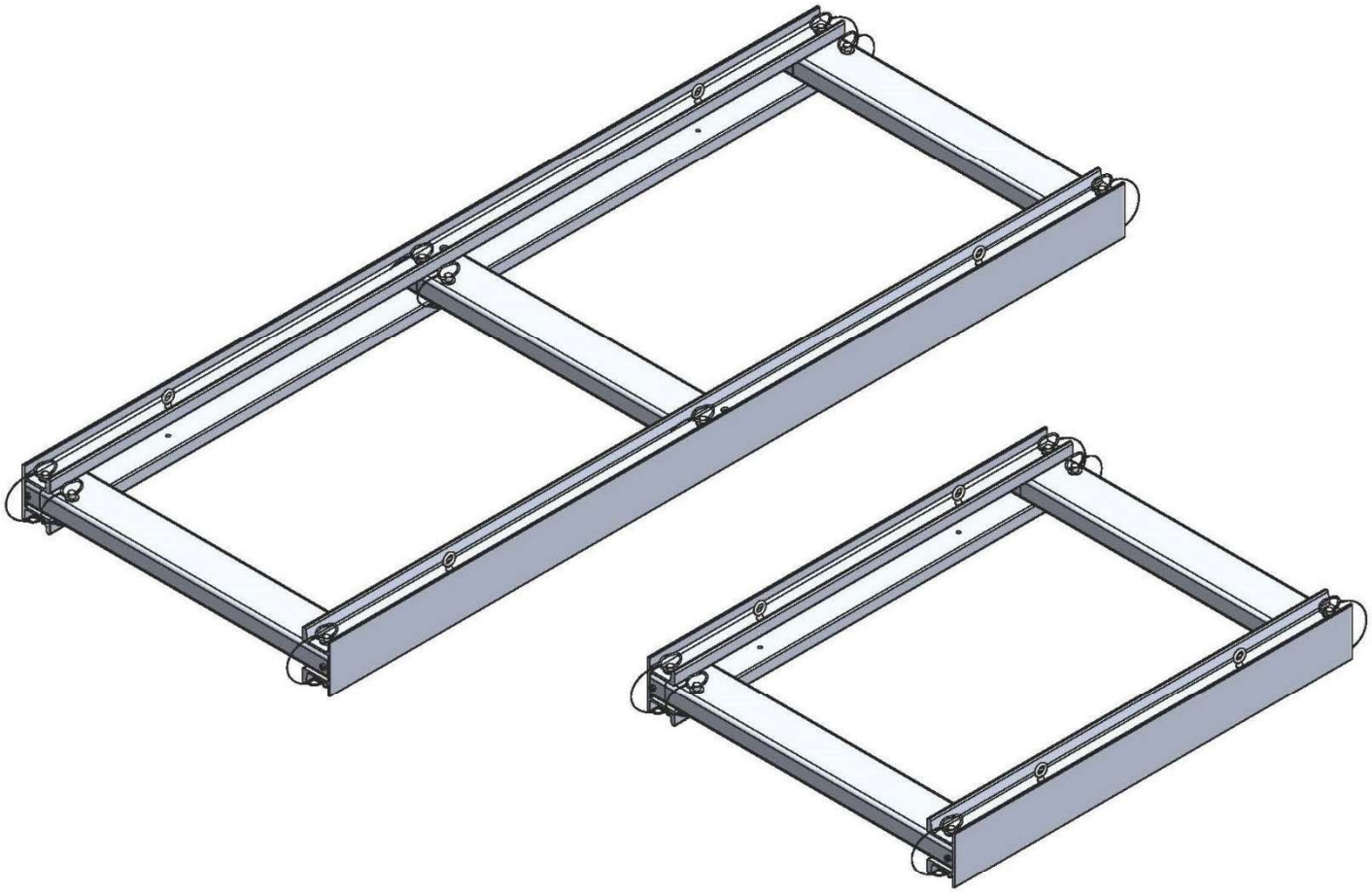
HORIZONTAL WALER SYSTEM – POWER STRUTS

TABULATED DATA

Effective February 2nd, 2026



Pacific SHORING
Quality Driven, Lead Time Focused

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1325 COLLEGE AVE., SANTA ROSA, CA 95404
(707) 528-4503 FAX (707) 528-4505

REGISTERED PROFESSIONAL ENGINEER
ADRIANUS J. VERMEULEN
No. 69082
CIVIL
STATE OF CALIFORNIA

Signed 2/2/2026

JMT #: 16260-21

Contents

Description

The Pacific Shoring Products Horizontal Waler System is generally used where it is not practical to use Hydraulic Vertical Shoring. The strength of the heavy-duty waler rails allow for greater horizontal spacing of the hydraulic power struts. The maximum vertical spacing of the wale and cylinders is 4 ft. the same as with Hydraulic Vertical Shoring; however, the horizontal spacing or clear span between power struts can be as much as 10.5 ft.

