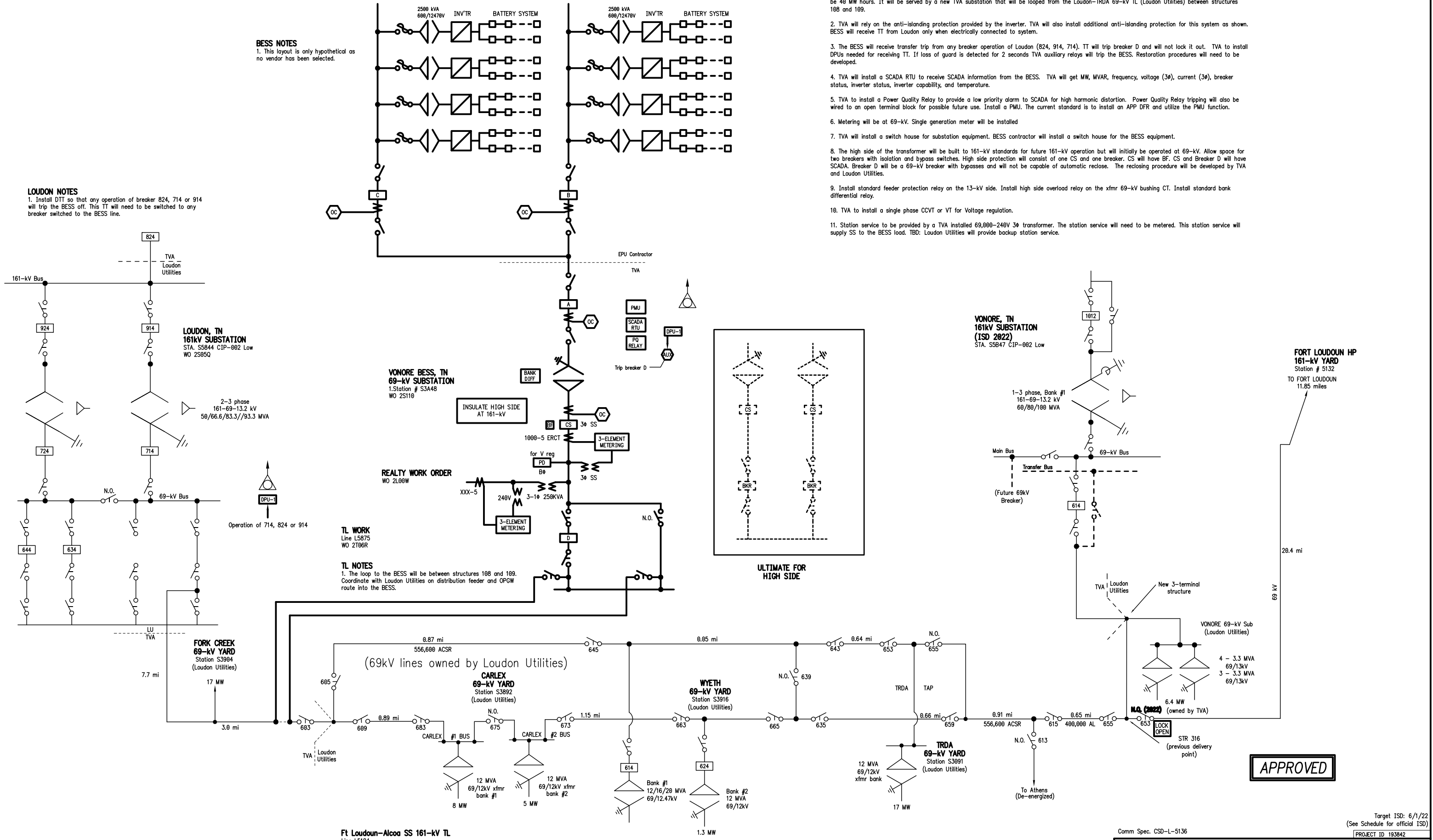


BESS NOTES
1. This layout is only hypothetical as no vendor has been selected.

