MSB GENERATOR REPLACEMENT

Houston, Texas

ISSUED FOR CONSTRUCTION
SEPTEMBER 30, 2016

SHAH SMITH & ASSOCIATES, INC.
HOUSTON/AUSTIN/DALLAS/COLLEGE STATION
TX. REGISTRATION NO. F2113
ENGINEER
System No. HW-D-0259

Assembly Rating — 1 and 2 Hr (See Items 1 and 2)
Compression or Extension

F Rating — 1 and 2 Hr (See Items 1 and 2)
Compression or Extension

D. Spray-Applied Fire Resistive Material* — Steel floor units and structural steel beam to be sprayed with the wall assembly. The floor assembly shall include the following construction features:

D. Steel Furring — Z-shaped bars or channels, located to span from steel beam to min 1 in. (25 mm) beyond face of min thickness of material specified in the individual D700 or D900 Series Design. The flutes of the steel floor material applied to each side of the steel beam web shall be min 11/16 in. (18 mm). For a 2 hr Assembly Rating, fully covered with spray applied fire resistive material to the minimum thickness of material required on the applied fire resistive material (see Item 1F).

2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips.

W R GRACE & CO - CONN — Type MK-6/HY, MK-6/HY ES, MK-6s, RG F1. Spray-Applied Fire Resistive Material* — After installation of ceiling runner, steel floor units and structural steel of the steel floor units above the structural steel beam shall be filled with spray-applied fire resistive material of the beam web shall be 11/16 in. (18 mm). For a 2 hr Assembly Rating, the thickness of material applied to each side of the 1 hr Assembly Rating and 2-5/8 in. (67 mm) of material for the 2 hr Assembly Rating.

A1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A through 2A3, slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner is secured to the 1/4 in. greater than max extended joint width. Ceiling runner centered beneath and parallel with steel beam (Item 1C). Ceiling runner secured to steel beam through spray-applied fire resistive material with steel fasteners the 1 hr Assembly Rating and 2-5/8 in. (67 mm) of material for the 2 hr Assembly Rating.

2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips.

A1. Forming Material* - Strips — As an alternate to Item 3A, the strips are stacked to a height twice larger than the cut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are compressed 50 percent overlap min 1/2 in. (13 mm) onto wall and min 2 in. (51 mm) onto spray-applied fire resistive material.
GENERAL NOTES

I. CODES AND SPECIFICATIONS

A. CODES

1. International Building Code 2012 with City of Houston Amendments

B. CONCRETE CODES

1. ACI 318-11, Building Code Requirements and Commentary for Structural Concrete

C. PIPE AND DRAINAGE CODES

1. ASCE 4-02 + 2009 Addenda, Standard Practice for Design of Municipal and Industrial Drainage Systems

D. STRUCTURAL STEEL CODES

1. ANSI/AISC 360-10, Specification for the Design of Structural Steel Buildings

E. FIBER OPTICS CODES


F. CONSTRUCTION DOCUMENTS

1. Contractor's Design and Construction Documents for the Structural Design

G. CONSTRUCTION PROJECT MANAGEMENT

1. Contractor's Project Management Plan and Site Administration Plan

II. FIELD INSTRUCTIONS AND REQUIREMENTS

A. Copper pipe shall be galvanized steel pipe.

B. All other metal pipe shall be seamless steel pipe.

C. All steel pipe shall be galvanized steel pipe.

III. MATERIAL

A. MATERIALS

1. Concrete mix designs must be submitted a minimum of 15 days prior to the start of the work for Engineer and Owner's testing laboratory approval.

2. Concrete mix designs must be submitted in writing to the Engineer and Owner's testing laboratory.

3. Concrete mix designs shall have mix proportions compatible with the specifications for approval prior to use in the field.

4. Cement shall be Type I/II, unless noted otherwise.

5. Fly ash conforming to ASTM C618, Type C or F, may be used unless noted otherwise on the Drawings:

6. All steel surfaces to be hot dip galvanized shall be prepared as specified.

7. Concrete mix designs shall be submitted with each submittal.

IV. TECHNICAL DATA

A. TECHNICAL DATA

1. The zinc coating for steel shapes and plates shall average not less than 8.0 oz./sq. ft.

2. All steel exposed to weather or outside the building's waterproofing, such as columns and members, shall be galvanized.

