints and filtings shall be vapor sealed. B. VARIABLE FREQUENCY DRIV. 1.02 RELATED SECTIONS A. THE REQUIREMENTS OF THE CONDITIONS, SUPPLEMENTS OF THE	HARACTERISTICS. DELIVERY, STORAGE AND G SOUTH ASH TO EASH OF A STRUCTURERS NOT COMPLYING WITH SELECT OF THE ARM SOUTH OF THE	PROVIDE CLASS YOR CLASS THE TEN MEDIA FER U.L. 900 AND AS REQUIRED BY LOCAL TIONS CODES. NALUG E. FILTER TYPES, EFFICIENCIES, AND NOMINAL DEPTHS SHALL BE AS FOLLOWS: TRAINING SHALL INCLUDE AHU CONTROLS, DEPTHS SHALL BE 24"X24". C. TRAINING SHALL INCLUDE STARTUP AND FLOATING FLOATING E. FILTERS - MERY 11A BAG FILTERS. MOTOR STARTER, YFD, AND AHU. TRAINING SHALL INCLUDE STARTUP AND SHUTDOWN PROCEDURES AS WELL AS FLOATING BE 24"X24" WITH A MAXIMUM CLEAN BE QUIREMENTS. B. PROVIDE A MINIMUM OF 4 HOURS OF TRAINING FOR OWNER'S PERSONNEL BY MANUFACTURER'S FACTORY-TRAINED AND FACTORY-EMPLOYED SERVICE TECHNICIAN. TRAINING SHALL INCLUDE AHU CONTROLS, MOTOR STARTER, YFD, AND AHU. TRAINING SHALL INCLUDE STARTUP AND SHUTDOWN PROCEDURES AS WELL AS REGULRA OPERATION AND MAINTENANCE REGULRA OPERATION AND MAINTENANCE REQUIREMENTS.
TRAD AVOIE TO P BEING	IANICAL WORK WITH THE WORK OF ALL OTHER ES AND EXISTING CONDITIONS SO AS TO CONFLICTS PRIOR TO ROUGH—IN. FAILURE ROVIDE SUCH COORDINATION PRIOR TO WORK S INSTALLED SHALL NOT BE CAUSE FOR TIONAL COMPENSATION TO THE CONTRACTOR.	A. Tape. Tape used for sealing purposes, shall be of the nonconductive type and applied as recommended by the covering manufacturer. Where recommendation is lacking, tape used shall be sealed with 3M adhesive EC-1329. B. Insulating Cement. Insulating cement shall be Owens-Corning 110 mineral wool, all purpose cement. Where insulating cement is applied to	unless otherwise specified, or shown. Where insulation is to be painted, all surfaces shall be properly prepared to receive paint. (See Section 09900, PAINTING.) Insulate unions, flanges, and valve bodies but not operating bandwheels or levers TESTING OR RATING AMCA 50 T METHODS SHUTTEP D. AMCA 61 AMCA	APP. ND ON-SITE APP. ND ON-SITE DEFLECTION AT PANEL MIDPOINT. K. PROVIDE OUTDOOR AHUS WITH A ROOF SYSTEM THAT DEFLECTS NO MORE THAN D LY240 WHEN SUBJECTED TO A SNOW LOAD OF SONS FOR UNLOADING AND FATIGUE D. PROTECT, PA. ECURE LOOSE-SHIPPED INTERMS	ABLE) a. PERFORMANCE OF INSTALLED FACTORY-MOUNTED VARIABLE FREQUENCY LLINCLUDE 2 FILTRATION SYSTEM SHALL BE DRIVE (VFD), HIRE THE VFD CLASSIFIED AS UL CLASS I WHEN CLASSIFIED AS UL CLASS I WHEN FACTORY-MOUNTED VARIABLE FREQUENCY MANUFACTURER'S FACTORY-TRAINED AND FACTORY-MOUNTED VARIABLE FREQUENCY DRIVE FACTORY-MOUNTED VARIABLE FREQUENCY MANUFACTURER'S FACTORY-TRAINED AND FACTORY-MOUNTED VARIABLE FREQUENCY DRIVE FACTORY-MOUNTED VARIABLE FREQUENCY DRIVE FACTORY-MOUNTED VARIABLE FREQUENCY DRIVE FACTORY-MOUNTED VARIABLE FREQUENCY MANUFACTURER'S FACTORY-TRAINED AND FACTORY-MOUNTED VARIABLE FREQUENCY MANUFACTURER'S FACTORY-TRAINED AND FACTORY-MOUNTED VARIABLE FREQUENCY DRIVE FACTORY-MOUNTED VARIABLE FREQUENCY DRIVE FACTORY-MOUNTED VARIABLE FREQUENCY MANUFACTURER'S FACTORY-TRAINED AND FACTORY-MOUNTED VARIABLE FREQUENCY FACTORY-
SUITA SHAL THIRI	MATERIALS SHALL BE NEW, SHALL BE ABLE FOR THE APPLICATION INTENDED, AND L BEAR LABELS OR MARKINGS INDICATING D PARTY TESTING AND/OR LABORATORY NGS ACCEPTABLE TO THE GOVERNMENT.	C. Fiberglass Pipe Insulation. 1. Insulation shall be a one-piece type made from long glass fibers bonded with a thermosetting resin molded into a hollow cylinder and jacketed with a kraft-reinforced foil all-purpose vapor barrier jacket (APJ). The jacketing shall have a factory applied double pressure-sensitive adhesive system, which provides positive closure and vapor sealing of the longitudinal joint. Provide circumferential 10.	manufacturer's instructions. The insulation shall be handled in a manner that will not adversely affect its structural or insulating properties. Support shall be provided for the insulation on vertical lines to prevent the insulation from slipping downward. Care shall be taken so as not to place insulation over vent and drain inlets and outlets. Underground refricerant piping shall be backfilled with a minimum SySTEM L O.5 C. 5 O.5 ARI 260 - SOUND RATING AND CONDITIONING CONDITIONING AND RATING CONDITIONING AND RATING CENTRAL VAIVES and fitting jackets. a. Valves and a shall be as schedu. V. SySTEM N JACKET N JACKET PARTICLE OF	APPLICATION. END PANELS BY A MINIMUM OF 2.* PROTECT, PACK AND SECURE CONTROLS DEVICES, MOTOR CONTROL DEVICES AND OTHER ELECTRONIC EQUIPMENT. DO NOT OTHER ELECTRONIC EQUIPMENT IN WET OR DAMP AREAS EVEN WHEN THEY ARE SEALED AND SECURED. TESTING AND SECURED. ENCY BY ELECTRONIC OF PNEUMATIC DEVICES, AND VARIABLE FREQUENCY DRIVES; AND PACK WHEN SUBJECTED TO ASTM B1417 500 HOUR, SAUTH SPRAY CONDITIONS. THIS IS EQUIVALENT TO AN ASTM D1654 RATING OF SITCH SECURITY OF THE SEALED OF A SCRIBED LINE SWEAT SPRAY CONDITIONS. THIS IS EQUIVALENT TO AN ASTM D1654 RATING OF SITCH SECURITY OF THE SEALED AND SECURED. BEARINGS AND DRIVES 1. PREMAGNETIZATION ON STOP PRESSURE 1. PREMAGNETIZATION ON STOP PRESSURE 2. LIDICAL FRANCE HANS OF FOTAL STATIC METABOLISM AND SPROVIDE THE FOLLOWING FUNCTI METABOLISM AND SECURED. SEALED TRANSPORT OF THE FOLLOWING FUNCTI METABOLISM AND SECURED. AND SECURED. SEALED TRANSPORT OF THE FOLLOWING FUNCTI METABOLISM AND SECURED. AND SECURED. SEALED TRANSPORT OF THE FOLLOWING FUNCTI METABOLISM AND SECURED. SEARINGS OMPLYING WITH AN AVERAGE UIFE LSO OF AT LEAST 200,000 HOURS. B. PROVIDE BEARINGS OF FORWARD CURVED FANS BANDS STATE FUNCTION SHALL INV. RAMP, FLYING START, AUTHORS C. PROVIDE PERMANENTLY LUBRICATED BEARINGS ON FORWARD CURVED FANS	TONS: F. PROVIDE A DWYER MAGNEHELIC, FLUSH MOUNTED, FACTORY INSTALLED DIFFERENTIAL PRESSURE AGGE ON THE DRIVE SIDE OF UNIT TO MEASURE PRESSURE DROP ACROSS FILTERS. MANUFACTURER SHALL PROVIDE FULLY PUNCTIONAL CICLUDE 2.17 DAMPERS CICLUDE 2.17 DAMPERS A. PROVIDE DAMPERS TESTED IN ACCORDANCE SMACL SOLVED TO ACCORDANCE DAMPERS ANY PROBLEMS FOUND AND REMEDIES PERFORMED. PROVIDE AHU STARTUP REPORT AND VFD PROGRAMMING PARAMETERS TO OWNER IN O&M MANUAL BINDER. CLEAN INITIATIENTOR PRIOR TO OPERATING. REMOVE TOOLS, DEBRIS, DUST AND DIRT. CLEAN EXTERIOR PRIOR TO TRANSFER TO
8. COOF WITH ELEV/ PRIO	RDINATE LOCATIONS OF MECHANICAL DEVICES ARCHITECTURAL DRAWINGS, DETAILS, ATIONS, EQUIPMENT AND FURNITURE LAYOUTS R TO ROUGH—IN.	accordance with the manufacturer's recommendation. 11.	Cellular Glass Insulation Installation. a. For systems operating below 35 degrees F. (2 degrees C.) seal all joints with a low permeability joint sealar systems operating from 35 to 400 degrees F. (2 to degrees C.) joint sealant is not required unless installation is direct buried. When multiple layers of insulation are required stagger joints between layers, joint sealing all sections Or Premolded Cover Hot Water L. All Expos. Premolded Cover BUILDINGS BUIL	BAGS EVERY 60 DAYS. FOR EQUIPMENT STORED IN AN ENVIRONMENT WITH A STORE BAGS EVERY 30 DAYS. DO NOT CHANGE BAGS EVERY 30 DAYS. DO NOT STORE EQUIPMENT IN WET OR DAMP AREAS COLOR AND HUMIDIFIERS BALL SECURCE SECURED. COLING COILS AND HUMIDIFIERS SHALL SET THE REQUIREMENTS OF ASHRAE 62. DAMAGE DURING SHIPPING, HANDLING AND DAMAGE DURING SHIPPING, HANDLING AND DRAWINGS. STORAGE. BAGS EVERY 60 DAYS. FOR EQUIPMENT STORE EQUIPMENT STORE EQUIPMENT STORE EQUIPMENT IN WET OR DAMP AREAS COMPLY WITH THE STATED INTENT OF HYDRAULIC GREASE FITTINGS LINES STRENDED TO THE MOTOR SIDE OF THE COLOR ASHRAE STANDARD 62. PROVIDE A DRAIN PAN HONDER EACH COOLING (PRIMARY ACCESS SIDE). PROVIDE DRIVES SELECTED WITH A 1.5 SERVICE FACTOR SHEAVES SHALL BE AND LIGHTS. PROVIDE SWITCHES ON DRAWINGS. ON DRAWINGS. DAMAGE DURING SHIPPING, HANDLING AND DRAWINGS. AND STATICALLY BALANCED BY THE B. PROVIDE FLUORESCENT LIGHTS IN	DAMPERS SHALL HAVE AIRFOIL BLADES, AS SECTION OF EACH OWNER'S PROJECT SYSTEM MANUAL. B. PROVIDE FACTORY-INSTALLED DAMPERS, AS SHOWN ON DRAWINGS. C. DAMPERS SHALL HAVE AIRFOIL BLADES, AS EXTRUDED VINYL EDGE SEALS, AND SECTION OF EACH UNIT. PROVIDE INSTALLATION, OPERATION & MAINTENANCE MANUALS IN THE SUPPLY FAN SECTION OF EACH UNIT. PROVIDE SIX ADDITIONAL COPIES FOR OWNER'S PROJECT SYSTEM MANUAL. CECEPTACLES D. DAMPERS SHALL HAVE A MAXIMUM SYSTEM MANUAL. LEAKAGE RATE OF 4 CFM/SQUARE FOOT AT 1" SYSTEM MANUAL. IN SEGMENTS E. DAMPER BLADES SHALL BE PARABLI BE PARABL
