

SECTION 260961
PERFORMANCE LIGHTING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

- A. THIS SECTION INCLUDES FURNISHING THE FOLLOWING EQUIPMENT FOR INSTALLATION AS DESCRIBED UNDER SECTION 260963:

1. PORTABLE DIMMER PACKS
2. EQUIPMENT RACKS
3. LIGHTING CONTROL CONSOLE & ACCESSORIES
4. ETHERNET NETWORK SYSTEM
5. CONTROL DEVICE FACEPLATES
6. PERFORMANCE LIGHTING DEVICE FACEPLATES
7. CABLE ASSEMBLIES
8. SPARE PARTS

- B. RELATED SECTIONS INCLUDE THE FOLLOWING:

1. PERFORMANCE LIGHTING SYSTEMS INSTALLATION
2. COMMON WORK RESULTS FOR ELECTRICAL
3. PERFORMANCE LIGHTING FIXTURES
4. RIGGING SYSTEMS AND CONTROLS
5. COMMISSIONING OF ELECTRICAL SYSTEMS

1.3 FULLY WORKING SYSTEMS

- A. REVIEW DRAWINGS AND SPECIFICATIONS THAT AFFECT WORK IN THIS SECTION.
- B. NOTIFY ARCHITECT UPON INDICATION THAT WORK IN THIS SECTION CANNOT BE COMPLETED AS SPECIFIED OR SCHEDULED.
- C. PROVIDE ADDITIONAL PARTS OR DEVICES REQUIRED FOR FUNCTIONAL REQUIREMENTS OF CONTROL SYSTEMS AT NO EXTRA COST TO OWNER.

1.4 DEFINITIONS

- A. DATA COMMUNICATION PROTOCOL: SIGNAL THAT PROVIDES CONTROL AND FEEDBACK COMMUNICATIONS BETWEEN DEVICES IN CONTROL SYSTEM.
- B. DMX 512: DATA COMMUNICATIONS PROTOCOL COMPLIANT TO USITT DMX-512/1990 SPECIFICATION (ANSI E1.11-2004).
- C. RDM: DATA COMMUNICATIONS PROTOCOL COMPLIANT TO ANSI/PLASA REMOTE DEVICE MANAGEMENT SPECIFICATION (ANSI/PLASA E1.20 RDM).
- D. ACN: DATA COMMUNICATIONS PROTOCOL COMPLIANT TO ANSI/PLASA ARCHITECTURE FOR CONTROL NETWORKS SPECIFICATION (ANSI E1.17-2006 ACN & E1.31 STREAMING ACN).
- E. POE / POWER OVER ETHERNET: 802.3AF COMPLIANT SCHEME OF POWERING DEVICES ON AN ETHERNET SYSTEM.

1.5 QUALITY ASSURANCE AND STANDARDS

- A. REFERENCES TO CODE, STANDARDS, SPECIFICATIONS, AND RECOMMENDATIONS OF TECHNICAL SOCIETIES, TRADE ORGANIZATIONS, AND GOVERNMENTAL AGENCIES WILL REFER TO THE LATEST EDITION OF SUCH PUBLICATIONS ADOPTED AND PUBLISHED PRIOR TO BID SUBMITTAL. ALL CODES AND STANDARDS WILL BE CONSIDERED A PART OF THIS SPECIFICATION AS IF THEY WERE FULLY INCLUDED.
- B. WORK AND MATERIALS SHALL COMPLY WITH RULES AND RECOMMENDATIONS OF:
 1. PREVAILING NATIONAL, STATE AND LOCAL BUILDING CODES.
 2. UL, ETL, CUL, CSA AND CE LABELS - WHERE MATERIALS AND EQUIPMENT ARE AVAILABLE UNDER THE CONTINUING INSPECTION AND LABELING SERVICE OF APPLICABLE INDEPENDENT PRODUCT TESTING AND CERTIFICATION SERVICES, PROVIDE SUCH LABELS, MATERIALS, AND EQUIPMENT.
 3. NATIONAL FIRE PROTECTION ASSOCIATE (NFPA) PUBLICATION: NATIONAL ELECTRICAL CODE, NFPA70 AS APPLICABLE TO INSTALLATION AND CONSTRUCTION OF PERFORMANCE LIGHTING AND CONTROL EQUIPMENT.
 4. NEMA COMPLIANCE PERTAINING TO COMPONENTS OF PERFORMANCE LIGHTING EQUIPMENT.
 5. UNITED STATES INSTITUTE FOR THEATRE TECHNOLOGY, INC. (USITT) DMX512/1990 (ANSI E1.11-2004).
 6. ANSI/PLASA REMOTE DEVICE MANAGEMENT (ANSI/PLASA E1.20 RDM) AND ARCHITECTURE FOR CONTROL NETWORKS (ANSI E1.17-2006 ACN & E1.31 STREAMING ACN) STANDARDS.
 7. INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. (IEEE) 802.3 AND 802.11N.

