

# Exhibit H

## Trenching Standards



## **SUBMITTAL REQUIREMENTS**

### **Streetcar Zone of Influence**

El Paso Streetcar has identified minimum trench safety and excavation requirements for all proposed open trenching or excavations within 25 feet of the track centerline (Streetcar Zone of Influence). Specific design requirements are detailed in Figure H – 1.

### **General**

All drawings and calculations for open trenching shall be prepared, sealed and signed by a Professional Engineer (civil or structural) currently licensed in the State of Texas who has previous experience in the design of trench safety applications.

The designer will be responsible for the accuracy of all controlling dimensions as well as the selection of appropriate materials and systems that accurately reflect the actual field conditions. No open trenching installation within the Streetcar Zone of Influence (25 feet from track centerline) will be allowed until the drawings and calculations are reviewed and accepted by EPSC.

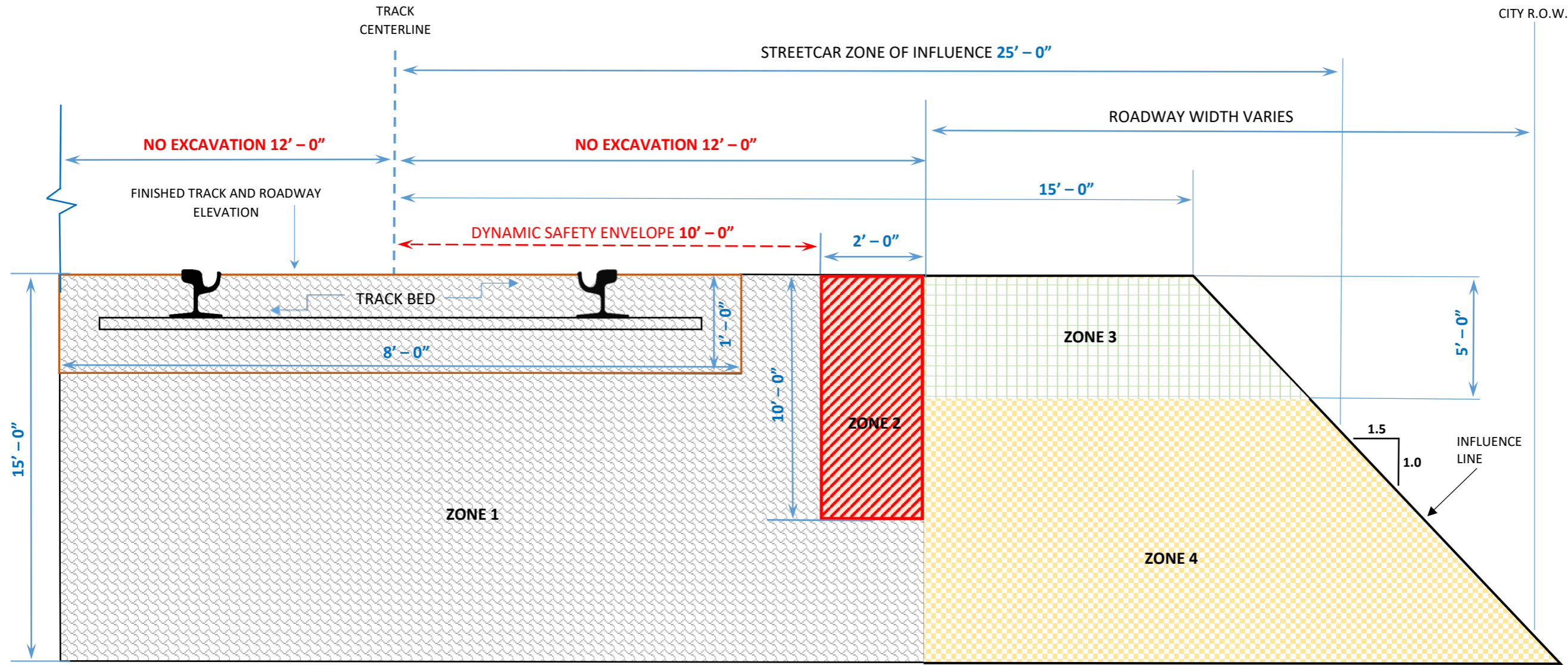
Submittal of forms, drawings and calculations shall be provided to EPSC for review in electronic format transmitted by email, or mail (with CD-R or DVD-R properly labeled). Files shall be Adobe PDF compatible. Each separate document shall be a separate PDF file (drawings, specifications, calculations, forms, etc.).

All submittals, design calculations, specifications and drawings shall be prepared in accordance with a QA/QC process. The QA/QC process may follow the established program of EPSC, Engineer in Responsible Charge firm, or Permittee. At a minimum, the QA/QC process must consist of an independent check of design calculations and an independent QC review of the drawings and specifications prior to submittal to EPSC by qualified individuals. Documentation of the QA/QC process, including names and contact information of independent reviewers, shall be made available to EPSC at their request.

A minimum of **FIFTEEN (15) CALENDAR DAYS** should be allowed for EPSC's review, provided that all required submittal materials are included and properly identified.