REQU EQUIF PROV DISCO INSTA	CONNECTIONS SHALL BE PROVIDED AS IJRED FOR ALL ELECTRICALLY POWERED PMENT, WHERE NOT INDICATED AS BEING IJDED WITH THE EQUIPMENT, ALL REQUIRED DINNECTING MEANS SHALL BE FURNISHED AND ALLED AS A PART OF THE MECHANICAL WORK. RDINATE LOCATIONS OF ALL EQUIPMENT AND	D. Fiberglass Duct Wrap Insulation. Insulation shall consist of an inorganic blanket of glass fiber, factory-laminated to a [reinforced foil kraft (FSK) vapor barrier facing] [Class 1 vinyl (white) (grey)]. A 2-inch (50 mm) stapling and taping flange shall be provided on one edge. Physical Properties.	the outermost layer. Secure all layers (one of mass with fiberglass reinforced tape. On multiple layer is lons, the outermost layer shall be secured with suit of the property outermost layer shall be secured with suit of the property of t	RAIN AND ROAD DEBRIS DURING SHIPPING. UCTION	HEDULED OR F. DAMPER BLADES SHALL BE GALVANIZED STEEL OR ALUMINUM, AS SCHEDULED. 2.18 DIFFUSERS A. PROVIDE DIFFUSER SEGMENTS AS SHOWN ON DRAWINGS. BY AHU E NOTED IN B. DIFFUSER PLATES SHALL ENSURE PROPER AIR FLOW ACROSS COMPONENTS DOWNSTREAM OF DWDI FANS.
ASSO MEAN CODE	CIATED DISCONNECTING AND CONTROLLING IS WITH EQUIPMENT INSTALLER TO MAINTAIN TO AND INSTALLATION REQUIREMENTS. DUCTWORK SHALL BE CONCEALED IN FINISHED ES, AND MAY BE INSTALLED EXPOSED IN	 a. Operating Temperature Range: 40 to 250 degrees F. (5 to 121 degrees C.). b. Density: 0.75 lb/cu. ft. (12 kg/cu. m). c. Thermal Conductivity: 0.30 BTU-IN/hr-sq. ft deg. F. (0.043 watt/m-k). d. Facing Water Vapor Permeance: 0.02 perms max. for FSK, 1.3 perms max for vinyl. 3. Manufacturer's Insulation shall be Certainteed, Knauf, 	Insulation of fiberglass level tape if a medic et system is a control of fiberglass level tape if a medic et system is a control of fiberglass level tape if a medic et system is a control of fiberglass level tape if a medic et system is a control of fiberglass level tape if a medic et system is a control of fiberglass level tape in the fiberglass level tape in t	SOUND POWER IN ADDITION TO THE FACTORY-INSTALLED SET. IN ADDITION TO THE FACTORY-INSTALLED SET. IN ADDITION TO THE FACTORY-TRAINED AND PROVIDE WARRANTY FOR 18 MONTHS FROM DATE OF SHIPMENT. WARRANTY SHALL NG. MINIMUM OF WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF FACTORY-EMPLOYED TECHNICIAN, SERVICE MINIMUM OF FACTORY-EMPLOYED TECHNICIAN, SERVICE MINIMUM OF TECHNICIAN WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF TECHNICIAN WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF TECHNICIAN WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF TECHNICIAN WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF TECHNICIAN WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF TECHNICIAN WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF TECHNICIAN WARRANTY WORK SHALL BE PERFORMED BY CASING, COIL SUPPORT OR ANY OF SIGNING, MINIMUM OF TECHNICIAN WARRANTY SHALL COIL OR HUMIDIFIER. A. PROVIDE FAIN WARRANTY OR ANY OF SIGNING. PROVIDE FAIN WARRANTY OR ANY OF SIGNING. DESIGNING, MINIMUM OF THE PEAN WARRANTY OR ANY OF SIGNING. PROVIDE AND WARRANTY OR ANY OF SIGNING. PROVIDE ANY OF SIGNI	DE COILS A. PROVIDE RAIN HOODS AND BIRD SCREENS ON OUTDOOR UNIT AIR INTAKES, AS SHOWN ON ANDARD 410 DRAWINGS. PROVIDE MOISTURE SCREENS ON OUTDOOR AIR INLET RAIN HOODS. HI THAT THE B. PROVIDE SAFETY GRATES OVER BOTTOM OPENINGS, AS SHOWN ON DRAWINGS. IDITIONS AT 1. SAFETY GRATES SHALL BE CAPABLE OF SUPPORTING A 300 LB. CENTER LOAD. MAXIMUM 2.0 FINISHES
ELEC' OTHE 11. ALL I BY M	EQUIPMENT SHALL BE SECURELY FASTENED IEANS OF ANCHORS, RODS, HANGERS,	Johns-Manville, or Owens-Corning. E. Fiber Glass Semi-Rigid Board Insulation 1. Board Form. a. Insulation shall be made from inorganic glass preformed into boards bonded by a thermost sin, and furnished with an All-Service Jacket (ASJ) control of a	Install & collass insulation of in accordage with the anufaction and guideline. Find Valves. a. Pipelines (above 60 degrees F) and egrees C.). ges, couplings, valves, apart is, and fittings shall be lated with factory preparated by the factory preparated of field in the same material and condensate Return All Interior Tape and Adhesive Condensate Return All Interior Tape and Adhesive And Pumped And Pumped And Pumped And Pumped And Pumped And Pumped All Interior Tape and Adhesive All Interior Tape and Adhesive C. If EQUIPMENT IS SUPPLIED	MILES OF JOB SITE. SCHEDULES B. INCLUDE FACTORY-PROVIDED CONTROLS IN IS BASED THE PARTS AND LABOR WARRANTIES. TWO PLANES BY A IAW PROVIDE TOOM IN AT LEAST TOWARD A SINGLE LOCATE DRAIN CONNECTION AT T EST POINT OF THE ARTS SHALL BE EXCLUDED. A. DO NOT OPERATE UNITS FOR ANY PURPOSE, A. PROVIDE ACCESS DO OR BACH SECTION DIVIDITIONS HALL BE BASED OF CHARACTERISTICS: CHARACTERISTIC	EXTERIOR SURFACES OF UNITS PRIOR TO AN THAT IS FINISHING, PAINTING, OR SHIPMENT. MUM OF 6' WINTS PRIOR TO SHIPMENT. THE COIL. TO PRIMER PRIOR TO PAINTING UNITS. SEGMENTS POLYURETHANE PAINT.
MAIN MOVE ZONE APPR	PORTS, GUIDES, SWAY BRACES, ETC., TO TAIN ALIGNMENT AND PREVENT EQUIPMENT EMENT. ALL EQUIPMENT LOCATED IN SEISMIC ES SHALL BE SECURED WITH MEANS EDVED FOR THE SEISMIC CLASSIFICATION OUNTERED.	reinforced white kraft calluminum foil laminate extraft facing of Lproperties. 1) remperature Lim. 0 degrees F. (232 degres). C.). 2) Density, 3 lbs/cu. ft. (100 J. m.). 3) Thermal conductivity, 0 J-IN/hr-sq. ft degrees. (24 degree)	of insulation e used, elbows shall be provided with not less than the segments. When nesting size sections of the used, all voids shall be filled with insulating to the insulation are used, all voids shall be filled with insulating to the insulation shall be sections of insulation shall be sections of insulation shall be sections with adhesive. Adhesive shall be applied over the insulation in two coats with tape embedded between coats. Tape shall overlap itself 1 inch (25 mm) and adjoining insulation jacket 2 Condensate All Exterior Tape and Adhesive Subcontractors to ENS USBCONTRACTORS TO ENSURE IN TAPE and Adhesive With Aluminum Jacket SHALL INCLUDE (BUT IS NOT FOLLOWING: Tape and Vapor Barrier Tape and Vapor Barrier Tape and Vapor Barrier 1. STRUCTURAL SUPPOR ENSURED TO ENSURE ENSURE ENSURED TO	BEARINGS LUBRICATED, AND FAN HAS BEEN TEST RUN UNDER OBSERVATION. THE SPECIFIED DOOR SHOULD BE OF ADE THE SECTIONS, AND A FAN. THE SPECIFIED DOOR SHOULD BE OF ADE THE SECTIONS, AND A FAN. THE SPECIFIED DOOR SHOULD BE OF ADE THE SECTIONS, AND A FAN. THE SPECIFIED DOOR SHOULD BE OF ADE THE SECTIONS, AND A FAN. THE SPECIFIED DOOR SHOULD BE OF ADE THE SECTION BE OF ADETTHE SECTION BE OF ADETT	SS BETWEEN SOU-HOUR SALT SPRAY SOLUTION (5%)