3. The total tensile strength of reinforcing steel shall be as specified in the drawings.

4. All welds shall conform to the American Welding Society (AWS) Type 1, High Strength Bolts for Structural Steel Joints, unless indicated on the Drawings.

5. All pipe columns shall conform to ASTM A53, Grade B or ASTM A501.

6. All steel members shall be hot dip galvanized.

7. All welds shall be full penetration in the groove weld.

8. All welds shall be inspected by the Owner.

9. All welds shall be inspected by the Contractor.

B. TECHNICAL DATA

1. All welds shall be inspected by the Owner.

2. All welds shall be inspected by the Contractor.

C. TECHNICAL DATA

1. All welds shall be inspected by the Owner.

2. All welds shall be inspected by the Contractor.

D. TECHNICAL DATA

1. All welds shall be inspected by the Owner.

2. All welds shall be inspected by the Contractor.

E. TECHNICAL DATA

1. All welds shall be inspected by the Owner.

2. All welds shall be inspected by the Contractor.

F. TECHNICAL DATA

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1. All welds shall be inspected by the Owner.

2. All welds shall be inspected by the Contractor.

K. TECHNICAL DATA

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P. TECHNICAL DATA

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2. All welds shall be inspected by the Contractor.

Q. TECHNICAL DATA

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R. TECHNICAL DATA

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U. TECHNICAL DATA

1. All welds shall be inspected by the Owner.

2. All welds shall be inspected by the Contractor.

V. TECHNICAL DATA

1. All welds shall be inspected by the Owner.

2. All welds shall be inspected by the Contractor.

VI. STRUCTURAL STRENGTH

A. STRUCTURAL STRENGTH

1. The structural strength shall be determined according to AISC provisions for the working load and allowable stress.

B. Allowable stress for all steel shall be as specified in the AISC.

C. The structural strength of all structural steel shall be determined according to AISC provisions for the working load and allowable stress.

D. The structural strength of all structural steel shall be determined according to AISC provisions for the working load and allowable stress.

E. The structural strength of all structural steel shall be determined according to AISC provisions for the working load and allowable stress.

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VII. WORKING STRENGTH

A. WORKING STRENGTH

1. The working load shall be determined according to AISC provisions for the working load and allowable stress.

B. The working load shall be determined according to AISC provisions for the working load and allowable stress.

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EXISTING CMU WALL

NOTE:
1. FIELD VERIFY ALL CONDITIONS & DIMENSIONS PRIOR TO FABRICATION/CONSTRUCTION.

NEW GENERATOR PAD
TYP. @ PAD

EXISTING WF BEAM
FIELD VERIFY
2'-0" MUFFLER MFR.
COORD. W/ W8X10 W8X10
EXISTING 48LH16
EXISTING 48LH14
MUFFLER

EXISTING ROOF JOIST
EXISTING ROOF JOIST
EXISTING ROOF JOIST
EXISTING ROOF JOIST
EXISTING ROOF JOIST

SPACE NEW HSS AT 4'-0" MAX, VERTICALLY

REMOVE EXISTING RAISED CONCRETE PAD DOWN TO PENTHOUSE SLAB LEVEL.
DO NOT DAMAGE OR PENETRATE FLOOR SLAB.

REMOVE EXISTING SIDING & LIGHT GAUGE FRAMING. CUT ANY CMU ANCHORS TO MINIMIZE DAMAGE TO BLOCKS

REMOVE EXISTING MECHANICAL LOUVER
DO NOT REMOVE OR DAMAGE STEEL CHANNELS OR BRACES ABOVE LOUVER

FRAMING PLANS
Provide diagonal braces at location of concentrated loads such as heavy mechanical units, heavy lights & any other concentrated loads.

P = Concentrated Loads.

1/4 in. 3 Sides

Diagonal brace is not required for "A" less than 3".