Horizontal Waler Systems are always used in conjunction with approved sheeting that can be driven behind the waler rails as the excavation proceeds to depth. This method is particularly useful in soft clays or running sand.

Heavy-duty waler rail lengths can vary from 4 ft. to 20 ft. in length. Horizontal Waler Systems with Power Struts have allowable trench widths of up to 12 ft. with maximum depths up to 20 ft. Site specific designs beyond these parameters are achievable when using designs prepared by a registered engineer.

General Information on use of Pacific Shoring Products Horizontal Waler Systems

1. The Horizontal Waler Systems tabulated here are based on requirements of Federal OSHA 29CFR, Part 1926, Subpart P-Excavations, and Trenches.

   1926.652(c)(2)-Option (2) - Designs Using Manufacturer's Tabulated Data.
   1926.652(c)(2)(i) -Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

   All provisions of Subpart P apply when utilizing this tabulated data. The contractor's competent person shall use this data to select allowable trench depth, trench length and vertical spacing. The competent person utilizing this tabulated data shall be experienced and knowledgeable of all requirements of Subpart P, and trained in the use and safety procedures for Horizontal Waler System applications.

2. Use of this tabulated data is dependent on first classifying the soil in accordance with OSHA Appendix A, Soil Classifications. Classification shall be determined just prior to installing Horizontal Waler System. Soil conditions may change at a later date and require revaluation of the strength and allowable depth.

3. Horizontal Waler Systems are tabulated based on the effect of a 20,000 lbs., surcharge load set back 2 ft. from the edge of the trench and the equivalent weight effect of the OSHA soil type, see classification of soil types, note 2.

4. The allowable depths and spacings given in **Tables 4-2 through Tables 5-3** govern the use of Pacific Shoring Products Horizontal Waler Systems and not tabulations given by other manufacturers. This tabulated data applies to Horizontal Waler Systems manufactured by Pacific Shoring Products, LLC. Any alterations to the system or variance from this tabulated data shall be indicated in a site-specific plan prepared and approved by a registered engineer.

5. The competent person shall continually monitor the shored excavation for changed conditions such as water seepage, soil movement cracks at the surface, sloughing or raveling, proper surcharge load weight less than 20,000 lbs. and setback a minimum of 2 ft. that may damage shoring equipment.

6. Horizontal Waler Systems shall be installed and removed from outside the trench, see installation and removal procedure.

7. The Horizontal Waler System is not designed to support vertical loads and should not be used as a means of access or egress to the trench. Workers shall always enter, exit, and work inside the shored area of the trench.

8. When the lower portion of the trench is shored, and the top is sloped the shoring and sheeting shall extend a minimum of 18" above the top of the vertical trench wall and the sloping beyond shall be in accordance with OSHA sloping and benching for the soil type encountered.

9. The lowest element, either the sheeting or the center line of the Horizontal Waler Systems must be set a maximum of 2 ft. from the bottom of the excavation. The trench depth is the full distance to the bottom of the excavation.

10. In excavations that are 6 ft. deep or less, only one Horizontal Waler System is required in each plane.

11. An adequate separately designed shoring system shall be used leading up to within 2 ft. of the Horizontal Waler Systems application. Systems such as Hydraulic Vertical Shores, End Shores, Shoring Shields, and designs by a registered engineer may be used in conjunction with the Horizontal Waler Systems.

12. Tabulated depths are limited to 20 ft. Additional depth may be achieved when the design is by a registered civil engineer.

13. When Horizontal Waler Systems are used in conjunction with additional Horizontal Waler Systems, Hydraulic Vertical Shores, or Hydraulic Shields in a linear application, the maximum horizontal spacing between the ends of consecutive units shall be 24 inches.

    a. Sheeting shall be used to prevent sloughing or raveling between systems.
    b. Sheeting is required at any depth and soil classification whenever sloughing or raveling is likely to occur. If sloughing or raveling occurs between the sheeting decrease the spacing until it is prevented.

Classification of Soil Types

1. Soil classification shall be in accordance with OSHA Appendix A and classified just prior to installing Horizontal Waler Systems. Soil conditions may change at a later date and require the competent person to check soil conditions periodically and adjust accordingly.