LOUDON NOTES
1. Install DTT so that any operation of breaker 824, 714 or 914 will trip the BESS off. This TT will need to be switched to any breaker switched to the BESS line.

- VONORE BESS NOTES:**
1. The Vonore Battery Energy Storage System (BESS) will be constructed by TVA. It will have generating capability of 20 MVA. The storage capacity will be 40 MW hours. It will be served by a new TVA substation that will be looped from the Loudon-TRDA 69-kV TL (Loudon Utilities) between structures 108 and 109.
 2. TVA will rely on the anti-islanding protection provided by the inverter. TVA will also install additional anti-islanding protection for this system as shown. BESS will receive TT from Loudon only when electrically connected to system.
 3. The BESS will receive transfer trip from any breaker operation of Loudon (824, 914, 714). TT will trip breaker D and will not lock it out. TVA to install DPUs needed for receiving TT. If loss of guard is detected for 2 seconds TVA auxiliary relays will trip the BESS. Restoration procedures will need to be developed.
 4. TVA will install a SCADA RTU to receive SCADA information from the BESS. TVA will get MW, MVAR, frequency, voltage (3 ϕ), current (3 ϕ), breaker status, inverter status, inverter capability, and temperature.
 5. TVA to install a Power Quality Relay to provide a low priority alarm to SCADA for high harmonic distortion. Power Quality Relay tripping will also be wired to an open terminal block for possible future use. Install a PMU. The current standard is to install an APP DFR and utilize the PMU function.
 6. Metering will be at 69-kV. Single generation meter will be installed.
 7. TVA will install a switch house for substation equipment. BESS contractor will install a switch house for the BESS equipment.
 8. The high side of the transformer will be built to 161-kV standards for future 161-kV operation but will initially be operated at 69-kV. Allow space for two breakers with isolation and bypass switches. High side protection will consist of one CS and one breaker. CS will have BF. CS and Breaker D will have SCADA. Breaker D will be a 69-kV breaker with bypasses and will not be capable of automatic reclose. The reclosing procedure will be developed by TVA and Loudon Utilities.
 9. Install standard feeder protection relay on the 13-kV side. Install high side overload relay on the xfmr 69-kV bushing CT. Install standard bank differential relay.
 10. TVA to install a single phase CCVT or VT for Voltage regulation.
 11. Station service to be provided by a TVA installed 69,000-240V 3 ϕ transformer. The station service will need to be metered. This station service will supply SS to the BESS load. TBD: Loudon Utilities will provide backup station service.



TL WORK
Line L5875
WO 2106R

TL NOTES
1. The loop to the BESS will be between structures 108 and 109. Coordinate with Loudon Utilities on distribution feeder and OPGW route into the BESS.

Ft Loudon-Alcoa SS 161-kV TL
Line L5184
WO 2106R

TL NOTES
1. Fiber will be installed on this line between structures 53 and 55. This fiber will connect two existing fiber routs together. See comm spec for detail.

APPROVED

Comm Spec. CSD-L-5136

Target ISD: 6/1/22
(See Schedule for official ISD)
PROJECT ID 193842

TENNESSEE VALLEY AUTHORITY
VONORE, TN. 69-kV BESS
CONSTRUCT BATTERY ENERGY STORAGE SYSTEM

SPECIFICATION DIAGRAM

REV	DATE	WORK ORDER	DOC NUMBER	ENG	ACD	GDP	RDH	JMH	TSC	APPROVAL STAMP	SCALE	SHEET	OF	SHEETS
0	2/22/21										NONE	1	1	1
DOC CLASS		DOC TYPE		DOC STATUS		CONST. AREA		CONTROL		STATION NUMBER		SK-2296 R0		
PLANNING		SPEC DIAGRAM		PRELIMINARY										