1/2" = 1'-0"

9 Section at muffler support

10 Muffler support attachment

3 Section at new slab

4 HSS beam connection to existing CMU

5 HSS connection to existing CMU wall

6 Section at roof side louver

7 Typical detail - stiffening of steel joist for concentrated loads

1/4" minimum thickness double angle connector

MIN. 1 3/4" embed. at CONN II or equiv. w/ min. 4'-0" O.C. (vertical)

HSS6X4X1/4 (LSH)

L3X3X1/4 X 0'-5" (typ.)

HSS required

Loever to determine number of field measure space above new

note

wind (ultimate)

for 61PSF out-of-plane

loever to be designed

new loever, existing slab

- reinforce w/ #3 @ 12" O.C. ea. way, top

new 4" thick concrete pad

per generator supplier

1/8 1

1/8 1

1/8 1

1/8 1

3" MIN. EMBED.

- drill & set in epoxy #4 dwls. @ 18" O.C.

2'-0" flange

generator

ea. angle

MIN. 1 3/4" embed. at conn II or equiv. w/ min. 4'-0" O.C. (vertical)

3" MIN. EMBED.

- drill & set in epoxy #4 dwls. @ 18" O.C.

2'-0" flange

generator

ea. angle

MIN. 1 3/4" embed. at conn II or equiv. w/ min. 4'-0" O.C. (vertical)

3" MIN. EMBED.
1. Connect to existing breaker in switchgear PSE.
2. Connect to existing breaker in switchgear USHXB-A/B.
3. Equipment shown light is installed under the switchgear project or existing to remain. Items shown bold are new work to be installed under this contract.
4. Switchgear PSE to be installed under switchgear switchgear.
5. Provided and installed under switchgear project.
7. Provided in switchgear project.
8. Connected to emergency side of existing ATS ETSP.
9. Switchgear PSE shown here has the same name as existing switchgear PSE shown on E010. PSE shown here is new and will be installed under the switchgear project. Existing switchgear PSE shown on E010 will be removed under switchgear project.

### Electrical One Line Diagram - Renovation

**Phases: E010R**

- **Switchgear PSE**
  - Connected to existing breaker.
  - New work to be installed under this contract.

- **Generator LGEN3**
  - 750 Kw, 480Y/277V, 4.16kV.
  - Installed under switchgear project.

- **Generator LGEN2**
  - 800 Kw, 480Y/277V, 4.16kV.
  - Installed under switchgear project.

- **Removal of existing switchgear PSE**
  - Removed under switchgear project.

### General Notes - E010R

- The switchgear project is designed to remain, but new work shown here is new work to be installed under this contract.
- New work shown on E010 is new work to be installed under the switchgear project. Existing switchgear PSE shown on E010 will be removed under switchgear project.
KEYED NOTES - E100

1. SUGGESTED CRANE LOCATION. RIGGING CONTRACTOR MAY PROPOSE ALTERNATE LOCATION. THE SELECTED CRANE LOCATION MUST BE COORDINATED WITH THE OWNER'S DESIGNATED REPRESENTATIVE ONE WEEK IN ADVANCE OF CRANE ARRIVING AT THE PROJECT SITE. SEE TRAFFIC CONTROL PLAN T1.0.

2. SUGGESTED EQUIPMENT SHIP/DEPOT LOCATION.

3. MANUFACTURER'S CRANE SPECIFICATION AND FLOOR PLAN: CRANE LOCATION FOR INSTALLATION OF NEW EXHAUST. REFER TO DETAILED EXHAUST AIR SHAFT.

4. A 16" OD DRAIN PIPE (4" OD PIPE FOR EXHAUST) SHALL BE PROVIDED IN DRAINAGE RAMPS TO PROTECT CRANE AND PREVENT DAMAGE. THE CONTRACTOR SHALL INSTALL DRAIN PIPING AND CONNECT TO EXISTING DRAINAGE SYSTEM OR REMOVE EXISTING DRAIN PIPING TO PLACE NEW DRAIN PIPE. REFER TO DETAILED DRAINAGE SYSTEM.

