

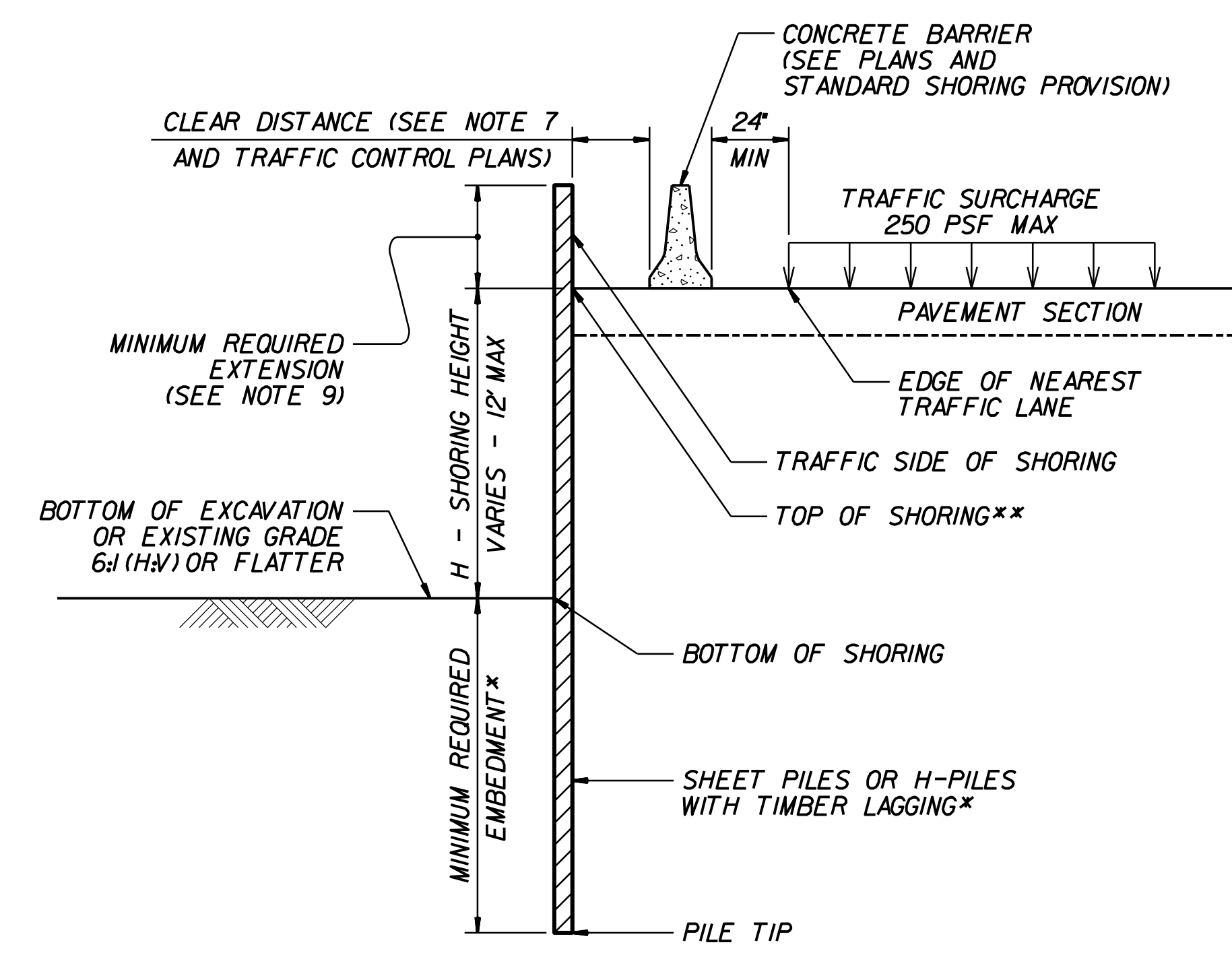
| GROUNDWATER CONDITION (SEE NOTE 6)                           | H SHORING HEIGHT (FT) | SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT |  |  |          |      | SURCHARGE CASE WITH TRAFFIC IMPACT |  |  |          |      |
|--|-----------------------|--|--|--|----------|------|------------------------------------|--|--|----------|------|
|  |                       | SHEET PILES                                    |  | H-PILES WITH TIMBER LAGGING                    |          |      | SHEET PILES                        |  | H-PILES WITH TIMBER LAGGING                    |          |      |
|  |                       | MINIMUM REQUIRED EMBEDMENT (FT)                | MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT) | MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10) |          |      | MINIMUM REQUIRED EMBEDMENT (FT)    | MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT) | MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10) |          |      |
|  |                       |  | HP 10x42   | HP 12x53                                       | HP 14x73 |      |                                    | HP 10x42   | HP 12x53                                       | HP 14x73 |      |
| GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP | < 6                   | 11.5   | 4.5  | 11.5   | 11.5     | 11.5 | 16.0                               | 12.0   | 13.0   | 13.0     | 13.0 |
|  | 7                     | 13.0   | 7.0  | 13.0   | 13.0     | 13.0 | 17.0                               | 14.5   | 14.5   | 14.5     | 14.5 |
|  | 8                     | 15.0   | 10.0   | --   | 15.0     | 15.0 | 18.0                               | 17.0   | --   | 15.5     | 15.5 |