1.6 SUBMITTALS

- A. BID SUBMITTALS
 1. BILL OF MATERIALS: IDENTIFY PARTS BY COMMON INDUSTRY STANDARD NUMBERS AND DESCRIPTIONS.
 2. CUT SHEETS: MANUFACTURER'S CATALOG DATASHEETS OF ALL PRODUCTS LISTED IN BILL OF MATERIALS.
 3. STATEMENT: MANUFACTURER AGREES TO WARRANTY PROVISIONS.
 4. PROJECTED TIMETABLE: LIST TIME IN WEEKS FOR FOLLOWING ACTIVITIES:
 - a. SHOP DRAWING PREPARATION
 - b. FABRICATION
 - c. SHIPPING TO SITE
 - d. SYSTEM COMMISSIONING
 - e. AS-BUILT DRAWING PREPARATION

B. SHOP DRAWINGS

1. FORMAT: UNIFORM SHEET SIZE.
2. BINDING: BIND SHOP DRAWINGS OF MORE THAN FIVE DRAWINGS.
3. SHOP DRAWINGS SHALL INCLUDE:
 - a. PICTORIAL DRAWINGS: ALL MAJOR COMPONENTS, SUB-ASSEMBLIES, PARTS LIST, DIMENSIONS, MATERIAL AND FINISH NOTES, QUALITY ASSURANCE LISTINGS.
 - b. WIRING DIAGRAMS: COMPONENTS AND INTERCONNECTIONS TO OTHER COMPONENTS.
 - c. BILL OF MATERIALS: ACCESSORIES AND SPARE PARTS NOT DRAWN.
 - d. NOT ACCEPTABLE: CATALOG CUT SHEETS.
4. REVIEW: FABRICATION SHALL NOT COMMENCE UNTIL THEATRE CONSULTANT AND ARCHITECT DETERMINE THAT THE SHOP DRAWINGS ARE IN COMPLIANCE WITH DESIGN INTENT OF CONTRACT DOCUMENTS.
5. REVISIONS: RESUBMIT AS REQUIRED.

C. MANUALS

1. FORMAT: LETTER AND/OR TABLOID SIZE PAPER.
2. BINDING: STANDARD 3-RING BINDER.
3. ELECTRONIC FORMAT: PDF FILES ON USB FLASH DRIVE.
4. MANUALS SHALL INCLUDE:
 - a. SYSTEM DESCRIPTION.
 - b. OPERATION INSTRUCTIONS, INCLUDING SAFETY MEASURES.
 - c. MAINTENANCE INSTRUCTIONS, INCLUDING RECOMMENDED PROCEDURES AND SCHEDULES FOR INSPECTING SYSTEM COMPONENTS.
 - d. CATALOG CUT SHEETS FOR ALL PURCHASED EQUIPMENT.
 - e. RECOMMENDED SPARE PARTS LIST.

D. AS-BUILT DRAWINGS

1. FORMAT: LETTER AND/OR TABLOID SIZE PAPER.
2. BINDING: STANDARD 3-RING BINDER.
3. ELECTRONIC FORMAT: PDF FILES ON USB FLASH DRIVE.
4. DELIVERY: WITHIN ONE MONTH OF SYSTEM ACCEPTANCE.
5. AS-BUILT DRAWINGS SHALL INCLUDE:
 - a. DRAWINGS OF ALL SYSTEM COMPONENTS.
 - b. CONTROL SCHEMATICS AND RISERS.
 - c. BILL OF MATERIALS.

