ITS and Toll Plaza Generator Replacement Design

HIGHWAY 301 SERVICE
ISSUE DATE: 01.13.2022
ISSUE PHASE: CONSTRUCTION DOCUMENTS

HALL ENGINEERING GROUP
PROJECT NO. 2010D

TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY

HALL ENGINEERING GROUP

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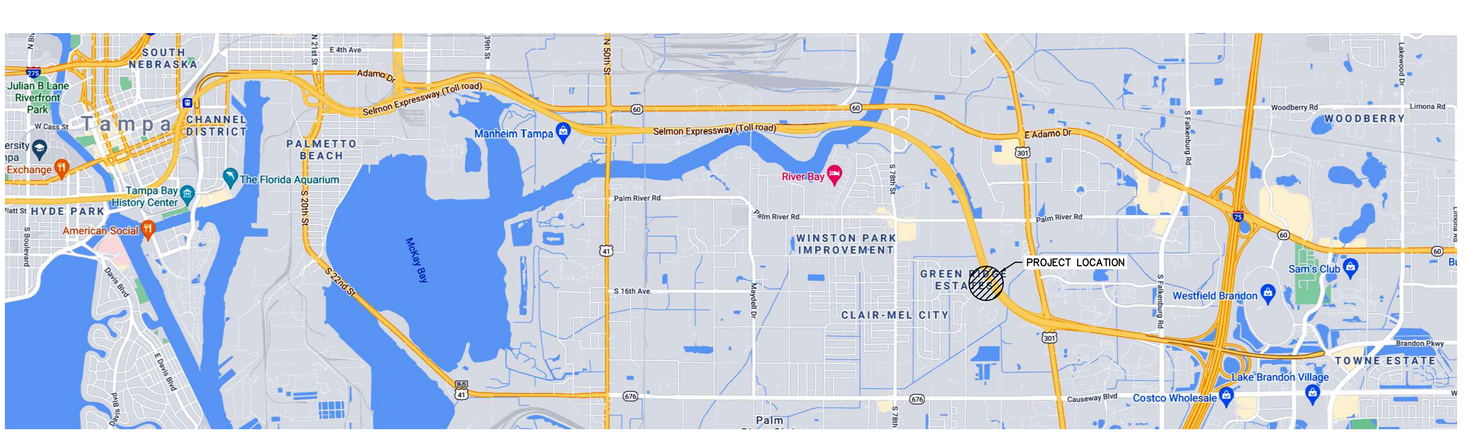


00 THE LEE ROY SELMON EXPRESSWAY FROM S. BOULEVARD TO BRANDON PARKWAY
SCALE:NONE

DRAWING INDEX	
SHEET NO.	SHEET TITLE
	COVER SHEET
E1.0	ELECTRICAL LEGEND, SPECIFICATIONS & DETAILS
E2.0	ELECTRICAL SITE PLAN
E3.0	POWER ONE-LINE DIAGRAMS & SCHEDULE
P1.0	FUEL GAS SITE PLAN

DRAWING SPECIFICATIONS

GENERAL:

A. REFER TO FDOT STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

B. PROVIDE SHALL MEAN FURNISH AND INSTALL.

C. THE COMPLETE ELECTRICAL SYSTEM WHICH SHALL BE PROVIDED BY THE CONTRACTOR SHALL INCLUDE ALL WORK, MATERIALS AND APPARATUSES SPECIFIED HEREINAFTER AND INDICATED ON THE DRAWINGS. ALL WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY AND NO SUBSTANDARD WORK WILL BE ACCEPTED.

D. PROVIDE ALL WORK AND ELECTRICAL SYSTEMS COMPONENTS REQUIRED TO SERVE LOADS AS SPECIFIED HEREINAFTER AND INDICATED ON THE DRAWINGS. THE WORK SHALL INCLUDE COMPLETE TESTING OF ALL ELECTRICAL SYSTEMS AT THE COMPLETION OF THE WORK AND MAKING ANY CHANGES AND ADJUSTMENTS NECESSARY FOR THE PROPER FUNCTIONING OF THE SYSTEMS.

E. MAKE A THOROUGH EXAMINATION OF THE SITE AND THE CONTRACT DOCUMENTS PRIOR TO EXECUTING THE CONTRACT. NO CLAIM FOR ADDITIONAL COMPENSATION WILL BE RECOGNIZED FOR DIFFICULTIES ENCOUNTERED WHICH AN EXAMINATION OF SITE CONDITIONS AND CONTRACT DOCUMENTS WOULD HAVE REVEALED.

F. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE FLOODPLAIN ELEVATION. CONTRACTOR SHALL COORDINATE FLOODPLAIN ELEVATION AND EQUIPMENT REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN.

G. THE PLANS ARE GENERALLY DIAGRAMMATIC. COORDINATE ALL WORK WITH OTHER TRADES AS REQUIRED TO AVOID INTERFERENCES BETWEEN TRADES (i.e. BEAMS, CONDUITS, EQUIPMENT, PIPING, ETC).

H. REMOVE ALL EXISTING LIGHTING FIXTURES, EQUIPMENT, DEVICES, CONDUCTORS, RACEWAYS, ETC. MADE UNNECESSARY BY THE NEW INSTALLATION. PRIOR TO REMOVAL FROM SITE, COORDINATE WITH OWNER TO DETERMINE IF OWNER WISHES TO RETAIN ANY REMOVED EQUIPMENT.

WORK PERFORMANCE:

A. JOB SITE SAFETY AND WORKER SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.

B. ARRANGE, PHASE AND PERFORM ALL WORK DURING TIME PERIODS SCHEDULED WITH AND ACCEPTABLE TO THE OWNER BEFORE PROCEEDING. NO ADDITIONAL COMPENSATION WILL BE AUTHORIZED FOR WORK NECESSITATED BY ILL-TIMED, DEFECTIVE, OR NON-CONFORMING WORK.

C. THE CONTRACTOR SHALL ENSURE THAT ALL SYSTEMS OPERATE AS DESIGNED AND/OR REQUIRED AND SHALL REVIEW THEIR OPERATION WITH THE OWNER UPON COMPLETION OF CONSTRUCTION AND TESTING. COMPILE COMPLETE AND UPDATED AS-BUILT DRAWINGS/DOCUMENTS AND ISSUE ONE (1) SET TO THE OWNER.

D. ELECTRICAL WORK SHALL BE ACCOMPLISHED WITH ALL AFFECTED CIRCUITS OR EQUIPMENT DE-ENERGIZED. WHEN AN ELECTRICAL OUTAGE CANNOT BE ACCOMPLISHED IN THIS MANNER FOR THE REQUIRED WORK, THE FOLLOWING REQUIREMENTS ARE MANDATORY:

1. ELECTRICIANS MUST USE AND WEAR FULL PROTECTIVE EQUIPMENT (PPE) (i.e. CERTIFIED AND TESTED INSULATING MATERIAL TO COVER EXPOSED ENERGIZED ELECTRICAL COMPONENTS, CERTIFIED AND TESTED INSULATED TOOLS, ETC.) WHILE WORKING ON ENERGIZED SYSTEMS IN ACCORDANCE WITH NFPA 70E. THE LEVEL OF PPE SHALL BE DETERMINED BY A COMPUTER GENERATED ARC FLASH CALCULATION PROVIDED AND PAID FOR BY THE CONTRACTOR. THE ARC FLASH DATA SHALL BE PRESENTED WITH THE SUBMITTAL BELOW.
2. WORK ON ENERGIZED CIRCUITS OR EQUIPMENT CANNOT BEGIN UNTIL PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE OWNER.

E. NEW WORK SHALL BE INSTALLED AND CONNECTED TO EXISTING WORK NEATLY AND CAREFULLY. PROVIDE PROTECTIVE MATS, COVERS, ETC. AS REQUIRED FOR ALL EXISTING WORK SUSCEPTIBLE TO DAMAGE. VERIFY SPECIFIC LOCATIONS AND REQUIREMENTS WITH THE OWNER. DISTURBED OR DAMAGED WORK AS A RESULT OF ELECTRICAL WORK SHALL BE REPLACED OR REPAIRED TO ITS PRIOR CONDITIONS.

F. ENSURE THAT ELECTRICAL SERVICE REMAINS UNINTERRUPTED FOR OTHER BUILDINGS AND FACILITIES AT ALL TIMES. PERFORM ALL TEMPORARY WORK NECESSARY TO MAINTAIN CONTINUITY OF ELECTRICAL SERVICE WHEN CONNECTION IS MADE TO EXISTING SYSTEMS. EXISTING SERVICE SHALL NOT BE INTERRUPTED WITHOUT PRIOR CONSENT OF THE OWNER AND MAY BE INTERRUPTED ONLY AT AND FOR THE SPECIFIED TIME DESIGNATED BY THE OWNER. THE CONTRACTOR SHALL BE GUIDED BY THE OWNER AT ALL TIMES IN MATTERS AFFECTING THE EXISTING FACILITIES.

