There are many components that allow RTD’s trains to operate. There are traction power substations (TPSS), train signaling systems with relay houses, communication houses and overhead contact wires that all play an important part in the system’s operations.

**Traction Power Substation (TPSS)**

- TPSS supply the power to the overhead contact wire of the light rail.
- It is a 16x40x12 foot electrical station that is usually a tan color.
- It converts power provided by the utility company from 13.2 kV AC power to 750 VDC power, and transmit it to the train through the Overhead Contact System (overhead wires – see more below).
- There are 11 TPSS locations that are approximately one mile apart along the I-225 Rail Line.
- Each weighs approximately 40 tons; a crane sets the unit in place.
- Due to high voltage danger, all TPSS locations will include 8-foot fencing for security and public safety.
- Typically fencing around the TPSS has barbed wire for the safety of the public.

**Relay House**

- There will be 37 relay houses along the I-225 Rail Line.
- Relay houses are metallic enclosures which come in various sizes (i.e. 6x6x12 foot, 6x8x12 foot, or 8x12x12 foot).
- It contains the equipment that controls the signals and crossing gates necessary to allow for movement of trains in a safe and efficient manner.
- Similar to a traffic control system, the signal system is automated and used for safe and proper routing of trains.
- The communications systems communicate everything back to RTD’s Operations Control Center (OCC) and the Security Command Center (SCC). The relay house feeds the communication house with information and communications houses feed information back to the control center.

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Communication House

- There will be a total of eight communication houses, which are 8x10x12 foot metallic enclosures located at the end of each of the station platforms.
- It contains the communications and Supervisory Control & Data Acquisition (SCADA) equipment necessary to inform and protect light rail patrons.
- It also allows RTD dispatchers, supervisors, and security personnel to remotely monitor and control the I-225 Rail Line system.
- The station platform public address, variable message (electronic signs), emergency telephone and closed circuit television systems are all part of the communications and SCADA network.
- An extensive fiber optic network connects the various systems and remote devices along the I-225 Rail Line with RTD's OCC and the SCC.

Overhead Wires

- There are two overhead wires: The bottom contact wire and the top messenger wire.
- The contact wire is needed to supply the electrical current to run the train. The current is collected through the train's pantograph, which presses against the underside of the contact wire as the train travels on its route.
- The top wire, called messenger wire, provides vertical physical support to the contact wire between structures and helps provide the OCS with more electrical conductivity.
- The OCS is a closed loop system. The current flows from the point of origin to its destination and back to the point of origin in a closed loop. The loop includes the contact wire (primarily), the pantograph, the train's motor, the steel wheels of the train, the running rails, and the substation, which is the source of the power.