2. The equivalent weight of OSHA soil types* is assumed to be as follows:

OSHA Type "A" Soil	25 PSF per ft of depth
OSHA Type "B" Soil	45 PSF per ft of depth
Type "C-60" Soil	60 PSF per ft of depth**
OSHA Type "C" Soil	80 PSF per ft of depth

   - These equivalent weights were adapted from OSHA 1926 Subpart P App C, Timber Shoring for Trenches, Tables C-1.1, C-1.2, and C-1.3

   ** Type C-60 soil is not identified or classified in OSHA Appendix A

3. Type C-60 soil is soil that does not qualify as OSHA Type A, or Type B, can be cut with vertical walls and will stand up long enough to safely insert and pressurize the Horizontal Waler System.

4. Horizontal Waler Systems may be used in Type C-80 soil.

Horizontal Waler Systems General Usage

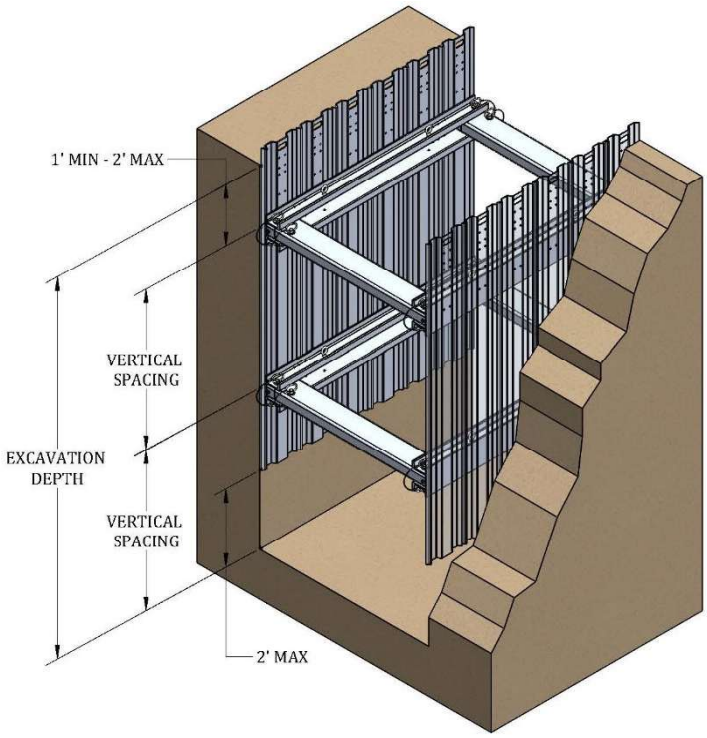


Figure 1. Horizontal Waler Use (Typical)

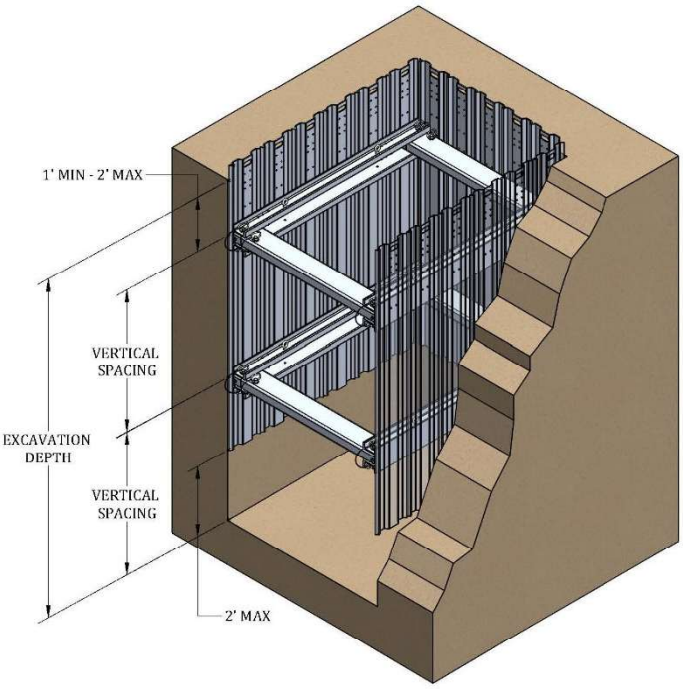


Figure 2. End Loading Case (Typical)