G. ELECTRICAL EQUIPMENT SHALL NOT BE STORED OUTDOORS. EQUIPMENT SHALL BE STORED IN AN OWNER/ENGINEER APPROVED MEDIUM AND LOCATION.

CODES & STANDARDS:

A. PERFORM WORK IN COMPLIANCE WITH THE LATEST EDITION OF ALL APPLICABLE, FEDERAL, STATE AND LOCAL CODES, REGULATIONS AND STANDARDS, TO INCLUDE THOSE LISTED BELOW, ADOPTED BY THE AUTHORITY HAVING JURISDICTION. WHERE DIFFERENCES MAY OCCUR THE MORE STRINGENT REQUIREMENTS SHALL GOVERN. IN CASE OF CONFLICT PROVIDE WRITTEN NOTIFICATION AND OBTAIN A DECISION FROM THE ENGINEER.

1. NFPA 70: NATIONAL ELECTRICAL CODE (2017)
2. NFPA 70E: STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE (2018)
3. NFPA 241: STANDARD FOR SAFEGUARDING CONSTRUCTION, ALTERATION AND DEMOLITION OPERATIONS (2019)
4. FBC: FLORIDA BUILDING CODE (2020)
5. OSHA PART 1910: OCCUPATIONAL SAFETY AND HEALTH STANDARDS
6. OSHA PART 1926: SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION
7. FDOT STANDARDS – SEE FDOT WEBSITE

WARRANTY:

A. CONTRACTOR SHALL WARRANTY ALL WORK FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUBSTANTIAL COMPLETION. CONTRACTOR SHALL RECTIFY ANY DEFECTS DUE TO FAULTY MATERIALS OR WORKMANSHIP AND PAY FOR ANY DAMAGE TO OTHER WORK RESULTING THEREFROM WITHIN SAID PERIOD. THE OWNER WILL GIVE NOTICE OF DEFECTS WITH REASONABLE PROMPTNESS.

B. PROVIDE COMPLETE WARRANTY INFORMATION FOR EACH ITEM TO INCLUDE PRODUCT OR EQUIPMENT; DATE OR BEGINNING OF WARRANTY OR BOND; DURATION OF WARRANTY OR BOND; AND NAMES, ADDRESSES, AND TELEPHONE NUMBERS AND PROCEDURES FOR FILING A CLAIM AND OBTAINING WARRANTY SERVICES.

SUBMITTALS:

A. SUBMIT ONE (1) ELECTRONIC PDF COPY. THE ENGINEER WILL RETURN SUBMITTAL REVIEW COMMENTS NO LATER THAN 14 CALENDAR DAYS OF RECEIPT.

B. APPROVAL SHALL BE OBTAINED FOR ALL EQUIPMENT AND MATERIAL BEFORE DELIVERY TO THE JOB SITE. DELIVERY, STORAGE OR INSTALLATION OF EQUIPMENT OR MATERIAL WHICH HAS NOT HAD PRIOR APPROVAL, WILL NOT BE PERMITTED AT THE JOB SITE.

C. ALL SUBMITTALS SHALL INCLUDE ADEQUATE DESCRIPTIVE LITERATURE, CATALOG CUTS, SHOP DRAWINGS AND OTHER DATA NECESSARY FOR THE ENGINEER TO ASCERTAIN THAT THE PROPOSED EQUIPMENT AND MATERIALS COMPLY WITH SPECIFICATION REQUIREMENTS. CATALOG CUTS SUBMITTED FOR APPROVAL SHALL BE LEGIBLE AND CLEARLY IDENTIFY EQUIPMENT BEING SUBMITTED.

D. SUBMITTALS FOR INDIVIDUAL SYSTEMS AND EQUIPMENT ASSEMBLIES WHICH CONSIST OF MORE THAN ONE ITEM OR COMPONENT SHALL BE MADE FOR THE SYSTEM OR ASSEMBLY AS A WHOLE. PARTIAL SUBMITTALS WILL NOT BE CONSIDERED FOR APPROVAL

E. SUBMITTAL OF SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES WILL BE ACCEPTED ONLY WHEN SUBMITTED BY THE CONTRACTOR. DATA SUBMITTED FROM SUBCONTRACTORS AND MATERIAL SUPPLIERS DIRECTLY TO THE ARCHITECT/ENGINEER WILL NOT BE PROCESSED.

F. SUBMITTALS SHALL BE MARKED TO SHOW SPECIFICATION REFERENCE INCLUDING THE SECTION AND PARAGRAPH NUMBERS. SUBMIT EACH SECTION SEPARATELY AND INCLUDE THE FOLLOWING:

1. INFORMATION THAT CONFIRMS COMPLIANCE WITH CONTRACT REQUIREMENTS. INCLUDE THE MANUFACTURER'S NAME, MODEL OR CATALOG NUMBERS, CATALOG INFORMATION, TECHNICAL DATA SHEETS, SHOP DRAWINGS, PICTURES, NAMEPLATE DATA AND TEST REPORTS AS REQUIRED.
2. PARTS LIST WHICH SHALL INCLUDE THOSE REPLACEMENT PARTS RECOMMENDED BY THE EQUIPMENT MANUFACTURER, QUANTITY OF PARTS, CURRENT PRICE AND AVAILABILITY OF EACH PART.

G. MANUALS: SUBMIT IN ACCORDANCE WITH "A" ABOVE FOR REVIEW AND COMMENT.

1. MAINTENANCE AND OPERATION MANUALS: SUBMIT AS REQUIRED FOR SYSTEMS AND EQUIPMENT SPECIFIED IN THE TECHNICAL SECTIONS. FURNISH THREE (3) COPIES, BOUND IN HARDBACK BINDERS, (MANUFACTURER'S STANDARD BINDERS) OR AN APPROVED EQUAL. FURNISH ONE COMPLETE MANUAL AS SPECIFIED IN THE TECHNICAL SECTION BUT IN NO CASE LATER THAN PRIOR TO PERFORMANCE OF SYSTEMS OR EQUIPMENT TEST, AND FURNISH THE REMAINING MANUALS PRIOR TO CONTRACT COMPLETION.
2. INSCRIBE THE FOLLOWING IDENTIFICATION ON THE COVER: THE WORDS 'MAINTENANCE AND OPERATION MANUAL," THE NAME AND LOCATION OF THE SYSTEM, EQUIPMENT, BUILDING, NAME OF CONTRACTOR, AND CONTRACT NUMBER. INCLUDE IN THE MANUAL THE NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF EACH SUBCONTRACTOR INSTALLING THE SYSTEM OR EQUIPMENT AND THE LOCAL REPRESENTATIVES FOR THE SYSTEM OR EQUIPMENT.

MATERIALS AND METHODS:

A. MATERIALS AND APPARATUSES SHALL COMPLY WITH ALL APPLICABLE TESTS, RATINGS, SPECIFICATIONS, AND REQUIREMENTS OF THE IEEE, NEMA, NFPA AND UL, SHALL BEAR THE UL LABEL OF APPROVAL AND BE LISTED FOR THE PROPOSED APPLICATION.

B. FINISHED PRODUCTS SHALL BE FACTORY PRIMED AND FINISH COATED WITH THE MANUFACTURER'S PRIME COAT AND STANDARD FINISH UNLESS SPECIFIED OTHERWISE BY THE OWNER/ENGINEER.

C. UNLESS OTHERWISE SPECIFIED, UNFINISHED PRODUCTS SHALL BE GALVANIZED, COATED OR PLATED TO RESIST CORROSION.

D. INSTALLATIONS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AS RECOMMENDED BY THE MANUFACTURER AND AS CLOSE AS PRACTICABLE TO LOCATIONS INDICATED ON DRAWINGS.

E. INSTALLATIONS SHALL FACILITATE MAINTENANCE AND REPAIR OR REPLACEMENT OF EQUIPMENT COMPONENTS. ACCESS, WORKING SPACES AND CLEARANCES SHALL NOT BE LESS THAN SPECIFIED BY THE NEC FOR ALL VOLTAGES SPECIFIED.

IDENTIFICATION:

A. INSTALL LABEL TAGS ON ALL WIRE AND CABLE IN JUNCTION BOXES, WIREWAYS AND WIRING GUTTERS OF PANELS. TAGS SHALL IDENTIFY WIRE OR CABLE CIRCUIT NUMBER AND/OR EQUIPMENT SERVED AS INDICATED ON DRAWINGS.

B. JUNCTION BOXES SHALL BE LABELED IN A PERMANENT MANNER REFLECTING PANELBOARD/CIRCUIT NUMBER OF BRANCH CIRCUIT WIRING CONTAINED WITHIN.