PENE FIRE SEALI APPR CONS	TIDE CORE DRILL HOLES FOR MECHANICAL TRATION AS REQUIRED. ALL PENETRATIONS OF OR SMOKE RATED CONSTRUCTION SHALL BE ED WITH FIRE—STOPPING MATERIALS ROVED AND LISTED FOR THE RATING OF THE STRUCTION TO BE PENETRATED. PROVIDE	meability, con shall be consolered. Knauf Insulation B cohns-Manville 800 Series Spin-Glass, or Owr corning 700 Series. 2. Flexible Forms. a. Insulation shall be consolered of high temperature fiberglass bonded to a flex coket with the engagin of the Insulation perpendice placket surface this construction shall at of high consessive strength while	inches (50 mm). In lieu of above finish, factory-premolded one-piece polyvinyl chloride fitting covers shall be used, where specified hereinafter. Polyvinyl chloride fitting covers shall be secured by permaweld, tack fastening, banding, or staping. When polyvinyl chloride fitting covers are used, factory precut blanket inserts provided by the fitting cover manufacturer may be used. Inserts shall be installed in accordance with the fitting manufacturer's recommendations. When proquited insulated florages couplings valves are byte.	ARE NOT ACCEPTABLE. ARE NOT ACCEPTABLE. D. PROVIDE EACH DOOR WITH A SINGLE HANDLE LINKED TO MULTIPLE LATCHIN STING OR STING OR SING AND CONTROLS, COILS, FILTERS RS, CONTROLS, COMPONENTS, AS CONTROLS, COMPONENTS, COMPONENTS, AS CONTROLS, COMPONENTS, COMPONEN	IS, SPACE ASSEMBLIES FROM 10% TO 100% OF DESIGN RPM. 3. TAKE FILTER-IN MEASUREMENTS IN THE HORIZONTAL AND VERTICAL AXES S ON EACH ON THE DRIVE AND OPPOSITE-DRIVE SIDES OF FAN SHAFTS. S. ON EACH SIDES OF FAN SHAFTS. S. 4. TAKE FILTER-OUT MEASUREMENTS IN UPPORT THE HORIZONTAL, VERTICAL, AND RE TO AXIAL AXES ON THE DRIVE AND
SEALI INSTA 13. ALL FOUN	IMENTATION ON ALL SUCH PENETRATION ING SYSTEMS FOR VERIFICATION OF PROPER ALLATION. PENETRATIONS OF ROOFS, EXTER IDATIONS, OR OTHER OF STURE OF CONSTRUCTIONS OF SHALE SEAL WITH	with insulation of conform to rounded surfaces without reducine of unickness. Jacket shall be a laminated kraft aluming foliall service jacket (ASJ) with vapor barrier. b. Physical roperties. 1 emperature limit, to 650 degrees F. (343 degrees C.). Density, 3 lbs/cu. ft. (48/cu. m.) 3) Thermal conductivity, 0.27 BTU-IN/hr-sq. ft deg. F. (.039 wat/m-k) at 75 degrees F. (24 degrees C.).	When required, insulated flanges, couplings, valves, anchors, and fittings shall be covered with preformed or field-fabricated sections of aluminum jacket secured with bands in lieu of finishes specified above. When pipe insulation with factory-applied aluminum jacket is provided, flanges, valves and fittings may be insulated with factory or field fabricated sections of the same material and thickness as adjoining pipe insulation and jacket. Sections shall be secured with bands. Unless otherwise shown, unjons will not be insulated and D. Chilled water valves shall be covered with antibudated box with a removable top which will permit valve operation when it is removed. Box shall be constructed of rigid insulation and vapor barrier equivalent to that specified for pipe. A label, responsible FOR COSTS I GENERAL CONTRACTOR, SL AND CONSULTING ENGINERY EVALUATION ENGINEER OF COSTS I GENERAL CONTRACTOR, SL AND CONSULTING ENGINERY EVALUATION EVALUA	R SHALL BE INCLUDING AIRFLOW, STATING THE SAME THERMAL PERFORMANCE AS RECEION AND WIRE VFD TO MOTOR, UNLESS IN A NEMBASE RAIL AND/OR ROOF CURB. ACCESS SIDE OF ITS ASSOCIATED FAN SECTION AND WIRE VFD TO MOTOR, UNLESS IN A NEMBASE RAIL AND/OR STACKED COOLING COILS, INTERNOTING COPY IN A NEMBASE RAIL AND/OR STACKED COOLING COILS, INTERNOTING COPY IN A NEMBASE RAIL AND/OR PERFORMANCE. ACCESS SIDE OF ITS ASSOCIATED FAN SECTION AND WIRE VFD TO MOTOR, UNLESS IN THE SIDE OF THE AHU. SECTION AND WIRE VFD TO MOTOR, UNLESS IN THE SIDE OF THE AHU. PROVIDE AN INTERMEDIATE DRAIN STACKED COOLING COILS, INTERNOTING COILS, INT	OVABLE LIMITS: FILTER-IN MEASUREMENTS SHALL NOT EXCEED 4 MILS. N PAN ON FILTER-OUT MEASUREMENTS SHALL MEDIATE NOT EXCEED 6 MILS IN THE HORIZONTAL AND VERTICAL AXF DORAIN AND 7 MILS IN THE AXIAL AXIS. 6. VARIABLE SPEED FAN VIBRATI FINNED SHALL NOT FOR AND 7 MILS. LIMITS: FILTER IN MEASUREM SHALL NOT FOR AND 7 MILS.
APPR	COPRIATE SEALING ITTING RESEARCH ESTRUCTION TO PHOENT THE POLITION OF TURE TO THE ELDING. PREVIOUS TROONN INJURY AND TIAL EM IN L. MECH. CAL WORK SHOUSE	4) Water Vapor permeability, 0.02 perm-inch (jacket). 3. Manufacturer's Insulation shall be Knauf Flex-Wrap, Johns-Manville Pipe and Tank Insulation, or Owens-Corning Pipe Wrap Insulation. F. Exterior Pipe Insulation Jackets. Aluminum jacket shall be 0.016 inches (0.406 mm) thick, Type 3003 or 5005 alloys, with 3/16 inch (4.76 mm) longitudinal or circumferential corrugations. Jacket shall have an acceptable factory-applied vapor barrier on the inside and shall be applied	b. Cold pipelines, (-30 to +60 degrees F.) (-34 to 15 degrees C.). Flanges, couplings, unions, valves, anchors and fittings unless otherwise shown shall be insulated with factory premolded, prefabricated or field fabricated sections of insulation of the same material and thickness as the adjoining ductwork shall be insulated similar to rigid ductwork. b. Duct insulation shall have a 2" overlap at edges and be sealed with glass fabric and mastic. SYSTEM LOCATION INSULATION FORM Supply Air Heating Concealed Fiberglass Flexible Duct Wrap N/A Flexible Duct Wrap N/A Flexible Duct Wrap N/A AAR HANDLING UNIT SAFETY B. ARRHOS AND CARITOR A. AR HANDLING UNIT SAFETY B. ARRHOS AND CARITOR 90.1 C. HANGLING UNIT CERTIFI FROGRAM: ARI 430 FROGRAM: ARI 430 FROGRAM: ARI 430 OR CLASS II OR CLASS II OR CLASS II AND CORD INSULATION FORM Supply Air Heating Concealed Fiberglass 1-1/2 inch (40 mm) FROM COLES ARI 410 OR CLASS II AR HANDLING UNIT CERTIFI FROGRAM: ARI 430 OR CLASS II OR CLASS II AR HANDLING UNIT SAFETY 1-1/2 inch (40 mm)	D. PROVIDE INTEDED COMPONENTS AND D. PROVIDE A MINIMUM PIPE CHASE DEPTH, AS ACCESSORY AS SPECIFIED AND SCHEDULED. E: ASHRAE E: ASTER UNIT INSTALLATION, VFD SHALL BE E: ASTRE	WITH A NOTION: AND B. MAN C. HIPOT TEST WIRING COLLS WITH A 141." COUGH AHU GOED GOED GOED GOED GOED GOED GOED GOED
COI FROM SERV PERF OWNE	RE WOO ON THE SYSTEMS WILL PLAUIRE RUPTIC OF ML SERVICE STOR HALL RE WRITTEN PROVAL OF FOR ANY DISPLATION OF ICE FACILITY, ALL WORK SHALL BE ORMED OF HOURS APPROVED BY THE	using aluminum straps over transverse joints. Corrugations shall match from one section of cover to the other. On vertical runs upper cover shall lap over lower cover and seams shall be toward walls, horizontal seams shall be on the bottom of the run. Fitting and valve jackets shall be factory fabricated and of the same material as the pipe jacket. G. Premolded Pipe Fitting Covers. Covers shall be factory-premolded one-piece polyvinyl chloride (PVC). Covers shall have a snow-white finish and shall withstand surface operating temperatures from 0 to 150 degrees	pipe insulation. Insulation on valve packages in room-fan-coil units may be omitted where the units are provided with auxiliary drain or drip pans under the valving. Anchors, when secured directly to the pipe shall be insulated for a distance to prevent condensation, but not less than 6 inches (150 mm) from the surface of the pipe insulation. Insulation and vapor barrier shall be extended to cover glands and stem completely. When segments of insulation are used, elbows Supply Air Heating Exposed Fiberglass Flexible Duct Wrap FLEXIBLE And Cooling 1-1/2 Inch (40 mm), vlnyl faced 1-1/2 Inch (40 mm), vlnyl faced 1-1/2 Inch (40 mm) Fiberglass Flexible Duct Wrap 1.06 SUBMITTAL DOCUMENTATION A. FURNISH FAN PERFORMANCE Uncooled or 1-1/2 Inch (40 mm) 1.07 SUBMITTAL DOCUMENTATION A. FURNISH FAN PERFORMANCE FOR CONTROL WIRNS: NEC COE REQUIREMENTS: NEC CO	REFERENCED IN THIS SPECIFICATION. B. MANUFACTURERS WHO DO NOT COMPLY INSTALLATION. B. MANUFACTURERS WHO DO NOT COMPLY ARE COLUBBLY INSTALLATION. B. MANUFACTURERS WHO DO N	COOLING OR VENT FUB OUT WITH A PERFORMED PER T CIFICATION
