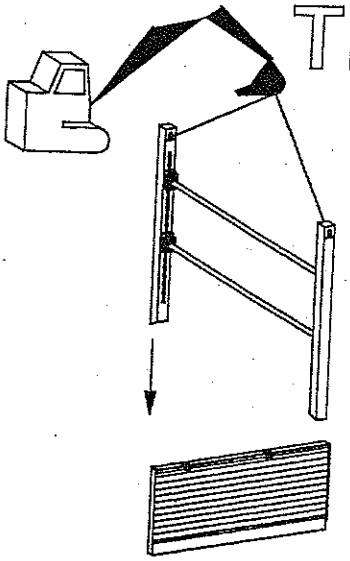
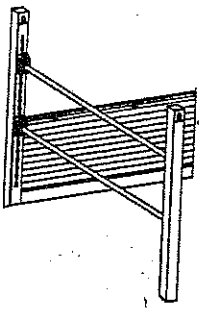
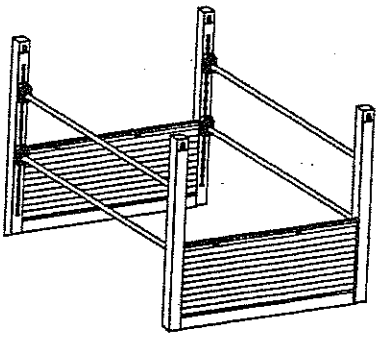
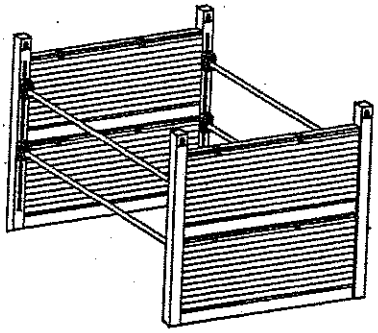
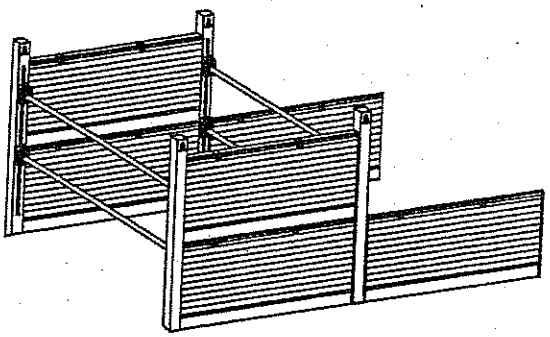
TRENCH INSTALLATION

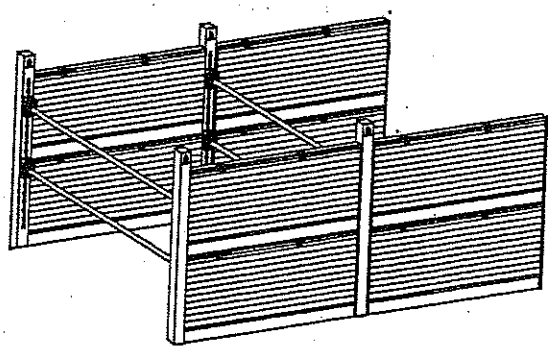


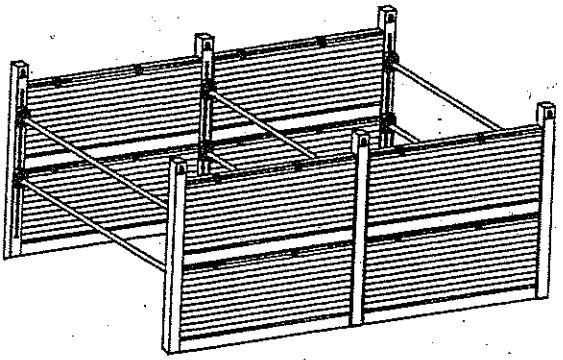












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INSTALLATION SKETCHES:

SKETCH #1 PILOT CUT

SKETCH #2 SET PLATES

SKETCH #3 SET RAIL PAIR

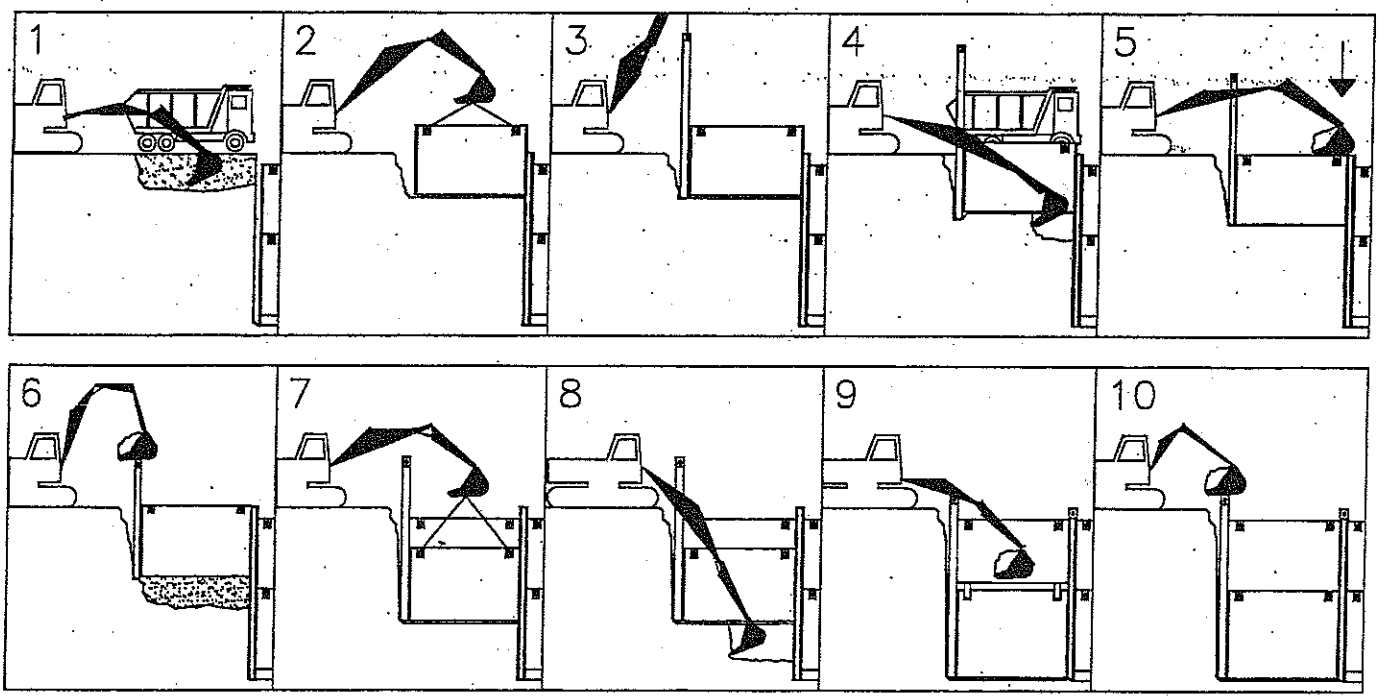
SKETCH #4 & 5 EXCAVATE TO 8 FEET

SKETCH #6 PUSH RAILS

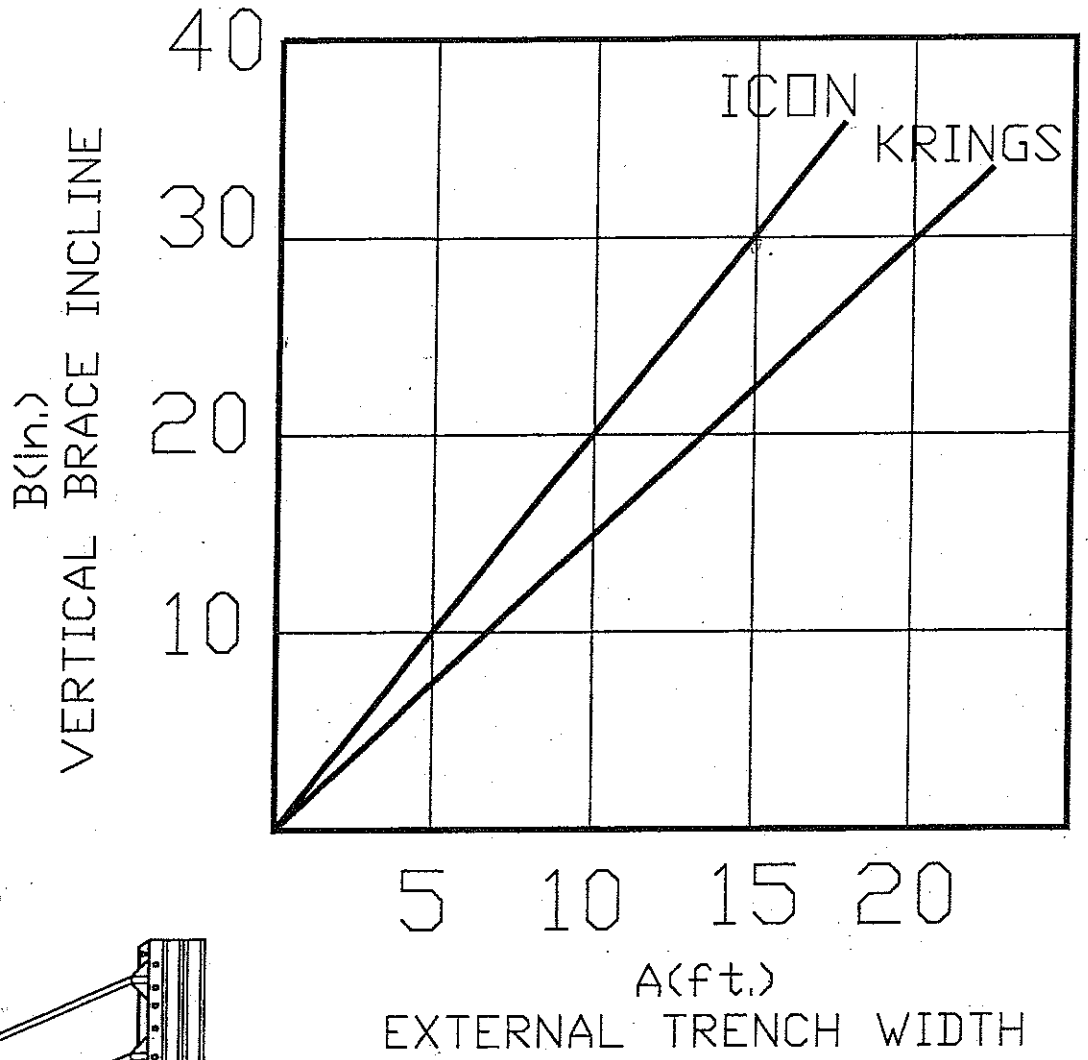
SKETCH #7 SET INNER PLATES

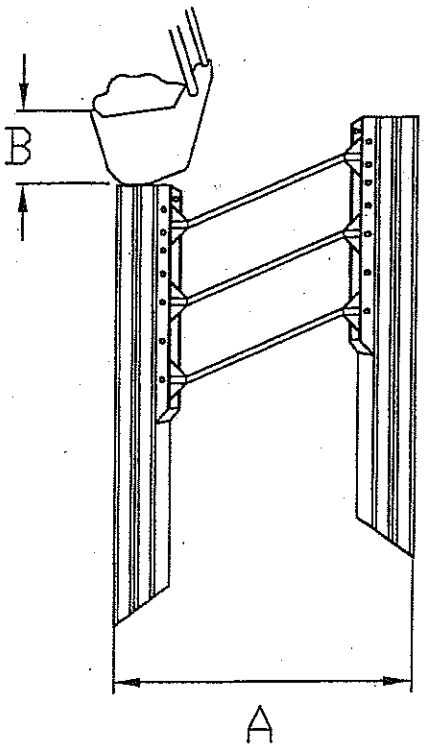
SKETCH #8 EXCAVATE

SKETCH #9 & 10 PUSH SHEETING AND EXCAVATE TO 16 FEET



ALLOWABLE BRACE INCLINATION DURING INSTALLATION





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ICON TEMPORARY SHEETING SYSTEM

STRUCTURE				
				Icon Industries
CONTRACTOR				FABRICATOR
ADDRESS			COUNTY	STATE
J.F.W.		NTS		N/A
DRAWN BY	APPROVED BY	SCALE	PROJECT No.	REF No.
				N/A
			DATE	REV SHEET No.

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STANDARD INSTALLATION INSTRUCTIONS FOR SLIDE RAIL SHEETING SYSTEMS:

1. Determine the proper inside trench width required from the contract drawings and consult the trench width tables indicating the proper brace configurations. Also, check contract plans to determine the trench depth required and the type of soil to be excavated. These items will determine the soil pressure on the system and also determine the proper lining plates to use based upon that soil pressure. Single slide rail Systems are used for excavations up to 12 feet (3.7m) and double slide rail systems are for excavations to 28 feet (8.2m). Additionally, the size of pipe, box culvert or structure will dictate the clear span (cantilever) below the bottom brace required for installation. Several slide rail designs are available to provide the required rail strength to support the lining plates in cantilever. Generally, single slide rails are for small pipe installations, standard (ICON) and Kombi (KRINGS) double slide rail systems are for small to medium size pipes, Heavy Duty (ICON) or Kombi SL (KRINGS) double slide rail systems are for small to large pipes, and Extra Heavy Duty (ICON) or Kombi SL HD (KRINGS) systems are for special applications such as, high earth pressures combined with large pipe or box culvert installations. Finally, Triple Slide Rail Systems are for deep excavations (generally 24 feet (7.1m) to 32 feet (9.8m) with high soil pressures and large pipe or box culvert installations. Typically the Triple Slide Rail System will provide up to 13.50 feet (4.1m) below the bottom brace for working room. Upon deciding the proper plates, rails and braces to use, assemble the spindle braces, tube steel braces or H-Beam braces with extensions where required, to form the slide rail pair conforming to the inner trench width for your project.

2. Before excavating, locate existing utilities that cross your trench by calling the utility companies for existing utility locations (see one call phone number on cover sheet), or reviewing as built plans. It is best to use plate lengths that will allow you to install the most modules per linear foot of trench. For example with utilities at 25 foot (7.6m) spacing on average the 9.84 (3.0m), 11.48 (3.5m), and 13.12 (4.0m) foot plates would be the best sizes to select. Areas that will allow utility relocation or with very few utilities lend themselves to the use of 14.76 (4.5m) and 16.40 (5.0m) foot lining plates so that productivity can be increased. Utility lines parallel to the proposed trenches shall be identified and located. Determine the inner trench dimension required based upon the contract documents and add 14 inches (35.56 cm) for single slide rails and 24 inches (60.96 cm) for double slide rails to that dimension to determine the outside dimension of the slide rail system. When triple slide rails are used, add 4.0' (1.23m) to the inside width to determine outside width of sheeting system. Proper use of the equipment during installation will insure that no soil adjacent to the system is lost and therefore parallel utility lines will be supported at all times.

3. Excavation and installation of the trench support system may now begin. Excavate the length of one module [6.56 - 16.40 ft. (2.0 - 5.0m)] and the outside width of the system allowing extra room for some adjustment in the sheeting position. When saw cutting pavement, allow distance for outside width of system plus an additional 0.5 feet (0.15m) (minimum). Depending upon the soil, location and condition of parallel utility lines, the pilot cut should be to such a depth that there are no breaks in the vertical trench walls but in no case shall the initial trench depth exceed 5 feet (1.5m) [29 CFR 1926.650 - .652 (Subpart P)]. If no utility lines are uncovered crossing the trench or are indicated on as-built plans or by the utility companies then follow directions for lining plate installation (see step 5). If utility lines are uncovered or indicated on plans or by utility companies then proceed with step 4 for utility line shoring and support instructions.