C. PANELBOARD DIRECTORIES SHALL BE TYPEWRITTEN, REFLECTING RECORD CONDITIONS TO INCLUDE CIRCUIT NUMBER, TYPE AND LOCATION OF LOAD.

D. INSTALL PLASTIC PLACARDS ON EQUIPMENT REFLECTING, EQUIPMENT NAME, NUMBER AND RATING.

RACEWAYS:

A. RACEWAYS:

1. EXTERIOR EXPOSED: GALVANIZED STEEL RIGID METAL CONDUIT (RMC).
2. EXTERIOR CONNECTIONS TO MOTORS, TRANSFORMERS AND VIBRATING EQUIPMENT: LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC).
3. UNDERGROUND: SCHEDULE 40 PVC.
4. PENETRATIONS THROUGH CONCRETE SLABS SHALL BE MADE WITH PVC COATED RIGID GALVANIZED STEEL CONDUIT.

B. ALL BENDS IN PVC LARGER THAN 1" NOMINAL TRADE SIZE SHALL BE MADE WITH PVC COATED RIGID METAL CONDUIT.

C. ALL CONDUIT SHALL BE PROPERLY ALIGNED, GROUPED AND SUPPORTED. EXPOSED CONDUIT SHALL BE INSTALLED AT RIGHT ANGLES TO OR PARALLEL TO THE PRINCIPAL STRUCTURAL MEMBERS. PROVIDE SUPPORT A MINIMUM OF 18" FROM BENDS AND BOXES AND ON INTERVALS NOT TO EXCEED 8'-0". CONDUIT IS NOT TO SPAN ANY SPACE UNSUPPORTED.

D. UNDERGROUND CONDUITS SHALL BE INSTALLED WITH MINIMUM 36" COVER.

E. PROVIDE NYLON PULL CORD AND LEAVE IN PLACE IN EACH EMPTY CONDUIT.

BOXES:

A. ALL BOXES SHALL BE RIGIDLY MOUNTED AND SHALL BE EQUIPPED WITH SUITABLE SCREW FASTENED COVERS. OPEN KNOCK-OUTS OR HOLES IN BOXES SHALL BE PLUGGED WITH A SUITABLE BLANKING DEVICE.

B. EXTERIOR BRANCH BOXES SHALL BE WEATHERPROOF CAST "FS" BOXES.

CONDUCTORS:

A. CONDUCTORS SHALL BE COPPER WITH XHHW-2 90°C INSULATION. THE FOLLOWING SYSTEMS OF COLOR CODING SHALL BE STRICTLY ADHERED TO AND SHALL BE CONSISTENTLY FOLLOWED THROUGHOUT:

1. GROUND WIRES: GREEN
2. GROUNDED NEUTRAL WIRES: WHITE
3. 240/120 VOLT, UNGROUNDED PHASE WIRES: BLACK AND RED
4. 480/240 VOLT, UNGROUNDED PHASE WIRES: BROWN AND ORANGE

NOTE: WHERE EXISTING COLOR CODING DIFFERS FROM COLOR CODING ASSIGNED HERE-IN, USE EXISTING COLOR CODING AS REQUIRED TO MAINTAIN CONSISTENCY.

B. UNDERGROUND SPLICES, JOINTS, TERMINATIONS, ETC. SHALL BE WATERPROOF AND LOCATED IN PULLBOX.

C. FOR NEW CIRCUITS, MULTIPLE CIRCUITS IN SAME CONDUIT SHALL NOT SHARE NEUTRAL CONDUCTORS.

D. REMOVE AND DISPOSE OF ALL UNUSED CONDUIT AND WIRING BACK TO LAST ACTIVE DEVICE OR PANEL.

E. INSTALL SPLIT BOLT CONNECTORS FOR COPPER CONDUCTOR SPLICES AND TAPS, 6 AWG AND LARGER.

F. INSTALL SOLDERLESS PRESSURE CONNECTORS WITH INSULATING COVERS FOR COPPER CONDUCTOR SPLICES AND TAPS, 8 AWG AND SMALLER.

G. INSTALL INSULATED SPRING WIRE CONNECTORS WITH PLASTIC CAPS FOR COPPER CONDUCTOR SPLICES AND TAPS, 10 AWG AND SMALLER.

H. "PUSH-IN" OR "STAB" TYPE CONNECTORS ARE NOT ACCEPTABLE.

GROUNDING:

A. THE ELECTRICAL SYSTEMS SHALL BE COMPLETELY AND EFFECTIVELY GROUNDED AS REQUIRED BY THE NEC AND AS SPECIFIED HEREINAFTER.

B. ALL METALLIC RACEWAYS SHALL BE MECHANICALLY AND ELECTRICALLY SECURE AT ALL JOINTS AND AT ALL BOXES, CABINETS, FITTINGS, AND EQUIPMENT. METALLIC RACEWAYS SHALL BE CONNECTED TO A DIRECT GROUND AT THE POINT OF ELECTRICAL SERVICE ENTRANCE AND SHALL BE ELECTRICALLY CONTINUOUS THROUGHOUT THE ENTIRE SYSTEM.

C. ALL GROUND CONDUCTORS SHALL BE INSULATED COPPER UON.

D. GROUND CONDUCTORS SHALL BE CONNECTED TO GROUND BUS IN PANELBOARDS.

E. TERMINATE FEEDER AND BRANCH CIRCUIT INSULATED EQUIPMENT GROUNDING CONDUCTORS WITH GROUNDING LUG, BUS, OR BUSHING. CONDUCTORS LOOPED UNDER SCREW OR BOLT HEADS WILL NOT BE PERMITTED.

F. INSTALL CLAMP-ON CONNECTORS ON CLEAN METAL CONTACT SURFACES TO ENSURE ELECTRICAL CONDUCTIVITY AND CIRCUIT INTEGRITY.

G. TEST THE GROUNDING SYSTEM TO ASSURE CONTINUITY AND THAT RESISTANCE TO GROUND DOES NOT EXCEED 5 OHMS UNLESS OTHERWISE NOTED. TEST EACH GROUND ROD FOR RESISTANCE TO GROUND BEFORE MAKING ANY CONNECTIONS TO THE ROD; THEN TIE ENTIRE GROUNDING SYSTEM TOGETHER AND TEST FOR RESISTANCE TO GROUND. MAKE RESISTANCE MEASUREMENTS IN NORMALLY DRY WEATHER, NOT LESS THAN 48 HOURS AFTER RAINFALL. MAKE GROUND RESISTANCE MEASUREMENTS WITH A GROUND RESISTANCE TEST METER CALIBRATED WITHIN THE LAST TWELVE MONTHS.

RECEPTACLES:

A. RECEPTACLES SHALL BE THE GROUNDING TYPE WITH GROUND CONNECTION MADE THROUGH AN EXTRA POLE WHICH SHALL BE PERMANENTLY CONNECTED TO GROUND CONDUCTOR.

B. CONNECT WIRING DEVICES BY WRAPPING SOLID CONDUCTOR AROUND SCREW TERMINAL. WHEN STRANDED CONDUCTORS ARE USED IN LIEU OF SOLID, USE CRIMP ON FORK TERMINALS FOR DEVICE TERMINATIONS. DO NOT PLACE BARE STRANDED CONDUCTORS DIRECTLY UNDER DEVICE SCREWS.

C. GFCI RECEPTACLES SHALL MEET CURRENT UL 943 REQUIREMENTS WITH AUTO-MONITORING OR SELF-TEST FUNCTIONALITY; IF THE SELF-TEST FUNCTION DETECTS A PROBLEM, THE UNIT MUST DENY POWER OR PROVIDE VISUAL AND/OR AUDIBLE INDICATION.

D. GFCI RECEPTACLES LOCATED IN DAMP, WET OR EXTERIOR LOCATIONS SHALL BE WEATHER-RESISTANT TYPE TO COMPLY WITH NEC 406.9.

E. RECEPTACLES FOR 20 AMPERE, 120 VOLT APPLICATION SHALL BE SPECIFICATION GRADE THREE-WIRE, TWO POLE, RATED 20 AMPERES AT 125 VOLTS, PASS & SEYMOUR OR APPROVED EQUAL.

F. WEATHERPROOF COVER PLATES SHALL BE NEMA 250 COMPLYING WITH TYPE 3R, WEATHER RESISTANT, DIE-CAST ALUMINUM, WHILE IN USE COVER. COVER SHALL HAVE NOTCH FOR CORD.