1.7 PROJECT CONDITIONS

- A. SUBMIT: WRITTEN CONFIRMATION THAT RELATED ELECTRICAL WORK, AS SHOWN ON DRAWINGS, PROVIDES NECESSARY PHYSICAL ACCOMMODATIONS OR INSTALLATION AND OPERATION OF EQUIPMENT.
- B. DELIVERY: WITHIN THREE WEEKS OF AWARD OF CONTRACT.

1.8 WARRANTY

- A. MANUFACTURER SHALL WARRANT EQUIPMENT AS FOLLOWS:
 1. ACCORDING TO GUARANTEE PROVISIONS IN GENERAL CONDITIONS.
 2. FOR TWO YEARS FROM ACCEPTANCE OF SYSTEMS, PROVIDE SERVICES DETAILED BELOW:
 - a. TECHNICAL AND OPERATIONAL ASSISTANCE HOTLINE: SHALL BE AVAILABLE DURING NORMAL WORKING HOURS, EVENING, AND WEEKENDS AT NO ADDITIONAL COST.
 - b. IN-STOCK SPARE PARTS: AVAILABLE FOR MAJOR ASSEMBLIES WITHIN 24 HOURS OF CONTACT.
 - 1) ADDITIONAL COST: NO CHARGE DURING DURATION OF WARRANTY FOR EXCHANGES NOT CAUSED BY MISUSE.
 - 2) SERVICE VISIT SHALL CONSIST OF:
 - a) CONSULT WITH OWNER
 - b) INSPECT SYSTEM
 - c) PERFORM NECESSARY MAINTENANCE AND REPAIR.
 - 3) REPORT: SUBMIT TO OWNER AND THEATRE CONSULTANT AFTER EACH VISIT. REPORT SHALL INCLUDE RECOMMENDED INSPECTION AND MAINTENANCE SCHEDULES BASED ON EQUIPMENT'S ACTUAL USE.
 - c. WARRANTY PERIOD: COMMENCE UPON FINAL ACCEPTANCE BY OWNER.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. THE EQUIPMENT SHALL BE MANUFACTURED BY THE FOLLOWING:
 1. ELECTRONIC THEATRE CONTROLS
3031 PLEASANT VIEW ROAD
MIDDLETON, WI 53562
608.831.4116
- B. THE EQUIPMENT SHALL BE SUPPLIED BY ONLY ONE OF THE FOLLOWING:
 1. 4WALL
35 STATE STREET
MOONACHIE, NJ 07074
201.329.9878
 2. BARBIZON
456 W 55TH STREET
NEW YORK, NY 10019
212.586.1620
 3. BMI SUPPLY
571 QUEENSBURY AVE
QUEENSBURY, NY 12804
518.793.6706

4. CANDELA CONTROLS
15 OWENO PLACE
MAHWAH, NJ 07430
201.529.2423

C. ADDITIONAL COMPANIES WISHING TO BID SHALL SUBMIT THE FOLLOWING 10 DAYS BEFORE SUBMISSION OF BIDS, FOR REVIEW AND APPROVAL BY THEATRE CONSULTANT:

1. FIRM HISTORY.
 2. LIST OF COMPLETED INSTALLATIONS, COMPARABLE IN SCOPE TO THE JOB DESCRIBED HERE.
 3. MINIMUM OF 5 REPRESENTATIVE SHOP DRAWING SHEETS.
 4. IF REQUESTED, A CURRENT CERTIFIED FINANCIAL STATEMENT SHOWING SUFFICIENT FINANCIAL BASE FOR THE SIZE OF JOB DESCRIBED HERE.
- D. FURNISHING: EQUIPMENT AND SERVICES SHALL BE PROVIDED BY ONE MANUFACTURER.
 - E. EXPERIENCE: MANUFACTURER SHALL HAVE BEEN CONTINUOUSLY ENGAGED IN PRODUCTION OF PERFORMANCE LIGHTING AND CONTROL EQUIPMENT FOR AT LEAST 20 YEARS.
 - F. EMERGENCY SUPPORT: MANUFACTURER SHALL HAVE A TOLL-FREE, 24 HOUR EMERGENCY PHONE LINE. RESPONSE SHALL BE WITHIN 30 MINUTES OF PHONE CALL.
 - G. SUBSTITUTIONS: SUBSTITUTED EQUAL PRODUCTS SHALL NOT BE ALLOWED WITHOUT PRIOR APPROVAL OF ARCHITECT, ELECTRICAL ENGINEER, THEATRE CONSULTANT, OR OWNER.
 - H. NEW PRODUCTS: PROVIDE LATEST MODEL OF SPECIFIED PRODUCTS PROVIDED LATEST MODEL RETAINS OR EXCEEDS CHARACTERISTICS OF PRODUCTS SPECIFIED HEREIN. MANUFACTURER SHALL PROVIDE DEMONSTRATION FOR ARCHITECT, ELECTRICAL ENGINEER, THEATRE CONSULTANT, OR OWNER.
 - I. TESTING: TEST AND LABEL ALL EQUIPMENT AT FACTORY PRIOR TO SHIPMENT.