ALL OURII FOR FOOTH	MECHANICA WORK SHALL BE PERFORMED NG DE ENERGIZED EQUIPMENT CONDITION.	and shall withstand surface operating temperatures from 0 to 150 degrees F. (-18 to 65 degrees C.) continuous usage. Covers shall be Ceel-Co Series 550 PVC, Certainteed "snap-form" or Zeston 2000. H. Cellular Glass Insulation. 1. Insulation shall be of a lightweight, inorganic, all-glass, closed-cell structure containing no binders or fillers, conforming to ASTM C552 (Type II), and shall be suitable for piping and equipment above ground, underground, indoors and outdoors. Insulation shall be	shall be provided with not less than three segments. When nesting size sections of insulation are used. All voids shall be filled with insulating cement or mineral fiber. Sections of insulation shall be secured in place with wire or by joining the sections with adhesive. Vapor barrier coating shall be applied over the insulation in two coats with glass tape embedded between coats. Tape shall overlap itself one inch (25 mm) and adjoining insulation jacket 2 inches (50 mm). The coating shall be applied to a total dry film thickness of not. Uncooled or 1-1/2 Inch (40 mm) Inheated Space Return Air Concealed or NONE N/A Exposed in Cooled Concealed or NONE N/A Exposed in Cooled Concealed or NONE N/A Exposed in Cooled Co	DISCHARGE AND RETURN AIR SOUND SHALL SUBMIT EACH UNIT TO AN INDEPENDENT AND CURB SOUND TEST LABORATORY FOR ARI 260 TESTING. THE TEST LABORATORY SHALL CONFORM TO ARI 260, SECTION 4.4, TEST EQUIPMENT AND FACILITIES. SHOWING EQUIPMENT AND FACILITIES. SHOWING EQUIPMENT AND FACILITIES. A. PROVIDE A STRUCTURAL BASE RAIL UNDER THE FULL PERIMETER OF THE UNIT, FORMED B. AIRFOLE FANS SHALL COMPLY WITH AMICA SHOWING. TERIALS, A. PROVIDE A STRUCTURAL BASE RAIL UNDER THE FULL PERIMETER OF THE UNIT, FORMED B. AIRFOLE FANS SHALL COMPLY WITH AMICA SHOWING. B. AIRFOLE FANS SHALL COMPLY WITH AMICA G. OUTPUT VOLTAGE DATA G. PROVIDE WORD ANALLING STRIP TO WHICH DATA G. MOTOR CURBE. G. A. OUTPUT FREQUENCY (Hz) BURNISHED, W	TESTING, BALANCING, AND AMMISSIONING PROVIDE SECOND COMPLETE SET OF FUNS AT TIME OF TRANSFER TO OWNER. F. INSTALL AHU PLUMB AND LEVE ONNECT PIPING AND DUCTWORK ACT ONNECT PIPING AND DUC
PROF IN CO 20-C HEAL	PER PERSONAL PROTECTION EQUIPMENT (PPE) DMPLIANCE WITH THE OSHA STANDARD CFR, PART 1910 OCCUPATION SAFETY AND TH STANDARDS, 191 SUB PART S CTRICAL) AND NFPA 70E.	vermin-proof. 2. Physical Properties. a. Operating Temperature Range: -450 to +900 degrees F. (-267 to +482 degrees C). b. Thermal Conductivity: 0.29 BTU-IN/hr-sq. ftdeg. F. (0.041 watt/m-k) at 75 degrees F. (24 degrees C). c. Water Vapor Permeance: 0.000 perm. inch. (completely impermeable).	less than 1/16 inch (1.6 mm). In lieu of the above vapor barrier coating, factory-premolded one piece polyvinyl chloride fitting covers may be used, where specified hereinafter. Polyvinyl chloride fitting covers shall be secured by permaweld, tack fastening, banding, or taping with vapor barrier tape. Staples or tacks and fittings cover edges shall be sealed with vapor barrier coating, in accordance with the Suppl/Return Air Unheated Space or Mech Rooms Unheated Space or Mech Rooms D. FURNISH OPERATION AND MAI DATA, INCLUDING INSTRUCTION LUBRICATION, FILTER REPLACE AND DRIVE REPLACEMENT, AN CONDENSATE PAN CLEANING; LISTS, AND WIRING DIAGRAMS 1-1/2 Inch (40 mm) E. ADJUST AND REPORT PERFOR FOR THE PROPER ALTITUDE O FOR THE PROPER AL	RANCE FROM MILL GALVANIZED STEEL. STANDARD 99 2408 69 AND 99 2401 82. STANDARD 99 2408 69 AND 99 2408 69 AND 99 2401 82. STANDARD 99 2408 69 AND 99 2408 69 AND 99 2401 82. STANDARD 99 2408 69 AND 99 2408 69 AND 99 2401 82. STANDARD 99 2408 69 AND 99	TUBES WITH SS. 3.02 FIELD QUALITY CONTROL A. STORE PER AHU MANUFACTURER'S WRITTEN RECOMMENDATIONS. STORE AHUS INDOORS OR RED IN A WARM, CLEAN, DRY PLACE WHERE UNITS TUBES WILL BE PROTECTED FROM WEATHER, CONSTRUCTION TRAFFIC, DIRT, DUST, WATER AND MOISTURE. IF UNITS WILL BE STORED
SLAB OR C INSUI	RACTOR SHALL X—RAY EXISTING CONCRETE (FLOOR/CEILING) PRIOR TO CORE DRILLING CUTTING OF ANY NEW SLAB PENETRATIONS TO RE THAT NO EXISTING SERVICES ARE CTED BY THIS WORK.	d. Density: 7.5 lb/cu. ft. (120 kg. cu. m) e. Compressive Strength: 87 psi (600 kPA) capped per ASTM C240. f. Flame Spread Rating: 5 g. Smoke Developed Rating: 0 3. Accessory Materials Suitable for Installation (Pittsburgh-Corning Products) a. Adhesives: PC 88 up to 180 degrees F. (82 degrees C.)	itting cover manufacturer's recommendations. When polyvinyl chloride fitting covers are used, factory precut blanket inserts provided by the fitting cover manufacturer may be used. Inserts shall be installed in accordance with the fitting cover manufacturer's recommendations. When required, insulated flanges, couplings, unions, valves, anchors, and fittings shall be covered with preformed or field-fabricated sections of aluminum jacket applied over the fitting cover the state of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting cover manufacturer's recommendations. When and part of the fitting spaces used as return air plenums shall be component section. H. REPORT COIL RATINGS IN ACC ARL410 (CAPACTIES AND PRE SOUND PROTECTION. REPORT AND RATE SOUND PROTECTION. REPO	A PROVIDE DOUBLE WALL AHU CASING. EXPOSED INSULATION IS NOT ACCEPTABLE. ILES BY B. PANEL ASSEMBLY SHALL MEET UL STANDARD 1995 FOR FIRE SAFETY. PANEL INSULATION SHALL COMPLY WITH THE DANCE WITH INSULATION SHALL COMPLY WITH THE RE DROPS). R LEVELS IN C. PROVIDE AN INSULATION SYSTEM THAT IS RESISTANT TO MOLD GROWTHIN INSULAT RESISTANT TO MOLD GROWTHIN INSULATION SYSTEM THAT IS RESISTANT TO MOLD GROWTHIN I	FOR MORE THAN 6 MONTHS, FOLLOW MANUFACTURER'S INSTRUCTION FOR LONG-TERM STORAGE. ROTECT B. RIG AND LIFT UNITS ACCORDING MANUFACTURER'S INSTRUCTIONS. REDULED OR N SECTION MORE THEN 6 MONTHS, FOLLOW MANUFACTURER'S INSTRUCTIONS. A. MANUFACTURER'S INSTRUCTIONS MORE THEN 6 MONTHS, FOLLOW MANUFACTURER'S PACTORY-TRAINING MORE THAN 6 MONTHS, FOLLOW MANUFACTURER'S FACTORY-TRAINING MORE THAN 6 MONTHS, FOLLOW MANUFACTURER'S FACTORY-TRAINING MANUFACTURER'S FACTORY-TRAINED AND FACTORY-EMPLOYED SERVICE TECHNICIAN SHALL STARTUP AHUS. TECHNICIAN SHALL PERFORM THE FOLLOWING STEPS AS A
		Hydrocal B-11 gypsum cement (cryogenic and above 180 degrees F. (82 degrees C.) (for fabrication only).	vapor barrier and secured with bands. Where unions are specifically shown to be not insulated, the pipe insulation and jacket shall terminate neatly at the ends of the unions. Ends of pipe insulation shall be sealed to the pipe with a brush coat K. REPORT PANEL LENGTH AND: CASING PANEL LENGTH AND: CONSTANT PROVIDED BY THE MANUFACTURER. K. REPORT CASING LEAKAGE RA SPECIFIED IN TERMS OF PERC DESIGN AIRFLOW. L. REPORT WEIGHT LOADS AND I BY COMPONENT SECTION. M. REPORT PRODUCT DATA FOR	Let Wilder and the provided from the panel and the provided from the provide	DESIGNED MINIMUM: MINIMUM: NUTHIN 12 1. ENERGIZE THE UNIT DISCONNECT SWITCH
			M. REPORT PERFORMANCE DATA, ASSEMBLY, AND FILTER FRAM N. REPORT ELECTRICAL RENO POWER SUPPLY WIRING INCL DIAGRAMS FOR INTERLOCK AN WIRING, CLEARLY INDICATING	ER F. ROOF, V. OOR, AND ACCESS C BASE T ADJUSTABLE AND FEATURES DRIVE SIDE THROUGH WHICH FILT PROGRAMMABLE ANALOG INPUTS BE EASILY LOADED. NTS FOR TO SURFACE AND THROUGH WHICH FILT STANDARD SIDE THROUGH WHICH FILT STANDARD SIDE THROUGH WHICH FILT STANDARD SIDE THROUGH WHICH FILT SIDE THROUGH WHICH FILT STANDARD SIDE THROUGH WHICH FILT STANDARD SIDE THROUGH WHICH FILT SIDE THROUGH WHICH SIDE T	TERS CAN THE CLOSED POSITION. 5. ENERGIZE FAN MOTORS AND VERIFY FOR THAT MOTOR FLA IS WITHIN EAM OF COIL MANUFACTURER'S TOLERANCE OF NIMUM) NAMEPLATE FLA FOR EACH PHASE. OOR ON THE SE LOADING