5. EXISTING ELEVATOR SHAFTS TO BE DOWNTOWN, REMOVED. THIS LOCATION IS SPECIFIED FOR REFERENCE ONLY. THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVING THE EXISTING SLEEVE AND SLIP FROM THE PRESENT WALL, ETC. REFER TO DETAILED WALL AND DOOR LOCATION.

6. MAIN EMERGENCY SERVICE TANK, LOCATED AT GROUND LEVEL, TO BE DISCONNECTED AND REMOVED. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING THE TANK. CONFIRM LOCATION WITH UNIVERSITY OF TEXAS HOUSTON CENTRAL ADMINISTRATION. MANIFEST OF DIESEL DISPOSAL SHALL BE PROVIDED TO UNIVERSITY OF TEXAS HOUSTON MEDICAL CENTER.

7. UNIVERSITY OF TEXAS HOUSTON MEDICAL CENTER ROUTE.

8. UNIVERSITY OF TEXAS HOUSTON MEDICAL CENTER SCHEDULE.

9. UNIVERSITY OF TEXAS HOUSTON MEDICAL CENTER SUPPLY AIR SHAFT.

10. UNIVERSITY OF TEXAS HOUSTON MEDICAL CENTER EXISTING GEN 1 TO REMAIN IN BUILDING OUTLINE.
1 PROVIDE CONDUCTORS FROM GENSET ON ROOF LEVEL TO LOCATION (ON GROUND LEVEL) FOR NEW GEN3 REMOTE ANNUNCIATOR AS SHOWN. COORDINATE LOCATION WITH EXISTING EQUIPMENT.

2 ROUTE THREE NEW 4" CONDUITS UP TO EMERGENCY SYSTEM IN PENTHOUSE FROM ATS ETSP. SEE E207.

2 ISSUE FOR CONSTRUCTION 09/30/2016

THE UNIVERSITY OF TEXAS
Health Science Center at Houston

MSB GENERATOR REPLACEMENT

LEVEL 2 ELECTRICAL PLAN
GENERAL NOTES - E208

A. INTERCONNECTIONS BETWEEN SUITE, MECHANICAL, AND ELECTRICAL ARE TO BE REVIEWED WITH A PLUS/ MINUS OF 0.01 PERCENT.
B. ELECTRICAL DISTRIBUTION AND FUSE PANELS ARE TO BE REVIEWED FOR 0.01 PERCENT OFF adversely affect the overall operation of the system.
C. NO DISTRIBUTION PANELS ARE TO BE MODIFIED OR ADDED.
D. NO NEW CIRCUIT BREAKERS ARE TO BE ADDED.
E. NO FUSE PANELS ARE TO BE ADDED OR MODIFIED.
F. NO NEW ELECTRICAL WIRING IS TO BE ADDED.
G. NO NEW ELECTRICAL MOUNTS ARE TO BE ADDED.
H. NO NEW ELECTRICAL ENCLOSURES ARE TO BE ADDED.

KEYED NOTES - E208

1. COORDINATE CONNECTIONS INTO EQUIPMENT INSTALLED UNDER THE SWGR REPLACEMENT PROJECT.
2. PROVIDE NEW BREAKER AS INDICATED ON SHEET E701.
3. CONNECT TO SPARE BREAKER. SEE E701.
4. ROUTE CONDUITS TO THE NEW PARALLELING SWGR PSE LOCATION.

KEY PLAN - E208

1. Coordinate with the architectural, structural, mechanical, and plumbing systems to avoid interference with or compromise of other systems.
2. Existing work is shown in light, and new work is shown in bold. This includes equipment provided in the SWGR Replacement Project.
3. Conduit route shown for general routing. Contractor is responsible for verifying existing conditions for the final conduit route.
4. Coordinate conduit route with other new conduit in the Switchgear Replacement Project.
5. Do not block access to existing equipment, such as dampers, with new installations.

No. Description Date
1. 100% CD REVIEW 06/24/2016
2. ISSUED FOR CONSTRUCTION 09/30/2016
A COORDINATE ELECTRICAL WORK WITH ARCHITECTURAL, STRUCTURAL, MECHANICAL AND PLUMBING SO AS TO AVOID INTERFERENCE WITH OR COMPROMISE OF OTHER SYSTEMS.

