

PARTIAL MAIN FLOOR - POWER AND SYSTEMS PLAN

SCALE: 1:50

GENERAL NOTES

1. SECURITY AND DOOR ACCESS SHOWN ARE FOR ROUGH-IN ONLY. CONTRACTOR TO PROVIDE COMPLETE PATHWAY TO EXISTING SECURITY SYSTEM MAIN PANEL IN 2ND FLOOR SERVER ROOM.
2. ALL NEW CARD ACCESS SYSTEMS ARE FOR ROUGH-IN ONLY. CONTRACTOR TO PROVIDE COMPLETE PATHWAY TO EXISTING CARD ACCESS PANEL IN 2ND FLOOR SERVER ROOM.
3. ELECTRICAL CONTRACTOR TO MEET WITH SECURITY CONTRACTOR PRIOR TO ROUGH-IN TO COORDINATE EXACT LOCATION AND REQUIREMENTS.

SECOND FLOOR SCOPE OF WORK

SECOND FLOOR WORK:

1. DISCONNECT EXISTING DEVELOPER WORKSTATIONS IN AREA A06.
2. DISCONNECT EXISTING CUSTOMER SERVICE WORKSTATIONS IN AREA A02 AND RETAIN EXISTING POWER AND DATA CABLING TO SERVICE DEVELOPER WORKSTATIONS BEING RELOCATED TO AREA A02.
3. RE-USE EXISTING POWER CIRCUITS, POWER AND DATA CABLING TO FEED DEVELOPER WORKSTATIONS. ADDITIONAL POWER AND DATA CABLING TO BE ADDED WHERE THERE IS INSUFFICIENT QUANTITIES OR LENGTHS.
4. RELOCATE POWER AND DATA FEED FOR SOUTHERN MOST ROW OF WORKSTATIONS FROM GRIDLINE BC TO 7D.
5. NORTH WORKSTATIONS TO BE FED FROM THE FOLLOWING CIRCUITS: T8-13, 15, 17, 19. CENTRE WORKSTATIONS TO BE FED FROM THE FOLLOWING CIRCUITS: T8-21, 23, 25, 27. SOUTH WORKSTATIONS TO BE FED FROM THE FOLLOWING CIRCUITS: T8-29, 31, 35.
6. RE-CALIBRATE DAYLIGHT SENSOR IN A02 TO MAX 10 FOOTCANDLES.
7. ADD CARD READER AT INSIDE OF 2ND FLOOR LOBBY EXIT DOOR. ADD WALL MOUNTED TELEPHONE (TV) AS SAME LOCATION AS DOOR OPENER BUTTON.

KEYNOTES

1	RECESSED TV OUTLET MOUNTED AT 1016mm AFF. SEE DETAIL ON DWG. E6.1
2	EXISTING SYSTEMS FURNITURE. ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL NEW CAT6 CABLING (2D/1V) TO EACH EXISTING DATA DEVICE. CONNECT TO EXISTING POWER WHIP LOCATED WITHIN SYSTEMS FURNITURE. ONE (1) 20A CIRCUIT TO SERVICE EVERY TWO (2) WORKSTATIONS.
3	CONNECTION TO LOW VOLTAGE CONTROL TRANSFORMER.
4	RE-LOCATE EXISTING FIRE ALARM PULL STATION TO EXISTING SOUTH ENTRANCE DOOR.
5	NOT USED.
6	CORE AND CONDUIT (2-100mm) TO SECOND FLOOR SERVER ROOM FOR DATA CABLING. CONTRACTOR TO USE APPROVED FIRE STOPPING MATERIAL WHEN PENETRATING A FIRE SEPARATION.
7	1-19mm CONDUIT FROM EXISTING FIRE ALARM PANEL TO INTRUSION ALARM CONTROL PANEL IN SECOND FLOOR SERVER ROOM C/W TWO PULL CORDS. CONTRACTOR TO USE APPROVED FIRE STOPPING MATERIAL WHEN PENETRATING A FIRE SEPARATION.
8	1-50mm CONDUIT FOR INTRUSION/DOOR CONTROL TO SECOND FLOOR SERVER ROOM. CONTRACTOR TO USE APPROVED FIRE STOPPING MATERIAL WHEN PENETRATING A FIRE SEPARATION.
9	POWER AND DATA CONDUIT FOR SYSTEMS FURNITURE TO EXIT WALL AT 102mm ABOVE FINISHED FLOOR.
10	TRENCH IN EXISTING CONCRETE FLOOR. 1-50mm CONDUIT FOR POWER AND 1-50mm CONDUIT FOR DATA TO FEED SYSTEMS FURNITURE. ENSURE PROPER BARRIER BETWEEN LINE AND LOW VOLTAGE/COMMUNICATIONS CABLING SECTIONS.
11	PROVIDE 120V CONNECTION TO MECH MASTER CONTROLLER LOCATED IN CEILING SPACE. COORDINATE LOCATION W/ MECH. CONTRACTOR ON SITE.
12	TRENCH IN EXISTING CONCRETE FLOOR. 1-19mm CONDUIT FOR AUDIO VISUAL CABLE.
13	NEW PULL STATION AND FIRE ALARM HORN/STROBE TO BE CONNECTED INTO NEAREST INITIATING AND NOTIFICATION DEVICE COOPS. NEW DEVICE MANUFACTURER TO MATCH EXISTING FIRE ALARM SYSTEM TO BE RE-VERIFIED ONCE NEW DEVICES ARE INSTALLED.
14	RECEPTACLES LOCATED IN SYSTEMS WALL CHANNEL. COORDINATE WITH FURNITURE SUPPLIER.
15	EXISTING DEVICE TO REMAIN.