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4. Several methods for utility line shoring are indicated on Icon shop drawings STD 01, 02 and 03 and are included here on pages 4 & 5. Please refer to appropriate details for the chosen method. Upon encountering utility line crossing that are perpendicular to the trench centerline and are within 5-6 feet (1.5-1.8m) from the last slide rail pair placed in the trench you may install horizontal wood lagging on both sides of the trench as per the discussion on page 4 (Icon STD. 03) and in accordance with the wood lagging table indicated on the Icon Slide Rail Sheeting System Project Detail shop drawing. In the case of multiple utility line crossings which span a distance greater than 5-6 feet (1.5-1.8m) along the pipe centerline you may install an internal waler or KKP frame and utility panels in accordance with the details on this page and references on the Icon Slide Rail Sheeting System Project Detail shop drawing.

5. Assuming no utility lines will be encountered, proceed with lining plate installation. To start the first bay of sheeting, pick a pre-assembled slide rail pair and place it in the pilot cut perpendicular to the centerline of the trench. Make sure the rail pair is centered. Use a large timber, H-Beam or lining plate laid across the trench to lean the rail pair against until the first lining plate is interlocked and the rail pair can stand by itself. Use the longest lining plate possible conforming to project conditions so that the sheeted trench is maximized with each module installed. Pick up a base plate (with cutting edge) and interlock the plate end with the slide rail just placed in the trench. Interlock another base plate of identical size in the other rail (the base plates must be inserted in the outermost tracks first in the case of the double and triple slide rail systems). Position both plates so that they are centered around the trench centerline and they are the proper distance apart to allow the next slide rail pair to be lowered over the top of there end sections. A wooden template can be cut to conform to the proper plate spread and a target can be placed in the center of the template to indicate centerline. This procedure is especially helpful to excavator operators and surveyors. Upon proper placement of the two plates, pick up a pre-assembled slide rail pair and place it over the end of the two plates interlocking the rails and plates.

6. After installing the second slide rail pair, begin excavating inside the sheeting. Initially, excavated material must be deposited behind the lining plates to stabilize the system. Back filling the pilot cut prevents the sides of the excavation from failing and causing the trench sides to crack and move. Once the space between the plates and the pilot cut wall has been filled the lining plates can be pushed into the ground as the excavation proceeds. It is suggested that a full back hoe bucket be used to push the rails and plates into the ground as excavation proceeds. Plate and rail protectors are provided with every slide rail sheeting system. Protectors should be in place prior to pushing plates and rails into the excavation to prevent equipment damage. The backhoe should excavate material, push the system down and then cast the material aside or load a waiting truck. This method will allow the trench support system to lower into the ground as excavation proceeds thus reducing stress and will make installation and removal of the equipment easier. The initial plates and rails should be pushed to a depth of 7.5 feet (2.3m). At this time if an unexpected utility is encountered a KKP frame or internal waler frame can be inserted in the inner rail and utility panels can be used to sheet around the utility. Alternatively, the utility can be temporarily disconnected, with approval of the responsible utility, to allow installation of additional lining plates.

7. If a single slide rail system is used, [the maximum allowable depth is 12 feet (3.7m)] then pick up two extension plates [4 feet (1.2m) high] and place them on top of the previously placed

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lining base plates one at a time. If you are to excavate to 20 feet (6.1m) or more with a double slide rail system, an extension plate must be installed in the outside rail on top of the first lining base plate. Remember, the purpose of double and triple slide rail systems is to limit the area of plate in any one rail so that installation and withdrawal is as easy as possible.

8. Excavations from 12 to 16 feet (3.7 to 4.9m) require 8 foot (2.4m) base plates to be installed in both inner and outer rails. Excavations to 20 feet (6.1m) deep require 4 foot (1.2m) extension plates to be installed in the outer slide rail and 8 foot (2.4m) base plates be installed in the inner slide rail as shown on the Slide Rail Sheeting System Project Details shop drawing. When installing extension plates it is very important that the interconnection pins and safety clips be installed also. Failure to do this will result in unsafe conditions and difficulty in removing the lining plates during back fill operations.

9. Slide rails come in many lengths for different applications. Single slide rails of 9.84 (3.0m) and 11.48 foot (3.5m) lengths are for shallow excavations. Double slide rails of 14.76 (4.5m) and 18.04 (5.5m) foot lengths are for deeper excavations. When the excavation exceeds 16 feet and 14.76 foot (4.5m) rails are being used extension rails of 6.56 feet (2.0m) must be placed on top of the base rails to allow more plates to be installed. For excavations over 20 feet (6.1m) , 6.56 foot (2.0m) extensions must be used with 18.04 foot (5.5m) long base rails. The procedure of excavating and pushing to system plates and rails into the ground is always the same, regardless of depth, width or configuration of the system.

10. Most slide rail sheeting can be installed using a track excavator. Packed gravel, clay or small rocks may become lodged in the slide rail preventing the plate from moving down the rail into the excavation. When this occurs, hand work with a pick is required to clean the rail. Obstructions such as timber and boulders must also be removed before attempting to push the sheeting into the ground. * If the excavator has trouble pushing the system into the ground there is reason for this. Check for alignment, boulder, clogged rails or other obstruction problems *.

11. Very large structures or pipes may require that a system brace be removed prior to installation of the structure. This can be accomplished by installing a strut below the proposed structure which spans between the slide rails located on opposite sides of the trench. Once the strut has been installed the bottom brace can be removed. The large structure can be placed without obstruction. The excavation shall be backfilled and the system extracted.

12. In all cases after the sheeting system has been installed and excavation is complete to sub grade, the pipe and/or structure(s) shall be constructed or installed in accordance with the contract documents.

13. Removal of the slide rail sheeting system is accomplished by reversing all installation procedures and properly compacting the trench in accordance with the contract documents. Inner lining plates are removed first and slide rail pairs are withdrawn as backfill proceeds. Outer plates are removed last and, upon reaching a backfill depth of less that 5 feet (1.5m) in stable ground, the last plates and slide rail pairs are removed from the trench.

14. If the surcharge exceeds 3 feet (0.9m) of soil the contractor shall reinforce the sheeting system and protect it from damage. Additionally, all slide rail designs assume that the contractor shall properly dewater the excavation.

15. All manufacturer's instruction as well as applicable contract provisions shall be observed in connection with sheeting installation and removal.

16. Excavations deeper than 20' (6.1m) require site specific engineering by a Professional Engineer.

SEWER HOUSE CONNECTION FLUME PROCEDURE

1. Determine the location and approximate depth of the existing house connection. If the house connection is within 8.5 feet (2.6m) of existing grade and the proposed trench sub grade then proceed with this method.

2. Pilot cut to 5 foot (1.5m) maximum. Install slide rail system and proceed as usual with the excavation while pushing the sheeting system into the soil.

3. Advance the excavation until the utility is exposed and stop lowering the sheeting system.

4. Expose the house connection, cut the pipe and install the inner lining plates proceeding with excavation. Advance the inner plates to such an elevation (beyond proposed subgrade if necessary) until the top of the plate is lower than the house connection invert. The space between the upper and lower plate must not exceed 18 inches (45.72cm).

5. Install 2 inch (5.08cm) wood lagging by hand behind the two plates at the exposed face.

6. Install temporary pipe or flume, if necessary, to handle discharge from the house connection.

7. Construct the sanitary sewer and riser pipe for the house connection.

8. When back filling is to begin, remove any temporary connections, deposit soil, compact and raise lower (inner) plate to an elevation just above the house connection crown.

9. Complete the new house connection tie-in and resume backfilling (see step 13, page 3).

SUGGESTED UTILITY CROSSING INSTRUCTIONS

A. WOOD LAGGING BETWEEN ADJACENT SLIDE RAIL PAIRS

1. Determine location of all utility lines crossing trench (see One-Call phone numbers on cover sheet).

2. Where utility lines cross trench, place one slide rail pair on either side of the utility line or lines. Stabilize the slide rail pair and lag with wood between the flanges of the slide rail tracks.

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3. Move the excavator back along centerline and excavate for the next module of sheeting and follow directions for slide rail lining installations. As the rails and lining are pushed into the excavation, lag the area between the adjacent rails and around the utilities.

4. Support the utility line as excavation proceeds as required by the responsible utility company.

B. WALER FRAME OR KKP UTILITY FRAME PROCEDURE

1. Excavate the pilot cut, not to exceed 5 feet (1.5m), and expose any existing utility lines. When using the KKP frame or waler frame in conjunction with slide rails, then lift a frame side panel and interlock the panel with the slide rail. If the utility lines cross the trench place another side panel in the rail on the opposite side of the trench. If the utility only enters the trench on one side place lining plates on the opposite side. Pick up a pre-assembled slide rail pair and place it over the end of the side panels to complete the frame. If you are using the frames independently of slide rails, then place the assembled frame in the pilot cut, tighten the frame side panels against the trench walls by adjusting spindle braces or backfill frames for stability.