GEORGIA STATE
UNIVERSITY
NGUAGE
REARCH CENTER

346 Panthersville Road Decatur Georgia 30034

Board of Regents of the University System of Georgia

of Georgia

8600 Indian Hills Drive Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564

DESCRIPTION

SUBMITTAL HISTORY

REVISIONS

DESCRIPTION

FILE LOG

E LOG BY HD

Additions/ Renovations to Building 'C' (Capuchin)

> 100% CD SUBMITTAL

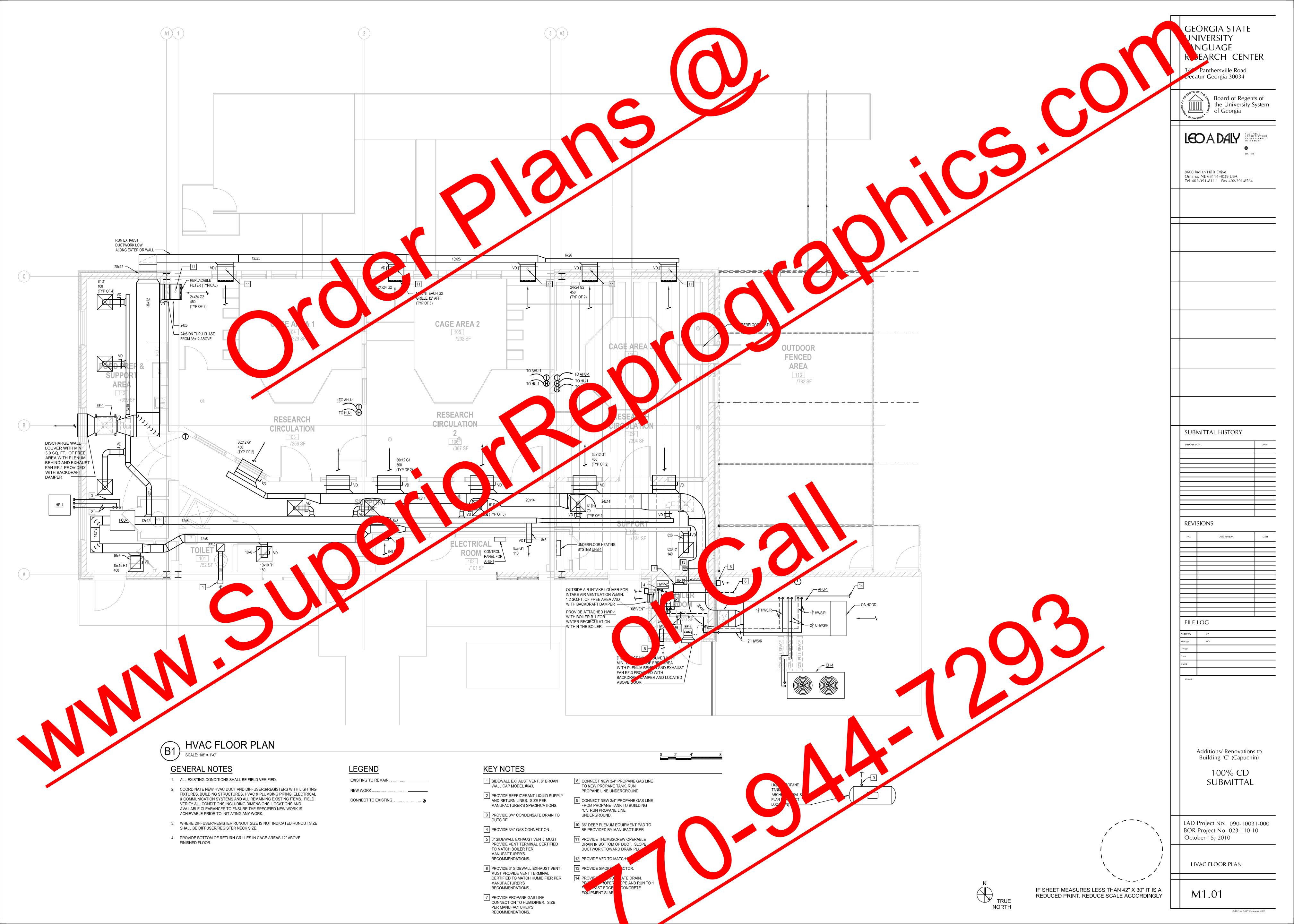
LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