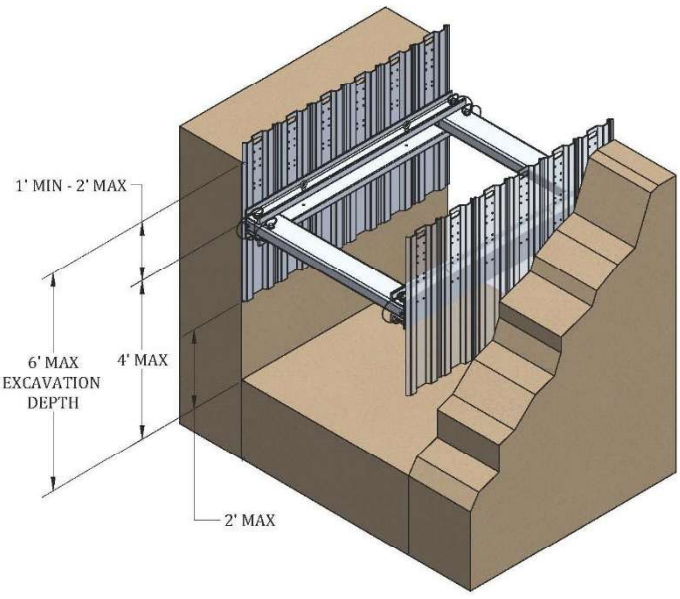


Figure 3. Single Waler Use

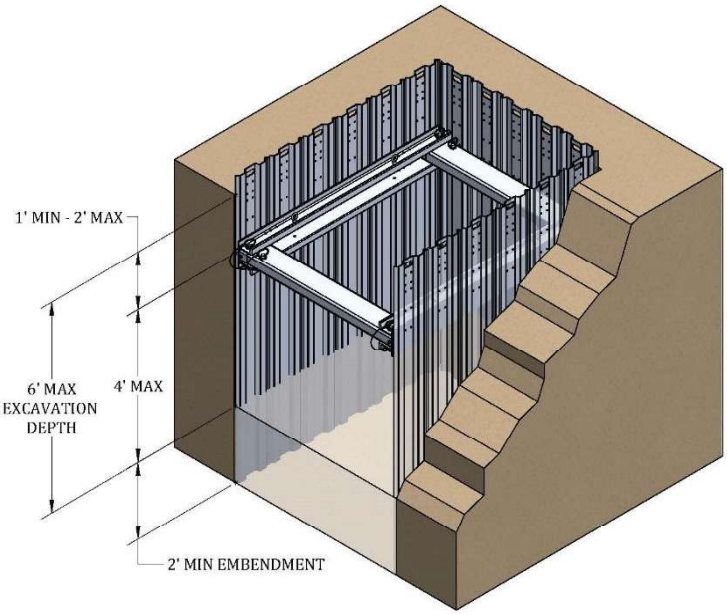


Figure 4. End Loading Single Waler Use

Hydraulic Power Strut Usage

Notes

1. Hydraulic Power Struts with cylinders 2-inches in diameter shall be used for end loading applications up to 12 ft. in width.

Waler Rail Specifications

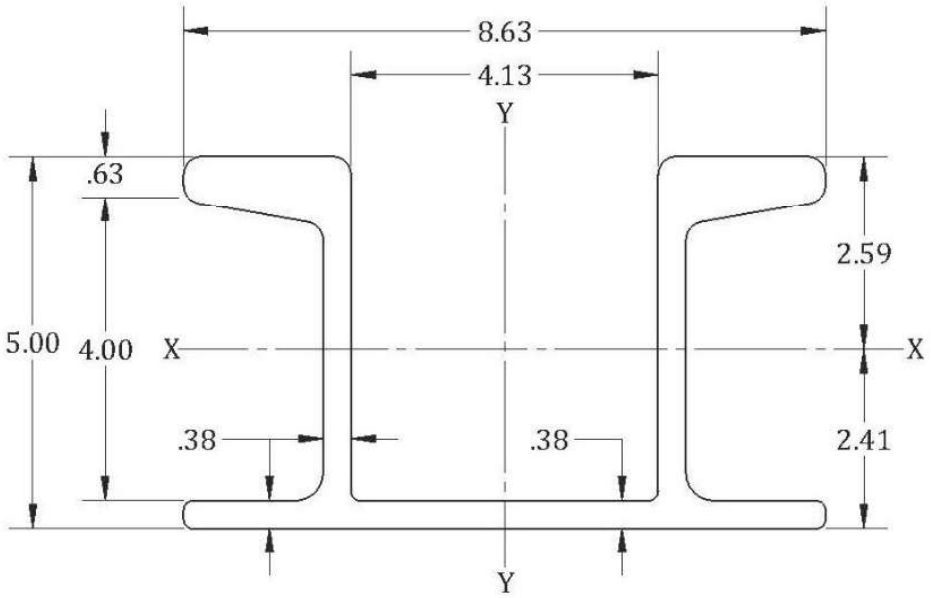


Figure 6. Heavy-Duty Waler Rail

Table 1: Waler Rail Specifications	
Section Properties	Heavy-Duty Waler
Material	6061-T6, 6005A-T61
Area	9.57 $in.^2$
Weight	11.25 lb./ft.
Moment of Inertia	36.34 $in.^4$
Section Modulus - Top	14.00 $in.^3$
Section Modulus - Bottom	15.10 $in.^3$
Radius of Gyration	1.95 in.