2. The lightweight utility panels are inserted in the frame so that they conform to the template in the frame and overlap the adjoining panel. (In the interest of safety and to ease installation of lightweight sheeting panels; contractor should consider the use of ground release shackles). Panels that conflict with crossing utilities are left out and wood lagging is installed to close the gap in the sheeting. Utility support measures must be installed at this time in accordance with the contract requirements and utility companies direction. As excavation proceeds the utility panels are pushed vertically making sure the trench walls are supported at all times.

3. The utility panels are supported in the upper section of the trench by the frame and in the lower section of the trench by the unexcavated soil. As the excavation continues, the unsupported utility panel span from the bottom of the frame to the bottom of the excavation lengthens and may require walers and cross braces for additional support. These additional waler and brace sets can be hung from the frame by chains (See Site Specific project design calculations for waler and brace locations and sizes).

4. Upon installation of all pipes and structures and completion of all underground work the lightweight utility panels can be lifted as back fill and compaction is accomplished in accordance with contract requirements. The utility panels shall not be withdrawn ahead of the back fill.

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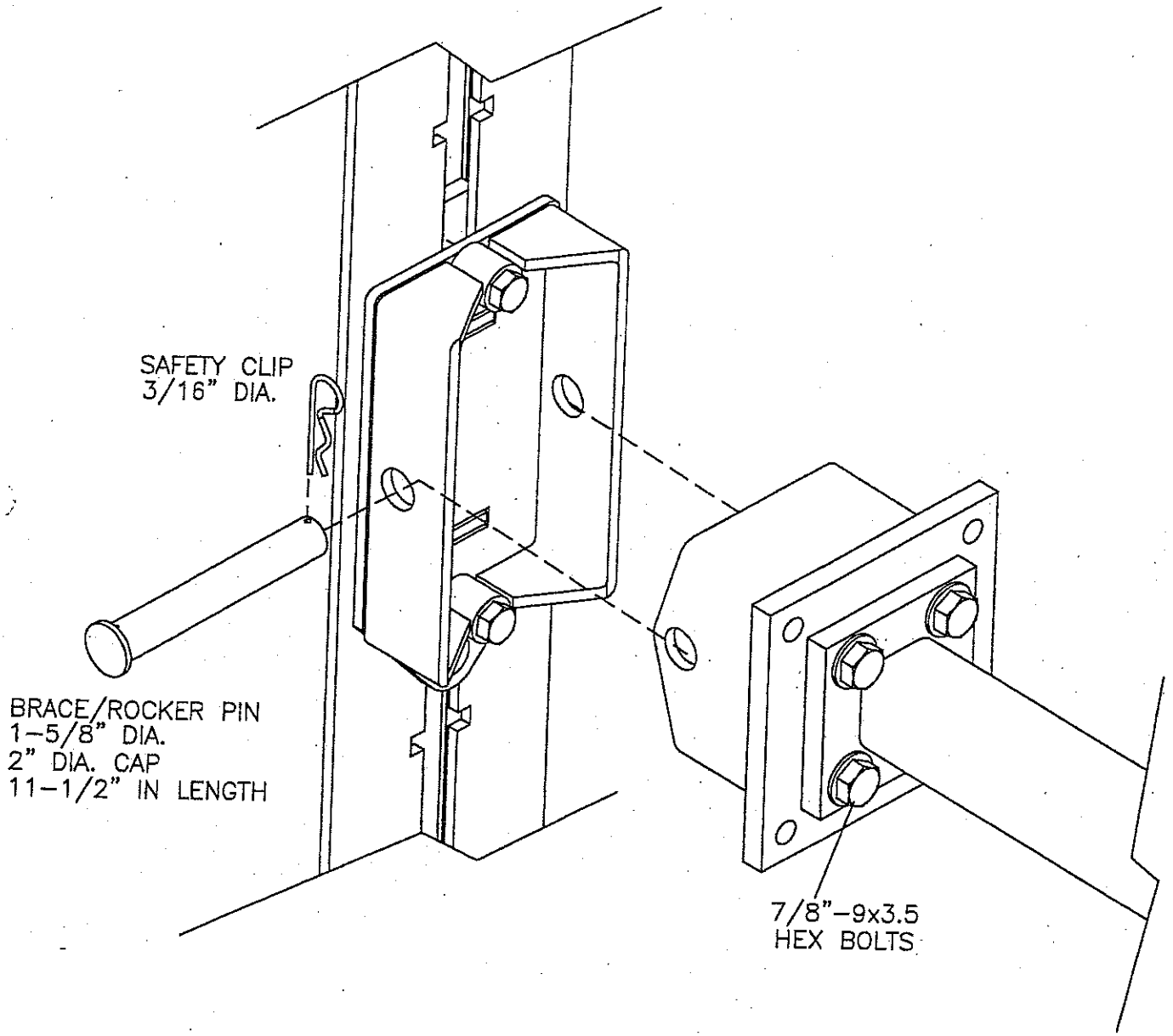
BRACE/ROCKER-SLIDE ASSEMBLY



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New England Regional Office
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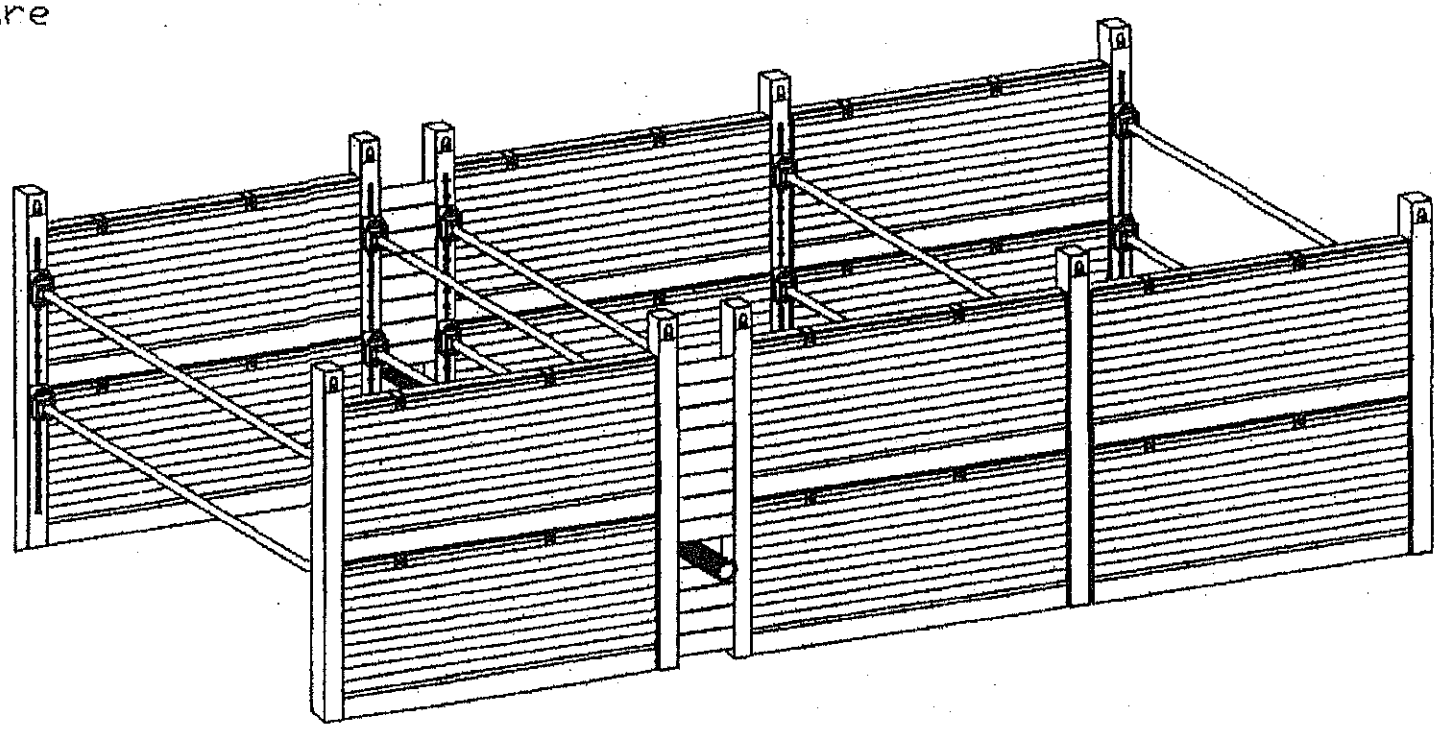
UTILITY CROSSINGS