|  | 9                     | 17.0   | 14.0   | --   | 17.0     | 17.0 | 19.0                               | 20.0   | --   | 17.0     | 17.0 |
|  | 10                    | 18.5   | 19.5   | --   | --       | 18.5 | 20.0                               | 23.5   | --   | --       | 18.5 |
|  | 11                    | 20.5   | 26.0   | --   | --       | --   | 21.0                               | 28.0   | --   | --       | 20.0 |
| 12   | 22.5                  | 33.0   | --   | --   | --       | 22.0 | 33.0                               | --   | --   | 21.5     |      |
| GROUNDWATER ELEVATION BELOW PILE TIP                         | < 6                   | 7.5  | 3.0  | 8.0  | 8.0      | 8.0  | 11.0                               | 10.0   | 9.5  | 9.5      | 9.5  |
|  | 7                     | 8.5  | 4.5  | 9.5  | 9.5      | 9.5  | 12.0                               | 12.0   | 10.5   | 10.5     | 10.5 |
|  | 8                     | 10.0   | 6.5  | 10.5   | 10.5     | 10.5 | 12.5                               | 14.0   | 11.5   | 11.5     | 11.5 |
|  | 9                     | 11.0   | 9.5  | --   | 12.0     | 12.0 | 13.5                               | 16.5   | --   | 12.5     | 12.5 |
|  | 10                    | 12.5   | 13.0   | --   | --       | 13.5 | 14.0                               | 19.5   | --   | 13.5     | 13.5 |
|  | 11                    | 13.5   | 17.0   | --   | --       | 14.5 | 15.0                               | 22.5   | --   | --       | 14.5 |
| 12   | 15.0                  | 21.5   | --   | --   | 16.0     | 16.0 | 25.5                               | --   | --   | 15.5     |      |

**MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS**

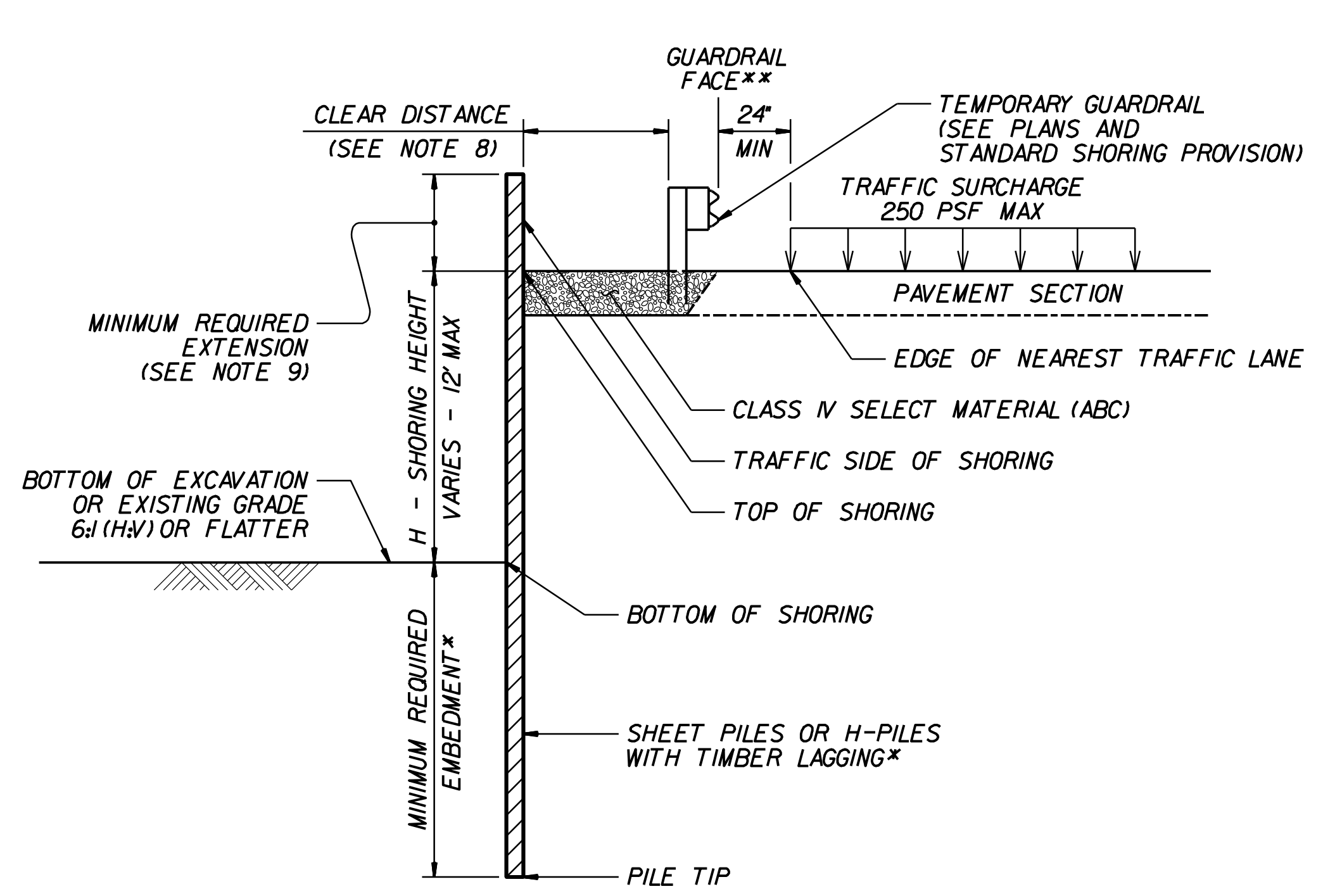
\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