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APEGS Permit #: 20326

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0 ISSUED FOR TENDER AUG. 07, 2015
NO. DESCRIPTION DATE
REVISIONS:

PROJECT NAME:
YARDI SYSTEMS EXPANSION

516 WELLMANS CRES,
SASKATOON

PROJECT NUMBER: 15-048

DRAWING NAME:
PARTIAL MAIN POWER AND SYSTEMS PLAN

DRAWN: KRE
CHECKED: WB

E2.1



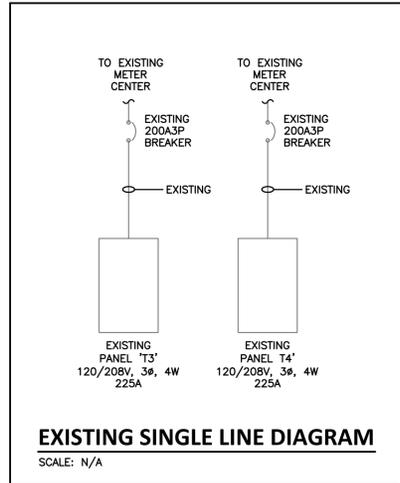
AT (58x) (8/1)

MOTOR SCHEDULE									
ITEM	DESCRIPTION	LOCATION	LOAD	VOLTAGE	PHASE	BREAKER	WIRE	STARTER & HOA (BY ELECTRICAL)	COMMENTS
WH-1	WATER HEATER	MAIN FLOOR	NOM.	120	1Ø	15A1P	21C-2#12	NONE	-
FF-1	ELECTRIC FORCE FLOW	MAIN FLOOR	2 KW	208	1Ø	20A2P	21C-2#12	BY MANUF.	OUELLET MODEL 'OAWHO2008', SUPPLIED AND INSTALLED BY ELEC. CONTRACTOR

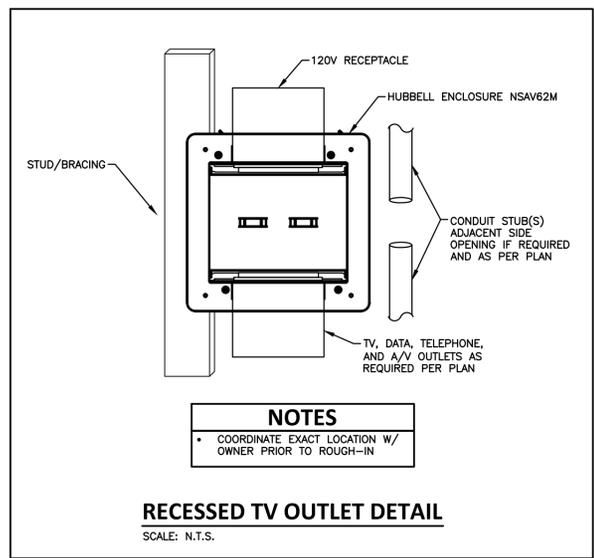
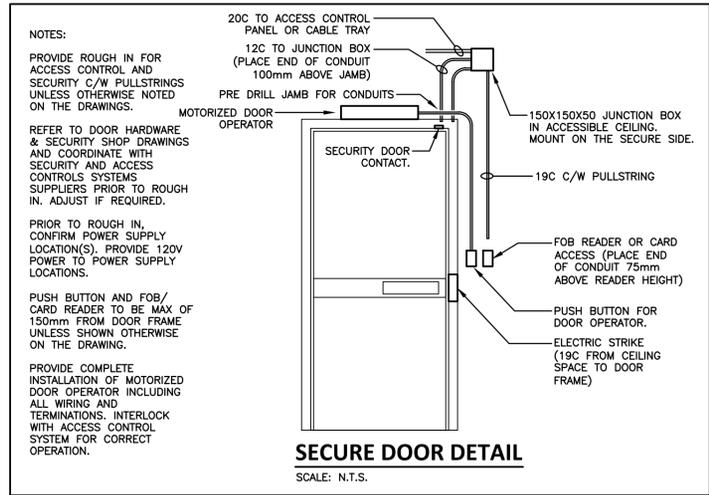
NOTES: -REVIEW MECHANICAL SHOP DRAWINGS PRIOR TO ORDERING ELECTRICAL EQUIPMENT. IF NECESSARY, ADJUST DISTRIBUTION TO SUIT ELECTRICAL REQUIREMENTS.
-ALL ROOF TOP HEATING, VENTILATION AND AIR CONDITIONING EQUIPMENT REQUIRE A SERVICE RECEPTACLE WITHIN 7.5m (24.5'), REVISIONS TO PLACEMENT OF ROOF TOP EQUIPMENT MAY NECESSITATE ADDITIONAL RECEPTACLES IF RELOCATION OF PLANNED RECEPTACLES IS INSUFFICIENT; NOTIFY ENGINEER OF ANY CHANGES.

FIXTURE SCHEDULE				
TYPE	MANUFACTURER	DESCRIPTION	LAMPS	COMMENTS
01	JUNO	IC22LEDG4-27K-U	12W LED 600 LUMENS	150mm RECESSED LED DOWNLIGHT, 120V.
02	JUNO	IC922LEDG3-3K-U	16W LED 900 LUMENS	150mm RECESSED LED DOWNLIGHT, 120V.
100	LITHONIA	2FSL4 72L EZ1 LP830	70W LED 6800 LUMENS	610x1220mm RECESSED LED LUMINAIRE, 120V.
BP	AIMLITE	EBST SERIES	2-4W LED	COMPACT EMERGENCY BATTERY PACK C/W REMOTE HEADS AS SHOWN, 120/24VDC. BATTERY TO BE SIZED FOR A MINIMUM OF 30 MINUTES OF OPERATION ON EMERGENCY VDC POWER
RH	AIMLITE	RMMD SERIES	2-4W LED	24VDC SMALL REMOTE EMERGENCY HEAD, C/W WHITE FINISH CONNECT TO NEAREST BATTERY PACK
EX	AIMLITE	RPST SERIES	2W LED	STEEL, GREEN 'RUNNING MAN' STYLE EXIT SIGN, 120/24VDC C/W WHITE FINISH, MOUNTED AS SHOWN

-FLUORESCENT FIXTURES TO HAVE A COLOR TEMPERATURE OF 3500K
-EQUIVALENT PRODUCTS ARE PERMITTED UPON APPROVAL OF THE ENGINEER