- Sheet trenches in congested area
- The complete system can be shipped to your job, unloaded and installed with your excavator and a small crew
- Vibrationless installation virtually eliminates damage to adjacent buildings and infrastructure



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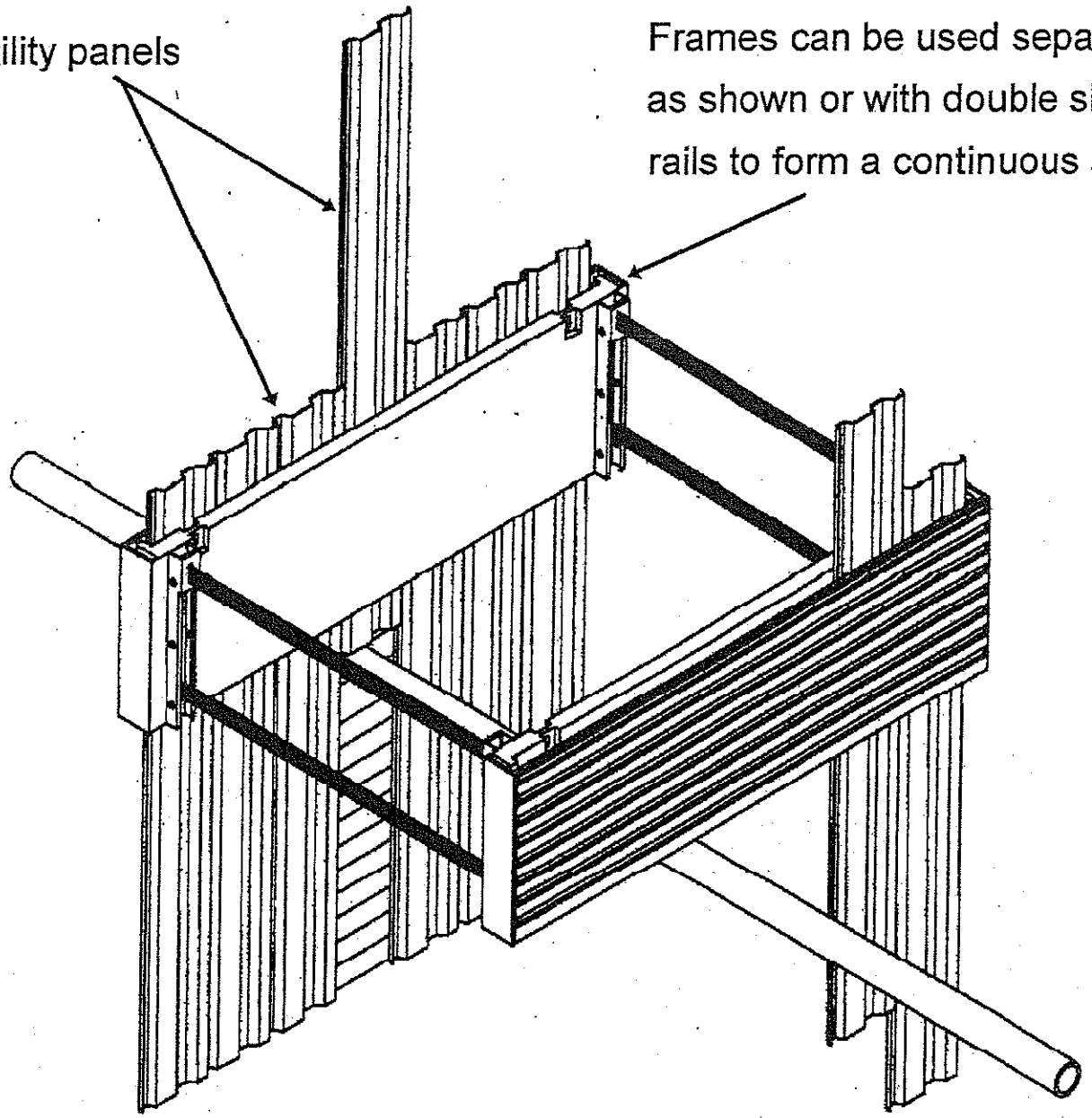
Utility Crossings

Icon fabricated steel utility panels

Frames can be used separately as shown or with double slide rails to form a continuous system



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Utility Crossing Frame

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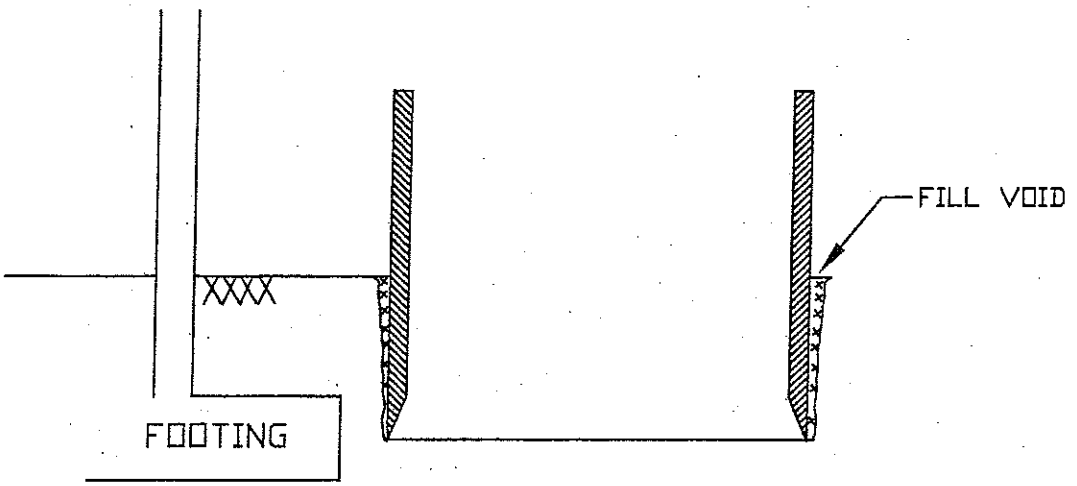
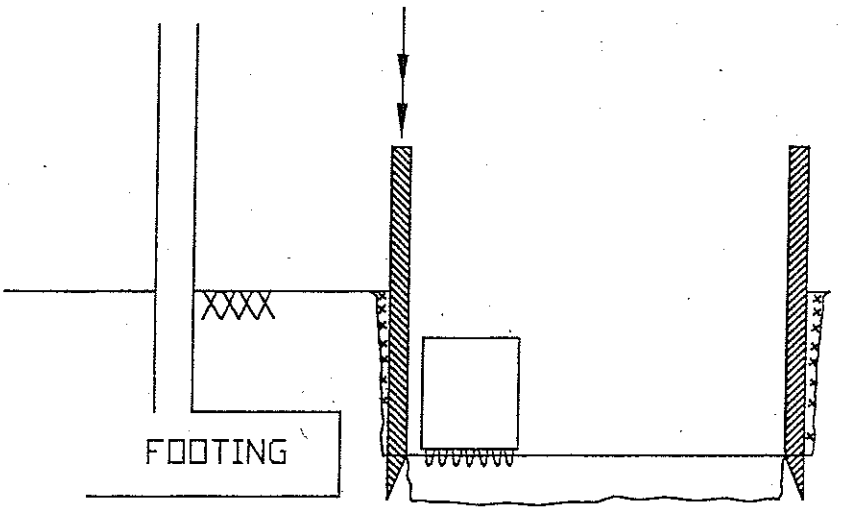
PROTECTING ADJACENT STRUCTURES

PART 1: INSTALLATION

STEP 1: EXCAVATE PILOT CUT ABOVE THE BOTTOM OF FOOTING. INSTALL SYSTEM AT DESIRED DIMENSIONS. FILL VOID BEHIND PANEL WITH SOIL.