**NOTES:**

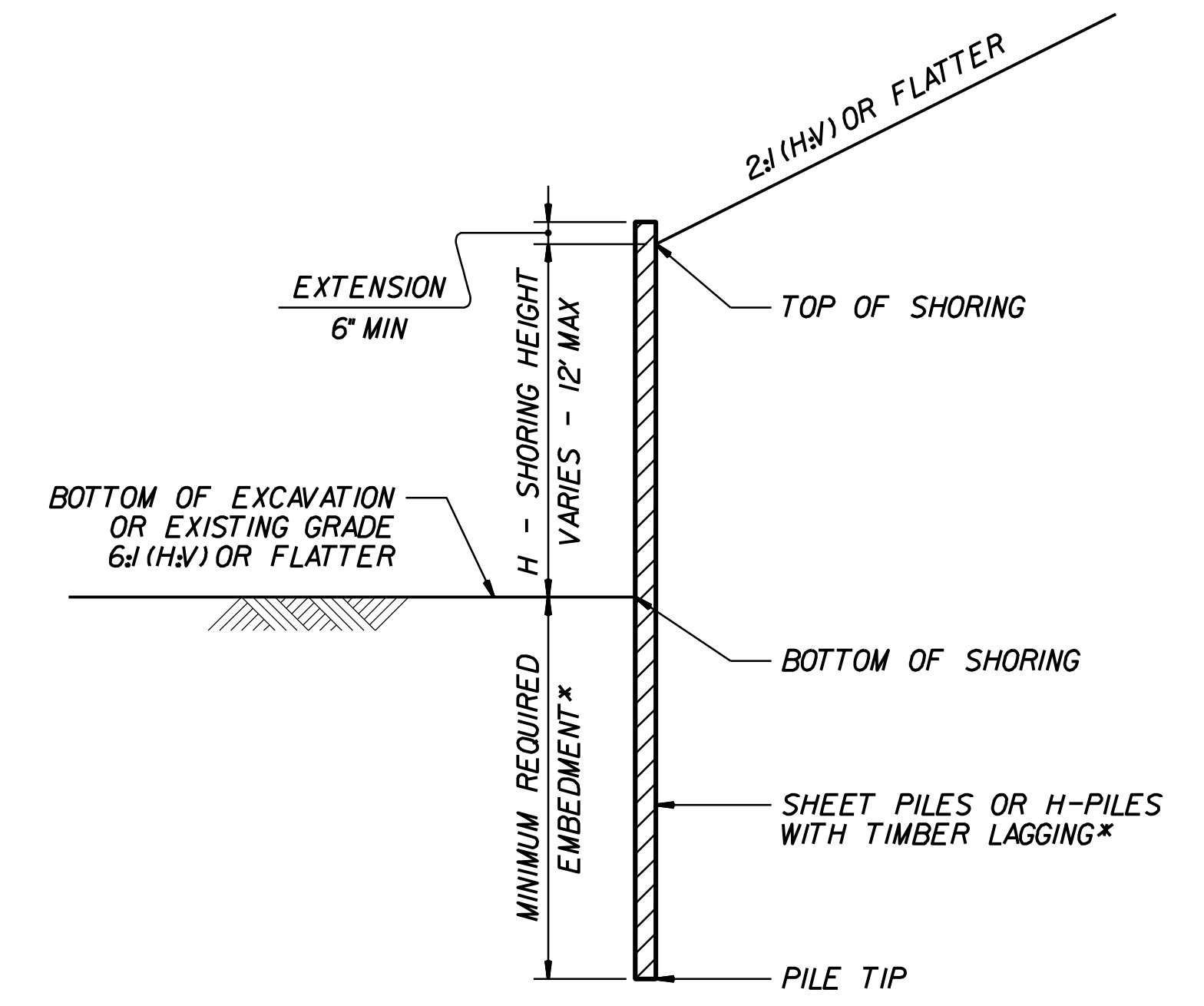
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  PCF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  PSF
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32' FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
- SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: [connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



**CONCRETE BARRIER**  
\*\*TOP OF SHORING =  
EDGE OF PAVEMENT

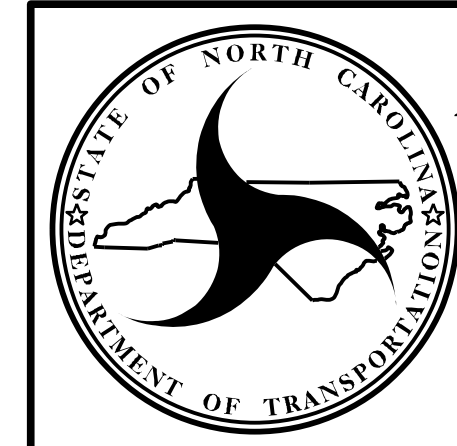


**TEMPORARY GUARDRAIL**  
\*\*GUARDRAIL FACE =  
EDGE OF PAVEMENT



**STANDARD TEMPORARY SHORING**  
(SLOPE CASE)  
\*SEE TABLE ABOVE.

**STANDARD TEMPORARY SHORING**  
(SURCHARGE CASE)  
\*SEE TABLE ABOVE.



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
**GEOTECHNICAL  
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.01

STANDARD  
TEMPORARY SHORING