2.2 PARTS

- A. ALL MATERIALS AND EQUIPMENT PROVIDED SHALL BE NEW AND OF HIGH QUALITY.

2.3 GROUNDING

- A. THESE SYSTEMS SHALL BE GROUNDED, AS SHOWN ON DRAWINGS AND IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS AND/OR AT THE ADVICE OF THE MANUFACTURER.

2.4 IDENTIFICATION LABELS

- A. PROVIDE LABELING AND SIGNAGE FOR EQUIPMENT AS DESCRIBED HEREIN AND/OR NOTED ON THE DRAWINGS.
 1. EQUIPMENT DESIGNATIONS AND HEADINGS: 1/4" HEIGHT.
 2. SECONDARY INFORMATION: 3/16" HEIGHT.

2.5 PORTABLE DIMMER PACKS

- A. BASIS OF DESIGN
 1. 750W: ETC SOURCE FOUR DIMMER ES750
 2. 1,800W: LEX PRODUCTS SLIM DIMMER PLUS
- B. DIMMER SHALL BE A SILENT, VOLTAGE REDUCING YOKE OR C-CLAMP MOUNT DIMMER. DIMMER SHALL REGULATE INCOMING POWER TO MAXIMUM 115V OUTPUT.
- C. DIMMER SHALL BE A SELF-CONTAINED UNIT, SUITABLE FOR PORTABLE USE.
- D. DIMMER SHALL BE CONVECTION COOLED AND SHALL OPERATE WITHOUT COOLING FANS OR FILTERS.
- E. DIMMER SHALL BE CONTROLLED VIA A MICROPROCESSOR BASED PROGRAMMABLE LIGHTING CONTROLLER WITH A DMX512 INTERFACE.
- F. PROVIDE THE FOLLOWING:
 1. (6) 750W DIMMER PACKS WITH C-CLAMP AND SAFETY CABLE
 2. (4) 1,800W DIMMER PACKS WITH C-CLAMP AND SAFETY CABLE

2.6 EQUIPMENT RACKS

- A. BASIS OF DESIGN:
 1. MIDDLE ATLANTIC PRODUCTS DWR SERIES FOR SWING FRAME RACKS
- B. GENERAL
 1. EQUIPMENT RACK SHALL BE EIA COMPLIANT 19", STEEL CABINET.
 2. COLOR: POWDER COAT BLACK
 3. RACKRAIL TYPE: 10-32
 4. MAXIMUM DIMENSIONS: 24" HIGH X 24" WIDE X 18" DEEP.
 5. USABLE DEPTH: AS REQUIRED FOR SPECIFIED EQUIPMENT
 6. BLANK FILLER PLATES: PROVIDE IN UN-USED SPACES. INTERNAL SPACE BEHIND FILLER PLATES SHALL NOT BE OBSTRUCTED OR USED.
 7. PANEL LEGENDS AND LINES: ENGRAVED AND FILLED WITH ENGRAVER'S ENAMEL.
 8. PROVIDE NON-COMBUSTIBLE BRACKETS, SHELVES, AND OTHER SUPPORTS FOR HEAVY COMPONENTS AND INTERNAL WIRING ASSEMBLIES AND HARNESSSES. PROVIDE INTERIOR MOUNTING ANGLES TO SUPPORT WORK-WRITING TOPS AND DRAWERS.
 9. COMPONENT WIRING: 36" LONG FLEXIBLE CABLE HARNESS TO NUMBERED BARRIER TERMINAL BLOCK. TERMINAL BLOCK SHALL BE ATTACHED TO FRAMES IN LINE WITH ASSOCIATED PANELS AND SHALL NOT INTERFERE WITH ADJACENT COMPONENTS OR FILLER PANELS.
 10. SIGNAGE: PERMANENTLY ATTACHED TO EQUIPMENT WITH FOLLOWING INFORMATION:
 - a. PROJECT NAME
 - b. PERFORMANCE VENUE NAME
 - c. EQUIPMENT DESIGNATION
 - d. FEED SIZE AND SOURCE IDENTIFICATION