### **Requirements**

Specific requirements concerning open trenching are detailed in Exhibit H1 – Excavation Support Guidelines which are available for download on Sun Metro's website [www.sunmetro.net/streetcar](http://www.sunmetro.net/streetcar).



TYPICAL SECTION VIEW – STREETCAR TRENCH ZONES– SCALE: N.T.S.

GENERAL NOTES:

1. CROSS – SECTION SHOWN IS TYPICAL OF FIELD CONDITIONS FOUND ON STREETCAR OPERATIONAL RIGHT-OF-WAY (ALIGNMENT).
2. A CONCRETE TRACK BED TYPICALLY MEASURING 8 FEET IN WIDTH AND 12 INCHES IN DEPTH (FROM FINISHED ROADWAY ELEVATION) IS FOUND THROUGHOUT THE ALIGNMENT.
3. HMAC OR CONCRETE ROADWAY PAVEMENT OR A COMBINATION OF BOTH MAY BE FOUND ON EITHER SIDE OF TRACK BED AT VARIOUS DEPTHS.
4. AN 8 INCH COMPACTED BASE IS TYPICAL UNDERNEATH THE ADJACENT HMAC OR CONCRETE PAVEMENT.
5. A 12 INCH COMPACTED BASE IS TYPICAL UNDERNEATH THE TRACK BED.
6. SUBGRADE DEPTH VARIES THROUGHOUT THE ALIGNMENT.
7. **ZONE 1** – EXCAVATION IS PROHIBITED.
8. **ZONE 2** – NO EXCAVATION OR TEMPORARY SHORING INSTALLATION WILL BE ALLOWED WITHOUT THE SPECIAL WRITTEN PERMISSION OF EL PASO STREETCAR (EPSC). ALTERNATES TO SHORED EXCAVATIONS SHALL BE UTILIZED WHEN PRACTICAL. IF EPSC GRANTS A VARIANCE TO ALLOW EXCAVATION, VERTICAL EXCAVATION WITH CONTINUOUS SHORING WALLS IS REQUIRED. SHORING INSTALLATION SHALL BE COMPLETE PRIOR TO ANY EXCAVATION. DESIGN OF THE SHORING SYSTEM SHALL INCLUDE LATERAL SURCHARGE DUE TO STREETCAR LIVE LOAD.
9. **ZONE 3** – EXCAVATION REQUIRES TEMPORARY SHORING. LATERAL SURCHARGE DUE TO STREETCAR LIVE LOAD NEED NOT BE CONSIDERED IN SHORING DESIGN. THE EXCAVATION SHALL BE PROVIDED WITH A SHORING SYSTEM THAT ACTIVELY SUPPORTS THE SIDES OF THE EXCAVATION AND PREVENTS THE EXCAVATION FACES FROM UNRAVELING OR MOVING. SLOPED EXCAVATIONS ARE NOT PERMITTED.
10. **ZONE 4** – EXCAVATION REQUIRES TEMPORARY SHORING. EXCAVATIONS SHALL BE VERTICAL. CONTINUOUS SHORING WALLS INSTALLED PRIOR TO ANY EXCAVATION ARE PREFERRED. MAXIMUM EXCAVATION LIFTS SHALL BE LIMITED TO FIVE (5) FEET FOR EACH STAGE OF EXCAVATION. **DESIGN OF THE SHORING SYSTEM SHALL INCLUDE LATERAL SURCHARGE DUE TO STREETCAR LIVE LOAD.**
11. **EXCAVATIONS BEYOND INFLUENCE LINE** – LATERAL SURCHARGE DUE TO STREETCAR LIVE LOAD NEED NOT BE CONSIDERED IN THE SHORING DESIGN. SHORED EXCAVATIONS ARE PREFERRED. SLOPED EXCAVATIONS ARE DISCOURAGED. EPSC MAY REQUIRE SLOPE STABILITY ANALYSIS FOR SLOPED EXCAVATIONS.
12. ALL TRENCHES SHALL BE SHORED PER OSHA STANDARDS.
13. ONLY VERTICAL EXCAVATION IS PERMITTED (NO SLOPING CUTS).
14. ALL DRAWINGS AND CALCULATIONS FOR TEMPORARY SHORING SHALL BE PREPARED, SEALED, AND SIGNED BY A PROFESSIONAL ENGINEER (CIVIL OR STRUCTURAL) CURRENTLY LICENSED IN THE STATE OF TEXAS WHO HAS EXPERIENCE IN THE DESIGN OF TEMPORARY SHORING SYSTEMS OF THE TYPE BEING SUBMITTED. THE DESIGNER WILL BE RESPONSIBLE FOR THE ACCURACY OF ALL CONTROLLING DIMENSIONS AS WELL AS THE SELECTION OF SOIL DESIGN VALUES THAT ACCURATELY REFLECT THE ACTUAL FIELD CONDITIONS.

FIGURE  
**H-1**



STREETCAR TRENCH ZONES

DRAWN BY: IMV      CHECKED BY: FB      APPROVED BY: CJ      03/12/2019