EXISTING IS SHOWN LIGHT AND NEW WORK IS SHOWN BOLD.

PROVIDE HEAT DETECTOR AT LOCATION OF EXISTING SMOKE DETECTOR AND CONNECT TO EXISTING FIRE ALARM CIRCUIT.

GENERATOR CAN BE BROUGHT IN THROUGH THE SHAFT. THE GENERATOR WILL BE SHIPPED IN THREE SECTIONS. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL DEMOLITION AND RENOVATION REQUIREMENTS.

EXISTING HIGH RESISTANCE GROUNDING CABINET. REMOVE EXISTING HIGH RESISTANCE GROUNDING BUSBAR; SEE KEYED NOTE 16. PROVIDE POST-GLOVER MODEL TO MATCH EXISTING HRG SYSTEMS.

NEW RESISTANCE GROUNDING CABINET (HRG). PROVIDE CONNECTION TO EXISTING HRG GROUNDING BUSBAR; SEE KEYED NOTE 16.

REMOVE EXISTING 3' HIGH GENERATOR PAD. PROVIDE NEW 4" GENERATOR PAD FOR NEW GENERATOR.

EXISTING GENERATOR NO. 2

LGEN2-4

Exhaust Air Shaft

100% CD REVIEW 06/24/2016

No. Description Date

1 1095-025-01_Elec_R15_rvance.rvt

EXISTING CONCRETE PAD OVERHEAD UNIT HEATER W/T-STAT

EXISTING HEAT DETECTOR

EXISTING SMOKE DETECTOR

EXISTING GENERATOR NO. 2

LGEN2

REMOTE ANNUNCIATOR

EMERGENCY STOP BUTTON

GENERATOR NO. 3

GENERATOR NO. 2

GENERATOR NO. 3

LGEN3

LGEN3-4

LGEN3-6,8

LGEN3-9

LGEN2-6,8

LGEN2-4

GENERATOR NO. 1

GENERATOR NO. 2

GENERATOR NO. 3

GENERATOR NO. 4

GENERATOR NO. 3

PENTHOUSE ENLARGED

PENTHOUSE RM P.102D POWER PLAN - DEMOLITION

PENTHOUSE RM P.102D POWER PLAN - RENOVATION

PENTHOUSE RM P.102D LIGHTING/FIRE ALARM PLAN - DEMOLITION

PENTHOUSE RM P.102D LIGHTING/FIRE ALARM PLAN - RENOVATION

1/4" = 1'-0"
KEYED NOTES - E401

1 SUGGESTED CRANE LOCATION SOUTH ELEVATION

2 EXHAUST SHAFT WALL

3 REFER TO 01/E100 FOR SUGGESTED CRANE LOCATION.

4 REMOVE WALL AND BOLTED BEAMS TO STRUCTURE TO ALLOW GENERATOR TO LOWER INTO THE EXHAUST SHAFT AND PLACED INTO POSITION. REFER TO MECHANICAL AND ARCHITECTURAL DRAWINGS FOR NEW LOUVERED WALL FOR GENERATOR EXHAUST.

EXHAUST SHAFT WALL

SUGGESTED CRANE LOCATION SOUTH ELEVATION
**GENERATOR EXHAUST SYSTEM SIDE VIEW - RENOVATION**

1. **BUILDING SUPPORT BEAM**
2. **BEAM CLAMP TYPE SUPPORT DETAIL**
3. **EXISTING LOUVER, 3' MIN.**
4. **EXISTING LOUVER, 3' MIN.**

**SCHEDULE - ELECTRIC UNIT HEATER**

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<th>Description</th>
<th>Quantity</th>
<th>Location</th>
<th>Watt</th>
<th>Motor HP</th>
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<td>230</td>
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**KEY NOTES - M100**

1. PROVIDE WALL MOUNTING KIT SIMILAR TO MODINE WMK.
2. PROVIDE UNIT WITH THERMOSTAT, PROGRAM TO 45 DEG F, FIELD ADJUSTABLE.
3. DIMENSION EXISTING UNIT HEATER, CONFIGURE, AND STEM PIPING BACK TO ISOLATION VALVE.