STEP 2: USE BUCKET TO EMBED PLATE 6-8 INCHES IN GROUND. EXCAVATE THE 6-8 INCHES TO THE BOTTOM OF KNIFE EDGE.



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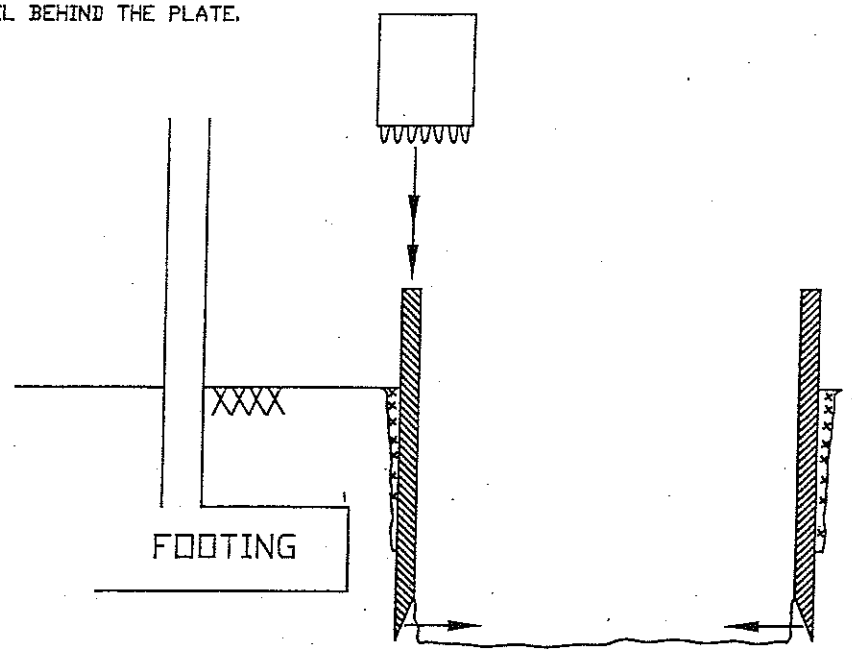
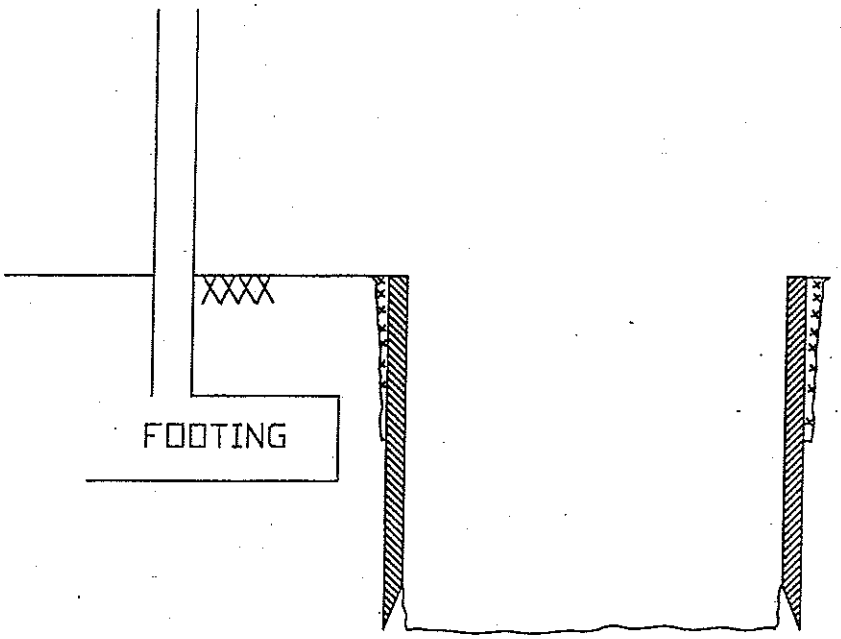
STEP 3: AS YOU PUSH THE PLATE DOWN THE BOTTOM OF THE KNIFE EDGE WILL SHAVE THE SOIL OFF. . THIS SHOULD PRESERVE THE INTEGRITY OF THE SOIL BEHIND THE PLATE.



STEP 4: REPEAT AS NECESSARY UNTIL SYSTEM IS DOWN TO GRADE.



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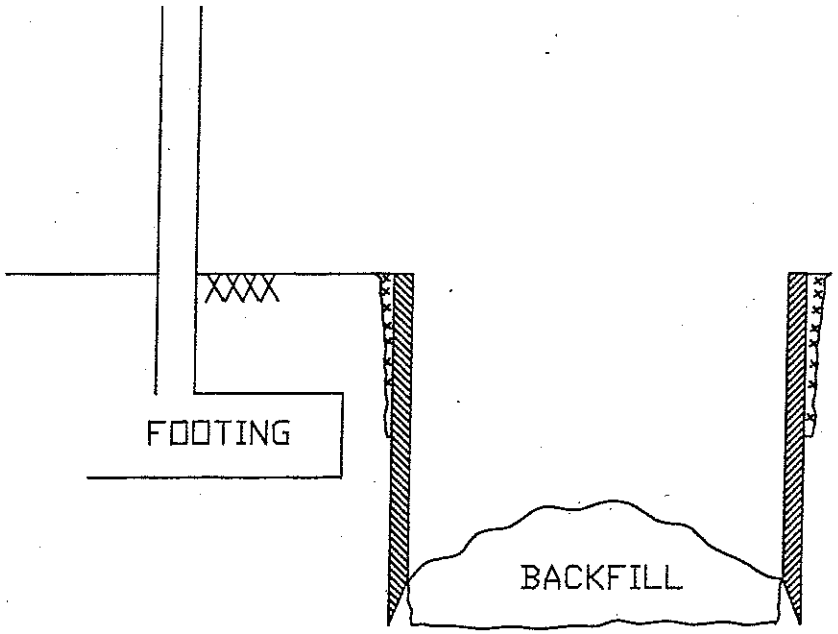
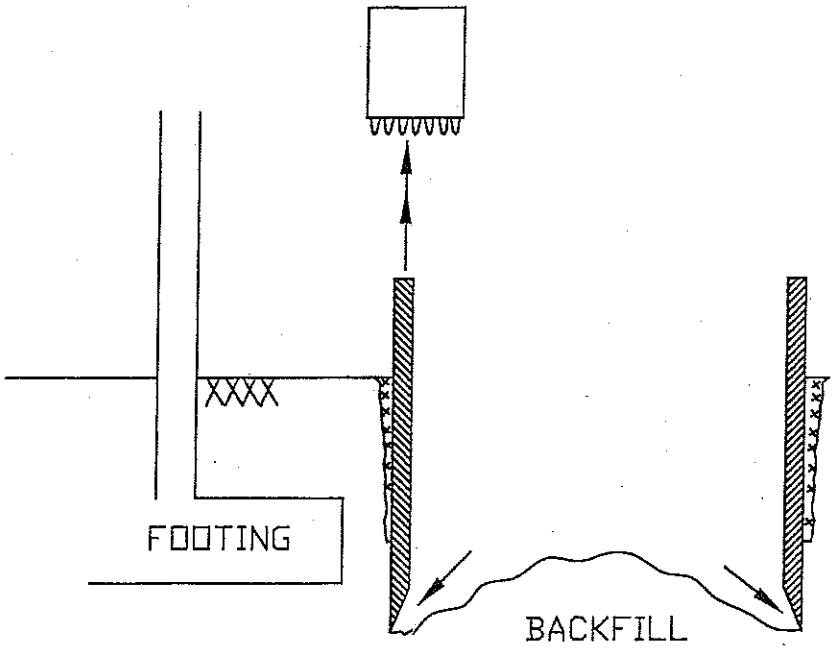
DATE:		
PROJECT:		
CONTRACTOR:		DRAWING NUMBER: 2 OF 3

PART 2: EXTRACTION

STEP 5: ADD BACKFILL AND BEGIN TO REMOVE THE SYSTEM.