Allowable Sheeting

Acceptable sheeting to be used in conjunction with Horizontal Waler Systems is as follows.

Notes

- The side walls and end walls of the excavations shall be cut near vertical to allow proper installation of the Horizontal Waler Systems.
- The end walls shall be within 6” of the sheeting and the sheeting shall be secured with brackets.
- If the soil face is greater than 6” backfill the void at least 2/3 of its height with excavated soil or crushed rock securing the sheeting. Intermittent gaps directly behind the sheeting and the soil shall not exceed 6”.
- Sheeting is always required; however, it varies from spaced plywood or timber to tight spaced timber 3 to 4” thick as the soil gets worse.

Table 2: Allowable Sheeting for Horizontal Waler Systems
Material
1 1/8” thick CDX Plywood
Two sheets of 3/4” thick CDX Plywood placed back-to-back
3/4” thick 14 ply Arctic White Birch (Finland Form)
Minimum 1/2” thick steel plates
Pacific Shoring Products Aluminum Sheeting
Timber Lagging, Douglas Fir # 1, S4S Nominal Dimension, 1 1/2” x 7 1/2" and 2 1/2” x 7 1/2”
Timber Lagging, Mixed Oak, Rough Cut, 2” x 8", 3” x 8” and 4” x 8”

Table 3: Allowable Sheeting for Horizontal Waler End Loading Applications
Material
1 1/8” thick CDX Plywood
Two sheets of 3/4” thick CDX Plywood placed back-to-back
3/4” thick 14 ply Arctic White Birch (Finland Form)
3/4” thick Plyform - APA B-B Class I Exterior
3/4” thick Combi Exterior Plywood
3/4” thick HDO-American Plywood Association, high density overlay exterior
3/4” thick Omni Form
Minimum 1/2” thick steel plates
Pacific Shoring Products Aluminum Sheeting
Timber Lagging, Douglas Fir # 1, S4S Nominal Dimension, 1 1/2” x 7 1/2" and 2 1/2” x 7 1/2”
Timber Lagging, Mixed Oak, Rough Cut, 2” x 8", 3” x 8” and 4” x 8”