- e. MANUFACTURER NAME, TOLL-FREE SERVICE PHONE NUMBER, AND JOB REFERENCE NUMBER
- f. "DESIGNED BY STAGES CONSULTANTS" STATEMENT WITH PHONE NUMBER AND WEB ADDRESS

2.7 LIGHTING CONTROL CONSOLE [OPTION 3]

- A. BASIS OF DESIGN: ETCNOMAD PUCK
- B. GENERAL

1. LIGHTING CONTROL CONSOLE SHALL BE A MICROPROCESSOR-BASED SYSTEM SPECIFICALLY DESIGNED TO PROVIDE COMPLETE CONTROL OF PERFORMANCE LIGHTING SYSTEMS.
2. MINIMUM CAPACITIES:
 - a. CONTROL OUTPUTS: 512
 - b. PROGRAMMABLE FADERS: 20
 - c. MASTER PLAYBACK FADERS: 2
 - d. ROTARY ENCODERS: 4
 - e. EXTERNAL MULTI-TOUCH SCREEN CAPABILITY
 - f. REMOTE VIDEO SUPPORT
 - g. LIGHTING NETWORK DEVICE CONTROL
 - 1) DIRECT CONTROL OF THIRD PARTY SACN/ACN DEVICES
 - 2) DMX512 / RDM HARDWARE INTERFACES
 - 3) SUPPORT MIDI, SMPTE AND RS-232 INTERFACES
3. USER INTERFACE SHALL BE FULLY GRAPHICAL WITH COMMAND LINE. CONTROL COMMANDS SHALL BE ACCEPTED AS EITHER COMMAND LINE OR DIRECT ENTRY.
4. THE MAIN CONTROL SHALL CONSIST OF NUMERIC KEYPAD, DEDICATED CONTROL KEYS, CONTEXT SENSITIVE SOFT KEYS, LEVEL CONTROL WHEEL, AND POINTING DEVICE.
5. A BLIND DISPLAY MODE SHALL ALLOW VIEWING AND MODIFICATION OF ALL RECORDABLE ATTRIBUTES WITHOUT AFFECTING LIVE STAGE LEVELS.
6. A PATCH DISPLAY MODE SHALL BE USED TO DISPLAY AND MODIFY SYSTEM CONTROL CHANNELS WITH THEIR ASSOCIATED DATA.
7. CONTROL AND PROGRAMMING FEATURES FOR AUTOMATED FIXTURES SHALL INCLUDE A STANDARD LIBRARY OF FIXTURE PROFILES; ABILITY TO COPY AND EDIT EXISTING PROFILES AND CREATE NEW PROFILES; AND PATCH DISPLAYS INCLUDING CHANNEL AND OUTPUT ADDRESSING, 16-BIT FADE RESOLUTION, COLOR CHARACTERIZATION ALLOWING COLOR MIXING AND STORING IN HUE AND SATURATION OR NATIVE DEVICE VALUES.
8. CONTROL CHANNEL DATA SHALL BE RECORDABLE AS CUES, GROUPS, SUBMASTERS, PALETTES, EFFECTS, MACROS, CURVES, AND PATCH CONTAINED IN NON-VOLATILE ELECTRONIC MEMORY AND STORED AS SHOW DATA TO INTERNAL STORAGE OR USB STORAGE DEVICE.
9. SIMULTANEOUS PLAYBACK OF RECORDED CUE LISTS SHALL BE POSSIBLE ON UP TO 200 FADERS.
10. THE CONSOLE SHALL BE CAPABLE OF BEING PLACED IN TRACKING OR CUE ONLY RECORD MODE BY THE USER.
11. INTEGRATED, INTEGRAL VIRTUAL MEDIA SERVER SHALL ALLOW MAPPABLE IMAGES AND ANIMATIONS TO RIG ARRAY. SYSTEM SHALL BE CAPABLE OF 40 MAPS, 12 LAYERS EACH.
12. USER DEFINABLE, INTERACTIVE MAGIC SHEET DISPLAYS SHALL ALLOW GRAPHICAL LAYOUT OF CHANNELS, DESK FUNCTIONS, AND PROGRAMMING TOOLS IN LIVE AND BLIND OPERATING MODES. PROVIDE STANDARD SYMBOL LIBRARY AND USER-IMPORT TOOL FOR CUSTOM GRAPHICS.
13. A FREELY AVAILABLE OFFLINE EDITING APPLICATION SHALL BE PROVIDED FOR CREATION AND MODIFICATION OF SHOW DATA ON A PERSONAL COMPUTER.
14. A PERSONAL COMPUTER RUNNING CLIENT SOFTWARE APPLICATION SHALL BE ABLE TO CONNECT TO A CONTROL SYSTEM VIA THE NETWORK AND VIEW CURRENT SHOW DATA IN A MIRRORRED DISPLAY ENVIRONMENT.
15. THE SYSTEM SHALL ALLOW REMOTE CONTROL FROM A WIRELESS HANDHELD REMOTE.
16. THE SYSTEM SHALL SUPPORT CONFIGURATION AND OPERATION OF TWO CONSOLES OR A CONSOLE AND A DEDICATED PROCESSOR AS A MAIN AND FULLY TRACKING BACKUP.