EQUIPMENT:

A. OUTDOOR EQUIPMENT SHALL BE NEMA 3R OR NEMA 4X AS REQUIRED.

B. CIRCUIT BREAKERS SHALL BE BOLT-ON TYPE.

C. SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE UON.

D. FUSES SHALL BE CLASS RK1 UON.

E. TRANSFORMERS:

1. TRANSFORMERS SHALL COMPLY WITH DOE, 2016 EFFICIENCY STANDARDS, NEMA ST20, FACTORY ASSEMBLED, AIR COOLED, DRY TYPE. AUTO TRANSFORMERS WILL NOT BE ACCEPTED.
2. INSULATION SYSTEMS:
   a. TRANSFORMERS 30 kVA AND LARGER: UL RATED 220° C SYSTEM HAVING AN AVERAGE MAXIMUM RISE BY RESISTANCE OF 150° C IN A MAXIMUM AMBIENT OF 40° C.
   b. TRANSFORMERS BELOW 30 kVA: SAME AS FOR 30 kVA AND LARGER OR UL RATED 185° C SYSTEM HAVE AN AVERAGE MAXIMUM RISE BY RESISTANCE OF 115° C IN MAXIMUM AMBIENT OF 40° C.
   c. NOMINAL IMPEDANCE SHALL BE AS SHOWN ON THE DRAWINGS. IF NOT SHOWN ON THE DRAWINGS, NOMINAL IMPEDANCE SHALL BE AS PERMITTED BY NEMA.
   d. SINGLE PHASE TRANSFORMERS RATED 15 kVA THROUGH 25 kVA SHALL HAVE TWO, 5% FULL CAPACITY TAPS BELOW NORMAL PRIMARY VOLTAGE. ALL TRANSFORMERS RATED 30 kVA AND LARGER SHALL HAVE TWO, 2 1/2 % FULL CAPACITY TAPS ABOVE, AND FOUR, 2 1/2 % FULL CAPACITY TAPS BELOW NORMAL RATED PRIMARY VOLTAGE.
   e. CORE ASSEMBLIES SHALL BE GROUNDED TO THEIR ENCLOSURES BY ADEQUATE FLEXIBLE GROUND STRAPS.

F. SURGE PROTECTIVE DEVICE MANUFACTURERS SHALL BE: PQ PROTECTION, ADVANCED PROTECTION TECHNOLOGIES, ATLANTIC SCIENTIFIC, OR CURRENT TECHNOLOGY.

LEGEND

SYMBOL	DESCRIPTION	MOUNTING/REMARKS
ZZZ	BRANCH CIRCUIT PANELBOARD: 480 VAC	TOP 78" AFF
	ELECTRICAL EQUIPMENT: DENOTED BY LABEL	AS NOTED
	ELECTRIC UTILITY METER/CABINET	AS REQUIRED BY UTILITY COMPANY
	DISCONNECT SWITCH	TOP 78" AFF
	ELECTRICAL TRANSFORMER: DRY-TYPE	AS NOTED
(#) (#)	KEYED NOTES	REFER TO LIKE-NUMBERED NOTES
'EQUIP'	EQUIPMENT LABEL	REFER TO RESPECTIVE SCHEDULE

ABBREVIATIONS:

A	AMPS OR AMPERE	FC	FOOTCANDLE	NEC	NATIONAL ELECTRICAL CODE
A/E	ARCHITECT/ENGINEER	FLA	FULL LOAD AMPS	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
AF	AMPERE FRAME	FO	FIBER OPTIC		
AFCI	ARC-FAULT CIRCUIT INTERRUPTER	FT	FOOT (FEET)	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
		GC	GENERAL CONTRACTOR		
AFF	ABOVE FINISHED FLOOR	GEN	GENERATOR	NO	NORMALLY OPEN
AFG	ABOVE FINISHED GRADE	GFCI	GROUND-FAULT CIRCUIT INTERRUPTER	NTS	NOT TO SCALE
AHJ	AUTHORITY HAVING JURISDICTION	GND	GROUND	OB	OUTLET BOX
AIC	AMPERE INTERRUPTING CAPACITY	HOA	HAND-OFF-AUTO	P	POLE
		HP	HORSEPOWER	PA	PUBLIC ADDRESS
AL	ALUMINUM	HPS	HIGH PRESSURE SODIUM	PB	PULL BOX
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	HV	HIGH VOLTAGE	PH/ϕ	PHASE
		HZ	HERTZ	PNL	PANELBOARD (PANEL)
ASD	ADJUSTABLE SPEED DRIVE	IG	ISOLATED GROUND	RCPT	RECEPTACLE
AT	AMPERE TRIP	IN	INCH (INCHES)	SCC	SHORT CIRCUIT CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH	JB	JUNCTION BOX	SF	SQUARE FOOT (FEET)
		kcmil	THOUSAND CIRCULAR MIL	SPEC	SPECIFICATION
AUTO	AUTOMATIC	kV	KILOVOLT	SPD	SURGE PROTECTIVE DEVICE
AWG	AMERICAN WIRE GAUGE	kVA	KILOVOLT AMPERE	SS	STAINLESS STEEL
BLDG	BUILDING	kW	KILOWATT	SWBD	SWITCHBOARD
BFG	BELOW FINISHED GRADE	kWh	KILOWATT HOUR	SWGR	SWITCHGEAR
BRKR	BREAKER	LED	LIGHT EMITTING DIODE	TR	TAMPER RESISTANT
C	CONDUIT	LPS	LIGHTNING PROTECTION SYSTEM	TYP	TYPICAL
CB	CIRCUIT BREAKER			U	UNKNOWN CIRCUIT
CKT	CIRCUIT	LTG	LIGHTING	UL	UNDERWRITERS LABORATORY
COMM	COMMUNICATIONS	LTNG	LIGHTNING		
CT	CURRENT TRANSFORMER	LV	LOW VOLTAGE	UON	UNLESS OTHERWISE NOTED
CU	COPPER	MAX	MAXIMUM	UPS	UNINTERRUPTIBLE POWER SUPPLY
C	DEGREES CELSIUS	MCA	MINIMUM CIRCUIT AMPACITY		
°F	DEGREES FAHRENHEIT	MCB	MAIN CIRCUIT BREAKER	UTIL	UTILITY
DISC	DISCONNECT	MCC	MOTOR CONTROL CENTER	V	VOLT OR VOLTAGE
DP	DISTRIBUTION PANELBOARD	MDP	MAIN DISTRIBUTION PANELBOARD	VA	VOLT AMPERE
DS	DISCONNECT SWITCH			VD	VOLTAGE DROP
DWG	DRAWING	MH	METAL HALIDE	VFD	VARIABLE FREQUENCY DRIVE
EC	ELECTRICAL CONTRACTOR	MHz	MEGAHERTZ		
EG	EQUIPMENT GROUND	MIN	MINIMUM	W	WATT OR WIRE
ELEC	ELECTRIC OR ELECTRICAL	MLO	MAIN LUGS ONLY	WP	WEATHERPROOF
ELEV	ELEVATOR	MOCP	MAXIMUM OVERCURRENT PROTECTION	WR	WEATHER RESISTANT
EMER	EMERGENCY			WT	WATERTIGHT
EPO	EMERGENCY POWER OFF	MTS	MANUAL TRANSFER SWITCH	XFER	TRANSFER
EPS	EMERGENCY POWER SUPPLY	N	NEUTRAL	XFMR	TRANSFORMER
EXIST	EXISTING	NA	NOT APPLICABLE	XP	EXPLOSION RATED
FA	FIRE ALARM	NC	NORMALLY CLOSED		

OBJECT STATE LINETYPES:

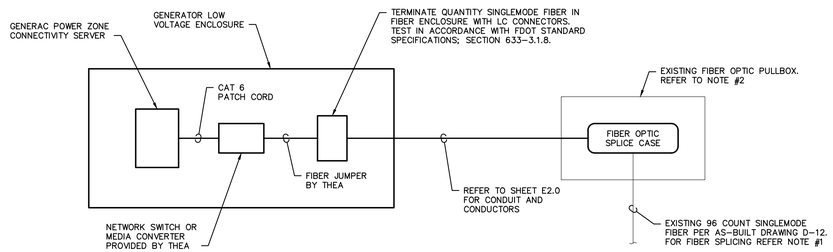
EXISTING OBJECT OR CONSTRUCTION: _____

EXISTING OBJECT OR CONSTRUCTION TO BE DEMOLISHED: - - - - - - - - - - - -

NEW OBJECT OR CONSTRUCTION TO BE PROVIDED: _____

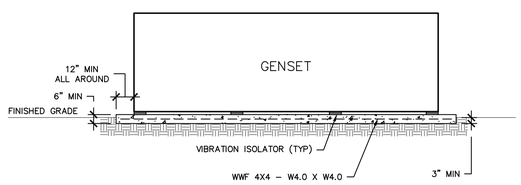
OBJECT STATE SUBSCRIPTS:

D	EXISTING OBJECT TO BE DEMOLISHED	M	EXISTING OBJECT TO BE REMOVED & RELOCATED
E	EXISTING OBJECT TO REMAIN	R	RELOCATED EXISTING OBJECT



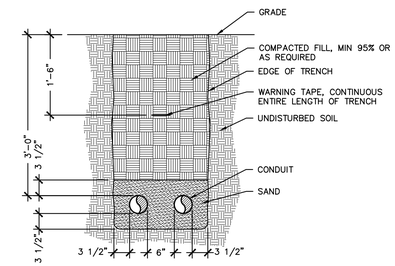
NOTES:
1. SOME FIBER ALLOCATIONS MAY HAVE BEEN CHANGED DUE TO FAILURE/MAINTENANCE SINCE AS-BUILT PLANS WERE COMPLETED. CONTRACTOR TO FIELD VERIFY AND COORDINATE WITH THEA STAFF PRIOR TO MODIFYING EXISTING SPLICE ENCLOSURE. PROPOSED FIBER ALLOCATION FOR THE GENERATOR CONTROL SIGNAL IS: 96 FOC BACKBONE 13 & 14 TO 12 STRAND DROP CABLE 1 & 2 TX AND 3 & 4 RX.
2. CONTRACTOR SHALL VERIFY EXISTING FIBER PULLBOX IS OF SUFFICIENT SIZE TO ACCOMMODATE NEW FIBER SPLICE CASE, OTHERWISE CONTRACTOR SHALL REPLACE FIBER PULLBOX AS REQUIRED.

03 LOW VOLTAGE DIAGRAM
SCALE:NONE

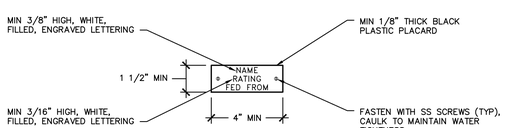


NOTES:
1. CONCRETE PAD LENGTH AND WIDTH SHALL BE COORDINATED WITH GENERATOR MANUFACTURER'S SHOP DRAWINGS.
2. PROVIDE ANCHORING PER GENERATOR MANUFACTURER'S RECOMMENDATION WITH STAINLESS STEEL (TYPE 316) ANCHORS.
3. PROVIDE VIBRATION ISOLATORS PER GENERATOR MANUFACTURER'S RECOMMENDATION.
4. CONCRETE SHALL HAVE A MIXTURE RATIO OF 1:2:3 (CEMENT:SAND:AGREGATE) WITH A MAXIMUM 4" SLUMP AND MINIMUM 29-DAY COMPRESSIVE STRENGTH OF 3,000 PSI.

02 GENERATOR CONCRETE PAD DETAIL
SCALE:N.T.S



04 TYPICAL CONDUIT TRENCH DETAIL
SCALE:N.T.S



01 EQUIPMENT PLACARD DETAIL
SCALE:N.T.S

Issue / Revision:

No.	Date:	Description:
1		
2		
3		
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Engineer: ADAM V. EACHES, P.E., FL. REG. # 76151

Digitally signed by Adam V. Eaches, P.E. #76151
Date: 2022.01.14 11:56:30-05'00'

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Consultant: HALL ENGINEERING GROUP
Electrical Lighting Mechanical Low Voltage
www.hallengroup.com | Tel: 813.374.2121
FL C.O.A. #: 27620

Project Name:
ITS AND TOLL PLAZA GENERATOR REPLACEMENT DESIGN
HIGHWAY 301 SERVICE

Sheet Title:
Electrical Legend, Specifications & Details

Project No.:	2010D
Issue Date:	01.13.2022
Drawn By:	TH
Checked By:	AE
Sheet No.:	E1.0

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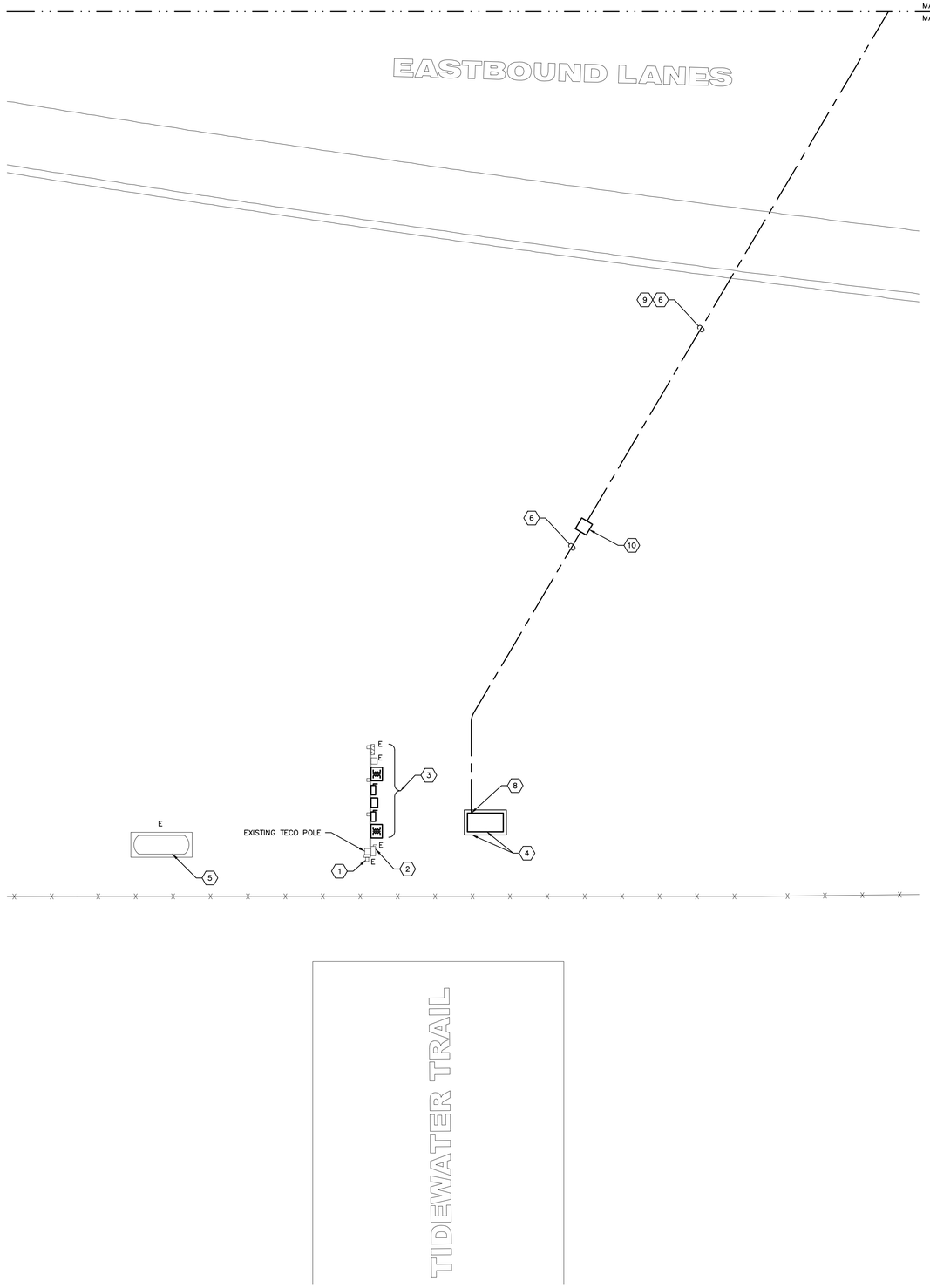