Horizontal Waler System - 2 Power Strut Cases

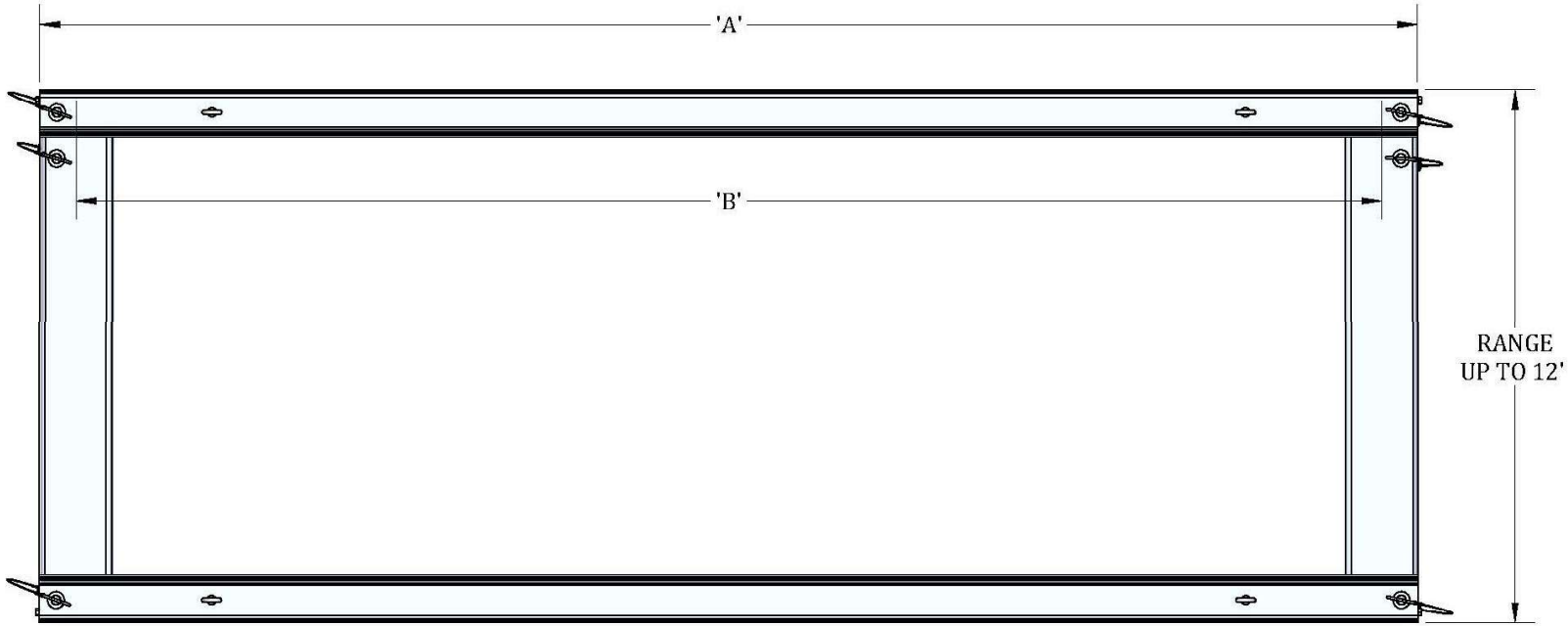


Table 4-1: 2 Power Strut Configurations		
Waler Model	Dimensions (in.)	
	'A'	'B'
WRH-04-EL	48.0	40.0
WRH-06-EL	72.0	64.0
WRH-08-EL	96.0	88.0
WRH-10-EL	120.0	112.0
WRH-12-EL	144.0	136.0

Horizontal Usage - 2 Power Strut Case

Table 4-2: Horizontal Usage - 2 Power Strut Case Allowable Depths												
Waler Model	Excavation Width	4' O.C. Vertical Spacing				3' O.C. Vertical Spacing				2' O.C. Vertical Spacing			
		A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80
WRH-04	12 ft. Max	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
WRH-06	12 ft. Max	20.0	20.0	20.0	19.9	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
WRH-08	12 ft. Max	20.0	20.0	19.2	14.4	20.0	20.0	20.0	19.5	20.0	20.0	20.0	20.0
WRH-10	12 ft. Max	20.0	15.2	11.4	8.5	20.0	20.0	15.6	11.7	20.0	20.0	20.0	18.0
WRH-12	12 ft. Max	17.6	9.8	7.3	5.5	20.0	13.6	10.2	7.6	20.0	20.0	15.9	11.9

End Loading Usage – 2 Power Strut Case

Table 4-3: End Loading Usage - 2 Power Strut Case Allowable Depths													
Waler Model	Excavation Width	4' O.C. Vertical Spacing				3' O.C. Vertical Spacing				2' O.C. Vertical Spacing			
		A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80
WRH-04-EL	0 ft. to 6 ft.	20.0	20.0	19.2	14.4	20.0	20.0	20.0	19.5	20.0	20.0	20.0	20.0
	8 ft. Max	20.0	13.7	10.3	7.7	20.0	18.8	14.1	10.6	20.0	20.0	20.0	16.3
	10 ft. Max	14.7	8.2	6.1	NA	20.0	11.4	8.6	6.4	20.0	18.0	13.5	10.1
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7
WRH-06-EL	0 ft. to 6 ft.	20.0	20.0	19.2	14.4	20.0	20.0	20.0	19.5	20.0	20.0	20.0	20.0
	8 ft. Max	20.0	13.7	10.3	7.7	20.0	18.8	14.1	10.6	20.0	20.0	20.0	16.3
	10 ft. Max	14.7	8.2	6.1	NA	20.0	11.4	8.6	6.4	20.0	18.0	13.5	10.1
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7
WRH-08-EL	0 ft. to 6 ft.	20.0	20.0	19.2	14.4	20.0	20.0	20.0	19.5	20.0	20.0	20.0	20.0
	8 ft. Max	20.0	13.7	10.3	7.7	20.0	18.8	14.1	10.6	20.0	20.0	20.0	16.3
	10 ft. Max	14.7	8.2	6.1	NA	20.0	11.4	8.6	6.4	20.0	18.0	13.5	10.1
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7
WRH-10-EL	0 ft. to 6 ft.	20.0	15.2	11.4	8.5	20.0	20.0	15.6	11.7	20.0	20.0	20.0	18.0
	8 ft. Max	20.0	13.7	10.3	7.7	20.0	18.8	14.1	10.6	20.0	20.0	20.0	16.3
	10 ft. Max	14.7	8.2	6.1	NA	20.0	11.4	8.6	6.4	20.0	18.0	13.5	10.1
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7
WRH-12-EL	0 ft. to 6 ft.	17.6	9.8	7.3	5.5	20.0	13.6	10.2	7.6	20.0	20.0	15.9	11.9
	8 ft. Max	17.6	9.8	7.3	5.5	20.0	13.6	10.2	7.6	20.0	20.0	15.9	11.9
	10 ft. Max	14.7	8.2	6.1	NA	20.0	11.4	8.6	6.4	20.0	18.0	13.5	10.1
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7