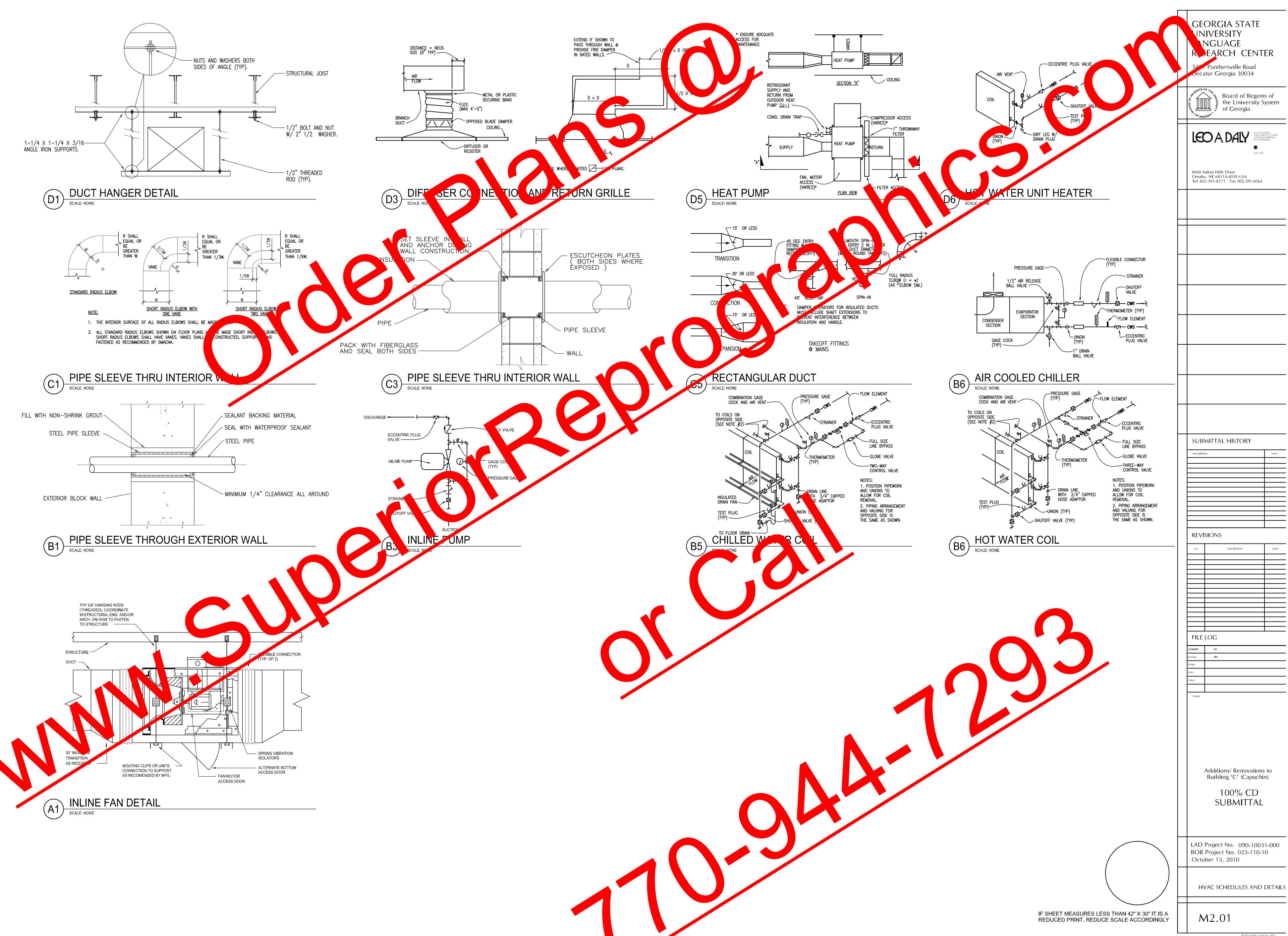
> HVAC SYMBOL LEGEND, ABBREVIATIONS, GENERAL AND DEMOLITION NOTES

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MARK	LOCATION	OEDVEO	TVDE	BALANCED	STAT P			MOTOR DAT	A		DDI\/E	MANUFACTURER	NOTEO	
IVIANN	LOCATION	SERVES	TYPE	CFM	EXT	TOTAL	HP	VOL	PH	HZ	DRIVE	AND MODEL NO.	NOTES	
EF-1	MOUNTED ABOVE IN FOOD PREP AREA	CAGES 1, 2, AND 3	CABINET FAN	2800	1.5	-	1.5	208	3	60	BELT	GREENHECK BDF	2	
EF-2	CEILING MOUNTED - SEE FLOOR PLAN	TOILET	CEILING VENTILATOR WITH INTEGRAL FAN AND GRILLE		0.1	-	1/30	120	1	60	DIRECT	BROAN QTXE080	1	
EF-3	BOILER ROOM WALL MOUNTED	BOILER ROOM VENT.	SIDEWALL FAN	610	0.25	-	1/10	115	1	60	DIRECT	GREENHECK BDF	2,3,4,5	

NOTES:

1. FAN ON OFF CONTROL BY LIGHT SWITCH.

2. PROVIDE MANUFACTURER INSTALLED INTEGRAL FUSED DISCONNECT 3. PROVIDE BACKDRAFT DAMPER.

4. CONTROLLED BY ROOM T'STAT.	
5. WALL BOX W/MOTOR SIDE GUARD, FACTORY AS	SEMBLED.

		DIFFUSER, RE	GISTER A	AND	GRIL	LE SCH	HEDULE	
MARK	FUNCTION	TYPE	FACE SIZE L x W INCH	MAX PD INCH WG	FINISH	BORDER TYPE	BASIS OF DESIGN	NOTES
D1	SUPPLY	PERFORATED FACE	24 X 24	0.10	WHITE	LAY-IN	TITUS MOD. TMS-AA	1, 3
G1	SUPPLY/RETURN/EXHAUST	GRILLE WITH HORIZONTAL BLADES	SEE TAGS	0.08	WHITE	SURF/DUCT MT	TITUS MOD. 350FL	1, 2, 3
G2	SUPPLY/RETURN/EXHAUST	GRILLE WITH HORIZONTAL BLADES	SEE TAGS	0.08	WHITE	SURF/DUCT MT	TITUS MOD. 350FLF1	1, 2, 3, 4
R1	RETURN	PERFORATED FACE	24 X 24	0.08	WHITE	LAY-IN	TITUS MOD. PAR	1, 3

NOTES:

1. BORDER TO BE SUITABLE FOR LAY-IN CEILING GRID MOUNT.

2. GRILLE TO BE DUCT MOUNTED. 3. COLOR: #26 WHITE

4. PROVIDE GRILLE WITH MATCHING 1" THICK FIBERGLASS FILTER

PUMP CONDENSING UNIT		L	LECTRIC <i>A</i>	EL		IVI						
MANUFACTURER AND MODEL NO.	MIN CIRCUIT AMP	NS.FAN FLA			HZ N	PH	VOL	TEMP °F	MBH	SERVES	LOCATION	MARK
CARRIER COMFORT SERIES HEAT PUMP WITH PURON REFRIGERANT, 3 TON	23.5	2.2	1	17.1	60 1	1	208/230	96	36	FCU-1	NEAR FOOD PREP RM	HP-1

				PU	MP SC	H	ED	U	L	-			
MARK	LOCATION	SERVES	TYPE	GPM	TOTAL HEAD FT WG	HP		OR DA		HZ	EFF %	MANUFACTURER AND MODEL NO.	NOTES
HWP-1	BOILER ROOM	B-1	INLINE	55	11	1/4		120	1	60		MSTRONG ARM3044PBF SERIES LS45	
HWP-2	BOILER ROOM	AHU-1	INLINE	26.1	15	1/4		208	1	60		B & G SERIES 60 MODEL 601S	1

NOTES:
1. PROVIDE VFD BY SQUARE D, MODEL NO. ATV31H.

		INDOOR FA	N/	COIL (TINL	SC	HEDL	JLE							
MARK	LOCATION	SERVES	CFM	EXT. S.P. IN WG	AIR T	EMP LAT °F	HEAT OUTPUT MBH	EL K\		ICAL D	HZ	DRIVE	MANUFA AND MO	JRER L NO.	
FCU-1	IN CEILING ABOVE FOOD PREP	OFFICE AREAS, FOOD PREP, SUPPORT AREAS	1000	0.15 HEATING 0.50 COOLING			17	2.6	208			DIRECT	RIER CO MOD	ORT SEP X-4	ES
NOTES:										,					

1. PROVIDE THERMOSTAT. 2. PROVIDE MATCHING FILTER.

3. COOLING COIL TO USE R-410A REFRIGERANT. PROVIDE ARMOR COAT UPGRADE TO COOLING COIL. 4. MUST BE SUITABLE FOR HORIZONTAL MOUNTING. 5. PROVIDE 17 MBH OF HEATING.

				_	IUMIDI	FZR	1	HE	Dί	JLF
MARK	LOCATION	SERVES	TYPE	CFM	CAPACITY LBS./HR. (MIN)	INPUT VHR(MAX)	KW	TRICAL E	HZ	MAX - ACTURER AND MODEL NO.
HU-1	BOILER ROOM	AHU-1	PROPANE GAS FUEL	2,800		200		200	60	NEC GSTC-100 WITH MATCHING DISPERSION TUBE MODEL "MINI SAM-E 24 INCH"
2. PROVI 3. PROVI 4. PROVI	IDE USER INTERF DE DIGITAL WALI DE DUCT MOUNT DE DISPERSION DE STEAM HE	- HUMIDIST ED I	SHOWN C RAWING IPPLY L SAM-E, VIT	G. TH 6" CE SAM-E	RS N TYPE M					

	UN DER	FLOOR RADIANT	HE	A ⁻	ΓIN	١Ć	S SYSTEM SCHEDULE
LOCATION	SEA	ТҮРЕ			CAL D. PH		MANUFACTURER AND MODEL NO.
AGE 3	CAGE 3 AREA	ELECTRIC HOT WATER UNDERFLOOR LOOP	10	208	1	60	ACCUTEMP BY KELTECH + INFLOOR HEATING SYSTEM

YSTEM OF HAPPROPRIATE HOT WATER CIRCULATION PUMP SIZED TO MATCH UNDERFLOOR HEATING SYSTEM.
YST OF WITH MATCHING MANUFACTURER'S CONTROLLER.
STEM WITH THERMOSTAT. SEE HVAC FLOOR PLAN FOR LOCATION.

			HOT WA	TEF	R BC	OILE	RS	CHE	DULI							
			MIN OUTPUT CAPACITY		HOT V	VATER		FIRIN	G RATE	EL	ECTRI	CAL DAT	4			
MARK	LOCATION	TYPE	МВН	GPM	EWT °F	LWT °F	MAX. PD FT	GAS CFH	OIL-GPH	HP	VOL			ACTU	AND MODEL NO.	
B-1	BOILER ROOM	HOT WATER (LIQUID PROPANE FUEL)	218	24	160	180		_	_		120	60	LOC. BOILE	PEFA	TY+	,
					-	-	.	-					-			

PROVIDE HOT WATER INSULATED BUFFER TANK W/ MINUMUM 40 GAL STORAGE. 4. PROVIDE AIR-LOCK HORIZONT DECT VENT 5. PROVIDE ON BOARD CONTROL MAINTAIN MIN. CLEARANCES REQUIRED BY MANUFACTURER FOR ADEQUATE OPERATION. 6. MINIMUM EFFICIENCY OF BOILER

		ŀ	TOH	WATER	UNI	T HEA		R	SCH	D		E
MARK	LOCATION	TYPE	CFM	MIN CAP MBH	GPM	TER	°F M	0	MOTOR DA HP VOI	н	7	MANUFACTURER AND MODEL NO.
UH-1	BOILER ROOM	CEILING HUNG	450	21	2	180	0.8	_		60		TRANE MODEL 024

MARK LOCATION UTDOOR AHU AHU-1 OUTSIDE NEAR ENTRANCE CAGE AREAS 1, 2, AND 3 CONSTANT VOLUME 2,800

NOTES:

1. AHU SECTIONS REQUIRED IN ORDER OF AIRFLOW: MIXING BOX, FILTER SECTION WITH PREFILTER AND 95% FILTER, HOW WATER PREHE COIL, CHILLED WA HEATING COIL, FAN. 2. UNIT SHOULD BE SUITABLE FOR OUTDOOR INSTALLATION.
3. PROVIDE CURB BY MANUFACTURER WITH VIBRATION ISOLATION.