- C. PROVIDE WITH THE CONSOLE (2) EXTERNAL 22" MULTI-TOUCH MONITORS, KEYBOARD, MOUSE, AND TASK LIGHTS.
- D. PROVIDE PROGRAMMING WING AND 20 FADER WING HARDWARE INTERFACES.
- E. FURNISH THE FOLLOWING CONSOLE ACCESSORIES:
 1. CABLES FOR CONTROL CONSOLE
 - a. 25'-0" POWER: 1
 - b. 25'-0" ETHERNET: 1
 2. SURGE PROTECTED POWER STRIPS FOR CONSOLE AND ACCESSORIES: 1
 3. 4 GB CAPACITY USB STORAGE KEYS: 1

2.8 ETHERNET NETWORK

- A. PROVIDE A FULLY FUNCTIONING ETHERNET SYSTEM. SYSTEMS USING PROPRIETARY FORMATS OR PROTOCOLS OTHER THAN TCP/IP SHALL NOT BE ACCEPTED.
- B. NETWORK COMPONENTS
 1. PROVIDE IEEE 802.3AF 10/100/1000 L3 SWITCHES IN QUANTITIES AND LOCATIONS SHOWN IN THE DRAWINGS AND DESCRIBED HEREIN.
 - a. SWITCHES SHALL CONTAIN AUTO-SENSING PORTS SUPPORTING 10BASE-T, 100BASE-T, AND 1000BASE-T. SWITCHES SHALL SUPPORT IEEE 802.3AB TYPE 1000BASE-T STANDARD.
 - b. SWITCHES SHALL BE RACK MOUNTED IN STANDARD 19" RACKS.

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ARCHITECT



MEP ENGINEER



STRUCTURAL ENGINEER



STAGE CONSULTANT



NO.	REVISION/ISSUE	DATE
2.	ISSUE FOR BID	06/18/2018
1.	ISSUE FOR BUDGETING	06/04/2018

SEAL

PROJECT

**INTERIOR
RENOVATION
MUSIC SOUND STAGE**

DATE:	06/18/2018
PROJECT NO:	DA 1845 / SU-062518
DRAWN BY:	MCR
CHECKED BY:	AS
SCALE:	AS NOTED

DRAWING TITLE

**PERFORMANCE LIGHTING
SYSTEM SPECIFICATIONS**

SHEET NO.

TE2.01