Horizontal Waler System - 3 Power Strut Case

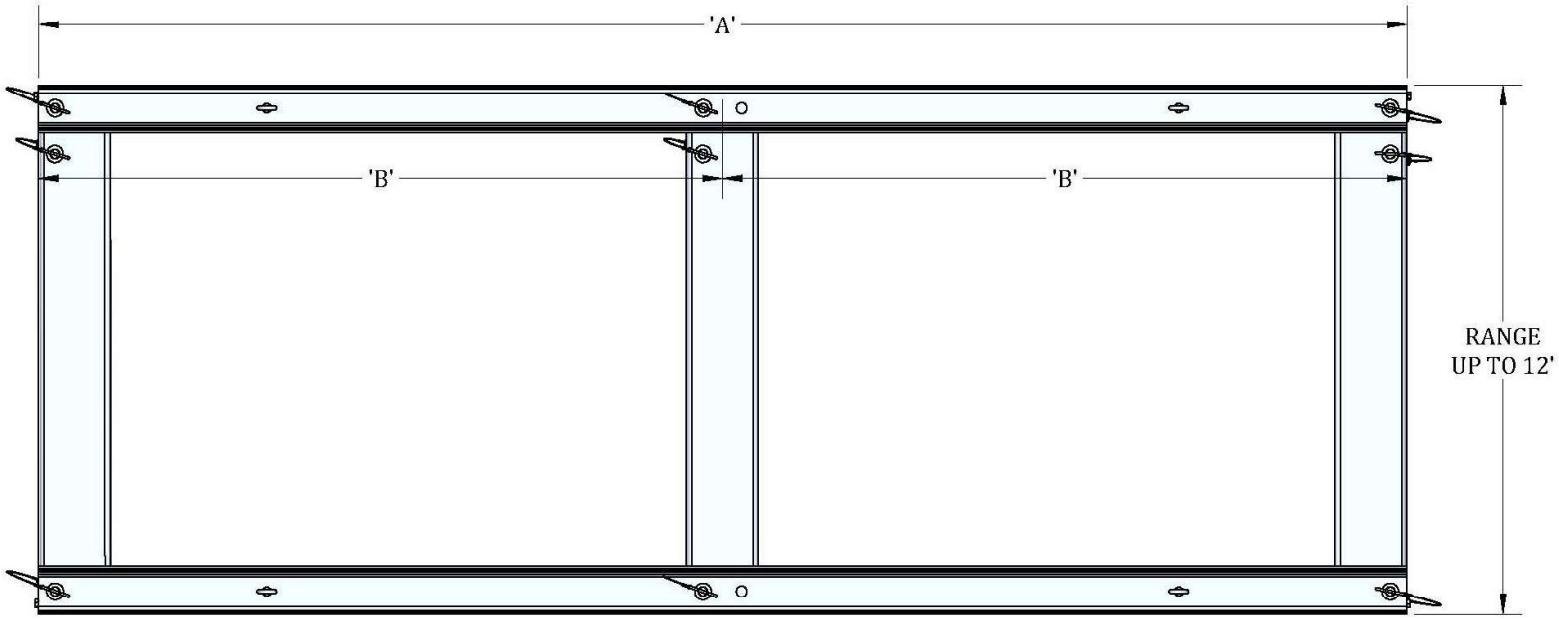


Table 5-1: 3 Power Strut Configurations		
Waler Model	Dimensions (in.)	
	'A'	'B'
WRH2-12-EL	144.0	72.0
WRH2-16-EL	192.0	96.0
WRH2-20-EL	240.0	120.0

Horizontal Usage – 3 Power Strut Case

Table 5-2: Horizontal Usage - 3 Power Strut Case Allowable Depths													
Waler Model	Excavation Width	4' O.C. Vertical Spacing				3' O.C. Vertical Spacing				2' O.C. Vertical Spacing			
		A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80
WRH2-12	12 ft. Max	20.0	13.5	10.1	7.6	20.0	18.5	13.9	10.4	20.0	20.0	20.0	16.1
WRH2-16	12 ft. Max	17.3	9.6	7.2	5.4	20.0	13.4	10.0	7.5	20.0	20.0	15.6	11.7
WRH2-20	12 ft. Max	13.2	7.4	5.5	NA	18.6	10.3	7.8	5.8	20.0	16.3	12.2	9.2

End Loading Usage – 3 Power Strut Case

Table 5-3: End Loading Usage - 3 Power Strut Case Allowable Depths													
Waler Model	Excavation Width	4' O.C. Vertical Spacing				3' O.C. Vertical Spacing				2' O.C. Vertical Spacing			
		A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80	A-25	B-45	C-60	C-80
WRH2-12-EL	0 ft. to 6 ft.	20.0	13.5	10.1	7.6	20.0	18.5	13.9	10.4	20.0	20.0	20.0	16.1
	8 ft. Max	20.0	13.5	10.1	7.6	20.0	18.5	13.9	10.4	20.0	20.0	20.0	16.1
	10 ft. Max	14.7	8.2	6.1	NA	20.0	11.4	8.6	6.4	20.0	18.0	13.5	10.1
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7
WRH2-16-EL	0 ft. to 6 ft.	17.3	9.6	7.2	5.4	20.0	13.4	10.0	7.5	20.0	20.0	15.6	11.7
	8 ft. Max	17.3	9.6	7.2	5.4	20.0	13.4	10.0	7.5	20.0	20.0	15.6	11.7
	10 ft. Max	14.7	8.2	6.1	NA	20.0	11.4	8.6	6.4	20.0	18.0	13.5	10.1
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7
WRH2-20-EL	0 ft. to 6 ft.	13.2	7.4	5.5	NA	18.6	10.3	7.8	5.8	20.0	16.3	12.2	9.2
	8 ft. Max	13.2	7.4	5.5	NA	18.6	10.3	7.8	5.8	20.0	16.3	12.2	9.2
	10 ft. Max	13.2	7.4	5.5	NA	18.6	10.3	7.8	5.8	20.0	16.3	12.2	9.2
	12 ft. Max	9.3	5.2	NA	NA	13.4	7.5	5.6	NA	20.0	12.0	9.0	6.7

Allowable Depths and Vertical Spacing Notes

Notes

- Vertical spacing is always 2 ft. maximum from the top, 4 ft. maximum between shores and maximum of 4 ft. from the bottom.
- Sheeting is always required; however, it varies from spaced plywood or timber to tight spaced timber 3 to 4” thick as the soil gets worse.
- For the single shore end loading case, as seen in Figure 4 on Page 5, the sheeting must be 1” steel plate or aluminum sheet piles.
- Do not butt rails back-to-back to span a wider excavation.

Horizontal Waler System Installation and Removal Procedure

Notes

- A competent person trained in installation and safe use of the Horizontal Waler System shall be present during installation.
- Prior to start of the excavation the sheeting and the Horizontal Waler Systems should be at the site and assembled so that the shoring equipment can be installed immediately following the excavation work.
- The excavation walls should be vertical, straight, and square. The sheeting may be placed prior to setting the frames or after they set in place.
- Use chains, cables, or slings for lifting that have a 5:1 factor of safety. A competent person is to determine the total lift weight.
- Confirm that dewatering is to the bottom of the excavation and that if there is a potential for water inside the excavation there is adequate pumping equipment available at the site.

Installation Procedures

Step 1 With the Horizontal Walers assembled expand them to a few inches narrower than the trench while ensuring to leave enough room for the sheeting to slide in behind the Horizontal Walers.

Step 2 Attach the appropriate size lifting sling to the Horizontal Waler lifting eyes, and lower the assembly into place following the spacings outline in **Tables 4-2 through Tables 5-3**.

Step 3 Position the sheeting around the excavation, if sloughing or raveling is present reduce spacing in between the sheeting.

Step 4 Pressurize waler assemblies to a minimum of 750 psi. The pressure gauge should hold at pressure and not indicate any loss of pressure.

Step 5 Proceed to lower the remaining waler assemblies into position and pressurize them as indicated in the previous step.

Removal Procedure

Step 1 With the appropriate size lifting sling attached to the lowest positioned waler assembly, use a release tool to slowly release the pressure on the hydraulics. Make sure there is no movement in the ground you are standing on before proceeding.

Step 2 Collapse the waler assembly enough to allow the system to pass inside the frames set above. Proceed to lift the waler assembly out of the trench. Repeat steps 1 and 2 until all of the Horizontal walers are out of the trench.

- **Depending on the length of the Horizontal Waler and width of the trench different installation procedures may be used. It is the responsibility of the contractor and his competent person to establish a safe installation and removal procedure for each application.**