SYMBOL LEGEND					
LIGHTING	BOLLARD LIGHT	FLOOR MOUNTED RECEPTACLE	CEILING MOUNTED DATA NETWORK OUTLET	FIRE ALARM	SECURITY
ON / OFF SWITCH	POLE MOUNTED EXT. LIGHT W/ OPTICS TYPE AND AIMING	CEILING MOUNTED RECEPTACLE	FLOOR MOUNTED DATA NETWORK OUTLET	FIRE ALARM HORN	ROUGH-IN WALL AND CEILING MOUNTED MOTION SENSOR
3-WAY SWITCH	UN-SWITCHED "NIGHT LIGHT" LIGHT FIXTURE	SPECIAL RECEPTACLE	FLOOR MOUNTED TELEPHONE OUTLET	FIRE ALARM HORN STROBE	ROUGH-IN SECURITY CAMERA
DIMMER SWITCH	WALL MOUNTED LIGHT FIXTURE	JUNCTION BOX	CEILING MOUNTED SPEAKER	FIRE ALARM STROBE	ROUGH-IN CARD READER
MULTI-GANG SWITCH	SURFACE MOUNTED LIGHT FIXTURE	PACT POLE	WALL MOUNTED SPEAKER	FIRE ALARM PIEZO SUITE HORN	DOORBELL BUZZER
WALL MOUNTED OCCUPANCY SENSOR SWITCH	RECESSED MOUNTED POT LIGHTS	MOTOR	THERMOSTAT	FIRE ALARM PULL STATION	ROUGH-IN SECURITY DOOR CONTACT
PHOTOCELL	RECESSED MOUNTED WALL WASH POT LIGHT	MAGNETIC STARTER		FIRE ALARM SPEAKER (/w STROBE)	ROUGH-IN MAGNETIC LOCK
CEILING MOUNTED OCCUPANCY SENSOR	PENDANT MOUNTED LIGHT FIXTURE	DISCONNECT SWITCH		FA SUITE SPEAKER & PIEZO HORN C/W SILENCE PUSH BUTTON	ROUGH-IN ELECTRIC STRIKE
LOW VOLTAGE SWITCH	FIXTURE TYPE MARKER	THERMOSTAT		FIRE ALARM BELL	PUSHBUTTON
WALL AND CEILING MOUNTED EXIT SIGNS		ISOLATED GROUND RECEPTACLE		FIRE ALARM BELL C/W STROBE	UP/DOWN/STOP BUTTON
EXIT SIGN WITH SELF POWERED EMERGENCY LIGHTING				HEAT DETECTOR - FIXED TEMP.	ANNOTATIONS
REMOTE EMERGENCY HEADS	DUPLIX RECEPTACLE	DATA NETWORK JACK		HEAT DETECTOR - RATE OF RISE	UNDERGROUND OR UNDERSLAB CONDUIT
BATTERY PACK C/W EMERGENCY HEADS	ABOVE COUNTER RECEPTACLE -APPLICABLE TO OTHER TYPES	TELEPHONE JACK		SMOKE DETECTOR	OVERHEAD OR SURFACE CONDUIT
RECESSED MOUNTED FLUORESCENT LIGHT FIXTURE	WEATHER PROOF RECEPTACLE	COMBINATION TEL/DATA JACK		SMOKE ALARM	S.P.D SURGE PROTECTIVE DEVICES
SURFACE MOUNTED FLUORESCENT LIGHT FIXTURE	GFI RECEPTACLE	AUXILIARY OUTLET (VIDEO, AUDIO ETC.)		DUCT SMOKE DETECTOR	MDP MAIN DISTRIBUTION PANEL
FLUORESCENT STRIP LIGHT	SPLIT FED RECEPTACLE	CEILING MOUNTED DATA/TELEPHONE OUTLET		FIRE ALARM PANEL (FACP/FAAP)	CDP CENTRAL DISTRIBUTION PANEL
WALL MOUNTED FLUORESCENT LIGHT FIXTURE	HALF SWITCHED RECEPTACLE	FLOOR MOUNTED DATA/TELEPHONE OUTLET		FIRE ALARM CONTROL MODULE	FACP FIRE ALARM CONTROL PANEL
TRACK LIGHTING	T-SLOT RECEPTACLE	CEILING MOUNTED TELEVISION OUTLET		FIRE ALARM MONITORING MODULE	FAAP FIRE ALARM ANNUNCIATOR PANEL
PENDANT MOUNTED FLUORESCENT LIGHT FIXTURE	QUAD RECEPTACLE	FLOOR MOUNTED TELEVISION OUTLET		FIRE ALARM FLOW AND TAMPER MODULES	N/L UN-SWITCHED NIGHT LIGHT
POLE MOUNTED EXTERIOR LIGHT FIXTURE	TAMPER RESISTANT RECEPTACLE	CEILING MOUNTED AUXILIARY OUTLET (VIDEO, AUDIO ETC)		END OF LINE RESISTOR	



PANEL SCHEDULE														
PANEL	EXISTING T3	CCT#	60	PROJECT NO.	7455									
VOLTAGE		120/208	V	3	PHASE	LOCATION:	YARDI							
DESCRIPTION		POWER	A	P	#	A	B	C	#	P	A	WATTS	HP	C
C	EXISTING MOTOR LOAD	3833	40	3	1	↑			2	1	15	1330		L
///	///	///	///	///	///	///	///	///	4	1	15	506		L
///	///	///	///	///	///	///	///	///	6	1	15	1260		L
M	EXISTING MOTOR LOAD	15	1	7	↑				8	1	15	250		R
R	SPARE	250	15	1	9	↑			10	1	15	250		R
R	SPARE	250	15	1	11	↑			12	1	20	750		R
R	OPEN AREA 105 CUBE	500	15	1	13	↑			14	1	20	250		R
R	OPEN AREA 105 CUBE	500	15	1	15	↑			16	1	20	250		R
R	OPEN AREA 105 CUBE	500	15	1	17	↑			18	1	15	1000		R
R	OPEN AREA 105 CUBE	500	15	1	19	↑			20	1	15	600		R
R	OPEN AREA 105 CUBE	500	15	1	21	↑			22	1	15	250		R
SPACE					23	↑			24	1	20	1500		R
SPACE					25	↑			26	1	15	250		R
SPACE					27	↑			28	2	20	1000		M
SPACE					29	↑			30	///	///	1000	///	///
SPACE					31	↑			32	1	15	250		R
SPACE					33	↑			34	1	20	500		R
SPACE					35	↑			36					SPACE
SPACE					37	↑			38					SPACE
SPACE					39	↑			40					SPACE
SPACE					41	↑			42					SPACE
SPACE					43	↑			44					SPACE
SPACE					45	↑			46					SPACE
SPACE					47	↑			48					SPACE
SPACE					49	↑			50					SPACE
SPACE					51	↑			52					SPACE
SPACE					53	↑			54					SPACE
SPACE					55	↑			56					SPACE
SPACE					57	↑			58					SPACE
R	BATTERY PACK	200	15	1	59	↑			60	1	15	100		L

PANEL SCHEDULE														
PANEL	EXISTING T4	CCT#	60	PROJECT NO.	7455									
VOLTAGE		120/208	V	3	PHASE	LOCATION:	YARDI							
DESCRIPTION		POWER	A	P	#	A	B	C	#	P	A	WATTS	HP	C
M	EXISTING MOTOR LOAD	3	1	↑					2	1	15	750		R
///	///	///	///	///	///	///	///	///	4	1	15	500		R
///	///	///	///	///	///	///	///	///	6	1	15	200		R
M	EXISTING MOTOR LOAD	1	7	↑					8	1	15	750		R
M	MECH CONTROLLER	250	15	1	9	↑			10	1	15	250		R
R	SPARE	11	1	↑					12	1	20	500		R
R	OPEN AREA 105 CUBE	750	15	1	13	↑			14	1	20	250		R
R	OPEN AREA 105 CUBE	750	15	1	15	↑			16	1	20	1000		R
R	OPEN AREA 105 CUBE	750	15	1	17	↑			18	1	15	500		R
R	OPEN AREA 105 CUBE	750	15	1	19	↑			20	1	15	500		R
R	OPEN AREA 105 CUBE	750	15	1	21	↑			22	1	15	250		R
R	SPARE	15	1	23	↑				24	1	15	250		R
R	OPEN AREA 105 CUBE	500	15	1	25	↑			26	1	15	250		R
R	OPEN AREA 105 CUBE	500	15	1	27	↑			28	1	15	250		R
R	OPEN AREA 105 CUBE	250	15	1	29	↑			30	1	15	250		R
SPACE					31	↑			32					SPACE
SPACE					33	↑			34					SPACE
SPACE					35	↑			36					SPACE
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0 ISSUED FOR TENDER AUG. 07, 2015
NO. DESCRIPTION: DATE:
REVISIONS:

PROJECT NAME:
YARDI SYSTEMS EXPANSION
516 WELLMANS CRES, SASKATOON

PROJECT NUMBER: 15-048

DRAWING NAME:
ELECTRICAL SCHEDULES AND DETAILS

DRAWN: KRE
CHECKED: WB

E6.1

SCOPE OF ELECTRICAL WORK

- The work in this Division includes, but is not necessarily limited to, supply and installation of the following:
 - All hangers, anchors, sleeves, chases, fixture supports, and all electrical material and equipment.
 - Low-voltage systems including when required: Telephone, Data, CATV, Fire Alarm, Security.
 - Complete wiring of, and connections to, mechanical equipment including interlocks.
 - Fire stopping systems relating to electrical penetrations through fire rated ceilings, wall or assemblies.

ELECTRICAL CONTRACTOR GENERAL REQUIREMENTS

- General Requirements, Division 1, shall form part of this Division, and all instructions to bidders, General Conditions, amendments thereto, and General Requirements of that Division apply to and govern the work of this Division.
- This section contains requirements applicable and supplementary to all other sections of this Division, and are to be read as integral to the Division.
- "Utility" shall hereafter mean the electrical power supply company, telephone supply company, fibre network supply company and cable TV supply company.
- The electrical installation shall adhere to the latest edition of the Canadian Electrical Code (CEC), applicable building code, and all other codes in force by the local Authority Having Jurisdiction (AHJ).
- Electrical drawings and these specifications are complementary to each other. Treat discrepancies between them as requirement to adhere to the most restrictive conditions. Contact Engineer 5 days prior to tender close if discrepancies or errors/omissions are found.
- Provide all labour, materials, tools, equipment, and transportation required for the complete installation and testing of all systems described herein.
- Obtain exact dimensions and coordinate placement of electrical conduit, devices and fittings from architectural and structural drawings. Make any necessary adjustments to accommodate structural and architectural conditions without additional charge.
- Materials are to be new, not inferior to the quality specified, and conform to standards issued by CSA, UL, or any other Canadian standards agency.
 - Where materials are specified by technical description, provide the best commercial qualities available for the purpose.
 - Maintain uniformity of manufacture, type, and style within a particular group or class of equipment throughout the work.
 - All work and materials covered by these specifications shall be subject to inspection at any and all times by the Engineer or the Owner's representative. If the inspection finds any material that does not conform to these specifications, Electrical Contractor shall, within three (3) days after being notified by the Engineer or Owner, remove the material from the premises and is not entitled to any additional charge.
- Inform Engineer of all inspections by Authorities at least 48 hours in advance.
- Provide all necessary measurements and assistance to Engineer on his visits to the site at any phase of the project, including after completion.
- No deviations from the drawings shall be permitted without written permission from the Engineer.
- Workmanship
 - All work is to be executed in a neat and orderly manner, with all surface conduit following building lines, and concrete-embedded conduit having approved bend and below.
 - Keep a competent foreman on the project for its duration, unless able to provide satisfactory reasons for changing that person.
 - Tradesmen under foreman, including specialty Electrical sub-trades, are to be competent in all aspects of work to which they are assigned. Specialty sub-trades include, but may not be limited to, audio/visual systems, video/data infrastructure (provide copy of workers' certification by equipment manufacturer), public address, intercommunication, sound reinforcement, security/access control, and lighting control.
 - Do not position device boxes based on Electrical drawings unless dimensions are shown. Determine placement of device boxes from Architectural drawings. If placement is not shown, consult with Architect or Engineer for clarification.
 - Place adjacent device boxes horizontally and vertically so their centres align. Boxes on opposite sides of a wall are to be separated by at least one stud space, unless directed otherwise, or provide sound-deadening material between them.
 - Locating devices 3 meters or less removed from position shown on drawings shall not entitle contractor to any extra charges.
- Protect all finished and unfinished work and equipment
 - Any damage by this contractor is to be repaired at no expense to Owner.
 - Receive and protect electrical equipment provided by Owner.
 - Where panels or other items are scratched, repaint entire affected surface to same finish as other sides or to voltage or system-coded colours.
 - All newly installed equipment to be left clean and in new condition at the completion of the project.
- Visit site / premises before tender in order to ascertain working conditions. No extras will be paid based on site or working conditions at time of tender.
- Provide sleeves, inserts, etc, as required, to General Contractor for placement in concrete, and supervise their placement. Correct incorrect placement at own expense.
- Remove daily debris and surplus materials resulting from this trade's work.
- No consideration will be given to requests for extras or equipment substitution due to late ordering of material, including delays due to rejection of shop drawings.

SHOP DRAWINGS SUBMITTALS - PROVIDE MINIMUM 6 (SIX) COPIES

- All shop drawings shall be original manufacturers' data sheets and information. No facsimiles, screen captures, blank catalogue pages, or poor quality reproductions will be accepted. Electronic PDF submissions are permissible.
- Shop drawings shall bear the name of the manufacturer and/or manufacturer's representative.
- Include only information relative to the equipment for which the shop drawing is submitted. Where equipment choices exist on cutsheets, indicate the proposed equipment with arrows or highlighting. Additionally, provide a list of the submitted equipment.
- Submit shop drawings to relevant utilities and authorities for approval prior to submission to the Engineer.
- All shop drawings submitted to the Engineer must bear the approvals of the Contractor and, if relevant, the Utility. Work shall not proceed with items until Engineer's reviews are complete and stamped shop drawings are returned.
 - Engineer's review is only for ascertaining conformance with the general design concept. It does not indicate approval of design detail implied by the shop drawings. Responsibility for design, errors and omissions in the shop drawings shall remain with Electrical contractor and his sub-trades.
 - Electrical contractor is responsible for dimensions and coordination related to fabrication or construction techniques, compliance with the Canadian Electrical Code, and coordination of the work with all sub-trades.
- Supply shop drawings for at least the following items or item types:
 - Motor control equipment, including starters, contactors, overload heaters, control relays, time-delay relays, motor circuit and control fuses and breakers, pilot lights, control transformers, and selector switches.
 - All light fixtures including interior / exterior and controls, ie: LV switching / sensors / emergency
 - All low voltage systems' components.
 - Wiring and cabling devices including receptacles, switches, floor boxes, and disconnect switches.
 - Firestopping system and details (See fire stopping section below).
- Shop drawings to clearly state equipment tag / designation.

ALTERNATES

- No alternates will be allowed without written approval of acceptance on alternate submittals from the engineer prior to close of tender.

PERMITS, CERTIFICATES, and FEES

- Obtain, pay for, and submit all permits and necessary documents (including drawing approvals by the Electrical Inspection Authority) necessary for the electrical work to commence.
- On completion of the work, submit a Certificate of Acceptance from the Inspection Authority to the Engineer.

INSURANCE

- Provide certification of insurance sufficient to fully cover Owner and his sub-contractor against any and all claims under the Workers' Compensation Act, and any insurance noted within the General Conditions.

FIRE STOPPING

- The electrical contractor, in coordination with the general contractor, is responsible for the installation of all fire stopping systems relating to electrical penetrations through fire rated ceilings, wall or assemblies. The fire stopping system utilized, shall maintain an effective barrier against the spread of flames, smoke and hot gases and shall have stamped the CAN4-S115M approved testing procedure.
- The electrical contractor must provide adequate notification to the electrical engineer, firestopping has been completed to allow for field observations and reporting prior to concealment.
- Submit shop drawings for approval, of all fire stopping system details, including but not limited to, product manufacturer's specifications, technical data for each material and cUL approved documentation.

PROGRESS CLAIMS, EXTRAS, and CREDITS

- Immediately after award of contract, provide Engineer with an itemized schedule of the tender price, with major items, milestones, etc. as line items (examples: Mobilization, Conduit, Service Equipment, Luminaires, Wiring, Voice/Data system) shown, totalling to the quoted price. Thereafter, when submitting progress claims, this schedule shall be used, and claims shall be made based upon percentage completion of each line item. Extras or credits shall be shown added or deleted to main contract.
- Any claim for progress or extras or offer of credit with respect to proposed electrical changes must be accompanied by a complete breakdown of labour and materials based upon an agreed upon industry standard schedule, together with explanation of any condition warranting additional consideration. Failure to supply such information will result in immediate rejection of the claim or offer.
 - Such claim must show quantities, unit prices, labour rates and hours, suppliers' invoices, and any other substantiating documentation.
 - Where agreement cannot be arrived at, claims are to be dealt with under General Conditions, and proposed changes are to be enacted as directed in writing.

INSPECTIONS and TESTS

- Before energizing any portion of the electrical system, provide and pay for testing equipment as part of this contract to perform 1000 volt megger tests (L-L, L-N, L-G) on all feeders and branch circuits, and verify that results conform to the Canadian Electrical Code, and to the satisfaction of the Inspection Authority and to the Engineer.

ENGINEER FIELD REVIEWS

- Contact the Engineer for field reviews at the following stages of construction:
 - Rough-in
 - Substantial Completions
 - Completion of Deficiencies (if required)
- Provide five (5) working days notice for all reviews
- The following items are to be completed prior to substantial inspection:
 - Fire alarm verification report and certificate from manufacturer's representative. Send copies to Engineer.
 - Connection of fire alarm system to central monitoring agency via UL approved dialer to be complete and operational with statement from monitoring agency.
 - All emergency and exit lighting to be installed and operational as per drawings.
 - All devices not installed must have wiring terminated inside a junction box c/w cover.
 - All electrical equipment to have covers and doors installed.

AS-BUILT DRAWINGS

- Maintain at the job site, one set of prints on which is recorded, day-by-day, all outlets, conduit, fixtures, and equipment as installed; together with any changes made to the work. Checking of progress on the preparation of the as built drawings will be carried out by the supervising Engineer regularly.
- Dimension underground services installed relative to the structure, clearly dimension and mark, to ensure ease of locating at future date, all concealed conduits and/or other equipment.
- Upon completion of the work, obtain from the GC one set of reproducible prints, and hire a qualified draftsman to transcribe all the information from the prints including changes due to addenda, change orders, or job site conditions. Mark these "As-Built" and turn over to the GC for submission to the Architect/Engineer before final payment is approved.

OPERATION and MAINTENANCE MANUALS

- Provide four (4) hardcopy sets and one (1) electronic copy (PDF format) of O & M Manuals for the electrical equipment covered under these specifications. Electronic set to be submitted on CD-R, USB flashdrive, or portable hard drive, as specified by the Owner.
- Manuals shall consist of manufacturers' and general maintenance schedules, on typed or printed sheets, and mounted in a hard cover three-post binder. One (1) copy of these manuals shall be submitted to the Engineer for approval prior to the final issue.
- Manuals shall cover a minimum of the following major electrical systems; lighting, voice/data, fire alarm, power, emergency lighting and controls. Provide the following headings for each:
 - Name of system
 - Operating instructions
 - Maintenance instructions
 - Trouble shooting guide
 - Light fixture type designations including:
 - Name of manufacturer
 - Catalogue # of fixture
 - Catalogue # of lamps for replacements
 - Catalogue # of ballasts for replacements
- The O & M Manual shall also include all specified warranties, the name, address, and telephone number of the company providing the warranty, operation procedures, and the manufacturers' recommended maintenance procedures.

GUARANTEE/WARRANTY

- All electrical equipment and systems installed and connected shall be guaranteed free of defective material and workmanship for a period of the greater of one year or any manufacturer offered extended warranty on specific items or systems, with time started from date of substantial completion (or system start-up, if later than substantial completion). Any defects shall be remedied without cost to Owner during this period.
- Provide documents of guarantee/warranty in the O & M Manuals, starting commencement of warranty period. Any manufacturer's extended warranty/warranties shall be provided as part of these documents, and drawn to the Owner's notice on turnover of manuals.
- If a specific system's start-up is later than the date of substantial completion, provide documentation showing the later commencement of system's warranty period; this documentation to be inserted into O & M Manuals alongside the above documents.
- If a specific system's start-up is earlier than the date of substantial completion, provide documentation showing the commencement of system's warranty period at the time of substantial completion, this documentation to be inserted into O & M Manuals alongside the above documents.

IDENTIFICATION and LABELLING

- All items of new electrical equipment such as power, lighting, signal, telephone panels, disconnect switches, manual and automatic control devices, etc, shall have nameplates. These nameplates shall be, unless otherwise specified, black plastic lamnoid with engraved white lettering, and shall be secured to the equipment with pop-rievets. Nameplates shall be neat and uniform in appearance.
 - Panel: Voltage, phase, identification
 - Signal name: System name
 - Manual Controls: Name of equipment controlled
 - Automatic Controls: Identify as on schematic diagrams
- Distribution panels shall have individual nameplates indicating each circuit's use.
- Branch circuit panelboards shall have typed circuit directories behind the panel, on the inside of the panel door.
- Identify all receptacle coverplates with clear self-adhesive mylar tape with black lettering indicating panel and circuit number (i.e. "A25"). Alternatively coverplates can be mechanically engraved. Data receptacles to be labeled similar to power.
- Identification of Panels, Conduits, and Junction Boxes
 - Each panel, conduit, and junction box shall be colour identified by system type carried.
 - Voltage colour identification for line voltage equipment shall be as follows:
 - 120/208 V or 120/240 V Grey
 - System colour identification for low voltage systems equipment shall be as follows:
 - Fire Alarm/Fire Telephone Red - Low Voltage Switching Black
 - Security CCTV Yellow - LV Emergency Lighting Pink
 - Card / PIN Access Yellow - Computer/Data Orange
 - Data / Telephone Wiring White - AV / TV Green
 - Electrical Door Lock Yellow - Telephone Cabinets Green
 - Intercom Green - Door Controls Yellow
 - Door Security Ivory - Isolated Ground Orange
- Colour code conduits and junction boxes as follows:
 - In advance of installation of conduit for a given system, paint conduit couplers and junction box lids the colour of the system that the conduit will be carrying. Use painted couplers and junction box lids only.
 - Where conduits go through walls or floors, on each side of the wall or floor, and within 1 metre of the reappearance of the conduit, system colour the conduit with a 100mm band of paint unless the nearest coloured coupler is within 1 metre of the wall or floor reappearance.
- Conduitors to be colour coded per following schedule:

Phase 'A'	120/208 V
Phase 'B'	Red
Phase 'C'	Black
Neutral	Blue
Ground	White
Tracers for Emergency circuits	Green

GROUNDING and BONDING

- Bond all electrically powered equipment to ground using suitable connectors. Equipment bonding conductors shall be sized according to CEC Table 16.
- Install #12 green ground wires in all conduits.
- Provide grounding buss bar c/w lugs at all telephone/TV backboards, communications cabinets, and data racks. Bond all wall or free standing data racks to ground with #6 green insulated ground wire.

RACEWAYS and JUNCTION BOXES

- Conduits to consist of rigid steel, electric metallic tubing (EMT), or liquid-tight flex.
- All empty conduits to be clearly labelled on both ends and have pull cord installed.
- All EMT straps, couplings and connectors to be zinc plated steel unless otherwise approved by the engineer.
- Raceways, junction boxes to be identified and colour coded as per Identification and Labeling section, this specification.
- All conduits, junction boxes to be concealed. Conform with engineer, where and if surface mount conduit and junction boxes will be allowed. Electrical contractor to coordinate with general contractor to provide labour force during all concrete slab and masonry installations. Use only approved mason boxes and fittings.
- It is the responsibility of the electrical contractor to provide and install any specialty recessed fittings or plates as shown as details in the electrical drawings. He may contract out the manufacturer of these fittings.
- All interior junction boxes to be cast metal, rigid PVC, aluminium or steel. Use of plastic boxes to be approved by the engineer.
- All conduits to be installed parallel to building lines unless otherwise stated.

CONDUCTORS and CABLES

- Minimum conductor size is #12AWG copper. All conductors to be copper unless otherwise noted.
- Power conductors shall be RW90 X-Link, 600V insulation unless indicated otherwise.
- Armoured Cable: To CSA C22.2 No. 51-95. Use in concealed and dry locations only.
- TECK 90 Cable: To CSA C22.2 No. 131-M89. Use where specified.
- Non-Metallic Sheathed Cable: to CSA C22.2 No. 48-M90 and as follows:
 - Conductor: copper
 - Insulation: PVC MM90
- Control Cable for Class 2 Remote Control and Signal Circuits:
 - Conductor: Copper
 - Insulation: 300V insulation, rated 90°C
- TECK 90 Cable
 - Provide protection for exposed cables where subject to damage. Cables prohibited to penetrate concrete slabs without sleeving.
 - Support horizontal runs on cable tray or channels c/w spacers and clamps.
 - Support vertical runs in channels c/w spacers and clamps.
 - Support cables minimum one diameter apart. Maintain equal spacing across supports.
 - Utilize only approved tech connectors and fittings when terminating cables
- Installation
 - Provide and install conductors for power and lighting and controls, as shown on the drawings, and specified herein. This shall consist of individual conductors or multi-conductor cables in raceways, or otherwise, as shown.
 - A grounding conductor shall be installed in conduits and ducts, as specified in the Canadian Electrical Code, whether or not it is shown on the drawings.
 - All wiring to be installed in conduit. Wiring to luminaires from main conduit runs may be flexible armoured cable not exceeding 2 metres in length (excluding vertical drops to suspended fixtures).
 - Colour coding: Refer to "Identification"

MOTORS and MOTOR CONTROL

- Low voltage and line voltage (120V or greater) wiring to be the responsibility of the mechanical contractor. Mechanical contractor to supply and install motor protection, whether shown in the motor schedule or not. Size heaters to FLA of equipment and starter's manufacturers value.
- The electrical trade shall provide magnetic motor starters, as per CEC, for all three phase motors, excluding mechanical equipment supplied with integral motor protection, whether shown in the motor schedule or not. Size heaters to FLA of equipment and starter's manufacturers value.
- Manual and magnetic 3 pole starters shall be in CEMA 1 enclosures or as specified on drawings. Size to suit the voltage and horsepower of the motor being controlled.
- Refer to mechanical drawings for control requirements. Confirm locations and quantities with Mechanical Contractor.
- Provide 120 volt control circuits for control transformers. Confirm locations and quantities with Mechanical Contractor.
- Confirm load, voltage, and phase of all equipment with Mechanical Contractor prior to rough-in and ordering of equipment.
- Refer to mechanical drawings for scope of mechanical control wiring when a building management system (BMS) is specified.
- Control equipment, time clocks, gas detector systems, summer switches to be supplied by the mechanical trade, wired, installed and connected by the electrical trade. Confirm operation interlocks required and wire for damper motors, air proving switches etc.
- Provide fire alarm shut down interlocks, duct detectors, stairwell HVAC, MUA and exhaust requirements as shown on the drawings.
- Provide room switches for all exhaust fans whether shown on drawings or not, unless fan control requirements are provided by mechanical drawings, engineer or building owner.
- All roof top mounted mechanical equipment to have a weather proof service receptacle within 7.5 meters. Service receptacle to be mounted at a minimum of 750mm above the roof surface on the surface of the equipment, an adjacent wall or on pedestal meeting the requirements of rule 26-704.
- Confirm proper operation of mechanical equipment/systems with mechanical contractor prior to final inspection.

WIRING DEVICES

- Outlet Boxes
 - Install all outlet boxes flush with the finished surface where conduit is concealed.
 - Where outlets occur in exterior ceilings and walls the electrical trade shall install molded "poly-vapour" hats, to maintain the integrity of the vapour barrier.
 - Lighting outlet boxes shall be 100mm (4") octagonal pressed steel, and for surface mounted luminaires, supported on metal saddles wired to the T-bar ceiling members.
- Receptacles
 - White decorator bodies, commercial grade, equivalent to those manufactured by Pass & Seymour 26242. Receptacles shall be impact resistant thermoplastic.

- GFCI receptacles shall be specification grade equivalent to those manufactured by Pass & Seymour 1595.
- All receptacles shall be of the same manufacturer and finish throughout.
- Switches
 - Rated 15 amperes 120/277 or 347 volts AC, white bodies, commercial grade, decorator style, equivalent to those manufactured by Pass & Seymour 2601W or 262447W. Switches shall be impact resistant thermoplastic.
 - All switches shall be of the same manufacturer and finish throughout.
- Dimmers
 - Dimmers to be electronic decorator style electronic slider dimmers rated for the load it controls. Ensure compatibility with ballast (if applicable) prior to ordering.
 - Provide a dedicated neutral wire to circuits containing dimmer switches. Provide neutral wire to each dimmer.
 - Dimmers controlling LED luminaires shall be rated as compatible with the specified LED light engine, and shall be 0-10V control.
- Occupancy Sensors
 - Ceiling Mounted Occupancy Sensors:
 - Sensor shall be combination ultrasonic and passive infrared technology type and provide minimum coverage of 2000 square feet, 360°.
 - Manual timer adjustment of 8, 16, or 32 minutes for delayed off time setting.
 - Sensor to be complete with power pack to provide a 24V DC power supply for the occupancy sensor and a 13 amp relay for switching 120V loads.
 - Acceptable manufacturers: Leviton, Watt Stopper, Lutron, Cooper, Sensor Switch or approved equivalent.
 - Wall Mounted Occupancy Sensors:
 - Sensor shall be passive infrared technology type, providing minimum 900 square foot coverage, 180°.
 - Adjustable time delay of 30 seconds to 30 minutes.
 - Adjustable sensitivity from 20% to 100%.
 - Acceptable manufacturers: Leviton, Watt Stopper, Lutron, Cooper, Sensor Switch or approved equivalent.
- Cover Plates
 - Surface mounted devices shall be fitted with cadmium plated sheet steel plates with rolled edges in service rooms.
 - Multi-gang plates shall be one piece construction.
 - Weatherproof plates shall be equal to Pass & Seymour IUCAST1
 - All flush switches and receptacles shall be fitted with standard size, stainless steel covers. Covers shall have beveled edges and screws with chrome-plated heads. Covers shall fit tight to the wall and to the wiring devices.
- Mounting Heights
 - Measured from finished floor to TOB (top of box), or COB (centre of box).
 - Unless otherwise noted, or if there are conflicts, devices shall be installed above finished floor level as follows:
 - Receptacles - general 400mm (16") TOB - Thermostats 1350mm (54") TOB
 - Recep. - above counter 150mm (6") TOB - Bells and horns min 300mm (12") below ceiling to max. 3000mm (10') AFF
 - Emergency lighting 2280mm (90") TOB
 - Telephone outlets 400mm (16") TOB - Pull Stations 1400mm (55") TOB
 - Television outlets 400mm (16") TOB - EOL 1550mm (61") TOB
 - Switches 1220mm (48") TOB
 - In locations where barrier free access is required, use ADA compliant or other approved mounting heights.
- Barrier Free access pushbutton locations to be coordinated with the Architect. Refer to architectural drawings for locations. Provide dedicated 120V, 15A power to each operator.

LIGHTING

- Installation of all light fixtures to be coordinated with general contractor. The electrical contractor is responsible for providing any necessary back boxes, flush trim ring, plaster rings and bolt patterns as needed prior to fixture installation. Refer to electrical drawings and fixture schedule for fixture catalogue numbers, manufacturer, lamp requirements and installation notes.
- The electrical contractor to allow for all surface mounted fixtures to be suspended at engineers request.
- Recessed fixtures in fire rated ceilings or assemblies to be installed in coordination with the general contractor and installed in a manner to maintain the integrity of the fire rating. Utilize fire rated back boxes or housings where necessary. Storage of light fixtures on site to be the responsibility of both the general and electrical contractor. Fixtures to be stored in a safe, secure place free from damage. No extras will be issued for damaged or missing fixtures.
- LED Fixtures shall be designed so that failure of one LED will not result in the loss of the entire luminaire. LED modules shall be replaceable without replacement of the entire luminaire. LED luminaires shall be rated for a minimum operational life of 80,000 hours based on an average 10 hours per operation cycle at a temperature of 25°C Lumen output depreciation shall be less than 30% over the life of the LED. LED luminaires shall be rated to operate on a 120/208 Volt system at 60 Hz with a power factor of 0.9 or greater and THD of less than 20% over the entire load range of 0-100%.

TELECOMMUNICATIONS & DATA CABLE INFRASTRUCTURE

- The telecommunications cable system described herein, shall consist of all outlets, conduit, cables, connectors and terminations as required to provide a complete and operational voice and data distribution system.
- Supply and install a complete cable distribution system to Category 6 Standards to support both voice and data communication systems. Cable installer shall be certified Siemon, Belden, Tyco, Hubbell, Leviton, Systimax or engineer approved alternate. Installation shall conform to EIA/TIA 568C Standards. All terminations and testing shall be completed per vendor's installation and testing practices. Contractor to submit test results from an approved tester to Engineer.
- All data cables shall be terminated to RJ45 Category 6 patch panels and RJ45 jacks. RJ45 Jacks shall be of punch down style and wired to T568A wiring scheme. Voice jack shall be white and data jacks shall be blue. Coverplates shall be stainless steel.
- All data cables that are installed in a plenum within a building permitted to be of combustible construction shall be FT4 compliant. All data cables that are installed in a plenum within a building permitted to be of non-combustible construction shall be FT6 compliant or installed in conduit.
- Data cable runs are not to exceed 90m in length. Contact Engineer if data runs will exceed 90m prior to installing - an alternate solution will be needed to meet TIA Standards.
- Provide 3 metres spare cable coiled at each end.
- All voice cables shall also utilize Cat 6 cabling and be terminated on wall mounted BIX block. If VOIP telephone system is being used all telephone drops to be treated the same as data and terminated on patch panels.
- All cables and outlets shall be labelled per TIA standards. Confirm labelling convention with Engineer/Owner.
- Provide two (2) factory assembled patch cables (2 metres and 3 metres) for each data run. Patch cables shall be Cat 6. (Blue - Data, White - Voice)
- Up to 4 port wall faceplates are acceptable.

FIRE ALARM SYSTEM

- System shall be installed per CAN/ULC S524 (current enforced version) and verified per CAN/ULC S537 (current enforced version).
- Acceptable system manufacturers: Simplex to current existing.
- Wiring Methods
 - Alarm initiating circuit shall be Class "A" wired and supervised, with return wire to panel, run in a separate conduit and cable.
 - Provide conductor protection per NBC and CSA/ULC requirements.
 - Alarm notification appliance circuits to be Class B wired and supervised, with end of line resistors placed according to schedule.
- All fire alarm loop and notification runs wiring to be copper, types FAS or MI, minimum 14 AWG or per system manufacturer's instructions. Transponder to main control conductors to be per manufacturer's requirements (eg: fibre), with separation and protection, as required by this section.
 - Install according to all Codes, including CEC Section 32.
 - All devices to be installed in accessible areas.
 - End of line resistors to be installed at minimum of 1550mm AFF, within the corresponding zone and labeled with lamnoid indicating zone.
 - Relays, modules and isolators to be wall mounted and labelled as to function and zone.
- Alarm Initiating Devices
 - Manual stations to be addressable, single pull, mounted in a recessed box, or surface mounted in manufacturers approved electrical box.
 - Heat detectors shall be addressable fixed temperature and/or rate-of-rise type(s), as indicated on floor plans and per schedule.
- Alarm Notification Appliances
 - Shall consist of an audio portion, (bell / horn / speaker), refer to drawings and a visual portion (strobe), with dB and candela settings and catalogue numbers, as indicated on floor plans and/or schedule. If not noted, maximum and minimum volume settings per Building Code.
 - Strobes within sight of one another shall have their flashes synchronize.

SECURITY SYSTEM

- All security components and equipment shall be by others. Electrical contractor to provide conduit rough-in in wall and in accessible area. Allow for coordination meeting with system supplier to verify exact requirements and placement.
- It is the responsibility of the electrical contractor and his security sub-trade to coordinate with the general contractor and door hardware installer, wiring in mullions, frames, walls and doors. Surface mount wiring for security not permitted.

EXISTING BUILDING

- The electrical contractor is required to visit the existing site to review conditions relating to their work and inform the engineer of any questions he requires clarification on, 3 days prior to close of tender.
- The electrical contractor is to repair any damage to the existing building, service lines, electrical systems or adjoining property incurred by his workmen.
- The electrical contractor shall take into consideration, the occupants of the existing building in terms of noise, safety, and access during construction. He shall allow for in his pricing, the requirements to meet the following:
 - After hours work for construction intrusive to tenants, ie: X-Raying, jack hammering / drilling, coring, systems shutdowns.
 - All life safety systems to be maintained, ie: fire alarm, emergency lighting, generators / transfer switches, egress lighting.
 - Coordinate all necessary electrical system shutdowns, relocates and tie-ins, ie: telephone/data, panel power, lighting, elevators.
 - All live equipment shall be either in a locked room/closet, or permanent covers located where not been worked on.
 - All electrical material or debris shall be maintained daily. In occupied areas, paths of egress shall be maintained, kept clean and sufficiently illuminated.



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■ REVISIONS:

■ PROJECT NAME:

**YARDI SYSTEMS
EXPANSION**

516 WELLMANS CRES,
SASKATOON

■ PROJECT NUMBER: 15-048

■ DRAWING NAME:

**ELECTRICAL
SPECIFICATIONS**

■ DRAWN: KRE

■ CHECKED: WB

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