**PROJECT INFORMATION**

- **MSB GENERATOR REPLACEMENT**
- **MECHANICAL PLAN PENTHOUSE LEVEL & DETAILS**
- **UH-P102D P.102D 8 530 1/40 208 3 60 20 °F 7.5 BASIS OF DESIGN MODINE HER.**

**Checked By**

10/3/2016 1:49:52 PM
PLUMBING LEGEND

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<td>IN</td>
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<tr>
<td>F</td>
<td>FLEX CONNECTOR</td>
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GENERAL NOTES

1. PRIOR TO WORK CONTRACTOR SHALL THOROUGHLY COORDINATE PLUMBING WORK WITH OTHER TRADES.
2. PROVIDE A CLEAR COORDINATES FROM EACH THREAD TO WALL.
3. REFER TO ARCHITECTURAL DRAWINGS FOR PLUMBING FIXTURE MOUNTING HEIGHTS.
4. MAKE ROUGH IN AND FINAL CONNECTION TO ALL PLUMBING FIXTURES.
5. ALL NEW WORK SHALL CONFORM TO THE 2013 EDITION OF THE INTERNATIONAL PLUMBING CODE UNLESS OTHERWISE NOTED OR SHOWN.
6. DIMENSIONS ARE DIMENSIONAL ONLY. NOT ALL REQUIRED PIPES, BOLTS, FASTENERS AND ASSOCIATED FITTINGS ARE SHOWN. CONTRACTOR SHALL PROVIDE A COMPLETE WORKING PLUMBING SYSTEM FOR THE SPECIFICATIONS AND PLUMBING CODE.
7. PROVIDE A CLASS A SPRINKLER SYSTEM IN ACCORDANCE WITH 2013 EDITION OF NFPA 13. A HYDRAULICALLY TESTED SPRINKLER SYSTEM IN ACCORDANCE WITH 2013 EDITION OF NFPA 13. TO PROVIDE SPRINKLERS IN CONFORM TO THE BUILDING AS INDICATED ON THE FLOOR PLANS.
8. FIRE PROTECTION PIPES SHALL BE COORDINATED WITH OTHER TRADES, SUCH AS PLUMBING, Hvac, AND ELECTRICAL.
9. REFER TO REFER TO ELECTRICAL MOUNTING HOLE LAYOUT.
10. COORDINATE NATURAL GAS SERVICE TO BUILDING WITH UTILITY COMPANY PRIOR TO WORK.
11. CONTRACTOR SHALL OBTAIN ARCHITECT/ENGINEER APPROVAL FOR ALL ACCESS PANEL LOCATIONS.

NATURAL GAS RISER DIAGRAM

EMERGENCY GENERATOR

EMERGENCY GENERATOR NO. 3

MATERIALS SUPPLIED WITH GENERATOR, INSTALLED BY SV 22

EMERGENCY GENERATOR TO

2" DRY FUEL FILTER

EMERGENCY LOW PRESSURE SWITCH

GENERATOR

PLUMBING LEGEND, GENERAL

Drawing No. 10/3/2016 5:12:36 PM

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MSB GENERATOR REPLACEMENT

PLUMBING LEGEND, GENERAL NOTES AND SPECIFICATIONS

Sheet No.: P001

The University of Texas Health Science Center at Houston
CONTRACTOR SHALL COORDINATE DOWNTIME OF EXISTING SYSTEMS W/ OWNER PRIOR TO WORK.

KEYED NOTES - P308

1. REMOVE EXISTING 4" GAS LINE AT A PRESSURE REGULATOR AS SHOWN. REFER TO SHEET FOR DETAIL.

2. 4" SEATING VENT认真学习 PRESSURE REGULATOR AS SHOWN. REFER TO SHEET FOR DETAIL.

3. ADD 1" SHAPE TO HANG OVER OPEN 4" DRAIN AND ENSURE DRAIN HANGS AT LEAST 10" - 12" ABOVE FINISHED FLOOR IN AID OF DRAINAGE INTAKES.