				HO.	T W	ATER	HE	ATI	V	CUI	L S	CHEDULE	
MARK	SERVES	CFM	MAX FACE VEL FPM	EAT °F	LAT °F	MAX AIR PD INCH WG	MIN CAP			HOTI	X.	FACTURE AND MODEL NO. NOTES	
HC-1	AHU-1 PREHEAT	2,800	367	60	102.44	14	1	13	180	160	1	PROVIDED AS A PART OF AHU-1 2	
HC-2	AHU-1 REHEAT	2,800	367	50	87.4	0.11	7	11.4	180	~		ROVIDED AS A PART OF AHU-1 1	
NOTE 1 HF	S: ATING COIL TO F	BE PIPED \	WITH 2-WAY C	ONTROL V	'AI VF AT O	OUT							

					Α	AIR (COC	LEC) Ch	HL	LER S	SC	H	E	DL	JL	E		
MAF	LOCAT		TV	AMB TEMP °F DB		GPM	EVAPORA EWT °F	TOR WATER	MAX PD FT WG	CON NO.	IDENSER FAN D TYPE	HP	ELE MCA		AL DA PH	TA HZ	NO.	OMPRESSOR TOTAL STEPS	MANUFACTURER AND MODEL NO.
CH-1	JOIDE NE . E	NTRANCE	SCROLL	95	25	50.2	54	44	27.7	2	1		143	208	3	60	1	2	CARRIER 30RAP030

OVIDE 120 GAL CHILLED WATER STORAGE TANK, LOCHINVAR MODEL NO. "CVU120" OR EQUIVALENT. PROVIDE WITH INTEGRAL PUMP MATCHED TO REQUIRED AHU-1 GPM AND PRESSURE DROP.

SUBMITTAL HISTORY REVISIONS FILE LOG Additions/ Renovations to Building 'C' (Capuchin) 100% CD SUBMITTAL LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010 **HVAC SCHEDULES**

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Board of Regents of

the University System

JNIVERSITY

NGUAGE

341 Panthersville Road

Decatur Georgia 30034

Board of Reg the Universit of Georgia

8600 Indian Hills Drive

MANUFACTURER AND MODEL NO.

Omaha, NE 68114-4039 USA Tel 402-391-8111 Fax 402-391-8564

IF SHEET MEASURES LESS THAN 42" X 30" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY

M3.01



1. ALL WORK, MATERIALS, AND EQUIPMENT SHALL COMPLY WITH THE RULES AND REGULATIONS OF ALL CODES AND ORDINANCES OF THE LOCAL, STATE, AND FEDERAL AUTHORITIES. SUCH CODES, WHEN MORE RESTRICTIVE, SHALL TAKE PRECEDENCE OVER THESE PLANS AND SPECIFICATIONS.

2. PRIOR TO PURCHASING ANY MATERIALS OR STARTING ANY WORK, CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, DUCTWORK SIZES AND LOCATIONS, EQUIPMENT, ETC. SHOWN ON DRAWINGS OR AFFECTING THIS WORK AND SHALL REPORT ANY DEVIATIONS TO THE PROJECT MANAGER.

3. SHOP DRAWINGS SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO ORDERING, PURCHASING OR FABRICATING ANY MECHANICAL EQUIPMENT. SHOP DRAWINGS SHALL LUDE: ALL EQUIPMENT SCHEDULED ON THE DRA

4. CONTRACTOR SHALL COORDINATE E CHARACTERISTICS AND REQUIREMENT CONTROL EQUIPMENT WITH ELF PRIOR TO ORDERING EQUIPM OR SUBMIT

SHOP DRAWINGS. SHIP WITH TABLISHED CONTROL SYS NOT LESS 1 IDE MONTHLY WA

SUPPLYING MORE ATAN 2000 CFM OF SPACE AND ALL RECIRCULATING FAN REVING ARE OF EGRESS SHALL BE WITH A SMOKE DETECTOR IN THE SUPPLY SMOKE DETECTOR SHALL BE WIRED F FAN UPON DETECTION OF SMOKE, AND

RK COMPLETED, REVISION

8. ALL CONTROL EQUIPMENT SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

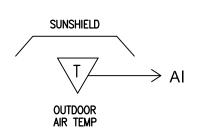
THE FIRE ALARM CONTROL PANEL.

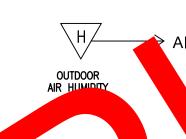
9. ALL CONTROL EQUIPMENT AND SYSTEMS SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR AFTER OWNER'S FINAL APPROVAL.

10. UPON COMPLETION OF INSTALLATION, SUBMIT THREE COPIES OF RECORD AS BUILT DOCUMENTS. THE DOCUMENTS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FINAL COMPLETION.

11. ALL PROJECT-DEVELOPED SOFTWARE AND DOCUMENTATION SHALL BECOME THE PROPERTY OF THE OWNER. THESE INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

(A.) PROJECT GRAPHIC IMAGES, (B.) RECORD DRAWINGS, (C.) PROJECT DATABASE, (D.)PROJECT SPECIFIC APPLICATION PROGRAMMING CODE. (E.) ALL DOCUMENTATION.





SEQUENCE OF OPERATIONS

NOTE: MAY BE MOUNTED IN OA

OUTSIDE AIR CONDITIONS:

SEMENT SYSTEM (BMS) SHA OUTSIDE AIR HUMIDITY. ONITOR THE OUTS TEMPERATU SHALL BE USED TO ACTIVATE VICTORS CONTROL STRATEGIES. THIS INFORM

S ALL COMPUTER HARDWARE LD HARDWARE PANELS, SENSORS CONTROL DEVICES, AND INSTALLED ID PIPING. THE CONTRACTOR SHALL BE PONSIBLE FOR ENGINEERING, SUPERVISION OF NSTALLATION, LABOR SERVICES, SYSTEM CALIBRATION, INITIAL SOFTWARE PROGRAMMING, AND SYSTEM CHECKOUT AS NECESSARY TO PROVIDE A COMPLETE AND FULLY OPERATIONAL DDC CONTROLS SYSTEM AS SPECIFIED HEREIN. THE DDC/EMS SYSTEM SHALL BE BASED ON SIEMENS CONTROLS.

WORK SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING:

-INSTALL DDC CONTROLLER AT LOCATION WITH FRONT END CONTROL PANEL.

-SYSTEM SHALL HAVE THE CAPABILITY OF REMOTE WEB ACCESS.

-PROVIDE DDC CONTROLS SENSORS IN ALL ROOMS AS SHOWN ON THE [

-ALL SENSING DEVICES AND NECESSARY TRANSDUCERS TO PERFORM UNCTIONS LISTED I I/O SUMMARY TABLES.

- ALL RELAYS, SWITCHES, INDICATING DEVICES, AND TRANSDUCERS REQUI FUNCTIONS LISTED IN I/O SUMMARY TABLES.

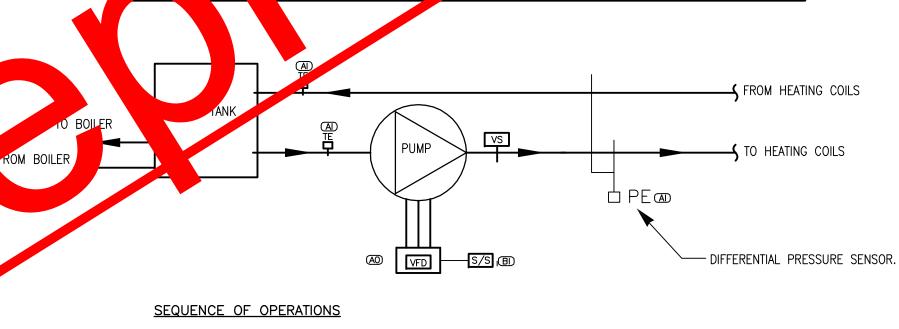
- ALL MONITORING, CONTROL WIRING AND TUBING.

- ALL MODEMS AND ACCESSORIES.

- ALL CONTROL VALVES, DAMPER ACTUATORS AND CONTROLS. EXISTING. - GRAPHIC FLOOR PLAN FOR ALL ROOM

- THE DDC CONTROLS CONTRACTOR S L PROVIDE AND TO PERFORM THE WORK SHOWN (HE SEQUENCE OF FRATION EACH ECH MENT. THE ON OF THESE SECUCION SHALL PROVIDED BY RIPTOR, ALAR MITS, CALID TION VARIABLES. THE CONTRACT

SHALL BY CONTROL MANUFACTURER, UNLESS APPROVED - ALL EQUI DDC CONTROL BY ENGINEL RECORD.