STEP 6: AS THE PLATE IS WITHDRAWN BE SURE TO SHOVEL SOIL INTO VOID CREATED BY THE KNIFE EDGE. PLATE SHOULD BE WITHDRAWN IN ACCORDING TO SOIL CONDITIONS.



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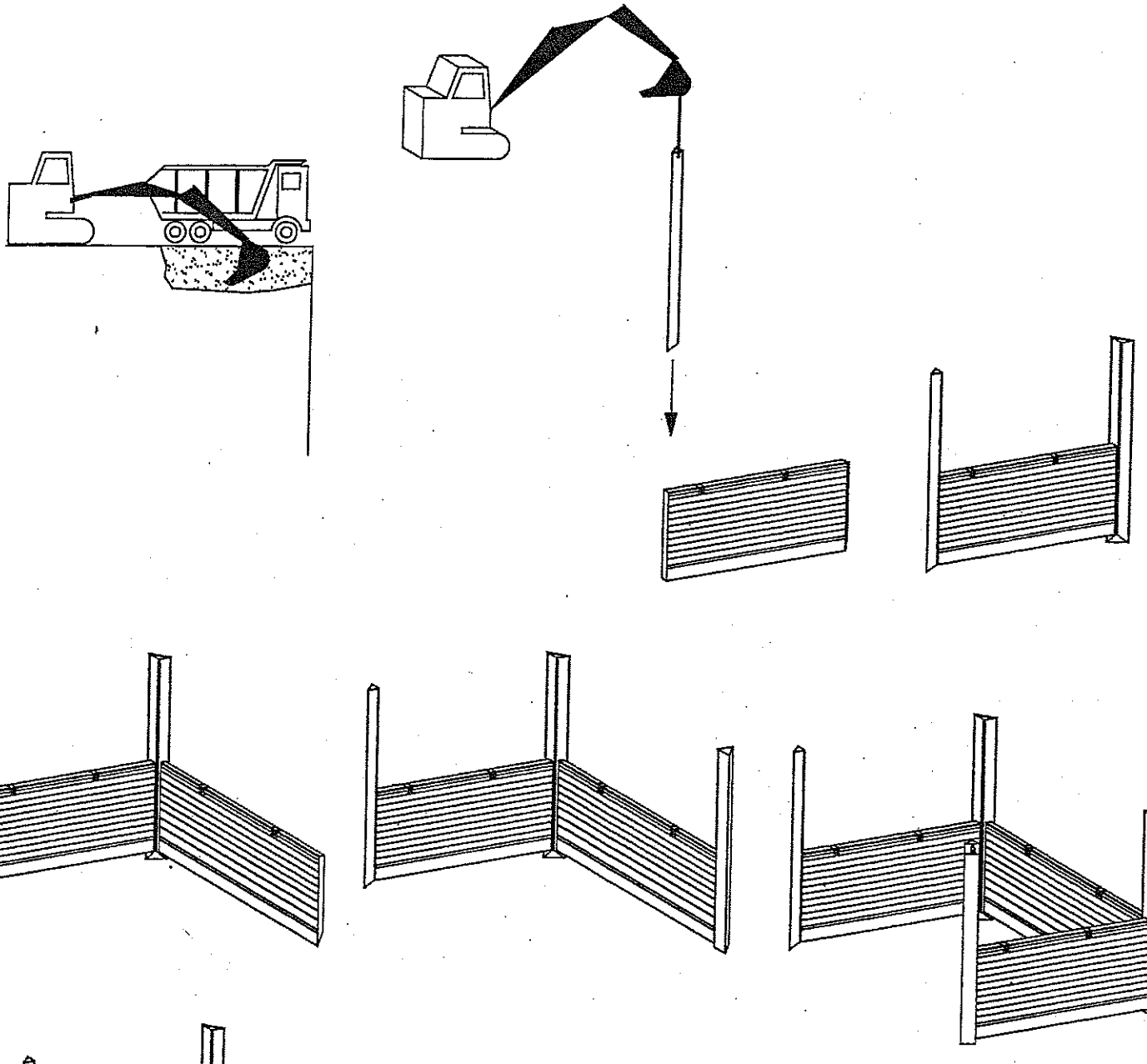
PIT INSTALLATION



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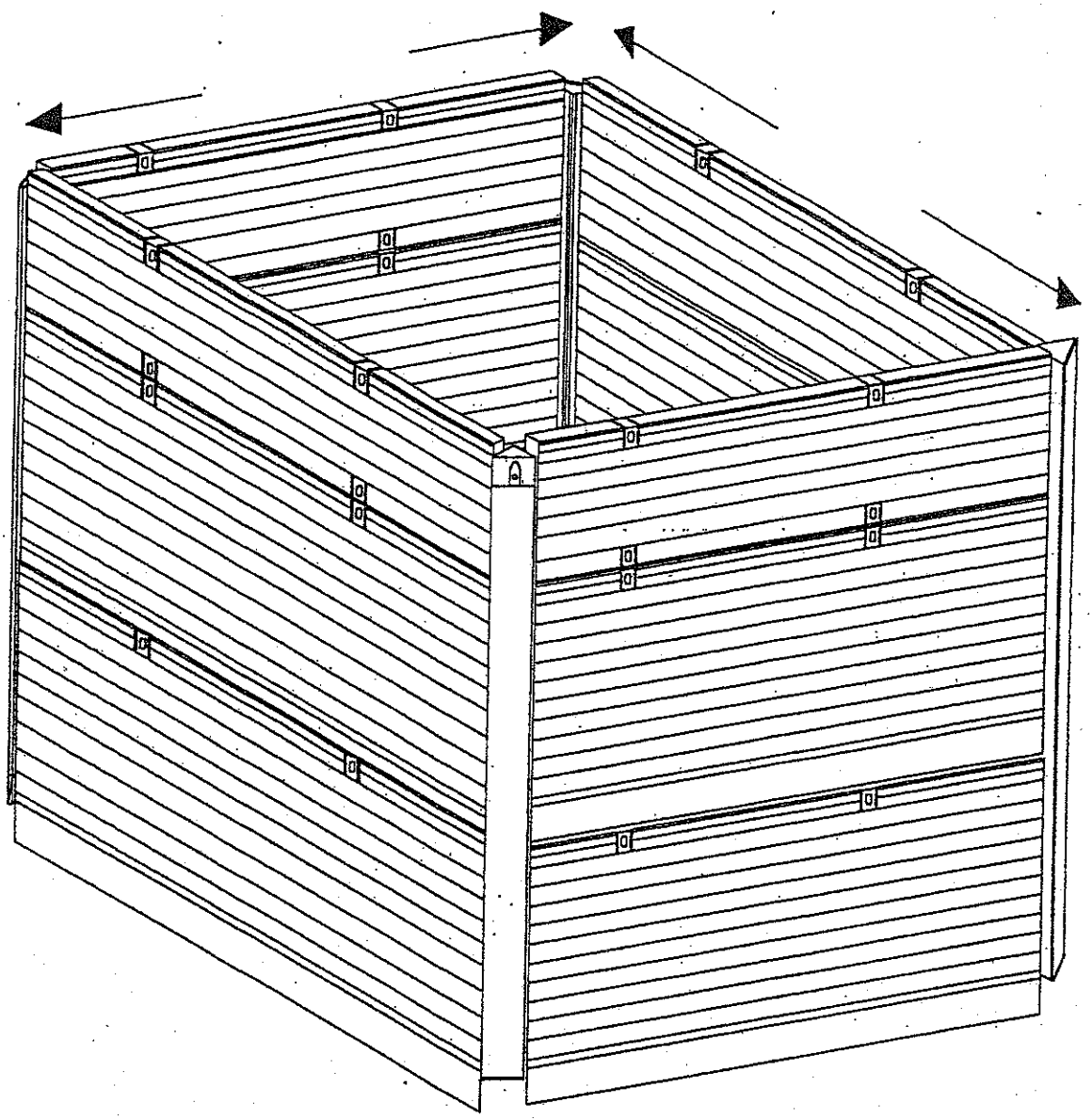

TOTAL DEPTH OF CUT: 20'

SOIL TYPE: _____

OTHER:

IN THE TRENCHES

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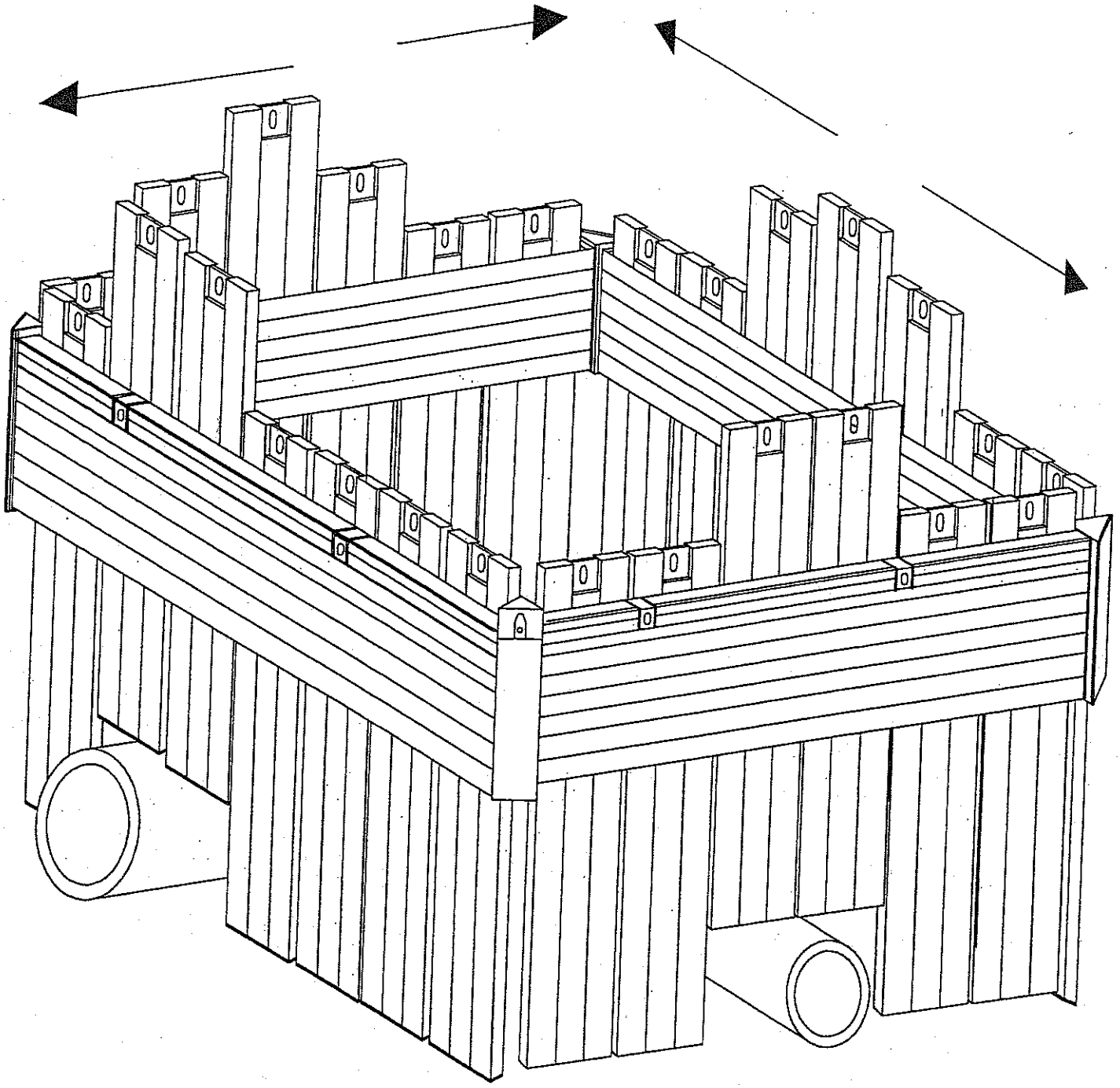
		DRAWING NUMBER:

KKP FRAME WALER PIT



IN THE TRENCHES

ICON EQUIPMENT DISTRIBUTORS INC.

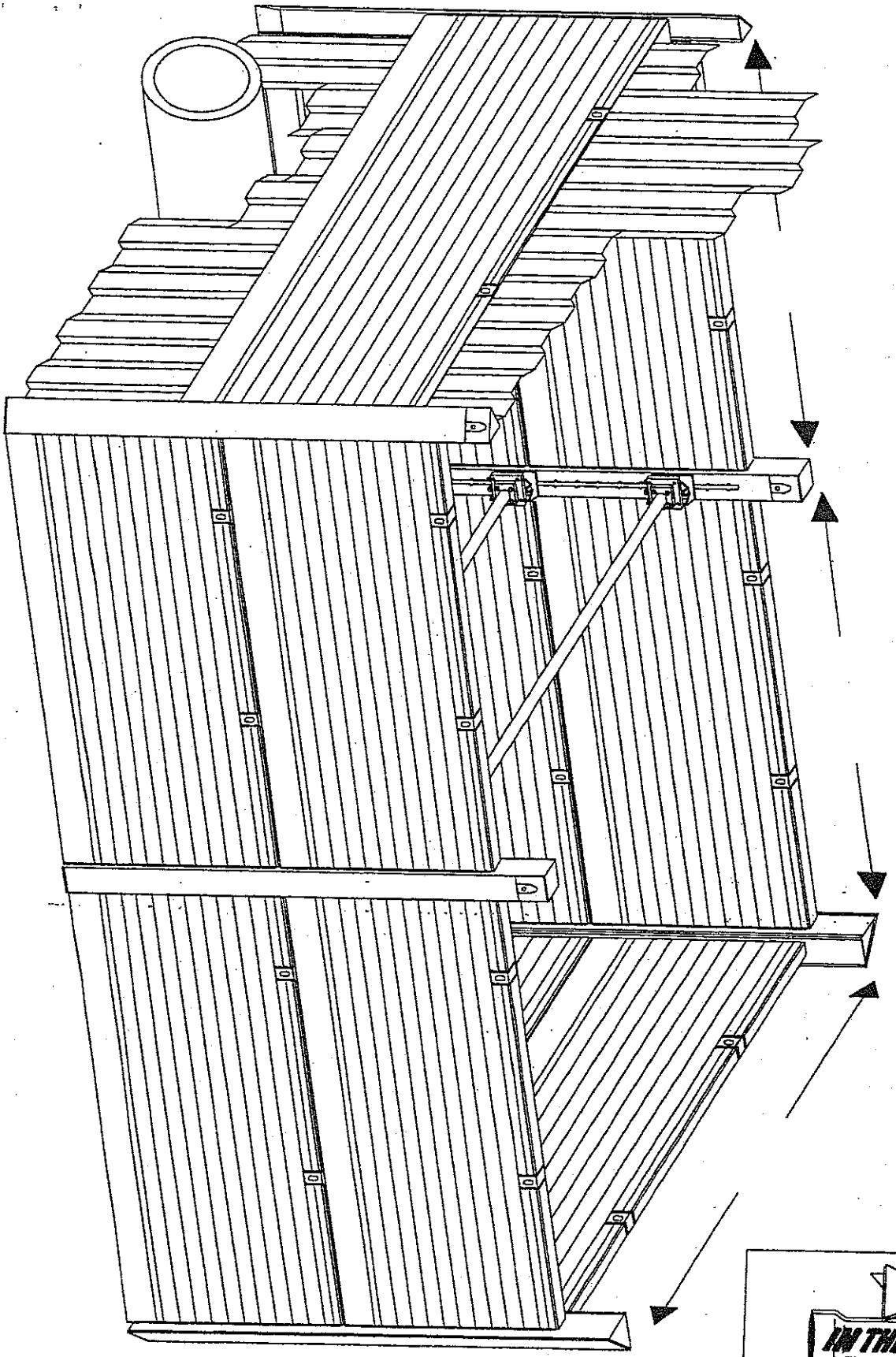
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

SCALE:	APPROVED BY	DRAWN BY:
DATE:		
PROJECT:		
CONTRACTOR:		DRAWING NUMBER:

TOTAL DEPTH OF CUT: _____

SOIL TYPE: _____

OTHER: _____



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SCALE:	APPROVED BY	DRAWN BY:
DATE:		
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