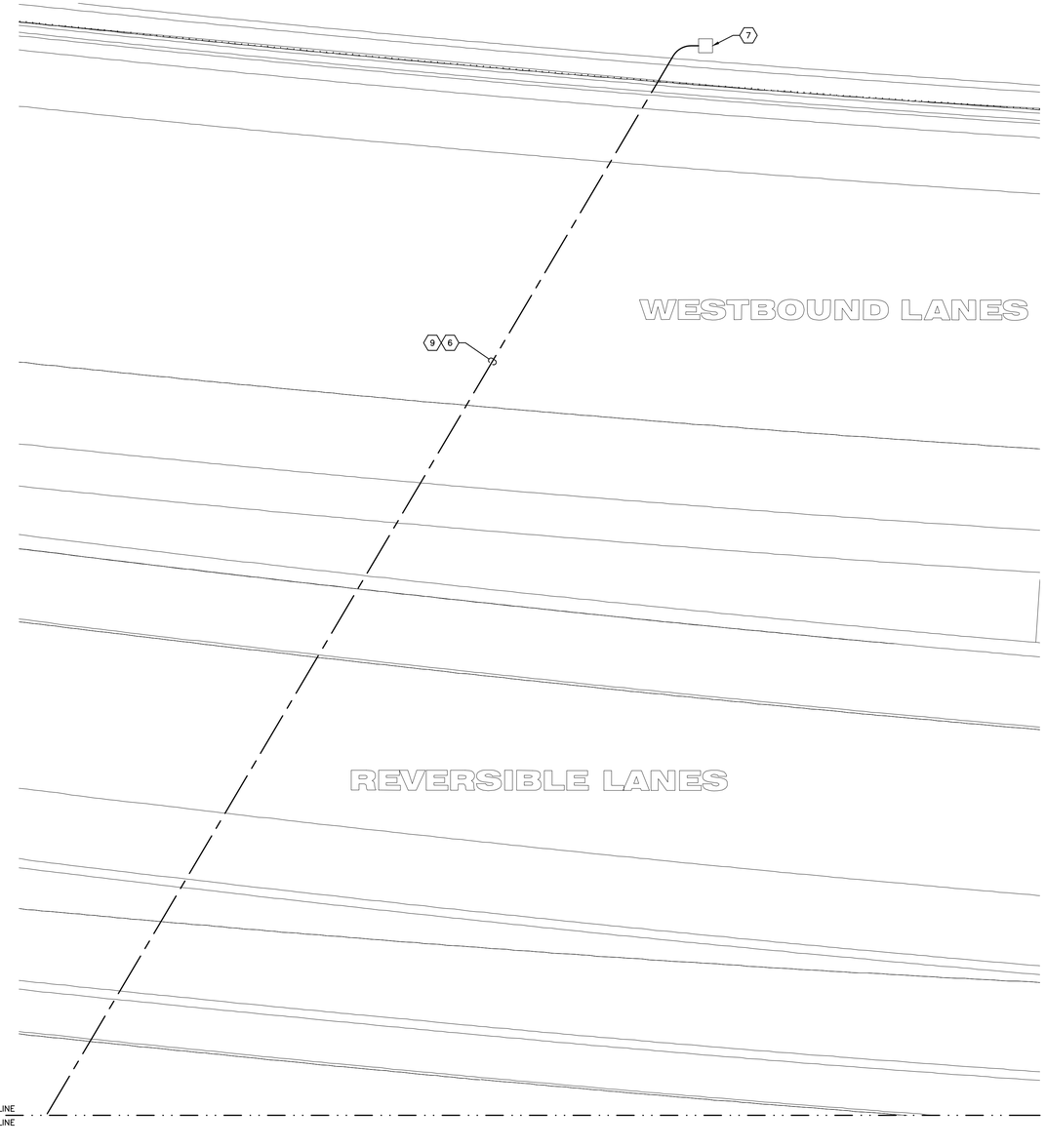

DRAWING NOTES

#	
1.	EXISTING UTILITY METER.
2.	EXISTING SERVICE DISCONNECT SWITCH.
3.	EQUIPMENT RACK. REFER TO POWER ONE-LINE DIAGRAM.
4.	NEW GENERATOR AND CONCRETE PAD.
5.	EXISTING PROPANE TANK. REFER TO FUEL GAS DRAWINGS FOR ADDITIONAL INFORMATION
6.	PROVIDE (2) 1" CONDUITS. PROVIDE #12 AWG LOCATE WIRE PER FDOT STANDARD SPECIFICATIONS; SECTION 630-2.2. INSTALL LOCATE WIRE AND 12 COUNT SINGLEMODE CORNING OSP FIBER IN ONE CONDUIT. SECOND CONDUIT IS SPARE. CONNECT LOCATE WIRE TO A WIRE GROUNDING UNIT (WGU) PER FDOT STANDARD SPECIFICATIONS; SECTION 630-2.3.
7.	APPROXIMATE LOCATION OF EXISTING FIBER CABLE PULL BOX.
8.	TERMINATE AT LOW VOLTAGE ENCLOSURE PROVIDED WITH GENERATOR. REFER TO LOW VOLTAGE DIAGRAM FOR ADDITIONAL INFORMATION.
9.	INSTALL CONDUITS IN DIRECTIONAL BORE. CONTRACTOR SHALL SUBMIT A DIRECTIONAL BORING PLAN FOR THEA'S REVIEW AND APPROVAL.
10.	PROVIDE FIBER CABLE PULL BOX PER FDOT STANDARDS.

DRAWING GENERAL NOTES

A.	REFER TO SPECIFICATIONS ON SHEET E1.0 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
B.	REFER TO FDOT STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS
C.	REFER TO POWER ONE-LINE DIAGRAM FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
D.	MAXIMUM 3 QUARTER TURNS (TOTAL 270°) CONDUIT BENDS BETWEEN JUNCTION/PULL BOXES.
E.	PROVIDE PLASTIC INSULATED BUSHINGS AND PULL STRINGS FOR ALL LOW VOLTAGE CONDUITS.
F.	LOW VOLTAGE SYSTEMS AND POWER CONDUITS SHOULD CROSS AT 90° AND MAINTAIN MINIMUM 12" SEPARATION BETWEEN CONDUITS AT ALL TIMES.
G.	MAINTAIN MINIMUM 12" SEPARATION BETWEEN ELECTRICAL AND OTHER UTILITIES/INFRASTRUCTURE.
H.	AREAS WHERE WORK IS NOT SHOWN SHALL REMAIN AS EXISTING UNLESS OTHERWISE NOTED.
I.	COORDINATE WITH EXISTING UNDERGROUND UTILITIES AND CONDITIONS. HAND DIG TRENCHES AS REQUIRED.
J.	EXTEND CONDUITS AND CONDUCTORS AS REQUIRED.
K.	FIELD VERIFY EXISTING FIBER INFRASTRUCTURE PRIOR TO BIDDING AND CONSTRUCTION.

01 ELECTRICAL SITE PLAN
SCALE:1" = 10'-0"
0 10' 20'

Issue / Revision:

No.	Date:	Description:
1		
2		
3		
4		
5		

Engineer:
Digitally signed by Adam V. Eaches, P.E. #76151
Date: 2022.01.14 11:56:48-05'00'
ADAM V. EACHES, P.E. FL REG. # 76151

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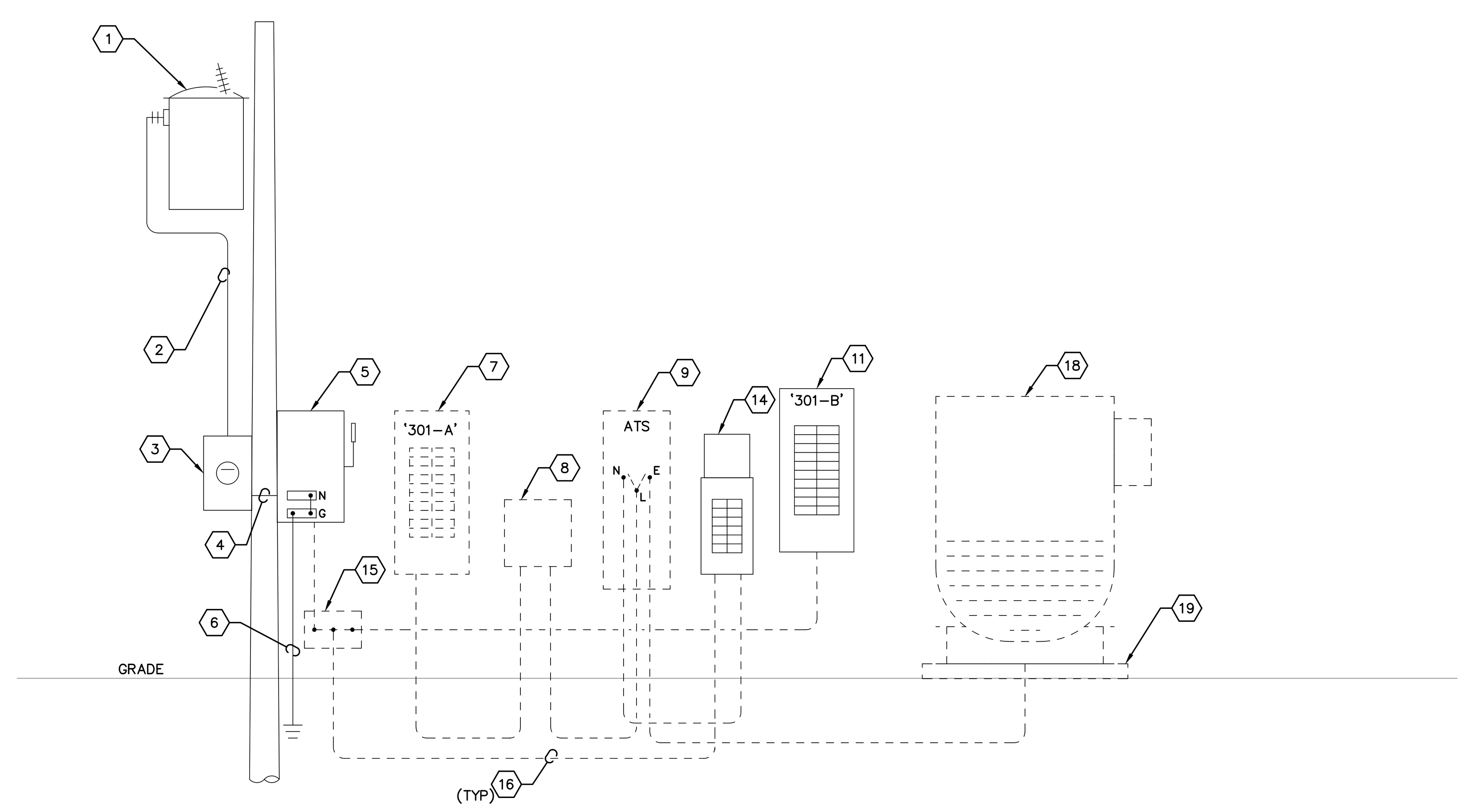
Consultant:

HALL ENGINEERING GROUP
Electrical - Lighting - Mechanical - Low Voltage
www.hallengroup.com | Tel: 813.374.2121
FL. C.O.A. #: 27620

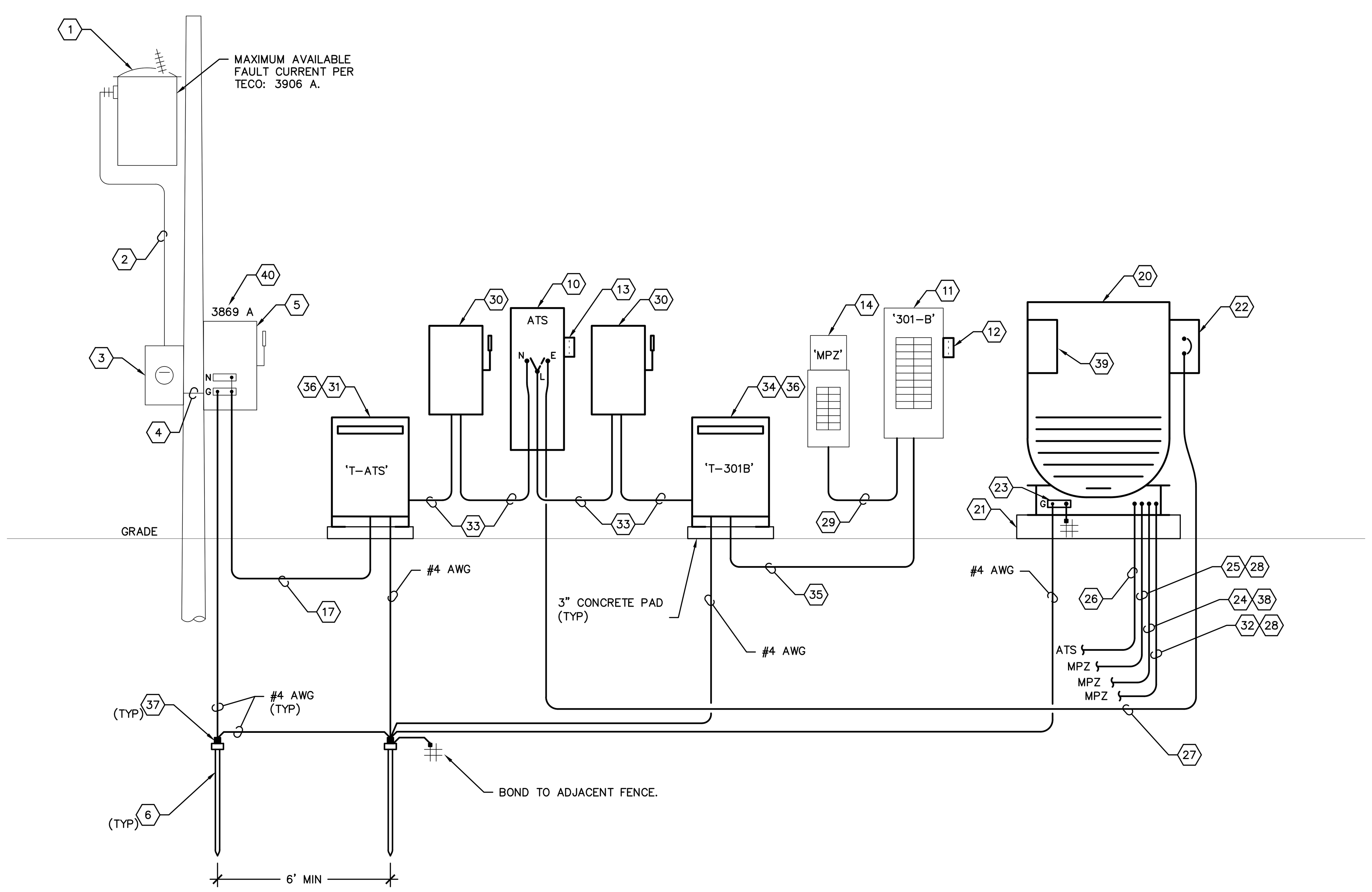
Project Name:
ITS AND TOLL PLAZA GENERATOR REPLACEMENT DESIGN
HIGHWAY 301 SERVICE

Sheet Title:
Electrical Site Plan

Project No.:	2010D
Issue Date:	01.13.2022
Drawn By:	TH
Checked By:	AE
Sheet No.:	E2.0



01 POWER ONE-LINE DIAGRAM – DEMOLITION
SCALE:NONE



02 POWER ONE-LINE DIAGRAM – NEW
SCALE:NONE

DRAWING GENERAL NOTES

A. REFER TO SPECIFICATIONS ON SHEET E1.0 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
B. REFER TO FDOT STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
C. COORDINATE ELECTRICAL UTILITY REQUIREMENTS WITH TECO.
D. CONTRACTOR SHALL UPDATE ALL PANEL DIRECTORIES.
E. LABEL ALL NEW AND EXISTING EQUIPMENT AND CONDUCTORS.
F. PRIOR TO PROJECT COMPLETION, CONTRACTOR SHALL TEST EMERGENCY POWER SYSTEM IN THE PRESENCE OF THE OWNER AND ENGINEER TO ENSURE THE SYSTEM OPERATES AS INTENDED AND TO THE OWNER'S SATISFACTION.
G. MAXIMUM 3 QUARTER TURNS (TOTAL 270°) CONDUIT BENDS BETWEEN JUNCTION/PULL BOXES.
H. MAINTAIN MINIMUM 12" SEPARATION BETWEEN ELECTRICAL AND OTHER UTILITIES/INFRASTRUCTURE.
I. COORDINATE WITH EXISTING UNDERGROUND UTILITIES AND CONDITIONS. HAND DIG TRENCHES AS REQUIRED.
J. EXTEND CONDUITS AND CONDUCTORS AS REQUIRED.
K. EXTEND/REWORK EQUIPMENT RACK AS REQUIRED. MATCH EXISTING MATERIALS.
L. GENERAC CONTACT: JOHN LUNDAHL AT: 813-309-3980.
M. MINIMIZE DOWNTIME OF ELECTRICAL SERVICE AND EMERGENCY GENERATOR BACKUP. PROVIDE DETAILED CONSTRUCTION AND OUTAGE SCHEDULE AND SUBMIT TO THEA FOR APPROVAL.