CONTROLS LEGEND

PCV

NORMALLY CLOSED

NORMALLY OPEN

CONTACT SWITCH

CURRENT TRANSDUCER

AIRFLOW MEASURING STATION

DIFFERENTIAL PRESSURE SE

(ELECTRICAL TYPE)

QUIPMENT CONTROL PANEL

FREQUENCY DRIVE

VELOCITY FLOW SENSOR

BOILER AND HOT WATER PUMPS:

HUMIDITY ELEMENT

PRESSURE SWITCH

PRESSURE ELEMENT

ADJUSTABLE ROOM HUMIDISTAT

ADJUSTABLE ROOM THERMOSTAT

ROOM TEMPERATURE SENSOR

ROOM HUMIDITY SENSOR

SMOKE DETECTOR

BINARY INPUT

BINARY OUTPUT

ANALOG INPUT

ANALOG OUTPUT

AIR TERMINAL_UN

TEMPERATURE ELEMENT

FLOW MEASURING ELEMENT

<u> Pte</u>

__PE

☐ SMD

BD

BO

ACV

THE BCS SHALL ENABLE THE HEATING SYSTEM WHENEVER A ZONE IS REQUESTING HEAT OR DEHUMIDIFICATION. THE SYSTEM SHALL BE DISABLED WHEN THE OUTSIDE TEMPERATURE IS ABOVE 74 DEGREES F (ADJUSTABLE) AND THERE ARE NO HE DEHUMIDIFICATION REQUESTS.

THE BCS SHALL MONITOR THE HOT WATER SUPPLY TEMPERATURE AND BOILER AND PRIMARY PUMP AS NECESSARY TO MAINTAIN THE HOT WATER

TEMPERATURE SETPOINT. WHEN THE SUPPLY TEMPERATURE FALLS BELOW THE HOT WATER PRIMARY PUMP SHALL BE ENERGIZED. WHEN FLOW IS PRO BOILER SHALL BE ENERGIZED. WHEN THERE IS NO LONGER BOILER SHALL BE DE-ENERGIZED. THE PRIMARY HOT WAT

TO OPERATE FOR 1 MINUTE (ADJUSTABLE) BEFORE IT A CYCLES WHEN PRIMARY LOOP TEMPERATURES REACH THE SUNDARY SHALL START AT MINUMUM SPECIAL DESIGN TEMPERATRUP SHALL THEN MODULATE TO MA AIN A PRESSURE DIFFERENT

THE BCS SHALL GENERATE A VIS UNDER ALL OF TOP FOR

RATURE IS MORE TO 20 DEGREES (ADJUSTABLE) 1. THE HOT WATER SUPPLY TE ABOVE OR BELOW SETPOINT.

ICATES F FOR MORE THAN 10 2. THE BOILER IS COMMANDED C NT ITS STATUS MINUTES (AD

COMMANDED ON BUILENTIAL WATER PRESSURE. 4. LOW

5. HIGH RENTIAL WATER PRESSURE. SPEED DRIVE FAULT ALARM HABEEN ENERGIZED. A VARIA

MP CONTROLED BY BOILER PACKAGE CONTROLS. BCS SHALL START/S MONITO STATUS, AND TEMPERATURE IN AND OUT. ALL POINTS SHALL

SENSOR — HUMIDITY SENSOR— TYP. ZONE ──UNIT LIMITS SPACE TEMPERATURE SENSORS SHALL BE AVERAGING TYPE. <u>AHU-1</u>

SEQUENCE OF OPERATIONS

<u>AHU-1</u> CONSTANT VOLUME AIR HANDLER:

THE BUILDING CONTROL SYSTEM (BCS) SHALL SEND A HEAT / COOL MODE, SPACE TEMPERATURE AND/OR SPACE TEMPERATURE SETPOINT.

HEAT/COOL:

WHEN THE SPACE TEMPERATURE RISES TO ONE DEGREE ABOVE THE OCCUPIED COOLING SETPOINT OF 78 DEGREES F (ADJUSTABLE), THE MODE SHALL TRANSITION TO COOLING. WHEN THE SPACE TEMPERATURE FALLS ONE DEGREE BELOW THE OCCUPIED HEATING SETPOINT OF 72 DEGREES F (ADJUSTABLE), THE MODE WILL 10% (ADJ). IF THE SPACE RELATIVE HUMIDITY TRANSITION TO HEATING. WHEN THE SPACE TEMPERATURE IS BETWEEN ONE DEGREE ABOVE THE OCCUPIED COOLING SETPOINT AND ONE DEGREE BELOW THE OCCUPIED HEATING SETPOINT THE MODE WILL REMAIN IN ITS LAST STATE. IF

THE SPACE TEMPERATURE SENSOR FAILS THE MODE WILL REMAIN IN ITS LAST STATE AND AN ALARM WILL BE ANNUNCIATED. IF THE LOCAL (AND COMMUNICATED) SETPOINT(S) FAIL THE CONTROLLER WILL USE ITS DEFÀULT SETPOINTS AND AN ALARM WILL BE ANNUNCIATED.

HUMIDITY CONTROL:

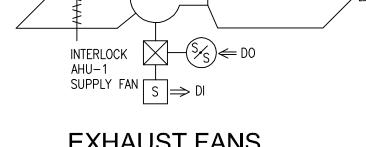
IF THE SPACE RELATIVE HUMIDITY IS GREATER THAN 70% (ADJ), THE CHILLED WATER VALVE WILL MODULATE TO REDUCE THE SPACE RELATIVE HUMIDITY AND THE REHEAT VALVE WILL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. MODE WILL TERMINATE WHEN THE SPACE RELATIVE HUMIDITY FALLS BELOW THE RELATIVE HUMIDITY SETPOINT (70% ADJ) MINUS SENSOR FAILS THE DEHUMIDIFICATION SEQUENCE WILL BE TERMINATED AND AN ALARM WILL BE ANNUNCIATED.

FILTER STATUS:

A DIFFERENTIAL PRESSURE SWITCH WILL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSES DURING NORMAL OPERATION A DIRTY FILTER ALARM WILL BE ANNUNCIATED.

<u>HU-1 HUMIDIFIER:</u>

WHEN SPACE HUMIDITY FALLS BELOW THE LOW HUMIDITY SETPOINT 40% (ADJ) THE BCS SHALL ACTIVATE THE HUMIDIFIER. THE HUMIDIFIER SHALL OPERATE BASED ON FACTORY PROVIDED CONTROLLER. THE BCS SHALL SHUT DOWN THE HUMIDIFIER WHEN THE SPACE HUMIDITY EXCEEDS THE LOW HUMIDITY SETPOINT +10% (ADJ).

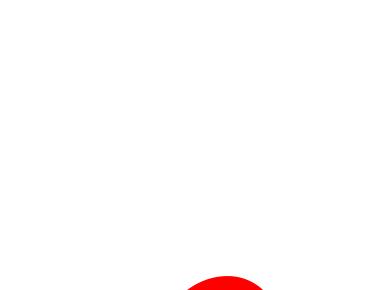


EXHAUST FANS

SEQUENCE OF OPERATIONS

EXHAUST FAN: THE BMS SHALL COMMAND THE EXHAUST FAN (EF-1) TO START AND RUN CONTINUOUSLY. (INTERLOCK WITH AHU-1 SUPPLY FAN).

THE BMS SHALL GENERATE ALARMS UNDER ALL OF THE FOLLOWING 1. THE EXHAUST FAN IS COMMANDED ON BUT THE FAN STATUS INDICATES IT IS OFF.





SEQUENCE OF OPERATIONS

CHILLED WATER SYSTEM CONTROL:

THE CHILLER AND PACKAGED CHILLED WATER PUMP SHALL COME WITH FACTORY CONTROLS WITH A BOARD COMMUNITE WITH THE BCS STEM.

THE CHILLED WATER SYSTEM WHEN THERE IS A CALL FOR COOLING OR DEHUMIDIFICATION IN ANY ZONE. THE SYSTEM ALL BE DISABLED HEN THE CHILLED WATER SYSTEM AND THE PROPERTY OF BCS SYSTEM SHALL START
OTSIDE OR TEMPERATURE IS BELOW 50 DEGREES (ADJUSTABLE), THERE ARE NO COOLING REQUESTS, OR A REFRIGERANT LEAK ALARM FROM THE REFRIGERANT SSURE SWITCH

WHEN THE SYSTEM IS DISABLED, THE CHILLER SHALL STOP.

THE BMS SHALL GENERATE ALARMS UNDER ALL OF THE

FOLLOWING CONDITIONS:

ES (ADJUSTABLE AFTER THE CHILLER HAS BEEN COMMANDED TO START. 1. THE CHILLED WATER SUPPLY TEMPERATURE IS ABOVE 60 DEGREES F (ADJUSTABLE 2. A PUMP IS COMMANDED ON BUT ITS STATUS INDICATES OFF.

3. A CHILLER FAULT ALARM HAS BEEN ENERGIZED .. 4. REFRIGERANT LEAK DETECTOR ALARM HAS BEEN ENERGIZED.



GEORGIA STATE

EARCH CENTER

Board of Regents of the University System

Panthersville Road ecatur Georgia 30034

≝ of Georgia

8600 Indian Hills Drive Omaha, NE 68114-4039 USA

Tel 402-391-8111 Fax 402-391-8564

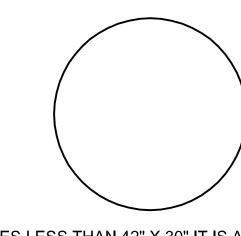
SUBMITTAL HISTORY

REVISIONS

FILE LOG

INIVERSITY

NGUAGE



LAD Project No. 090-10031-000 BOR Project No. 023-110-10 October 15, 2010

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HVAC CONTROLS

IF SHEET MEASURES LESS THAN 42" X 30" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY