CONTRACT DOCUMENTS
FOR
WAYNE STATE UNIVERSITY
ENGINEERING BUILDING
ELECTRICAL RELIABILITY UPGRADES
ADDENDUM No. 2

VICINITY MAP

NORTH

LOCATION MAP

NORTH

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WAYNE STATE UNIVERSITY

090-ENGINEERING BUILDING
5050 ANTHONY WAYNE DRIVE
ELECTRICAL RELIABILITY UPGRADES

WAYNE STATE UNIVERSITY
FACILITIES PLANNING & MANAGEMENT
5454 CASS AVENUE DETROIT, MICHIGAN

JAS DRAWN BY	CJM PROJECT LEAD
RSD DESIGNED BY	SRB REVIEWED BY
APPROVED BY	DATE

MARK	ISSUED FOR/REVISIONS	DATE
A	OWNERS REVIEW	8-15-2014
B	OUT FOR BID	8-26-2014
2	ADDENDUM No.2	9-15-2014

Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
AS SHOWN
SCALE:

SHEET TITLE
COVER SHEET

SHEET NO.
C-0

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FOUNDATIONS

1. FOOTINGS SHALL BE CARRIED DOWN TO UNDISTURBED SOIL HAVING A MINIMUM NET ALLOWABLE BEARING CAPACITY OF 2000 LBS PER SQUARE FOOT.

1A. GEOTECHNICAL INFORMATION IS UNAVAILABLE FOR THE SITE. FOOTINGS SHALL BE CARRIED DOWN TO UNDISTURBED SOIL HAVING AN ASSUMED NET ALLOWABLE BEARING CAPACITY OF 2 KIPS PER SQUARE FOOT FOR AN ASSUMED MAXIMUM SETTLEMENT OF 1/2" OR LESS. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENGAGE A MICHIGAN REGISTERED GEOTECHNICAL ENGINEER. THE GEOTECHNICAL ENGINEER SHALL VERIFY THE ASSUMED SOIL BEARING CAPACITY VIA BORE HOLES, TEST PITS, OR ANY OTHER MEANS NECESSARY TO ESTABLISH THE SUITABILITY OF THE BEARING STRATUM AND THE UNDERLYING SOILS TO SUPPORT THE LOADS.

2. DESIGN LATERAL EARTH PRESSURE IS EQUIVALENT FLUID PRESSURE OF 40PSF PER FOOT OF DEPTH.

3. NO FOUNDATION ELEMENTS SHALL BE PLACED IN WATER OR ON FROZEN GROUND. PROVIDE FROST PROTECTION FOR ALL FOOTINGS DURING WINTER CONSTRUCTION.

4. FINISHED EXCAVATIONS AND BEARING GRADES SHALL BE INSPECTED AND APPROVED BY THE OWNERS REPRESENTATIVE BEFORE ANY CONCRETE IS PLACED.

5. CONTRACTOR SHALL FURNISH ALL MEASURES REQUIRED TO MAINTAIN A DRY EXCAVATION. THE EXPOSED SUB GRADE SOILS ARE SUBJECT TO DISTURBANCE AND STRENGTH DEGRADATION WHEN HIGH MOISTURE CONTENTS ARE PRESENT. CONSTRUCTION TRAFFIC OVER EXPOSED SUB GRADE SHALL BE AVOIDED.

6. NO BACK FILLING AGAINST FOUNDATION WALLS AND GRADE BEAMS SHALL BE DONE UNTIL CONCRETE HAS ATTAINED 75% OF IT 28 DAY STRENGTH. BEFORE BACK FILLING, PROVIDE BRACING FOR WALLS AND GRADE BEAMS SUSTAINING MORE THAN 2'-0" OF UNBALANCED EARTH PRESSURE. BRACING IS TO REMAIN UNTIL PERMANENT RESTRAINTS BECOME EFFECTIVE.

7. CONCRETE FOR FOOTINGS AND GRADE BEAMS MAY BE PLACED AT CONTRACTORS OPTION INTO UNFORMED TRENCHES. IT IS THE CONTRACTORS RESPONSIBILITY TO MINIMIZE SLOUGHING OF SIDEWALLS. WHERE SLOUGHING OCCURS, REMOVE SLOUGHED SOIL AND/OR OVER EXCAVATE AT NO ADDITIONAL COST TO THE OWNER.

8. THE BEARING ELEVATION OF ALL FOUNDATION ELEMENTS ARE MINIMUM DEPTHS OF EXCAVATION. OVER-EXCAVATE WHERE REQUIRED TO ACHIEVE THE MINIMUM REQUIRED SOIL BEARING CAPACITY, FILL OVER-EXCAVATED AREAS WITH LEAN CONCRETE. (f'=2000 PSI MIN)

9. SPOILS OR EXCESS MATERIAL SHALL BE LEGALLY DISPOSED OF OFF SITE.

10. REFER TO GEOTECHNICAL REPORT PREPARED BY SOIL AND MATERIAL ENGINEERS (SME) DATED JULY 21, 2014.

STRUCTURAL STEEL

1. SHOP DETAILS, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF AISC "SPECIFICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", AISC "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", AND AISC "DETAILING FOR STEEL CONSTRUCTION."

2. UNLESS NOTED OTHERWISE, STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM AND THE MINIMUM YIELD STRENGTH (fy) AS FOLLOWS:

   A. W SHAPES: A992 (50 KSI)

   B. C SHAPES: A36 (36 KSI)

   C. L SHAPES: A36 (36 KSI)

   D. HSS SHAPES: A500 GR B (46 KSI)

   E. STEEL PIPE: A53 GR B (35 KSI)

   F. ALL OTHER PLATES AND SHAPES A36 (36 KSI)

3. BOLTS SHALL CONFORM TO ASTM A325 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."

4. ALL WELDING SHALL BE DONE BY AWS CERTIFIED WELDERS WITH APPROPRIATE E70 SERIES ELECTRODES COMPATIBLE WITH THE NEW AND EXISTING STEEL AND SHALL CONFORM TO THE REQUIREMENTS OF THE "CODE FOR WELDING IN BUILDING CONSTRUCTION" OF THE AMERICAN WELDING SOCIETY.

5. REFER TO ARCHITECTURAL DRAWINGS FOR STEEL PLATES, ANGLES, ETC., ATTACHED TO BEAMS, FRAMES ETC., FOR SUPPORT OF FASCIA AND OTHER CONSTRUCTION.

6. THE LENGTH DIMENSION AND THE CONNECTION DETAIL FROM NEW STRUCTURAL MEMBER TO THE EXISTING STRUCTURE SHALL BE FIELD VERIFIED BEFORE FABRICATION. NO FIELD MODIFICATION TO THE FABRICATED MEMBER OR CONNECTION IS ALLOWED WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

7. NO BURNING OF HOLES OR CUTTING OF MEMBER IN FIELD SHALL BE ALLOWED.

8. THOROUGHLY CLEAN ALL EXISTING SURFACES TO RECEIVE FIELD WELDS FROM RUST, PAINT, DEBRIS AND OTHER FOREIGN MATTER. ALL GALVANIZED MEMBERS SHALL BE GRINDED AT FIELD WELD LOCATIONS, AND TOUCHED-UP WITH ZINC-RICH PAINT.

9. ALL BRACING SHALL BE DESIGNED FOR A MINIMUM AXIAL LOAD (COMPRESSION OR TENSION) OF 15K AND SHALL HAVE A MINIMUM OF TWO BOLTS PER CONNECTION, UNLESS OTHERWISE INDICATED ON DRAWINGS.

10. WHERE BEAM END REACTIONS ARE NOT SHOWN ON PLAN, OR DOUBLE ANGLES.

   A. ALL NON COMPOSITE BEAMS SHALL BE DESIGNED FOR AN END REACTION AS TABULATED IN THE MOST RECENT EDITION OF THE AISC HANDBOOK, PART 2 (6 KIP MINIMUM)

11. MINIMUM SHOP DRAWINGS SUBMITTAL REQUIREMENTS: SUBMIT SHOP DRAWINGS INDICATING SIZES, MATERIAL TYPE, LAYOUT, CONNECTIONS, COATING SYSTEMS, AND DETAILS OF FABRICATION FOR ALL STRUCTURAL AND MISCELLANEOUS STEEL FOR ENGINEER REVIEW AND APPROVAL PRIOR TO COMMENCEMENT OF FABRICATION. ALL SHOP DRAWINGS SHALL BE ENGINEERING AND CERTIFIED BY CONTRACTOR PRIOR TO SUBMITTAL.

CAST-IN-PLACE CONCRETE

1. CONCRETE WORK SHALL CONFORM TO THE ACI STANDARD "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318) AND THE ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" (ACI 315).

2. CONCRETE (NORMAL WEIGHT), UNLESS OTHERWISE NOTED ON DRAWING, SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

3. CONCRETE CAR REINFORCEMENT SHALL BE NEW BILLET STEEL CONFORMING TO ASTM 615 GRADE 60.

4. CONCRETE ADMIXTURES SHALL NOT AFFECT ENGINEERING PROPERTIES OF CONCRETE. FOLLOW MANUFACTURER'S WRITTEN SPECIFICATIONS FOR APPLICATION.

5. CONCRETE SLABS, INCLUDING SLABS ON METAL DECKS, SHALL BE CAST SUCH THAT THE SLAB THICKNESS IS AT NO POINT LESS THAN THAT INDICATED ON THE DRAWINGS.

6. REINFORCEMENT SHALL HAVE THE FOLLOWING MINIMUM CONCRETE COVER:

   A. UNIFORMED SURFACES IN CONTACT WITH GROUND: (3 INCHES)

   B. SLABS ON GRADE: (1 INCH TOP COVER)

   C. FORMED SURFACES IN CONTACT WITH GROUND OR EXPOSED TO WEATHER: (3 INCHES)

   D. FORMED PIERS: (2 INCHES)

   E. INTERIOR WALL SURFACES: (1 INCH)

   F. IN ALL CASES, CLEARANCE NOT LESS THAN THE DIAMETER OF THE BARS.

   MAXIMUM DEVIATION FROM THESE REQUIREMENTS SHALL BE +1/4" FOR SECTIONS TEN INCHES OR LESS AND +1/2" FOR SECTIONS OVER TEN INCHES THICK.

7. WHERE CONTINUOUS BARS ARE CALLED FOR, THEY SHALL BE RUN CONTINUOUSLY AROUND CORNERS AND LAPPED AT NECESSARY SPLICES, AND HOOKED AT DISCONTINUOUS ENDS.

8. ALL CONCRETE EXPOSED TO THE ELEMENTS SHALL BE AIR-ENTRAINED 6% + 1% UNLESS OTHERWISE INDICATED.

9. ALL EXPOSED CONCRETE EDGES SHALL HAVE ¾" CHAMFER UNLESS OTHERWISE INDICATED.

10. REINFORCING EMBEDMENTS ARE SPLICES SHALL MEET MINIMUM REQUIREMENTS OF ACI 315 & 318. PROVIDE STANDARD HOOKS OR 90° BENDS AS REQUIRED TO FULLY DEVELOP REINFORCING AT THE CRITICAL SECTION.

11. WALLS AND GRADE BEAMS SHALL BE DOWELED TO FOOTINGS AND CONTINUOUS THROUGH PIERS.

12. MINIMUM SHOP DRAWINGS SUBMITTAL SHALL BE AS FOLLOWS:

   A. SUBMIT CONCRETE MIX DESIGN INCLUDING MATERIAL PROPERTIES, AGGREGATE GRADATIONS, WATER/CEMENT RATIOS, THEORETICAL YIELD, CEMENT DATA AND CYLINDER STRENGTH TEST DATA OF PROPOSED MIX FOR ENGINEER REVIEW AND APPROVAL PRIOR TO COMMENCEMENT OF WORK.

   B. SUBMIT SHOP DRAWINGS SHOWING MATERIAL PROPERTIES, SIZES, BENDING, LAPS, EMBEDMENTS, AND PLACEMENT OF ALL CONCRETE REINFORCING STEEL FOR ENGINEER REVIEW AND APPROVAL PRIOR TO COMMENCEMENT OF WORK.

   C. SUBMIT SHOP DRAWINGS SHOWING ALL PROPOSED CONSTRUCTION JOINT AND CONTROL JOINT LOCATIONS FOR APPROVAL PRIOR TO PREPARATION OF AFFECTED REINFORCEMENT.

13 CONCRETE TESTING FREQUENCY SHALL CONFORM TO THE MORE FREQUENT OF THE FOLLOWING:

   A. ACI STANDARDS (318), 5.6.2

   B. OWNER REQUIREMENTS

14. CONCRETE FIELD AND LABORATORY TESTING SHALL BE PERFORMED BY AN ACI TESTING TECHNICIAN GRADE 1 OR EQUIVALENT AND INCLUDE AT A MINIMUM:

   A. SAMPLING: (ASTM C 172)

   B. TEMPERATURE: (50-85) 0°F (ASTM C 1064)

   C. SLUMP: 2-4 INCHES (ASTM C 143)

   D. AIR CONTENT: 6%+ 1% (ASTM C 231, C 173)

   E. CURING: (ASTM C 31, OR C 192)

   F. COMPRESSION: (ASTM C39)

15. CONCRETE CURING

   A. HOT WEATHER CURING, GREATER THAN 77°F, IMMEDIATELY AFTER FINISHING PROTECT FROM EXCESSIVE DRYING FOR MINIMUM OF 24 HOURS BY ONE OF THE FOLLOWING:
   1. CURING PAPER
   2. HEAT-REFLECTING PLASTIC
   3. MEMBRANE-FORMING COMPOUNDS
   4. FOGGING

   B. COLD WEATHER CURING, LESS THE 50°F FOR 12 HOURS, MAINTAIN INTERVAL TEMPERATURE AND SURFACE TEMPERATURE AT OR GREATER THAN 50°F FOR 7 DAYS USING ACCEPTED CURING METHODS.

COATING SYSTEMS

1. ALL STRUCTURAL STEEL AND MISC. METALS SHALL BE HOT DIPPED GALVANIZED AS PER ASTM-A123.

2. PREPARE ALL STEEL SURFACES AND SHOP WELDS FOR GALVANIZING PROCESS, INCLUDING THE REMOVAL OF ALL LACQUERS AND POINT, PROVIDE RELIEF/DRAINAGE HOLES IN MEMBERS AS REQUIRED

3. STRUCTURAL BOLT ASSEMBLIES SHALL BE GALVANIZED PER ASTM 153.

4. ALL STRUCTURAL SHAPES SHALL BE SHOP PRIMED WITH ZINC RICH PRIMER TO WINTHIN 3" OF FIELD WELDS, FIELD TOUCH-UP AS REQUIRED. FINISH COAT SHALL BE APPLIED TO MEET OWNER SPECIFICATIONS.

CONTROLLED LOW-STRENGTH MATERIAL (FLOWABLE FILL)

1. THE FOLLOWING STANDARDS APPLY:

   A. AMERICAN CONCRETE INSTITUTE (ACI):

      a. 229R-98, CONTROLLED LOW STRENGTH MATERIALS.

   B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARD:

      a. C 33-97, SPECIFICATION FOR CONCRETE AGGREGATES.

      b. C 94-00E2, STANDARD SPECIFICATION FOR READY MIX CONCRETE.

      c. C 143-00, STANDARD TEST METHOD FOR SLUMP OF HYDRAULIC CEMENT CONCRETE.

      d. C 150-00, STANDARD SPECIFICATION FOR PORTLAND CEMENT.

      e. C 168-01, STANDARD SPECIFICATION FOR COAL FLY ASH AND RAW OR CALCINED NATURAL POZZOLAN FOR USE AS MINERAL ADMIXTURE IN CONCRETE.

      f. D 448-86 (1993), CLASSIFICATION FOR SIZES OF AGGREGATE FOR ROAD AND BRIDGE CONSTRUCTION.

      g. D 653-97, TERMINOLOGY RELATING TO SOIL, ROCK AND CONTAINED FLUIDS

      h. D 698-91, TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT.

      i. D 2216-92, TEST METHOD FOR LABORATORY DETERMINATION OF WATER (MOISTURE) CONTENT OF SOIL AND ROCK.

      j. D 2487-93, CLASSIFICATION OF SOLID FOR ENGINEERING PURPOSES (UNIFIED SOIL CLASSIFICATION SYSTEM).

      k. D 2974-87, TEST METHODS FOR MOISTURE, ASH AND ORGANIC MATTER OF PEAT AND OTHER ORGANIC SOILS.

      l. D 3017-96, TEST METHOD FOR WATER CONTENT OF SOIL AND ROCK IN PLACE BY NUCLEAR METHODS (SHALLOW DEPTH).

      m. D 4832-95EL, STANDARD TEST METHOD FOR PREPARATION AND TESTING OF CONTROLLED MATERIAL (CLCM) TEST CYLINDERS.

2. MATERIALS:

      a. FLY ASH CLASS F IN ACCORDANCE WITH ASTM C 618

      b. PORTLAND CEMENT, IN ACCORDANCE WITH ASTM C 150, MINIMUM 100 POUNDS PER CUBIC YARD.

      c. FINE AGGREGATE (OPTIONAL), IN ACCORDANCE WITH ASTM C 33.

      d. WATER, IN ACCORDANCE WITH ASTM C 94.

3. QUALITY ASSURANCE:

      a. SLUMP, 7 TO 10 INCHES, MEASURED IN ACCORDANCE WITH ASTM C 143.

      b. MINIMUM 28 DAY COMPRESSIVE STRENGTH, 100 PSI, TESTED IN ACCORDANCE WITH ASTM D 4832.

4. SUBMIT CLSM MIX DESIGN INCLUDING MATERIAL PROPERTIES, AGGREGATE GRADATIONS, WATER/CEMENT RATIOS, THEORETICAL YIELD, CEMENT DATA AND CYLINDER STRENGTH TEST DATA OF PROPOSED MIX FOR ENGINEER REVIEW AND APPROVAL PRIOR TO COMMENCEMENT OF WORK.

ANCHOR BOLTS AND GROUT

1. U.N.O ANCHOR BOLTS, BASE PLATES OR BEARING PLATES SHALL BE LOCATED AND BUILT INTO CONNECTING WORK, PRESET BY TEMPLATES OR SIMILAR METHOD. PLATES SHALL BE SET IN FULL BEDS OF NON-SHRINK MORTAR OR GROUT.

2. ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED.

3. ADHESIVE ANCHORS SHALL BE HILTI HIT HY150. FOR INSTALLATION IN TEMP BELOW 30°F USE HILTI HIT-ICE ADHESIVE.

STEEL GRATING

1. STEEL GRATING SHALL CONFORM TO ASTM A36 STEEL SPECIFICATION.

2. MAIN BEARING BARS SHALL BE 1" DEEP BY 3/16" THICK, SPACED AT 1 3/16" CENTERS.

3. CROSS BARS SHALL BE WELDED AND SPACED AT 4" CENTERS U.O.N.

4. FINISH TO BE GALVANIZED.

5. OVERALL DIMENSIONS SHALL BE FIELD VERIFIED BY CONTRACTOR AND SPAN DIRECTION SHALL BE IN ACCORDANCE WITH PLANS.

6. GRATING SHALL BE FASTENED TO SUPPORTING STEEL BY WELDING.

7. WELDED INSTALLATIONS SHALL BE AS FOLLOWS: TACK WELD EVERY FOURTH BEARING BAR OF EACH PANEL TO EACH SUPPORT MEMBER WITH 3/16" FILLET WELD X ¾" LONG.

8. EXPOSED ENDS OF BEARING BARS SHALL BE BANDED.

DESIGN CRITERIA

1. BUILDING DESIGN CODE: MICHIGAN BUILDING CODE 2009

2. LIVE LOADS: LL REDUCTIONS NOT INCLUDED

   A. MAINTENANCE WALKWAYS: 40 PSF*

   B. AREAS SUBJECT TO VEHICLE TRAFFIC: AASHTO H-20 LOADING OR 250 PSF UNIFORM SURCHARGE.

   C. ROOF LOADS: 30 PSF* ADDITIONAL DRIFT LOADING DUE TO CHANGES IN ELEVATION OF ROOF ELEMENTS APPLIED PER SPECIFIED BLDG. CODE.

3. DEAD LOADS:

   A. SUPERIMPOSED DEAD LOADS: 10 PSF

   B. SUSPENDED UTILITIES TYP U.O.N.: 10 PSF*

4. WIND LOADS FOR MAIN WINDFRAME RESISTING SYSTEM: PER SPECIFIED BUILDING CODE

5. SEISMIC DESIGN LOADS: PER SPECIFIED BUILDING CODE.

6. BUILDING IS DESIGN FOR ADDITIONAL FUTURE VERTICAL EXTENSION AS FOLLOWS:

7. GROSS OPERATING WT OF GENSET: 30,000#

8. GROSS OPERATING WT OF TRANSFORMER: 16,500#

9. SOIL OR FILL SURCHARGE 40 PSF PER FOOT OF DEPTH OF BACKFILL MATERIAL IN ADDITION TO PRESSURES INDUCED BY DESIGN SURCHARGE LIVE LOADS.

9. GEOTECHNICAL INFORMATION IS BASED UPON GEOTECHNICAL INVESTIGATION/REPORT BY SOIL AND MATERIALS ENGINEERS, INC. (SME) DATED JULY 21, 2014

10. SITE SURVEY PROVIDED AS REFERENCE BY NOWAK & FRAUS DATED 6-25-2014 AND IS USED AS A BASICS OF DESIGN FOR SITE DEMOLITION, DESIGN & RESTORATION.

GENERAL

1. THESE NOTES ARE COMPLEMENTARY TO THE SPECIFICATIONS AND REPRESENT MINIMUM REQUIREMENTS. REFER TO SPECIFICATIONS FOR ADDITIONAL OR MORE STRINGENT REQUIREMENTS.

2. ALL WORK SHALL BE PERFORMED IN STRICT COMPLIANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES AND REGULATIONS.

3. VERIFY THE SIZES, LOCATIONS, ELEVATIONS AND DETAILS OF THE EXISTING CONDITIONS THAT AFFECT THE WORK AND INFORM THE OWNER OF ANY DISCREPANCIES IN DIMENSIONS, SIZES, LOCATIONS AND CONDITIONS BEFORE PROCEEDING WITH THE WORK.

4. PROVIDE SHORING, BRACING, UNDERPINNING AND ANY OTHER MEANS REQUIRED TO PROTECT THE SAFETY, INTEGRITY AND STABILITY OF ALL NEW AND EXISTING CONSTRUCTION.

5. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AT THE SITE, INCLUDING UTILITIES, SERVICES, ETC., AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROPERTY, NEW AND EXISTING CONSTRUCTION, AND FOR UNAUTHORIZED DISRUPTIONS TO THE OWNERS OPERATION, UTILIZES AND SERVICES.

6. TYPICAL DETAILS APPLY TO ALL DRAWINGS AND SHALL BE USED UNLESS OTHERWISE NOTED OR DETAILED.

7. SEE ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND SHOP DRAWINGS FOR SIZE AND LOCATION OF OPENINGS, OFFSETS, STAIR DETAILS, UTILITY LOCATIONS AND OTHER DETAILS & DIMENSIONS, NOT INDICATED ON STRUCTURAL DRAWINGS.

8. NORMAL OPERATIONS WILL BE CONTINUED BY THE OWNER THROUGHOUT THE DURATION OF CONSTRUCTION. ANY INTERFERENCE, UTILITY OUTAGE, OR DISRUPTION TO THE OWNER'S OPERATION MUST BE COORDINATED WITH THE OWNER AND AUTHORIZED IN WRITING BEFORE PROCEEDING WITH WORK.

9. EQUIPMENT INSTALLATION DETAILS, REQUIREMENTS AND DIMENSIONS ARE PROVIDED FOR BIDDING PURPOSES ONLY AND ARE SUBJECT TO CHANGE UNTIL EQUIPMENT IS PURCHASED. CONTRACTOR IS RESPONSIBLE TO OBTAIN FINAL APPROVED, CERTIFIED MANUFACTURERS SHOP DRAWINGS FOR ALL EQUIPMENT AND INSTALL EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURERS WRITTEN REQUIREMENTS. THIS INCLUDES, BUT IS NOT LIMITED TO, FINAL ANCHOR BOLT SIZE, SPACING, DETAILS AND INSTALLATION, EQUIPMENT INSTALLING METHODS AND REQUIREMENTS, PROPER LEVELING GROUTING AND ANCHORAGE, AND TEMPORARY SUPPORT AND PROTECTIVE MEASURES DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL INCIDENTAL MATERIALS, TOOLS AND SUPERVISION TO PROVIDE A COMPLETE AND CORRECT INSTALLATION CAPABLE FOR CERTIFICATION BY THE EQUIPMENT MANUFACTURER. DISCREPANCIES OR PROBLEMS SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE FOR DIRECTION BEFORE PROCEEDING WITH INSTALLATION OF ANY EQUIPMENT COMPONENTS. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CORRECTING NON-CONFORMING EQUIPMENT INSTALLATION.

ELECTRICAL DEMOLITION

ELECTRICAL DEMOLITION

1. ABANDONED AND INACTIVE CONDUITS, WIRE, DEVICES, EQUIPMENT, ETC., SHALL BE REMOVED IN THEIR ENTIRETY. ABOVE NEW CEILINGS, EXISTING LIGHTING FIXTURES SHALL BE REMOVED. CONDUIT AND BOXES SHALL BE REMOVED. CONDUIT AND WIRING FEEDING DEVICES, AND EQUIPMENT TO BE REMOVED SHALL BE ALSO REMOVED UP TO THE NEXT ACTIVE PULL BOX, JUNCTION BOX OR PANEL. HANGERS, MESSENGER CABLE, BRACKETS ETC., SUPPORTING ITEMS TO BE REMOVED SHALL ALSO BE UNFASTENED AND REMOVED. OPEN HOLES IN DUCTS, BOXES, PANELS AND KNOCK-OUTS SHALL BE CLOSED WITH SUITABLE SNAP PLUGS OR BLANK-OFF STEEL PLATES.

2. THE CONTRACTOR SHALL REMOVE AND DELIVER TO A PLACE DESIGNATED BY THE UNIVERSITY, ALL EXISTING ELECTRICAL EQUIPMENT SELECTED FOR SALVAGE BY THE UNIVERSITY. THIS EQUIPMENT REMAINS THE PROPERTY OF THE UNIVERSITY. ANY EQUIPMENT, DEVICES, MATERIALS, ETC., THAT THE UNIVERSITY ELECTS NOT TO RETAIN SHALL BE LEGALLY DISPOSED OF BY THIS CONTRACTOR.

ELECTRIC - GENERAL

1. THE INSTALLATION SHALL BE IN ACCORDANCE WITH WSU CONSTRUCTION DESIGN STDS AND WITH ALL APPLICABLE CODES. INCLUDING NFPA 70, NFPA 110.6 FLASH PROTECTION, FPN N01 NFP, 70E, FPN N02, ANSI Z535.4 - 1998

2. LOCATE EQUIPMENT REQUIRING MAINTENANCE SO THAT IT IS EASILY ACCESSIBLE. AVOID INSTALLATIONS THAT REQUIRE THE USE OF LIFTS OR SCAFFOLDING, OR THE REMOVAL OF OTHER EQUIPMENT, FOR ROUTINE MAINTENANCE. PROVIDE ACCESS DOORS TO ALL MAINTAINABLE EQUIPMENT LOCATED BEHIND WALLS OR ABOVE PERMANENT CEILINGS. DO NOT CREATE CONFINED SPACES OF ANY REGULATED DESCRIPTION.

3. PROVIDE RACEWAYS FOR ALL WIRING UNLESS OTHERWISE AGREED. ALL POWER WIRING SHALL BE ENCLOSED IN CONCEALED RACEWAYS. ALL RACEWAYS SHALL BEAR UL LABELING FOR THE APPLICATION SELECTED.

4. DO NOT MIX WIRING SYSTEMS. PROVIDE SEPARATE RACEWAYS FOR DIFFERENT SYSTEMS BY VOLTAGE, TYPE OR PURPOSE. PROVIDE 120/208 VOLT SEPARATE FROM 277/480 VOLTS.

5. EXIT AND EMERGENCY LIGHTING SEPARATE. FIRE ALARM, SECURITY, TELE/COMM/DATA/AUDIOVISUAL MAY BE COMBINED IN A SUITABLE CABLE TRAY.

6. PROVIDE PIPE SLEEVES WHERE CONDUITS PASS THROUGH CONCRETE FLOORS, WALLS, BEAMS AND CEILINGS. CORE DRILLED SLEEVES SHALL BE SET WITH STEEL TABS AND GROUTED WITH EXPANDED GROUT.
ALUMINUM CONDUIT SHALL NOT BE USED. WHERE SPECIFIC SIZES ARE NOT INDICATED ON DRAWINGS, SLEEVES SHALL BE SIZED TO PROVIDE ONE-HALF (1/2) INCH CLEARANCE BETWEEN THE OUTSIDE SURFACES OF THE ITEM FOR WHICH THEY WERE INSTALLED. THEY SHALL BE FLUSH WITH WALL SURFACES, AND SHALL EXTEND 1-1/2", OR AS DIRECTED, ABOVE FINISHED FLOOR LEVELS. THE SPACE BETWEEN CONDUIT AND SLEEVES SHALL BE FIRE STOPPED USING ONE OF THE METHODS DETAILED IN THE UL FIRE RESISTANCE DIRECTORY, VOL. 2, THROUGH - PENETRATION FIRESTOP SYSTEMS, LATEST EDITION. SEAL ANY OPENINGS BETWEEN SLEEVES AND CONCRETE IN AN APPROPRIATE MANNER.

7. THE FILLER MATERIALS AND METHODS USED SHALL BE RATED AT LEAST EQUAL TO THE FIRE RESISTANCE OF THE CONSTRUCTION MATERIAL BEING PENETRATED.

8. PROVIDE CONCRETE ENVELOPES FOR BELOW GRADE CONDUITS AND HOUSEKEEPING PADS FOR MOTOR CONTROL CENTERS, FLOOR MOUNTED DISTRIBUTION PANELS, MOTOR CONTROL CENTERS, TRANSFORMERS, SWITCHGEAR, ETC.

9. CONCRETE WORK SHALL BE DONE BY THE CONTRACTOR FOR CONCRETE WORK BUT PAID FOR BY THIS CONTRACTOR. PROVIDE 4" INCH HIGH CONCRETE HOUSEKEEPING PADS FOR EQUIPMENT UNLESS OTHERWISE NOTED.

10. CONCRETE PADS FOR PRIMARY SWITCH UNITS AND UNIT SUBSTATIONS SHALL HAVE ANGLE IRON OR CHANNEL NOSING.

11. ALL CONTRACTORS MUST OBTAIN APPROVAL FROM THE UNIVERSITY PROJECT MANAGER PRIOR TO INTERRUPTING EXISTING SERVICES. ALL SERVICE INTERRUPTIONS SHALL BE AT A TIME SUITABLE TO THE UNIVERSITY. INCLUDE SPECIFICATION LANGUAGE COVERING OFF HOURS TIE-INS.

12. IN GENERAL, ALL SHUTDOWN OF ELECTRICAL SERVICES SHALL BE PERFORMED DURING OFF HOURS AND MAY INCLUDE SUNDAY AND HOLIDAY PERIODS. THIS PREMIUM TIME COST SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID.

13. ALL CONDUITS & RACEWAYS SHALL BE CONCEALED IN FINISHED AREAS UNLESS OTHERWISE NOTED. EXPOSED WORK SHALL BE INSTALLED PERPENDICULAR OR PARALLEL TO WALLS, CEILINGS, AND STRUCTURAL MEMBERS AND COORDINATED WITH MECHANICAL DUCTS, PIPES AND EQUIPMENT.

14. FOR WORK IN FINISHED ROOMS WITHOUT CEILINGS, THE CONDUIT SHALL BE RUN EXPOSED EXCEPT AS NOTED HEREINBEFORE. CONDUIT DROPS FOR OUTLETS, SWITCHES, ETC., SHALL BE RUN CONCEALED IN THE WALL CONSTRUCTION AND SUCH CONDUITS SHALL BE CONCEALED UP TO A POINT AS DETERMINED BY DESIGNER.

15. ALL INDOOR CONDUIT SHALL COMPLY WITH WSU CONSTR. DESIGN STD 16110 & INTERIOR CONDUIT BEYOND 10' FROM BLDGS SHALL BE SCH 40 PVC; EXTERIOR CONDUIT WITHIN 10' OF BUILDING SHALL BE GRS. INDOOR CONDUIT SHALL BE EMT UNLESS OTHERWISE NOTED.

BASIC MATERIALS AND METHODS

1. MINIMUM SIZE CONDUIT IS 3/4" UNLESS OTHERWISE INDICATED.

2. EXTERIOR CONDUIT BEYOND TEN FEET FROM BUILDING SHALL BE SCHEDULE 40 PVC, MINIMUM ¾"

3. EXTERIOR CONDUIT WITHIN TEN FEET FROM THE BUILDING FOUNDATION WALL SHALL BE GALVANIZED RIGID STEEL, MINIMUM 3/4"

4. ALL LARGE (3" OR LARGER) BURIED CONDUITS CONTAINING CONDUCTORS FROM GENERATORS SHALL BE PVC: ELBOWS OR SWEEPS SHALL BE GALVANIZED RIGID STEEL. CONDUITS PROJECTING THROUGH CONCRETE SLABS OR EXTENDING ABOVE GRADE SHALL BE GALVANIZED RIGID STEEL.

5. ALL EXTERIOR UNDERGROUND CONDUITS SHALL INCORPORATE A CONDUCTIVE WARNING TAPE BURIED ABOVE THE CONDUIT.

6. INTERIOR CONDUIT UNDER SLAB ON GRADE SHALL BE SCHEDULE 40 PVC, MINIMUM ¾"

7. NO CONDUIT SHALL BE PLACED IN CONCRETE ROOF OR FLOOR SLABS.

8. CONDUIT IN WET/DAMP LOCATIONS SHALL BE GALVANIZED RIGID STEEL, MINIMUM 3/4"

9. IN CONCEALED DRY LOCATIONS USE ELECTRICAL METALLIC TUBING (EMT) THRU 4" IN DRYWALL PARTITIONS AND ABOVE CEILING.

10. IN EXPOSED DRY LOCATIONS USE ELECTRICAL METALLIC TUBING (EMT) THRU 4".

11. CONDUITS OF 4" AND LARGER SHALL BE GALVANIZED RIGID STEEL WITH THREADED FITTINGS, PROVIDE SWEEPS IN LIEU OF ELBOWS.

12.

ELECTRICAL INSTALLATION

1. INSTALL CONDUIT IN ACCORDANCE WITH NFPA 70 "STANDARD OF INSTALLATION".

2. FLEXIBLE CONDUIT SHALL BE SUPPORTED AT INTERVALS OF 3"-0" MAXIMUM.

3. SUPPORT CONDUIT USING COATED STEEL OR MALLEABLE IRON STRAPS, LAY-IN ADJUSTABLE HANDERS, CLEVIS HANGERS, AND SPLIT HANDERS WITH ¼" ROD MINIMUM.

4. DO NOT ATTACH CONDUIT TO CEILING SUPPORT WIRES, OR SUPPORT OF OTHER TRADES, UNLESS SPECIFICALLY DESIGNED.

5. ARRANGE EXPOSED CONDUITS TO MAINTAIN HEADROOM AND PRESENT NEAT APPEARANCE.

6. ROUTE CONDUIT PARALLEL AND PERPENDICULAR TO WALLS.

7. ROUTE CONDUIT INSTALLED ABOVE ACCESSIBLE CEILING PARALLEL AND PERPENDICULAR TO WALLS.

8. ROUTE CONDUIT UNDER SLAB FROM POINT-TO-POINT.

9. MAINTAIN 12 INCH CLEARANCE BETWEEN CONDUIT AND SURFACES WITH TEMPERATURES EXCEEDING 104F.

10. INSTALL NO MORE THAN THE EQUIVALENT OF THREE 90 DEGREES BENDS BETWEEN BOXES. USE CONDUIT BODIES TO MAKE SHARP CHANGES IN DIRECTION, AS AROUND BEAMS. USE FACTORY ELBOWS FOR BENDS IN METAL CONDUIT LARGER THAN 2 INCH SIZE.

11. PROVIDE SUITABLE FITTINGS TO ACCOMMODATE EXPANSION AND DEFLECTION WHERE CONDUIT CROSSES CONTROL AND EXPANSION JOINT.

12. GROUND AND BOND CONDUIT UNDER PROVISIONS OF SPECIFICATIONS.

13. PROVIDE FLEXIBLE CONNECTIONS TO RESILIENTLY MOUNTED EQUIPMENT AND DRY TRANSFORMERS.

14. MAKE CONDUIT CONNECTIONS TO EQUIPMENT USING FLEXIBLE CONDUIT. USE LIQUID TIGHT FLEXIBLE CONDUIT WITH WATERTIGHT CONNECTORS IN DAMP OR WET LOCATIONS.

15. MAKE WIRING CONNECTIONS USING WIRE AND CABLE WITH INSULATION SUITABLE FOR TEMPERATURE ENCOUNTERED IN HEAT PRODUCING EQUIPMENT.

16. PROVIDE RECEPTACLE OUTLET WHERE CONNECTION WITH ATTACHMENT PLUG IS INDICATED. PROVIDE CORD AND CAP WHERE FIELD-SUPPLIED ATTACHMENT PLUG IS INDICATED.

17. PROVIDE SUITABLE STRAIN-RELIEF CLAMPS AND FITTINGS FOR CORD CONNECTIONS AT OUTLET BOXES AND EQUIPMENT CONNECTION BOXES.

18. MOMENTS ARE REQUIRED FOR BELOW GRADE ELECTRIC ROUTING TO INDICATE LOCATION & ROUTING.

DESIGN BASIS FOR ELECTRICAL EQUIPMENT AS PROVIDED BELOW:

REVISIONS MAY BE REQUIRED FOR SUPPORT REQUIREMENTS AND INTERFACE WITH UTILITIES BASED UPON FINAL PURCHASED EQUIPMENT.
COORDINATE WITH MANUFACTURERS APPROVED SHOP DRAWINGS FOR PURCHASED EQUIPMENT BEFORE FABRICATION AND CONSTRUCTION.

SEE SHEET 102.1

ENGINEERING BUILDING

1. ALL SHUT DOWN WORK IS TO BE COORDINATED SO THAT WORK IS SCHEDULED FOR SUNDAYS OR HOLIDAYS. THE PREMIUM PORTION ONLY OF WAGES ASSOCIATED WITH A SHUTDOWN IS TO BE COVERED IN THE ALLOWANCE THAT IS TO BE INCLUDED IN THE BASE BID. (FOR ENGINEERING THIS ALLOWANCE IS $25,000.) IT WILL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE HOW TO SEQUENCE THE WORK, AS WELL AS THE MEANS AND METHODS NECESSARY TO PROVIDE POWER TO THE BUILDING FOR ANY SHUT DOWN, INCLUDING PROVIDING ANY NECESSARY EQUIPMENT, (RENTING / OPERATING GENERATORS, PROVIDING FUEL, ETC.) TO SUPPORT A BUILDING LOAD OF 1.0MW FOR ENGINEERING AND 125 KW FOR EDC. PROPOSED SEQUENCING AND MEANS AND METHODS MUST BE REVIEWED AND APPROVED BY WSU AND ALL COSTS TO SUPPORT THE PROPOSED SEQUENCING AND PROVIDE POWER FOR ANY SHUT DOWN IS TO BE INCLUDED WITHIN THE BASE BID. NOTE: CONTRACTORS MUST PROVIDE AT A MINIMUM A SEVEN (7) DAY ADVANCED SHUT DOWN NOTICE FOR DISRUPTION OF ANY UTILITIES, AND TEMPORARY ENCLOSURES SHALL BE INSTALLED AS SECURITY MEASURES AROUND CABLES BETWEEN ANY TEMPORARY GENERATOR AND A SECURE AREA AT THE BUILDING.

2

UPS INSTALLATION

1. INSTALL UPS SYSTEM INCLUDING NEW DISTRIBUTION PANELS AND BRANCH CIRCUITS TO THE LAB/EQUIPMENT LOADS.

2. INSTALL NEW FEED TO UPS FROM NEW 400A PLUG IN BUS DISCONNECT IN THE BASEMENT ROOM

3. COORDINATE MAXIMUM 4 HOUR OUTAGE WITH WSU TO TIE-IN NEW UPS FEED.

EMERGENCY GENERATOR INSTALLATION

1. INSTALL 2000KVA DIESEL GENERATOR

2. INSTALL NEW 2000KVA, 480V-4800V PAD-MOUNTED TRANSFORMER AND NEW ATS-5 FOR 100/300 BUILDING SECTION.

3. INSTALL NEW EXTERIOR TRANSFER SWITCH ATS-4 FOR EDC BUILDING SECTION.

4. INSTALL CONDUITS AND CABLES EXTENDING FROM GENERATOR TO TRANSFORMER AND ATS'S

5. COORDINATE SEPARATE BUILDING OUTAGES WITH WSU, MAXIMUM 6 HOURS DURATION TO ESTABLISH AND TEST EACH OF THE FOLLOWING CONNECTIONS TO THE EXISTING BUILDING ELECTRICAL SYSTEM: FOR EDC BUILDING SECTIONS, TIE EXISTING BUILDING FEED TO ATS-4 AND RE-FEED MAIN DISTRIBUTION PANELS. FOR 100/300 BUILDING SECTION, TIE EXISTING BUILDING FEED TO ATS-5 TO EXTERIOR PAD-MOUNTED ELECTRICAL GEAR RE-FEED MAIN DISTRIBUTION PANELS TEST AND COMMISSION OPERATION OF NEW GENERATOR, TRANSFORMER AND AST-4 AND 5.

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JAS — DRAWN BY
CJM — PROJECT LEAD
RSD — DESIGNED BY
SRB — REVIEWED BY
APPROVED BY
DATE

MARK	ISSUED FOR/REVISIONS	DATE
A	OWNERS REVIEW	8-1-2014
B	OUT FOR BID	8-26-2014
2	ADDENDUM No.2	9-15-2014

Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
N/A
SCALE:

SHEET TITLE
GENERAL NOTES AND DESIGN CRITERIA

SHEET NO.
G-1

REV NO.
2

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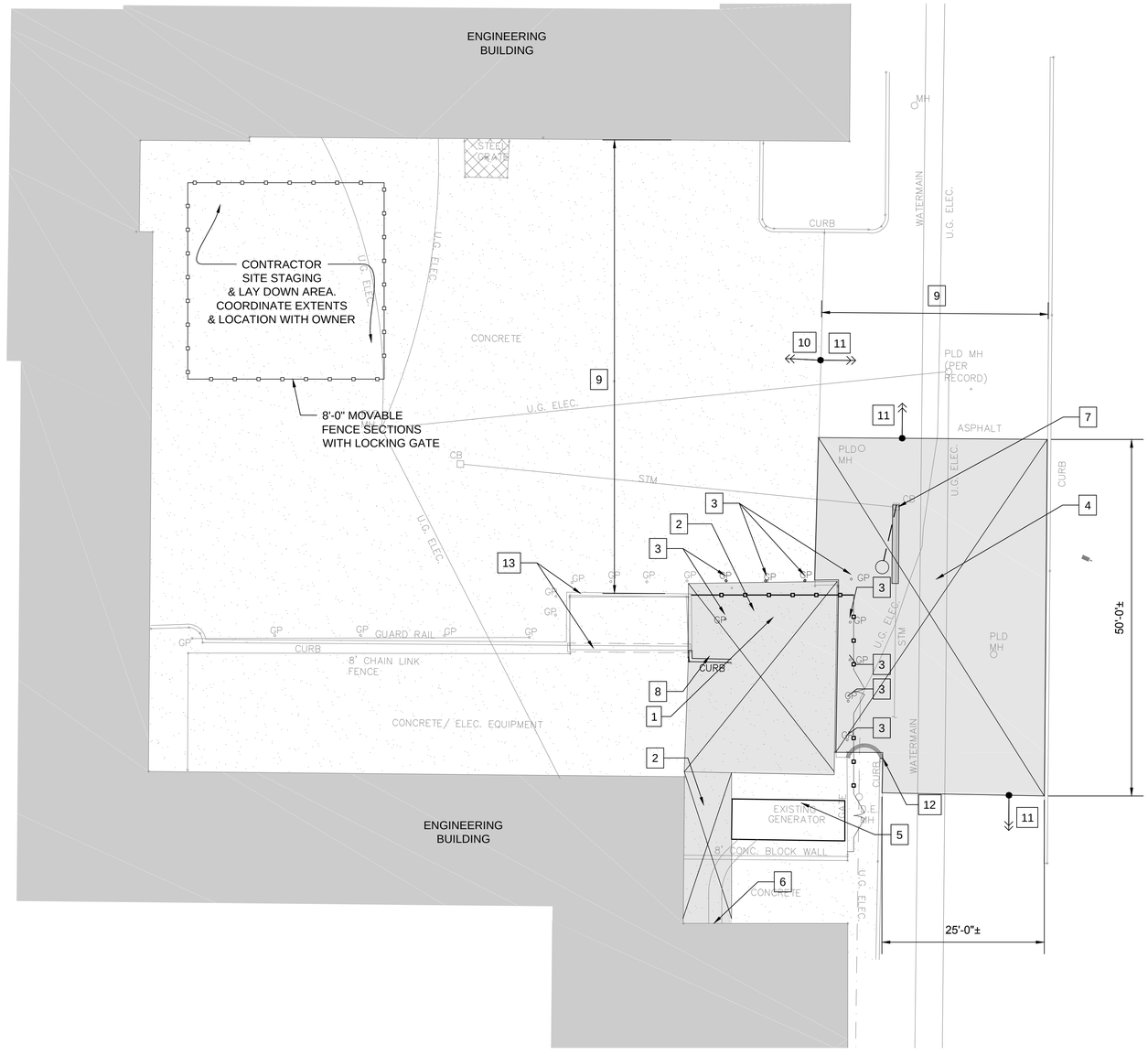


SITE DEMOLITION PLAN

NORTH

1" = 10'

0' 5' 10' 20'

SCALE IN FEET

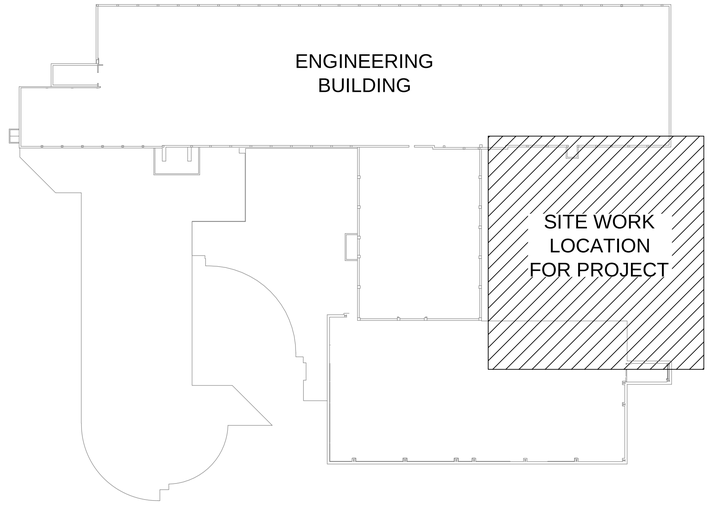
SITE DEMOLITION KEY NOTES

1. NITROGEN TANK & ASSOCIATED PIPING TO BE REMOVED BY OTHERS
2. REMOVE EXISTING PAVEMENT. CONCRETE PADS, FENCING & MISCELLANEOUS SITE ELEMENTS
3. REMOVE GUARD POST AS INDICATED ON PLAN.
4. REMOVE EXISTING ASPHALT PAVING.
5. PROTECT EXISTING GENERATOR & MAINTAIN IN CONTINUOUS OPERATIONAL CONDITION.
6. REFER TO STRUCTURAL & ELECTRICAL DRAWINGS FOR BUILDING INTERFACE REQUIREMENTS.
7. REMOVE APPROXIMATELY 12'-0" OF EXISTING STORM LINE FOR NEW MANHOLE & OIL STOP VALVE
8. REMOVE EXIST. MASONRY WALL FULL HEIGHT, FOUNDATION, ETC.
9. FOR SITE DEMOLITION RECONSTRUCTION MAINTAIN PASSABLE LANE AND ACCESS TO PARKING AT ALL TIMES
10. EXISTING CONCRETE PAVEMENT TO REMAIN
11. EXISTING ASPHALT PAVING TO REMAIN
12. REMOVE PORTION OF EXISTING CURB
13. EXISTING SHED STRUCTURE, WALL & SILANE STORAGE TO REMAIN.

PLAN NOTES

1. SITE SURVEY PROVIDED BY NOWAK & FRAUS DATED 6-25-2014 IS USED AS A BASIS FOR SITE DEMOLITION, DESIGN & RESTORATION. NO TOPOGRAPHY OR BENCHMARK AVAILABLE.
2. BENCHMARK: EXISTING STORM CATCH BASIN RIM TO BE MODIFIED = REF EL. 100'-0"
3. UNCHARTED UTILITIES MAY EXIST. & THE UTILITIES NOTED ON PLANS MAY VARY FROM LOCATIONS SHOWN ON THE SURVEY. ELEVATION DATA IS UNAVAILABLE FOR INVERTS & UTILITY DEPTHS. PROVIDE GROUND PENETRATION RADAR SURVEY TO LOCATE EXISTING UNDERGROUND UTILITIES. HAND DIG AS NECESSARY TO AVOID DAMAGE TO EXITING UTILITIES.

2



KEY PLAN

NORTH

SCALE: N/A

Know what's **below.** **Call** before you dig.

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Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
AS SHOWN
SCALE:

SHEET TITLE
SITE DEMOLITION PLAN

SHEET NO.
C-1

REV NO.
2

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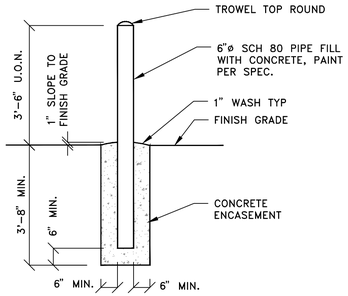

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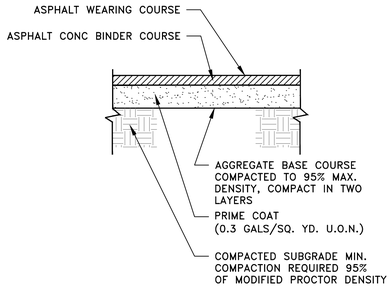

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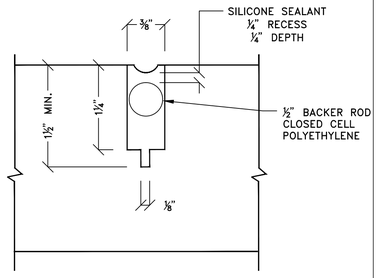
SCALE NONE



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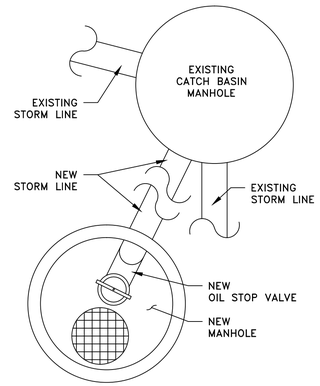

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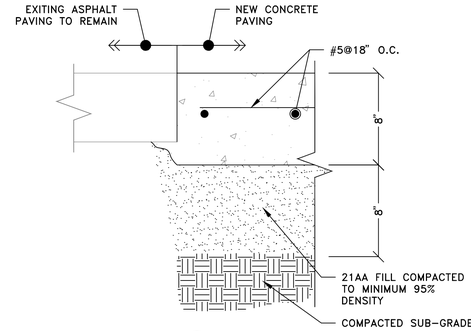

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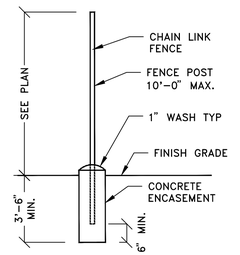

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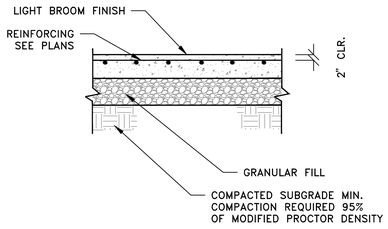

5 TYPICAL CONCRETE PAVING DETAIL
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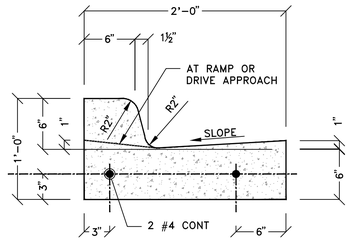

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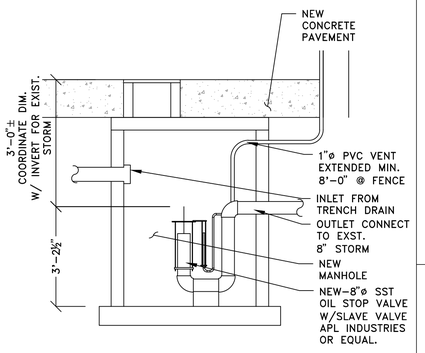

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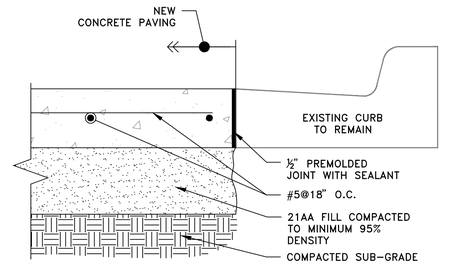

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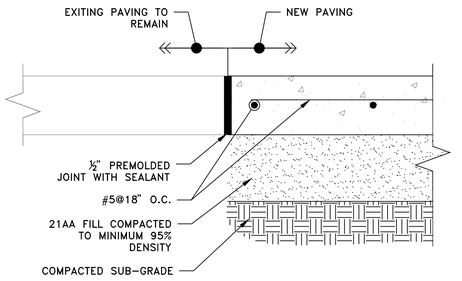
C-3 SCALE NONE



3 SECTION
C-3 SCALE NONE

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2	ADDENDUM No.2	9-15-2014

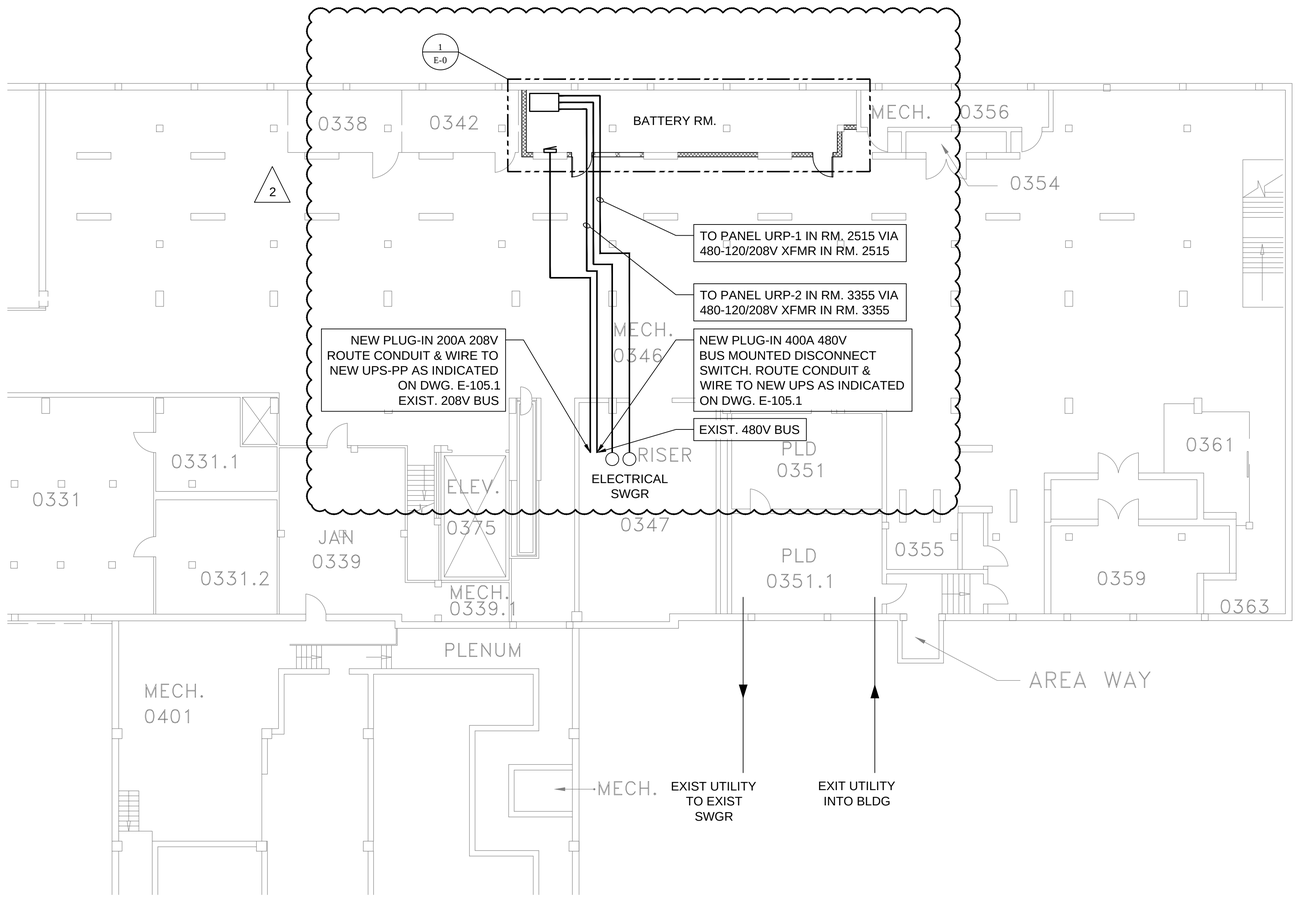
Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
N/A
SCALE:

SHEET TITLE
TYPICAL CIVIL AND SITE DETAILS

SHEET NO.
C-3

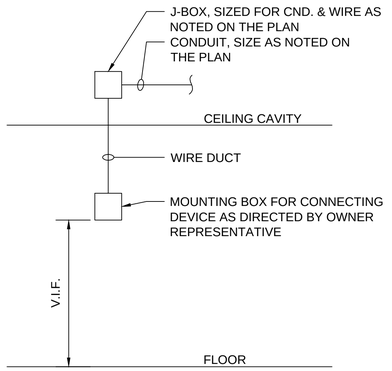
REV NO.
2



BASEMENT FLOOR LEVEL

SCALE: 1/16" = 1'-0"

NORTH



DETAIL "A"

SCALE: NTS

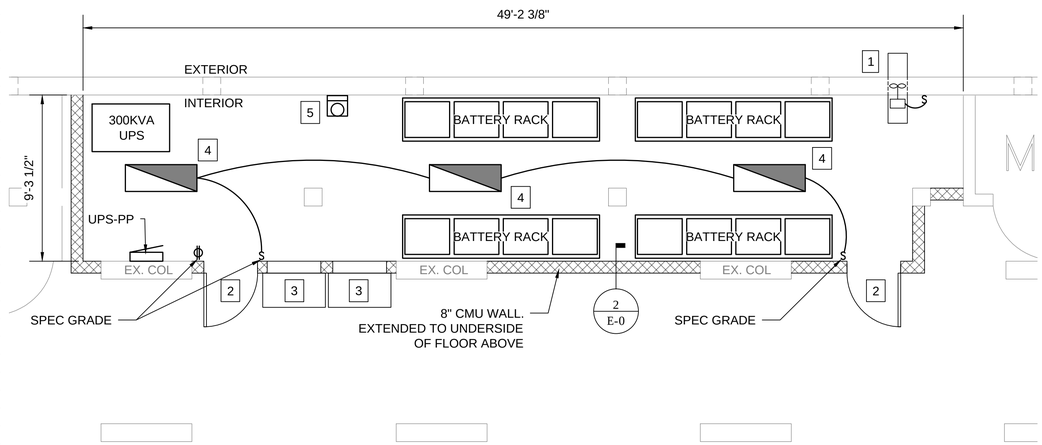
NOTES:

1. SHADED ROOMS / AREAS INDICATE NEW UPS CIRCUIT LOCATIONS TO SERVE EQUIPMENT LOADS.
2. REFER TO E102 THRU E103 FOR CIRCUIT AND PANEL SCHEDULES.
3. NEW CIRCUITS EXTEND FROM UPS PANELS (URP-1 AND URP-2) TO DESIGNATED LOADS THROUGHOUT THE ENGINEERING BUILDING.
4. EXPOSED SURFACE MTD RACEWAY SHALL BE SOLID WIRE DUCT WITH SNAP ON COVER.
5. COORDINATE WITH OWNERS REP FOR DEVICE REQ'D TO MAKE CONNECTION TO USER EQUIPMENT.
6. COORDINATE WITH OWNERS REP FOR EXACT LOCATION OF DEVICE TO BE INSTALLED.
7. CONDUITS ARE SHOWN DIAGRAMMATIC, EXACT ROUTING AND PENETRATION THRU CEILING AND WALLS SHALL BE COORDINATED WITH THE OWNERS REPRESENTATIVE.
8. VERIFY ALL ELECTRICAL LOADS FOR VOLTAGE AND AMPERAGE PRIOR TO MAKING FINAL CONNECTION. NOTIFY OWNERS REPRESENTATIVE FOR ANY LOADS THAT DOES NOT COMPLY.
9. FOR BID PURPOSES CONTRACTOR SHALL ASSUME 20' CABLE EXTENSION INTO EACH ROOM.
10. INSTALL 3.5 TON HVAC UNIT ON INSIDE WALL OF UPS ENCLOSURE.

2

11. CONTRACTOR TO PROVIDE SEISMIC RATED ANCHOR BOLTS PER MANUFACTURES ANCHOR BOLT PATTERN.
12. CONTRACTOR TO GROUND BATTERY RACK W/ 2EA. #4AWG.
13. PROVIDE ENVIRO GUARD OR EQUAL SPILL CONTAINMENT SYSTEM AROUND BATTERY RACKS.
14. REVIEW EXTERNAL MONITORING, ALARM AND CONTROL REQUIREMENTS ASSOCIATED WITH 300KW (NOM) UPS PROTECTIONS. CONNECT CIRCUIT SWITCHES AND MONITORING CIRCUITS CONCERNED WITH UPS READINGS TO PERFORM. SHOULD BE NETWORKED WITH EXISTING BUILDING AUTOMATION SYSTEM ALARM OR DATA CONCENTRATION SCHEMES.
15. HVAC UNITS, 2 EACH 90% CAPACITY EACH UNIT WITH ITS PROTECT SENSOR THERMOSTAT CONTROL. TO ENSURE TOSHIBA'S OPTIMAL AMBIENT TEMPTERATURE FOR MAXIMUM BATTERY LIFE. OVERLAPPING TSTAT CONTROLS WILL BE DEPLOYED TO ALLOW FOR STAGGERED OPERATION. I.E. HVAC 1 SET AT 73F AND HVAC 2 AT 77F.
16. ADD FIRE MONITORING SMOKE ENCLOSURE DETECTOR TO THE EXISTING BUILDING MONITORING SYSTEM.
17. ELECTRICAL EQUIPMENT GROUND CIRCUITS (BONDING) SHALL BE PROVIDED FOR ALL NEW ELECTRICAL EQUIPMENT AND RACKS PER NEC 70.

2



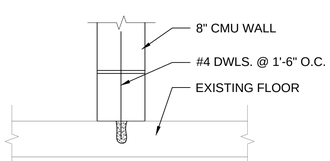
1 ENLARGED PLAN DETAIL

E-0

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

KEY NOTES:

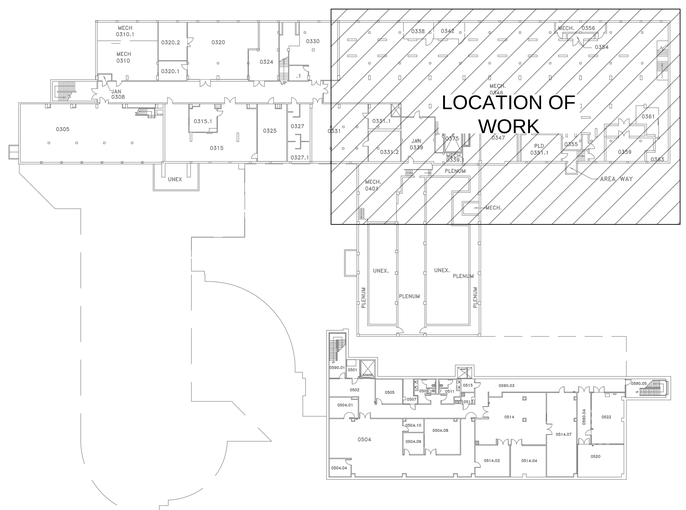
1. EXHAUST FAN:
   * 90CFM @ O.S.P MINIMUM
   * TOTALY ENCLOSED MOTOR TYPE
   * WEATHER HOOD FOR PENETRATION TO EXTERIOR & GRAVITY DAMPER
   * POSITIONED ABOVE THE BATTERY RACK & NEAREST TO THE CEILING AS POSSIBLE
   * POWERED FROM UPS-SS
2. DOORS:
   * DOOR TO HAVE LOUVERED OPENING. 12"x12" MINIMUM OPENING
3. HVAC:
   * 3 TON UNIT W/ 5KW HEATER WALL MOUNT. MODEL BARD W38A2-A5XPXXXX OR SIMILAR
4. LIGHTING:
   * INDUTRIAL ENCLOSED & GASKET, 2 LAMP T8 W/ BUILT IN BATTERY BACK UP
5. EYE WASH:
   * SELF CONTAINED EYE WASH STATION



2 SECTION

E-0

SCALE: 1" = 1'-0"



KEY PLAN

SCALE: NTS

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(APPROVED BY)	(DATE)

MARK	ISSUED FOR/REVISIONS	DATE
A	OWNERS REVIEW	8-1-2014
B	OUT FOR BID	8/26/2014
2	ADDENDUM No.2	9-15-2014

Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
AS SHOWN
SCALE:

SHEET TITLE
BASEMENT FLOOR PLAN

SHEET NO.
E-0

REV NO.
2

PANEL NO.:	Gen-2		SERVICE VOLTS:	L-L	480	L-N	277		LOCATION:	Generator Enclosure		
MOUNTING:	SURFACE		PHASE:	3	HZ:	60	WIRE:	4	SPECIALITIES:			
NEMA:	1		MAIN: (•) C/B ( ) LUGS				SIZE:	2400	(15) INDICATES LOCK ON DEVICE			
			AIC:				CIRCUITS:	4				

	LOAD DESCRIPTION	WIRE SIZE	VOLT AMPS	C/B AMP	C/B PH	A	B	C	C/B AMP	C/B PH	VOLT AMPS	WIRE SIZE	LOAD DESCRIPTION	
1	EDC		1000000	1200	3	3000000			2400	3	2000000		100/300	2
3	EDC		1000000	1200	*		3000000		2400	3	2000000		100/300	4
5	EDC		1000000	1200	*			3000000	2400	3	2000000		100/300	6
7														8
9														10
11														12
13														14
15														16
17														18
19														20
21														22
23														24
25														26
27														28
29														30
31														32
33														34
35														36
37														38
39														40
41														42
		TOTAL LOAD PER PHASE (VA)				3000000	3000000	3000000						
	TOTAL CONNECTED LOAD (VA)	9000000					TOTAL AMPS	10838		@480 VOLTS				

2

EQUIP	PURPOSE	LOCATION	RATING	VOLTAGE	TYP WIDTH	TYP HEIGHT	TYP DEPTH	MANUFACTURER BASIS FOR DESIGN
ATS-4	EDC Electrical Gear	100/300 Switchgear Line-Up Outdoor	3000A	480V	72"	91"	72"	ASCO
ATS-5	100/300 Electrical Gear	100/300 Switchgear Line-Up Outdoor	1200A	4800V	72"	91"	72"	ASCO
URP-1	EDC ESSENT. UPS LOADS	EDC (Electrical Closet 2rd Floor)	400 A	208V/120V 3Ø	30"	72"	5.75"	Square D
URP-2	100/300 ESSENT. UPS LOADS	100/300 (UPS RM 3355)	400 A	208V/120V 3Ø	30"	72"	5.75"	Square D
UPS	UPS EP-1 & UPS EP-2	100/300 Basement	300 KVA	480V-480V	76.8"	35.7"	79.4"	Toshiba
Gen	Electrical Reliability	S/E Corner of the Horseshoe	2000 kW	480V	-	-	-	Caterpillar
XFMR-GEN	100/300 ESSENT. UPS LOADS	100/300 (UPS RM 3355)	2000 kVA	480V-4800V 3Ø	30"	72"	5.75"	Eaton
XFMR-URP1	URP-1	EDC (Electrical Closet 2rd Floor)	100 kVA	480V-208V/120V	-	-	-	Eaton
XFMR-URP2	URP-2	100/300 (UPS RM 3355)	100 kVA	480V-208V/120V	-	-	-	Eaton

090-ENGINEERING BUILDING MAJOR EQUIPMENT

2

Ckt	Cable Description	"From"	"To" Equipment	"To" Room No.	Length (ft)	Voltage (V)	Load (W)	AMPS (A)	Conduit Size To Room
G2- 1	8 Sets 750kcmil 24 - Phase Cdrs 8 - 4/0 ground	Generator G-2	ATS-4	EDC BASEMENT MAIN ELECTRICAL ROOM	25	480	2494080	3000	8 Sets of 5" Sch 40 PVC to 5" Rigid - See WSU Standard
PLD PRIMARY	8 Sets 750kcmil 24 - Phase Cdrs 8 - 4/0 ground	EDC Main Switchboard	ATS-4	EDC BASEMENT MAIN ELECTRICAL ROOM	125	480	2494080	3000	8 Sets of 5" Sch 40 PVC to 5" Rigid - See WSU Standard
ATS- 4	8 Sets 750kcmil 24 - Phase Cdrs 8 - 4/0 ground	ATS-4	EDC Main Switchboard	EDC BASEMENT MAIN ELECTRICAL ROOM	125	480	2494080	3000	8 Sets of 5" Sch 40 PVC to 5" Rigid - See WSU Standard
G2- 2	6 Sets 750kcmil 24 - Phase Cdrs 8 - 4/0 ground	Generator G-2	New 2000 kVA XFMR-EMER	East of 100/300 Outdoor Switchgear Main Disc. Switch	40	480	2000000	2406	6 Sets of 5" Sch 40 PVC
ATS5- EM	350 kcmil 3 - Phase Cdrs 1 - AWG 2 ground	New 2000 kVA XFMR-EMER	ATS-5	East of 100/300 Outdoor Switchgear Main Disc. Switch	20	4800	2000000	241	3-1/2" RGS
ATS5- UM	Cable By PLD Arranged By Contractor	Primary Feed From Existing PLD	ATS-5	West of 100/300 Outdoor Switchgear Main Disc. Switch	100	4800	8313600	1000	3-1/2" RGS
100/300- M	350 kcmil 3 - Phase Cdrs 1 - AWG 2 ground	ATS-5	100/300 Outdoor Switchgear Main Disc. Switch	100/300 Outdoor Switchgear Main Disc. Switch	10	4800	8313600	1000	3-1/2" RGS
UPS- M	500 kcmil 3 - Phase Cdrs 1 - ground 2AWG	Bus Riser Tap in Basement Rm 0347	300 kVA UPS	0346	100	480	300000	361	3-1/2" EMT
URP1- MT	1/0 3 - Phase Cdrs 1 - ground 6AWG	UPS Rm 0346	112.5 kVA Transformer	EDC 2nd Floor Electrical Closet	350	480	112500	135	2" EMT
URP2- MT	1/0 3 - Phase Cdrs 1 - ground 6AWG	Rm 0346	112.5 kVA Transformer	3355	100	480	112500	135	2" EMT
URP1- MP	350 kcmil 3 - Phase Cdrs 1 - ground 6AWG	112.5 kVA Transformer	URP-1	3355	10	208	112500	312	2" EMT
URP2- MP	350 kcmil 3 - Phase Cdrs 1 - ground 6AWG	112.5 kVA Transformer	URP-2	EDC 2nd Floor Electrical Closet	10	208	112500	312	2" EMT

CABLE / CONDUIT SCHEDULE FOR GENERATOR / UPS FEED & URP FEEDS

2

Commonwealth associates, inc.
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2700 W. Argyle Street
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WAYNE STATE UNIVERSITY

090-ENGINEERING BUILDING
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ELECTRICAL RELIABILITY UPGRADES

WAYNE STATE UNIVERSITY
FACILITIES PLANNING & MANAGEMENT
5454 CASS AVENUE DETROIT, MICHIGAN

DRAWN BY	PROJECT LEAD
JAS	CJM
DESIGNED BY	REVIEWED BY
APPROVED BY	DATE

MARK	ISSUED FOR/REVISIONS	DATE
A	OWNERS REVIEW	8-1-2014
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Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
N/A
SCALE

SHEET TITLE
MAJOR EQUIPMENT PANEL SCHEDULE & CABLE/CONDUIT SCHEDULE

SHEET NO.
E-102

REV NO.
2

PANEL NO.:	URP-1	SERVICE VOLTS:	L-L 208	L-N 120	LOCATION:	Floor 2 EDC Electrical Closet
MOUNTING:	SURFACE	PHASE: 3	HZ: 60	WIRE: 250 kcmil	SPECIALITIES:	
NEMA:	1	MAIN: ◉ C/B ○ LUGS		SIZE: 400	(15)	INDICATES LOCK ON DEVICE
		AIC:		CIRCUITS: 42		

	LOAD DESCRIPTION	WIRE SIZE	VOLT AMPS	C/B AMP	C/B PH	A	B	C	C/B AMP	C/B PH	VOLT AMPS	WIRE SIZE	LOAD DESCRIPTION	
1	Server Shelf #2 - Rm 2537	AWG 10	1920	20	1	3840			20	1	1920	AWG 10	Server Shelf #1 - Rm 2537	2
3	SPARE						1920		20	1	1920	AWG 10	Server Shelf #3 - Rm 2537	4
5	Server Shelf #4 - Rm 2537	AWG 10	1920	20	1			3840	20	1	1920	AWG 10	Server Shelf #6 - Rm 2537	6
7	Server Shelf #5 - Rm 2537	AWG 10	1920	20	1	3840			20	1	1920	AWG 10	Server Shelf #7 - Rm 2537	8
9	Server Shelf #8 - Rm 2537	AWG 10	1920	20	1		3840		20	1	1920	AWG 10	Server Shelf #9 - Rm 2537	10
11	Server Shelf #10 - Rm 2538	AWG 10	1920	20	1			3840	20	1	1920	AWG 10	Server Shelf #11 - Rm 2537	12
13	Server Shelf #12 - Rm 2539	AWG 10	1920	20	1	3840			20	1	1920	AWG 10	Server Shelf #13 - Rm 2537	14
15	Server Shelf #14 - Rm 2540	AWG 10	1920	20	1		3840		20	1	1920	AWG 10	Server Shelf #15 - Rm 2537	16
17	Server Shelf #16 - Rm 2540	AWG 10	1920	20	1			3840	20	1	1920	AWG 10	Server Shelf #17 - Rm 2537	18
19	Server Shelf #18 - Rm 2540	AWG 10	1920	20	1	3840			20	1	1920	AWG 10	Server Shelf #19 - Rm 2537	20
21	Server Shelf #20 - Rm 2540	AWG 10	1920	20	1		1920		20	1			SPARE	22
23	SPARE			20	1				20	1			SPARE	24
25	SPARE			20	1								SPACE	26
27	SPACE												SPACE	28
29	SPACE												SPACE	30
31	SPACE												SPARE	32
33	SPACE												SPACE	34
35	SPACE												SPACE	36
37	SPACE												SPACE	38
39	SPACE												SPACE	40
41	SPACE												SPACE	42
	TOTAL LOAD PER PHASE (VA)					15360	11520	11520						
	TOTAL CONNECTED LOAD (VA)	38400				TOTAL AMPS		107	@208 VOLTS					

2

Circuit No.	Copper (Cu) Cable Description	"From"	"To" Load Rm No.	Equipment Served	Length (ft)	Voltage (V)	Load (W)	AMPS (A)	Conduit Size To Room
URP1- 2	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #1	80	120	1920	16	1-1/2" EMT - Circuits to be combined
URP1- 1	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #2	80	120	1920	16	
URP1- 4	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #3	80	120	1920	16	
URP1- 5	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #4	80	120	1920	16	1-1/2" EMT - Circuits to be combined
URP1- 7	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #5	80	120	1920	16	
URP1- 6	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #6	80	120	1920	16	
URP1- 8	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #7	80	120	1920	16	1-1/2" EMT - Circuits to be combined
URP1- 9	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #8	80	120	1920	16	
URP1- 10	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #9	80	120	1920	16	
URP1- 11	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #10	80	120	1920	16	1-1/2" EMT - Circuits to be combined
URP1- 12	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #11	80	120	1920	16	
URP1- 13	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #12	80	120	1920	16	
URP1- 14	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #13	80	120	1920	16	1-1/2" EMT - Circuits to be combined
URP1- 15	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #14	80	120	1920	16	
URP1- 16	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #15	80	120	1920	16	
URP1- 17	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #16	80	120	1920	16	1-1/2" EMT - Circuits to be combined
URP1- 18	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #17	80	120	1920	16	
URP1- 19	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #18	80	120	1920	16	1-1/2" EMT - Circuits to be combined
URP1- 20	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #19	80	120	1920	16	
URP1- 21	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-1	2537	Server Shelf #20	80	120	1920	16	

CABLE / CONDUIT SCHEDULE FOR PANEL URP-1

NOTE 1: AMPACITY WAS ASSUMED TO BE 80% OF THE LOAD PROVIDED BY THE ESSENTIAL LOAD LIST FOR UPS. CONTRACTOR SHOULD VERIFY ALL POWER REQUIREMENTS BEFORE ROUTING AND CONNECTING CIRCUITS.

NOTE 2: CIRCUIT CABLE WERE SIZED TO LIMIT VOLTAGE DROP FROM PANEL TO END USER TO APPROXIMATELY 2%. CABLES THAT NEED TO TERMINATE AT A CONNECTION NOT SUITED FOR ITS CABLE SIZE SHOULD BE REDUCED TO AN ADEQUETE SIZE WITHIN A JUNCTION BOX LOCATE IN A DISCRETE LOCATION PREFERABLE ABOVE DROP CEILING HEIGHT.

NOTE 3: CERTAIN CIRCUITS WERE COMBINED WITHIN A COMMON RACEWAY FOR CONVENIENCE, VARIATION OF THIS APPROACH IS ACCEPTABLE PROVIDED NO MORE THAN 3 CIRCUITS PER RACEWAY IS USED.

2

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FACILITIES PLANNING & MANAGEMENT
5454 CASS AVENUE DETROIT, MICHIGAN

JAS (DRAWN BY)	CJM (PROJECT LEAD)
(DESIGNED BY)	(REVIEWED BY)
(APPROVED BY)	(DATE)

MARK	ISSUED FOR/REVISIONS	DATE
A	OWNERS REVIEW	8-1-2014
B	BIDS	8/26/2014
2	ADDENDUM No.2	9-15-2014

Engineers Seal

CLIENT PROJECT NO.: 320004
PROJECT NO.: N/A
SCALE:

SHEET TITLE:
UNINTERUPTIBLE RECEPTACLE PANEL & CABLE / CONDUIT SCHEDULES

SHEET NO.: E-103
REV NO.: 2

PANEL NO.:	URP-2	SERVICE VOLTS:	L-L	208	L-N	120	LOCATION:	Rm 3355
MOUNTING:	SURFACE	PHASE:	3	HZ:	60	WIRE:	2 AWG	SPECIALITIES:
NEMA:	1	MAIN:	○ C/B	◉ LUGS		SIZE:	400	(15) INDICATES LOCK ON DEVICE
		AIC:				CIRCUITS:	42	

	LOAD DESCRIPTION	WIRE SIZE	VOLT AMPS	C/B AMP	C/B PH	A	B	C	C/B AMP	C/B PH	VOLT AMPS	WIRE SIZE	LOAD DESCRIPTION	
1	Server Rack #1 - Rm 2354	AWG 12	4992	30	2	**9984**			30	2	4992	AWG 12	Server Rack #2 - Rm 2354	2
3	Server Rack #1 - Rm 2354	AWG 12	4992	*	*		**9984**		*	*	4992	AWG 12	Server Rack #2 - Rm 2354	4
5	Servers - Rm 2409.1	AWG 6	1920	20	1			**6912**	30	2	4992	AWG 12	Server Rack #3 - Rm 2354	6
7	Servers - Rm 3354	AWG 8	4992	30	2	**9984**			*	*	4992	AWG 12	Server Rack #3 - Rm 2354	8
9	Servers - Rm 3354	AWG 8	4992	*	*		**9984**		30	2	4992	AWG 12	Servers - Rm 2354	10
11	Server Rack #1.2	AWG 10	4992	30	2			**9984**	*	*	4992	AWG 12	Servers - Rm 2354	12
13	Server Rack #1.2	AWG 10	4992	*	*	**9984**			30	2	4992	AWG 10	Server Rack #1.1	14
15	Server Rack #2.2	AWG 10	4992	30	2		**9984**		*	*	4992	AWG 10	Server Rack #1.1	16
17	Server Rack #2.2	AWG 10	4992	*	*			**9984**	30	2	4992	AWG 10	Server Rack #2.1	18
19	Server Rack #3.2	AWG 10	4992	30	2	**9984**			*	*	4992	AWG 10	Server Rack #2.1	20
21	Server Rack #3.2	AWG 10	4992	*	*		**9984**		30	2	4992	AWG 10	Server Rack #3.1	22
23	Server Rack #4.2	AWG 10	4992	30	2			**9984**	*	*	4992	AWG 10	Server Rack #3.1	24
25	Server Rack #4.2	AWG 10	4992	*	*	**9984**			30	2	4992	AWG 10	Server Rack #4.1	26
27	SPARE			30	2		**4992**		*	*	4992	AWG 10	Server Rack #4.1	28
29	SPARE			*	*				30	2			SPARE	30
31	SPARE			20	1				*	*			SPARE	32
33	SPACE								20	1			SPARE	34
35	SPACE												SPACE	36
37	SPACE												SPACE	38
39	SPACE												SPACE	40
41	SPACE												SPACE	42
		TOTAL LOAD PER PHASE (VA)				**49920**	**44928**	**36864**						
TOTAL CONNECTED LOAD (VA)	**131712**					TOTAL AMPS		**366**	**@208 VOLTS**					

2

Ckt	Copper (Cu) Cable Description	"From"	"To" Load Rm No.	Equipment Served	Length (ft)	Voltage (V)	Load (W)	AMPS (A)	Conduit Size To Room For Grouped Ckts
URP2- 1/3	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	2354	Server Rack #1	70	208	4992	24	1" EMT - Circuits to be combined
URP2- 2/4	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	2354	Server Rack #2	70	208	4992	24	
URP2- 6/8	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	2354	Server Rack #3	70	208	4992	24	1-1/2" EMT - Circuits to be combined
URP2- 5	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	2409.1	Servers	160	208	4992	24	
URP2- 7/9	AWG 10 1 - Phase Cdrs 1 - Neutral 1 - ground	URP-2	3354	Servers	50	120	1920	16	3/4" EMT
URP2- 10/12	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	2354	Servers	100	208	4992	24	3/4" EMT
URP2- 14/16	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #1.1	80	208	4992	24	1-1/2" EMT - Circuits to be combined
URP2- 11/13	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #1.2	80	208	4992	24	
URP2- 18/20	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #2.1	80	208	4992	24	
URP2- 15/17	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #2.2	80	208	4992	24	1-1/2" EMT - Circuits to be combined
URP2- 22/24	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #3.1	80	208	4992	24	
URP2- 19/21	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #3.2	80	208	4992	24	
URP2- 26/28	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #4.1	80	208	4992	24	1" EMT - Circuits to be combined
URP2- 23/25	AWG 10 2 - Phase Cdrs 1 - ground	URP-2	3359.1	Server Rack #4.2	80	208	4992	24	

CABLE / CONDUIT SCHEDULE FOR PANEL URP-2

NOTE 1: AMPACITY WAS ASSUMED TO BE 80% OF THE LOAD PROVIDED BY THE ESSENTIAL LOAD LIST FOR UPS. CONTRACTOR SHOULD VERIFY ALL POWER REQUIREMENTS BEFORE ROUTING AND CONNECTING CIRCUITS.

NOTE 2: ROOM 2354 IS EQUIPPED WITH NETWORKS AND SERVERS. CONTRACTOR SHOULD EVALUATE LOADS AT TIME OF INSTALLATION AND DETERMINE REQUIRED CIRCUITS TO ROOM

NOTE 3: CIRCUIT CABLE WERE SIZED TO LIMIT VOLTAGE DROP FROM PANEL TO END USER TO APPROXIMATELY 2%. CABLES THAT NEED TO TERMINATE AT A CONNECTION NOT SUITED FOR ITS CABLE SIZE SHOULD BE REDUCED TO AN ADEQUETE SIZE WITHIN A JUNCTION BOX LOCATE IN A DISCRETE LOCATION PREFERABLE ABOVE DROP CEILING HEIGHT.

NOTE 4: CERTAIN CIRCUITS WERE COMBINED WITHIN A COMMON RACEWAY FOR CONVENIENCE, VARIATION OF THIS APPROACH IS ACCEPTABLE PROVIDED NO MORE THAN 3 CIRCUITS PER RACEWAY IS USED.

2

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5454 CASS AVENUE DETROIT, MICHIGAN

JAS	CJM
DRAWN BY	PROJECT LEAD
DESIGNED BY	REVIEWED BY
APPROVED BY	DATE

MARK	ISSUED FOR/REVISIONS	DATE
A	OWNERS REVIEW	8-1-2014
B	BIDS	8/26/2014
2	ADDENDUM No.2	9-15-2014

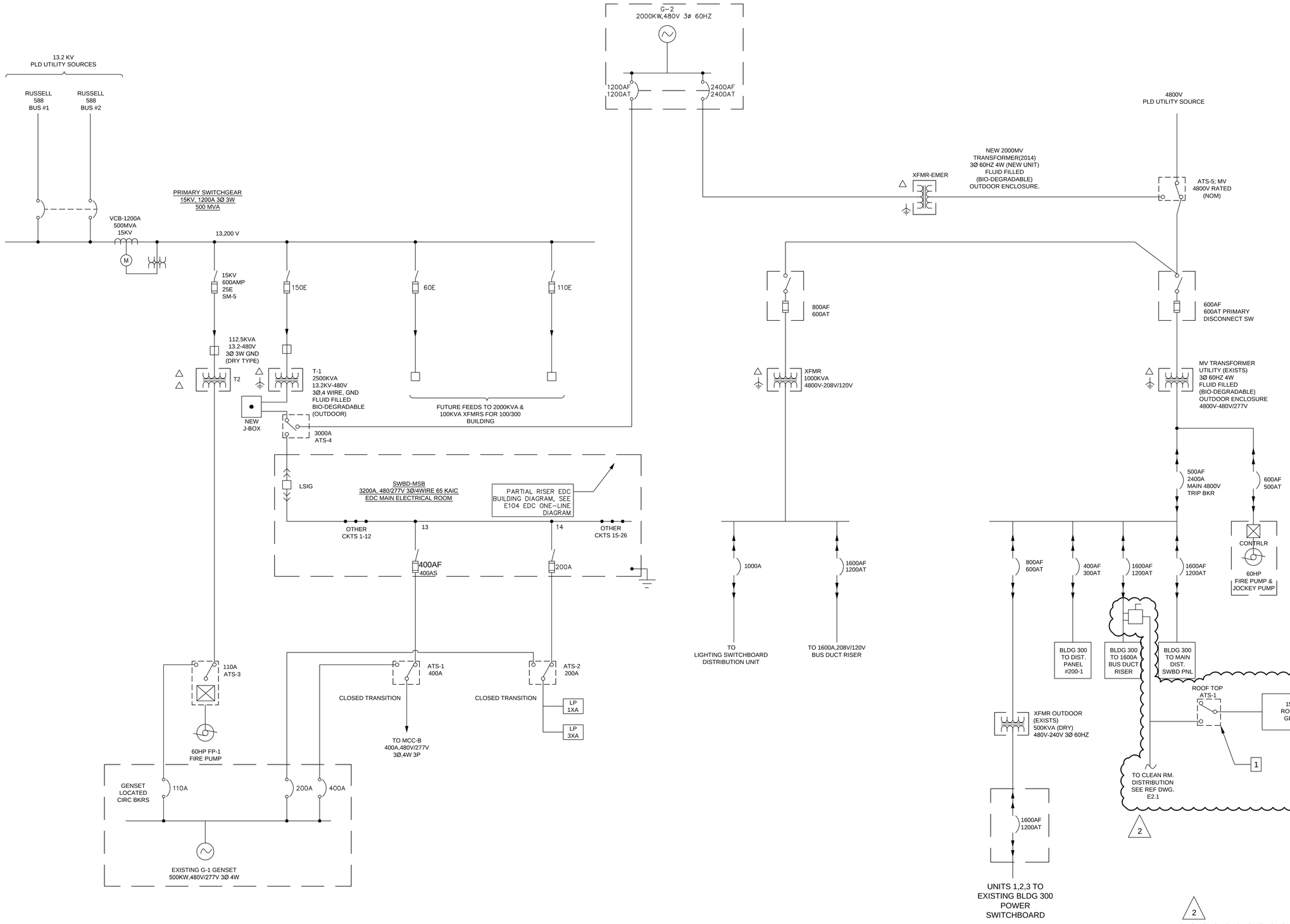
Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
N/A
SCALE:

SHEET TITLE
UNINTERUPTIBLE RECEPTACLE No. 2 PANEL/CONDUIT SCHEDULE

SHEET NO.
E-103.1

REV NO.
2



WAYNE STATE UNIVERISTY
EDC BUILDING-EXISTING

(SEE DWG EP-601)

WAYNE STATE UNIVERISTY
100/300 BUILDING-EXISTING

(SEE DWG E-5)

2

NOTES:

1. ATS TO BE CONFIGURED & WIRED WITH COMMUNICATION CABLE TO PROVIDE FOR DELAYED RETURN TO NORMAL. DUE TO FULL BUILDING BACK-UP, ATS WILL RECOGNIZE G-2 POWER AS UTILITY POWER & WILL WANT TO RETURN TO NORMAL. DELAYED CONTACTS TO PREVENT RETURN TO NORMAL UNTIL ATS-4 RETURN TO NORMAL IS REQUIRED. FIELD ROUTED.

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5454 CASS AVENUE DETROIT, MICHIGAN

MSM (DRAWN BY)	CJM (PROJECT LEAD)
SWA (DESIGNED BY)	(REVIEWED BY)
(APPROVED BY)	(DATE)

MARK	ISSUED FOR/REVISIONS	DATE
A	OWNERS REVIEW	8-1-2014
B	OUT FOR BID	8-26-2014
2	ADDENDUM No.2	9-15-2014

Engineers Seal

CLIENT PROJECT NO.
320004
PROJECT NO.
N/A
SCALE:

SHEET TITLE
EDC. AND 100/300
PARTIAL ONE
LINE DIAGRAM

SHEET NO.
E-105.2

REV NO.
2

Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
TCP 14	1	567-352	SIEMENS	567-352	#3 PNEU PANEL 24X24X9
Panel Mounted Devices					
AD 1	1	AD-2001	UNITED SECURITY	AD-2001	AUTO VOICE/PAGER DIALER
	1	AC-2P	UNITED SECURITY		AC/DC ADAPTER 12V W/PLUG
	1	IR-1	UNITED SECURITY		ISOLATION RELAY
	1	PP-1	UNITED SECURITY		POWER PACK FOR AVD
PS 1	1	SLS-12-017T	EMERSON		POWER SUPPLY, 120V, 12-15VDC, DIN RAIL
PTES 1	3	9001KR1U	SQUARE D		PUSH BUTTON, MOMENTARY, 30MM, 7 COLOR
	3	9001KA2	SQUARE D		CONTACT BLOCK 30MM N.O. 10A
RE 1	1	5YR26	DAYTON		RELAY,GP 4PDT, 12VDC 3A W/LED
	1	2A584	DAYTON		SOCKET-4P, SQUARE, 14 PIN
RE 2	1	5YR26	DAYTON		RELAY,GP 4PDT, 12VDC 3A W/LED
	1	2A584	DAYTON		SOCKET-4P, SQUARE, 14 PIN
RE 3	1	5YR26	DAYTON		RELAY,GP 4PDT, 12VDC 3A W/LED
	1	2A584	DAYTON		SOCKET-4P, SQUARE, 14 PIN
SB 1	1	4A238	RACO		UTILITY BOX 4"X2.125"X1.875"
	1	52835	HUBBELL		DUPLEX RECEPTACLE 20A, 125VAC
	1	4A241	RACO		DUPLEX RECEPTACLE COVER PLATE
UPS 1	1	PW5125 1500	POWERWARE	PW51251500	UPS, 1500VA, 1050 WATTS
	1	1FD93	CCI		POWER SUPPLY CORDS 12/3, 8 FT

SEQUENCE OF OPERATIONS FOR TESTING GENERATOR CONDITIONS MONITORED VIA THE SIEMENS APOGEE SYSTEM.

TESTING WILL PROVIDE GENERATOR "RUN" ALARM, "FAULT" ALARM, FUEL "RUPTURE" ALARM, FUEL "50%" ALARM, FUEL "80% ALARM. EACH ALARM ONCE TRIGGERED WILL PROVIDE A SIEMENS RENO PAGING ALARM AND GRAPHICAL COMMAND CENTER ALARM.

ADDITIONALLY, THE FUEL DIALER SYSTEM AND PHONE LINE WILL ALSO BE TESTED AND VERIFIED FOR PROPER OPERATION.

TEST #1: NORMAL RUNNING ALARM

START AND RUN GENERATOR FOR NORMAL MONTHLY TESTING. ONCE GENERATOR STARTED, GENERATOR INTERLOCK RELAY PROVIDES SIEMENS RENO PAGING AND GRAPHIC ALARMS AS SHOWN.
"GENERATOR RUN STATUS = ON" AND "GENERATOR RUN STATUS = OFF"

TEST #2: ALARM FAULT TEST

GENERATOR OFF AND PANEL SELECTOR SWITCH IN "AUTO". MOVE SELECTOR SWITCH TO "MANUAL RUN", (DELAY OCCURS THEN GENERATOR STARTS) NOW PUSH IN RED STOP BUTTON. THIS WILL FORCE GENERATOR INTO AN ALARM CONDITION. GENERATOR INTERLOCK RELAY PROVIDES SIEMENS RENO PAGING AND GRAPHIC ALARMS AS SHOWN. TO RESET ALARM, PULL OUT RED STOP BUTTON, SWITCH SELECTOR SWITCH TO "AUTO". NOTE THAT GENERATOR SELECTOR SWITCH SHOULD ALWAYS BE IN THE "AUTO" POSITION.
"GENERATOR ALARM = ALARM" AND "GENERATOR ALARM = NORMAL"

TEST #3: TANK RUPTURE ALARM

PRESS AND HOLD THE MOMENTARY WALL MOUNTED "RUPTURE" PUSH BUTTON (PB). GENERATOR INTERLOCK RELAY PROVIDES SIEMENS RENO PAGING AND GRAPHIC ALARMS AS SHOWN. NOTE THAT THE RENO ALARM SHOULD BE BROADCASTED WITHIN 1 MINUTE. RELEASE PB ONCE COMPLETED.
"FUEL TANK RUPTURE = ON" AND "FUEL TANK RUPTURE = OFF"

TEST #4: 50% FUEL LEVEL ALARM

FUEL LEVEL 50% TEST ACTIVATES BOTH THE LOCAL PHONE DIALER AND SIEMENS SYSTEM.
CONTACT FUEL SUPPLY COMPANY REPRESENTATIVE (SEE ANALOG PHONE DIALER INFORMATION). INFORM FUEL SUPPLY COMPANY REPRESENTATIVE THAT THEY WILL RECEIVE A 50% FUEL CALL OUT FROM THE RESPECTIVE BUILDING. FUEL SUPPLY COMPANY REPRESENTATIVE WILL BE STANDING BY AND WILL NEED TO CALL BACK THE WSU ONSITE PERSON ONCE EACH ALARM HAS BEEN RECEIVED.
TEST PROCEDURE AS FOLLOWS: PRESS AND HOLD THE MOMENTARY WALL MOUNTED "50% TEST" PUSH BUTTON (PB). GENERATOR INTERLOCK RELAY PROVIDES PHONE DIALER, SIEMENS RENO PAGING AND GRAPHIC ALARMS AS FOLLOWS: NOTE THAT ALARM SHOULD BE BROADCASTED WITHIN 1 MINUTE. CONTINUE TO HOLD PB UNTIL FUEL SUPPLY COMPANY REPRESENTATIVE RECEIVES, ACCEPTS AND THEN RETURNS THEIR CONFIRMATION CALL THAT PHONE DIALER WAS RECEIVED. PHONE MESSAGE READS.... WSU RESPECTIVE BUILDING GENERATOR STARTED, DELIVER FUEL WITHIN 4 HOURS.
"50% FUEL LEVEL = ALARM" AND "50% FUEL LEVEL = NORMAL"
NOTE: 2 MINUTE DELAY BEFORE RETURN TO NORMAL ON RENO ALARM.

TEST #5: 80% FUEL LEVEL ALARM

FUEL LEVEL 80% TEST ACTIVATES BOTH THE LOCAL PHONE DIALER AND SIEMENS SYSTEM.
CONTACT FUEL SUPPLY COMPANY REPRESENTATIVE (SEE ANALOG PHONE DIALER INFORMATION). INFORM FUEL SUPPLY COMPANY REPRESENTATIVE THAT THEY WILL BE RECEIVING A 80% FUEL CALL OUT FUEL CALL OUT FROM THE RESPECTIVE BUILDING. FUEL SUPPLY COMPANY REPRESENTATIVE WILL BE STANDING BY AND WILL NEED TO CALL BACK THE WSU ONSITE PERSON ONCE EACH ALARM HAS BEEN RECEIVED.
TEST PROCEDURE AS FOLLOWS: PRESS AND HOLD THE MOMENTARY WALL MOUNTED "80% TEST" PUSH BUTTON (PB). GENERATOR INTERLOCK RELAY PROVIDES PHONE DIALER, SIEMENS RENO PAGING AND GRAPHIC ALARMS AS FOLLOWS: NOTE THAT ALARM SHOULD BE BROADCASTED WITHIN 1 MINUTE. CONTINUE TO HOLD PB UNTIL FUEL SUPPLY COMPANY REPRESENTATIVE RECEIVES, ACCEPTS AND THEN RETURNS HIS CONFIRMATION CALL THAT PHONE DIALER WAS RECEIVED. PHONE MESSAGE READS.... WSU RESPECTIVE BUILDING GENERATOR FUEL LEVEL LOW, DELIVER FUEL IMMEDIATELY.
"80% FUEL LEVEL = ALARM" AND "80% FUEL LEVEL = NORMAL"
NOTE: 2 MINUTE DELAY BEFORE RETURN TO NORMAL ON RENO ALARM.

DDC MONITORING POINTS PER GENERATOR:

GENERATOR RUN	DIGITAL INPUT VIA DRY CONTACT
GENERATOR FAULT	DIGITAL INPUT VIA DRY CONTACT

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Detroit, MI

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
SFM	TAJ		08/07/14	09/03/14

GENERATOR/FUEL OIL CONTROL

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BATTERY CHARGER FAULT DIGITAL INPUT VIA DRY CONTACT

DDC MONITORING POINTS FOR FUEL STORAGE TANK:

FUEL LEVEL 80% DIGITAL INPUT VIA DRY CONTACT
FUEL LEVEL 50% DIGITAL INPUT VIA DRY CONTACT
TANK RUPTURE ALARM DIGITAL INPUT VIA DRY CONTACT
LOW DETECTION ALARM DIGITAL INPUT VIA DRY CONTACT
TANK LEVEL ANALOG INPUT VIA 4–20MA SIGNAL

RENO – REMOTE ENUNCIATION THRU APOGEE

SET UP RENO GROUP FOR GENERATORS. "(RESPECTIVE BUILDING) GENERATOR"
1. SUPERVISOR PAGE (COMMAND CENTRAL)
2. OWNER DEFINED
3. OWNER DEFINED
4. OWNER DEFINED

DEFINE THE FOLLOWING POINTS FOR RENO

GENERATOR RUN – "GEN # IS RUNNING" (USE RUNNING AND OFF AS CHANGE OF STATES)
RETURN TO NORMAL – "GEN # IS OFF

GENERATOR ALARM – "GEN # FAILED TO START"

LOW FUEL LEVEL (DAY TANK) – "GEN # (ARE DAY TANKS NUMBERED)

50% FUEL LEVEL – "FUEL TANK 50% ALARM"

80% FUEL LEVEL – "FUEL TANK 80% ALARM"

NO ATS POINTS DEFINED FOR RENO

ANALOG PHONE DIALER INFORMATION

THE FOLLOWING FOUR NUMBERS TO BE PROGRAMMED INTO THE "DIALER" PANEL
1. ATLAS OIL COMPANY (FUEL DELIVERY) 800–878–2000
2. KATIE WELLMAN (ACCOUNT REPRESENTATIVE)–(OFFICE) 313–662–3621
(CELL) 313–932–6893
3. WSU SUPERVISOR (COMMAND CENTER) 313–577–4844
4. WSU PUBLIC SAFETY (NON–EMERGENCY) 313–577–2224

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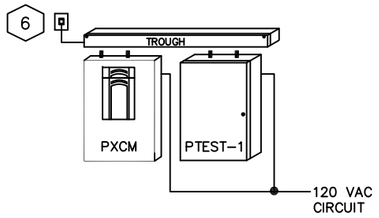
PANEL INSTALLATION NOTES:

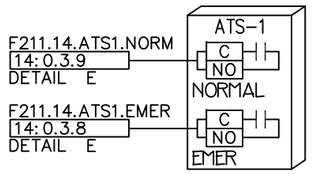
*DDC PANELS PROVIDED BY SIEMENS.
*TROUGH PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR.
*120VAC CIRCUITS PROVIDED BY DIV. 16 ELECTRICAL
*SEE JOB DOCUMENTS FOR CIRCUIT LOCATIONS AND NUMBERS.
*120VAC SHALL BE WIRE INTO THE PANELS WITHOUT RUNNING IN THE WIRING TROUGH.
*HIGH VOLTAGE & LOW VOLTAGE CABLE SHALL NOT MIX IN WIRING TROUGH.
*DDC PANELS TO BE MOUNTED AND TERMINATED BY INSTALLING ELECTRICAL CONTRACTOR.
*INSTALLING ELECTRICAL CONTRACTOR TO PROVIDE MINIMUM OF (2) 1" NIPPLES BETWEEN EACH PANEL AND TROUGH.
*REFER TO ALTRM DRAWING FOR WIRING TAGGING REQUIREMENTS.
*USE ONLY SIEMENS APPROVED WIRING.

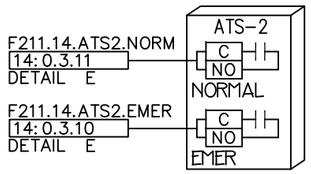


	IP ADDRESS	SUBNET MASK	GATEWAY
PXCM-X	XX.X.X.XX	XXX.XXX.XXX.X	XX.X.X.X

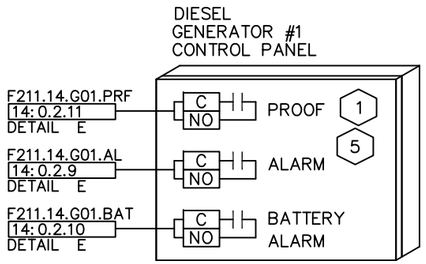
INSTALLATION NOTES:

1. ALL CONTACTS PROVIDED BY EQUIPMENT VENDORS ARE TO DRY.
2. NEW 120 VAC POWER FROM EMERGENCY POWER PANEL PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR.
3. NEW DEDICATED PHONE LINE TO BE PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR.
4. FUEL OIL STORAGE TANK TO BE PROVIDED WITH AN ANALOG LEVEL SENSOR TO REPORT TO DDC SYSTEM.
5. ALL TERMINATION PENDING VENDOR EQUIPMENT SUBMITTALS.
6. ETHERNET DROP BY OTHERS.

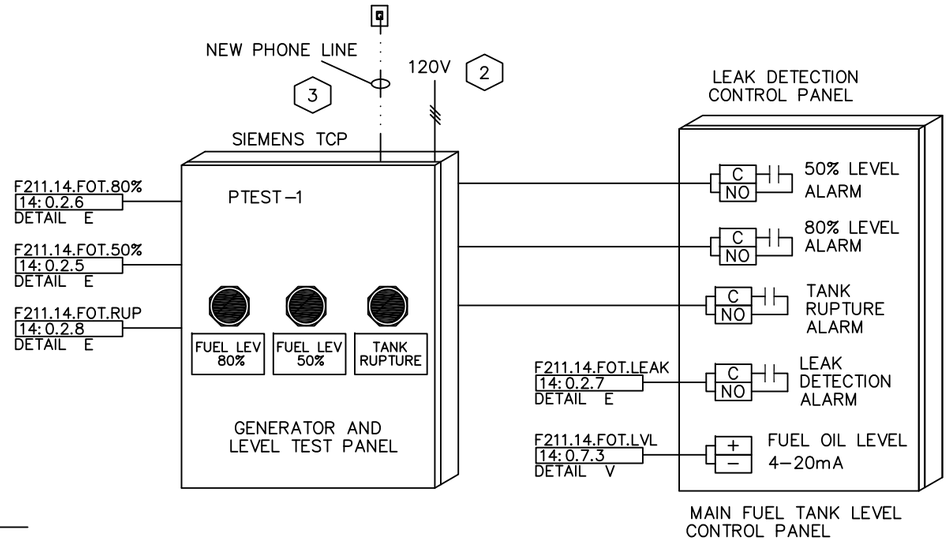




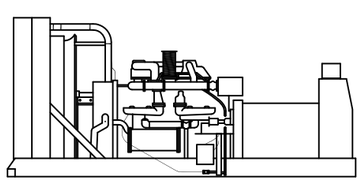
1 / 001B ATS



2 / 001B GENERATOR MONITORING



3 / 001B FUEL OIL STRG. TANK MONITORING



4 / 001B DIESEL GENERATOR MONITORING

COORDINATE FINAL EQUIPMENT TERMINATIONS WITH GENERATOR & FUEL OIL VENDOR.

Reference Only

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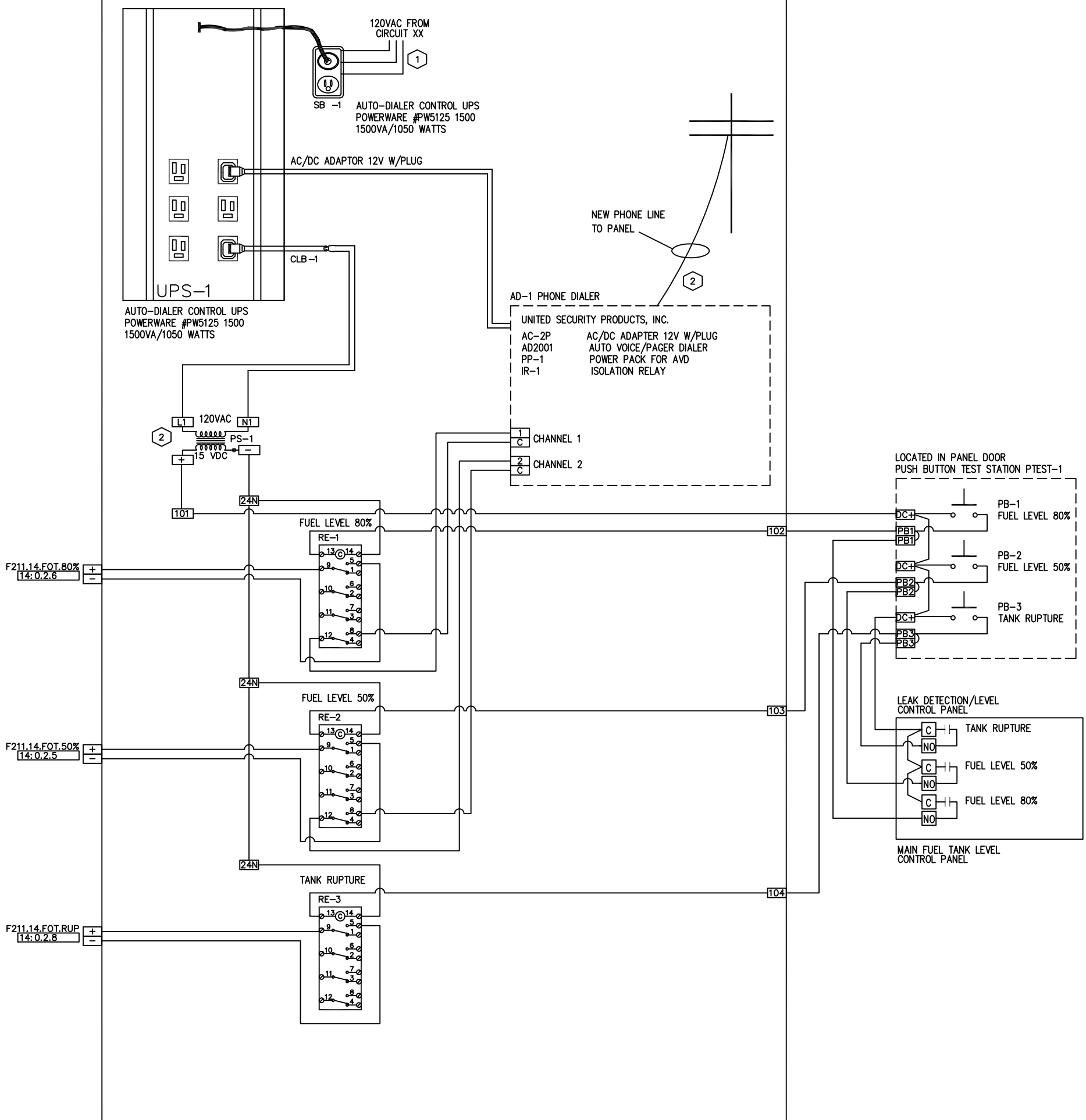
FIELD PANEL PXCM–XX

TEMPERATURE CONTROL PANEL TCP–XX

FIELD WIRING



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INSTALLATION NOTES:

1. 120VAC POWER CIRCUIT NUMBER TO BE VERIFIED.
2. PROVIDE DEDICATED PHONE LINE FOR DIAL–OUT TO FUEL DELIVERY SYSTEM.
3. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1 / 001C FUEL OIL DELVERY TEST SYSTEM

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GENERATOR ELECTRICAL DIAGRAM

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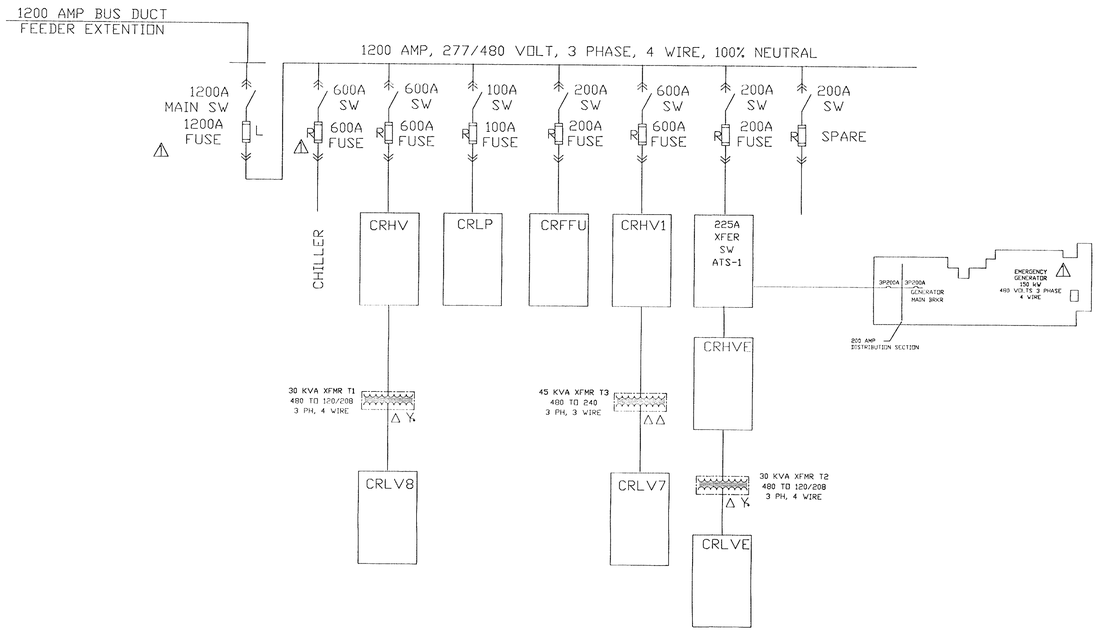

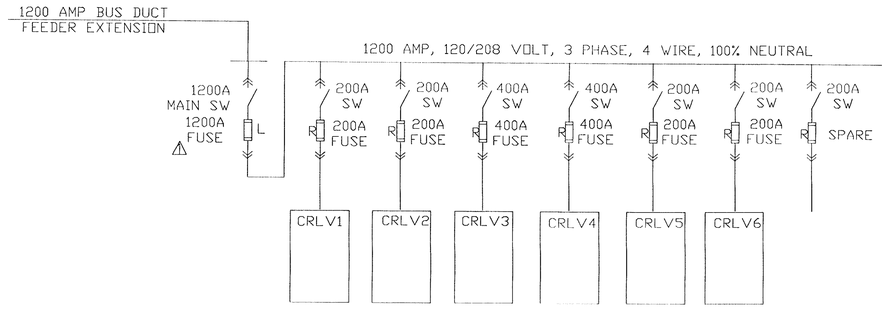

PROCESS DISTRIBUTION PANELS
AND PANEL FEEDERS PART
OF BULLETIN #4

BUILDING 300
SINGLE LINE DIAGRAM
WAYNE STATE UNIVERSITY CLEANROOM PROJECT

MIDWEST CLEANROOM ASSOCIATES
Planning • Design • Construction
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Cleanroom Project For:
Wayne State University
College of Engineering
Detroit, MI

Issue Date	Description
8/1/02	BID PACKAGE #1
10.24.02	BID PACKAGE #2 PRELIMINARY ISSUE
11.08.02	BULLETIN #4 PRELIMINARY
11.14.02	BULLETIN #4
12/10/03	AS-BUILT

Sheet: SINGLE LINE DIAGRAM

Drawing Scale:	N/A
Plot Scale:	4:1
Drawn By:	LAC
Approved By:	LAC
File Name:	30310E21.DGN
Project No.:	30310
Sheet No.:	E2.1