(#) DRAWING NOTES

1. EXISTING 480/240 V SECONDARY, 1Ø, 3W UTILITY TRANSFORMER. COORDINATE WITH TECO REGARDING TRANSFORMER SIZE/UPGRADE REQUIREMENTS.
2. EXISTING SERVICE CONDUCTORS.
3. EXISTING UTILITY METER.
4. EXISTING CONDUIT AND CONDUCTORS.
5. EXISTING 600 V (480 V), 2-POLE, 200 A, FUSIBLE SERVICE ENTRANCE DISCONNECT SWITCH; FUSED AT 200 A. REPLACE WITH 100 A FUSES.
6. COPPER CLAD GROUND ROD. VERIFY MINIMUM (2) GROUND RODS AND TEST TO ENSURE RESISTANCE TO GROUND DOES NOT EXCEED 5 OHMS. FOR ADDITIONAL INFORMATION REFER TO FDOT STANDARD SPECIFICATIONS; SECTION 620-2.2.
7. EXISTING 480 V, 1Ø, 3W, 100 A MCB PANELBOARD TO BE REMOVED. EXTEND EXISTING CIRCUITS AS REQUIRED TO BE FED FROM EXISTING PANEL '301-B'. PROVIDE PULL BOX AS REQUIRED.
8. EXISTING 240 V – 480 V, 1Ø, 25 kVA STEP-UP TRANSFORMER TO BE REMOVED AND REPLACED WITH NEW.
9. EXISTING ATS TO BE REMOVED AND REPLACED WITH NEW.
10. 200 A, 240 V, 1Ø, 2-POLE, 3W, NEMA 3R, 42 kWCR, OPEN TRANSITION ATS; GENERAC, SERIES TX301 OR ENGINEER APPROVED EQUAL.
11. EXISTING PANELBOARD. REFER TO SCHEDULE FOR ADDITIONAL INFORMATION.
12. SPD; PQ PROTECTION, MODEL #PQC100-277/480 OR ENGINEER APPROVED EQUAL.
13. SPD; PQ PROTECTION, MODEL #PQM100-120/240 OR ENGINEER APPROVED EQUAL.
14. EXISTING 480 V – 240/120 V, 1Ø, 10 kVA MINI POWER ZONE TO REMAIN.
15. REMOVE EXISTING WIREWAY.
16. REMOVE EXISTING CONDUIT AND CONDUCTORS MADE UNNECESSARY BY THE NEW INSTALLATION.
17. 2 #3 + #8 GND – 1 1/4" C.
18. EXISTING 240/120 V, 1Ø, 3W, 15 kW GENERATOR TO BE REMOVED AND REPLACED WITH NEW.
19. EXISTING GENERATOR CONCRETE PAD TO BE REMOVED AND REPLACED WITH NEW.
20. 240/120 V, 1Ø, 3W, 35 kW/35 kVA, 60 HZ, STAND-BY PROPANE, UL 2200 GENERATOR SET WITH ALUMINUM, 140 MPH WIND RATED WEATHER ENCLOSURE, COOLANT HEATER, ALTERNATOR HEATER, BATTERY CHARGER AND 20 A, 120 V GFCI RECEPTACLE; GENERAC, MODEL #SG035 OR ENGINEER APPROVED EQUAL. INCLUDE ALL NECESSARY COMPONENTS, FITTINGS, ISOLATORS, BATTERIES, CONNECTIONS, ETC FOR A COMPLETE AND FULLY OPERATIONAL GENERATOR SET. INCLUDE START-UP, COMMISSIONING SERVICES, LOAD BANK TESTING AND CABLES (2 HR TEST: 1 HR @ 50% LOAD AND 1 HR AT 100% LOAD), AND O&M MANUALS.
21. GENERATOR CONCRETE PAD. REFER TO DETAIL.
22. 175/2 OUTPUT CIRCUIT BREAKER.
23. NO NEUTRAL-GROUND BOND.
24. 2 #10 + #10 EG – 3/4" C FOR BATTERY CHARGER, COOLANT HEATER, AND ALTERNATOR HEATER CIRCUIT.
25. 2 #12 + #12 EG – 3/4" C FOR ETHERNET SWITCH CIRCUIT.
26. 2 #12 – 3/4" C + (1) SPARE 3/4" C TO ATS FOR START CIRCUIT.
27. 2 #2/0 + #6 EG – 2" C.
28. PROVIDE NEW 20/1 CIRCUIT BREAKER IN AVAILABLE SPACE. MATCH EXISTING MANUFACTURER AND AIC RATING.
29. 3 #10 + #10 EG – 3/4" C.
30. 200 A, 240 V, 2-POLE, NEMA 3R, FUSIBLE DISCONNECT SWITCH; FUSE AT 175 A.
31. 37.5 kVA, 480-240/120 V, 1Ø, 3W, DRY TYPE TRANSFORMER WITH NEMA 3R ENCLOSURE.
32. 2 #12 + #12 EG – 3/4" C FOR GFCI RECEPTACLE.
33. 2 #2/0 + #6 GND – 2" C.
34. 37.5 kVA, 240-480/240 V, 1Ø, 3W, DRY TYPE TRANSFORMER WITH NEMA 3R ENCLOSURE; SQUARE D, MODEL #EE37S1802H. CONTACT STEVE BAGAN WITH SQUARE D @ 813-882-6601 TO PROVIDE QUOTATION.
35. 3 #3 + #8 EG – 1 1/4" C.
36. BOND THE NEUTRAL OF THE TRANSFORMER SECONDARY TO THE TRANSFORMER EQUIPMENT GROUNDING TERMINAL BAR AND THEN TO THE ENCLOSURE. SIZE BONDING JUMPERS PER NEC TABLE 250.66.
37. EXOTHERMIC WELD.
38. PROVIDE NEW 30/1 CIRCUIT BREAKER IN AVAILABLE SPACE. MATCH EXISTING MANUFACTURER AND AIC RATING.
39. GENERATOR MANUFACTURER SHALL PROVIDE 14" W x 6" D x 32" H CABINET (INSIDE ENCLOSURE, OPPOSITE SIDE OF OUTPUT CB) FOR CONTRACTOR PROVIDED AND INSTALLED GENERAC POWER ZONE CONNECTIVITY SERVER AND OWNER PROVIDED ETHERNET SWITCH AND UPS (PROVIDE HOLE IN CABINET FOR UPS CORD/PLUG AS DIRECTED BY OWNER). CONNECT CONNECTIVITY SERVER TO GENERATOR CONTROLLER WITH MANUFACTURER RECOMMENDED RS-485 CABLES AND CONNECT TO 12 V POWER SUPPLY WITH 2 #16 AWG.
40. CALCULATED FAULT CURRENT.

EXISITNG PANELBOARD 301-B SCHEDULE

VOLTAGE (L-L/L-N): 480 / 277 V | PHASE: 1 | WIRES: 3 | MAIN TYPE: MCB | MAIN OC DEVICE (1): 100 A
BUS RATING: 125 A | MIN AIC RATING: 18,000 A | ENCLOSURE TYPE: NEMA 3R | MOUNTING: SURFACE
FEED-THRU LUGS: NO | SUB-FEED LUGS: NO | ISOLATED GND BUS: NO | NEUTRAL BUS: YES

CKT NO	DESCRIPTION	BREAKER		PHASE LOADS (VA)				BREAKER		DESCRIPTION	CKT NO
		POLE	TRIP	A		B		TRIP	POLE		
1	SPACE			–	–					SPACE	2
3	SPACE					–	–			SPACE	4
5	SPACE			–	–					SPACE	6
7	SPACE					–	–			SPACE	8
9	MPZ (2)	2	30	1,093	–					SPACE	10
11	"					1,093	7,280	40	1	GATES 3,4,5,6 (2)	12
13	MPZ-4 / ACN (2)	2	20	2,000	3,640			20	1	GATES 1,2 (2)	14
15	"					2,000	–			SPACE	16
17	SPACE			–	–					SPACE	18
19	SPACE					–	–			SPACE	20
21	SPACE			–	–					SPACE	22
23	MPZ-2 (4)	2	30			1,553	0	30	2	SPD (4)	24
25	"			1,553	0					"	26
27	MPZ-3 (4)	2	30			1,673	3,036	70	2	MPZ-1 / BARRIER GATE (4)	28
29	"			1,673	3,036					"	30
			TOTAL	12,994		16,634					

LOAD CLASSIFICATION	CONNECTED (VA)	DEMAND FACTOR	DEMAND (VA)
EXTERIOR LIGHTING	0	1.25	0
INTERIOR LIGHTING	0	1.25	0
RECEPTACLE (1st 10 k)	0	1.00	0
RECEPTACLE (Over 10 k)	0	0.50	0
AIR HANDLERS	0	1.00	0
ELECTRIC HEAT	0	1.00	0
COOLING	0	1.00	0
EQUIPMENT/MOTORS	16,882	1.00	16,882
LARGEST MOTOR	1,826	1.25	2,283
GATES (3)	10,920	0.00	0
TOTAL	29,628		19,165

PANEL SUMMARY	
CONNECTED	62 A
DEMAND	40 A
SPARE CAPACITY	50 %

NOTES:
1. REPLACE EXISTING 150 A MCB WITH NEW; SIZE AS INDICATED.
2. NEW CIRCUIT BREAKER. MATCH EXISTING MANUFACTURER AND AIC RATING.
3. GATE LOADS ARE NON-SIMULTANEOUS.
4. EXISTING CIRCUIT BREAKER.

Issue / Revision: No. | Date: | Description:

Engineer: Digitally signed by Adam V. Eaches, P.E. #76151 Date: 2022.01.14 11:57:05-05'00'

ADAM V. EACHES, P.E. FL. REG. # 76151

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FL C.O.A. # 27620

Project Name: ITS AND TOLL PLAZA GENERATOR REPLACEMENT DESIGN HIGHWAY 301 SERVICE

Sheet Title: Power One-Line Diagrams & Schedule

Project No.: 2010D
Issue Date: 01.13.2022
Drawn By: TH
Checked By: AE
Sheet No.: E3.0