

TRANSMITTAL

To: Wenger Excavating, Inc../ Jeff Date: 9/8/2014
Gaul/Gjorgi Kondev

From: Frederick P Werner

Re: 2013 Levee Infrastructure Date 9/10/2014
Improvement Project Submitted:

WE ARE SENDING YOU:

☒ ATTACHED ☐ DRAWINGS ☒ SHOP
DRAWINGS/
SUBMITTAL ☐ CONTRACTS ☐ CHANGE ORDER

Notes: Link-Pipe PVC Sleeve —, **APPROVED**,

Submittals have been reviewed with the following exceptions:

SUBMITTAL/ SHOP DRAWING REVIEW

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF THE GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. NOTHING HERE IN AUTHORIZES ADDITIONAL COST. THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; PERFORMANCE; SELECTING FABRICATION PROCESS AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS OR HER WORK WITH THAT OF ALL OTHER TRADES, AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

CITY OF MASSILLON
151 LINCOLN WAY EAST
MASSILLON, OHIO 44646

BY _____
DATE _____

(x) APPROVED () NOT APPROVED
() APPROVED AS NOTED () REVISE/RESUBMIT

CC: File, RPR

SIGNED: _____

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LINK-PIPE[®]

No-Dig Rehabilitation For Underground Pipes

27 West Beaver Creek Rd., Unit # 2, Richmond Hill, Ontario
Canada L4B 1M8 Tel: (905) 886-0335 Fax: (905) 886-7323
E-Mail: info@linkpipe.com http://www.linkpipe.com

LINK-PIPE[™] PVC SLEEVE INSTALLATION PROCEDURE

Installation Tips (Project # 18274-3)

General Information:

1. **Product Description:** LINK-PIPE[™] PVC sleeve is made of rigid PVC material generally used in pressure pipes. This design of sleeve consists of 5 segments.

Segments 'B' and 'S' are usually largest in size and form the major structure of the sleeve. Segments 'C' are smaller and their purpose is to lock the sleeve in place. 'C's are also called 'Flaps'.

2. The sleeve is first transported into the pipe. In most cases this requires passing through the Access Chamber (ACh) cover frame opening. Since the sleeve is larger than the opening, Sleeve is disassembled to be able to access the manhole.
3. Hinges are reinstalled when the sleeve arrives to the floor of the ACh. (Or to assemble the sleeve at the repair spot.)
4. O-rings are then placed into the grooves to keep them aligned during the sleeve expansion process.
5. The sleeve is now ready to be transported to the repair site in the pipe.
6. At the repair site the sleeve is either placed so as to cover the damaged area, or if joint sealing is required, the sleeve is centered on the joint.
7. Sleeve expansion is now ready to start:
 - 7.1. You need only one jack for the installation of this LPR series design.
 - 7.2. Set up the jack vertically sitting on the bottom (middle of segment 'B') pushing up to the 'Flaps' and expand the jack carefully observing that the tongues in line of hinge pins of 'Flaps' on right and left sides home into the grooves.
 - 7.3. Expanding the jack always pushes the 'Flaps' to spring out with a snapping sound. Snapping sound indicates a good and tight installation.
 - 7.4. O-rings create a holding force that prevents the sleeve from becoming loose.
8. The sleeve is designed to have an annular space between the outside of the sleeve and inside of the host pipe. This space must be filled to provide a load transfer medium in case of damaged pipe repair or a sealer in case infiltration is the goal.
 - 8.1. First some water must be present in the annular space. This may need pouring about a liter, quart, of water through the vent nipple at the invert.
 - 8.2. Liquid G-200 grout is then pumped through the water into the annular space until dense foam, or liquid grout, starts emerging from the crown vent.
 - 8.3. Both vent holes are then closed and the job is complete.
9. One may observe some grout emerging because of high pressure being created during the curing process. High pressure helps sealing and if the leaking joint or cracks in the pipe material are open, curing pressure forces the grout into surrounding soil and combines with it creating a solid saddle around the damaged pipe.

Further Explanations and Suggestions:

1. Metal hinges alone are not strong enough to withstand the installation forces. Their purpose is only to guide the first tongue of the 'Flap' into the groove of Segment 'A's. Those tongues provide hinge strength for installation. It is therefore important to watch that the tongue fits into the groove without slipping out. Slip-out may happen if hinges may have been twisted in transport or handling.
2. When grout cures, some foam is forced out through 'Flap' joints. To reduce this from happening, some grout may be painted on the joints a couple hours before the installation, or before leaving the shop.

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MASSILLON, OHIO 44648**

**APPROVED
APPROVED AS NOTED**

**NOT APPROVED
REVISE/RESUBMIT**





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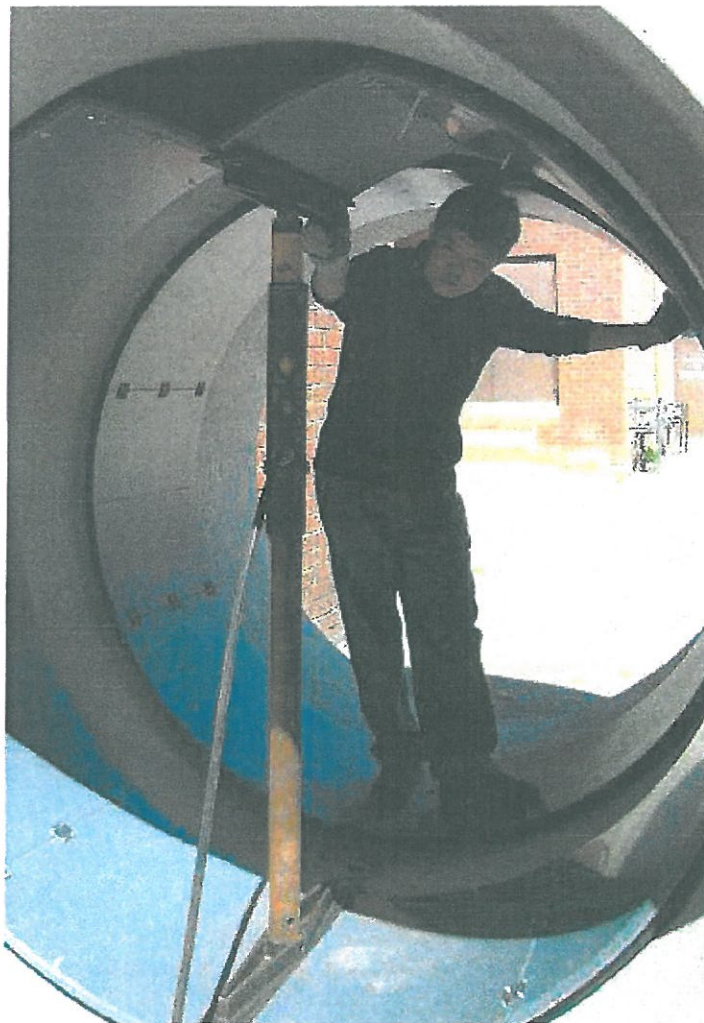
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Tips:

To install the sleeve, you need to have the jack set up as follows. Only one jack is needed for this LPR series design. You also need one hydraulic pump of model P80 from 'SIMPLEX' or 'ENERPAC'. Be aware that the jack is heavy and very slippery when working on the PVC material. It is recommended to have the jack setup and tried before you go for a real installation.



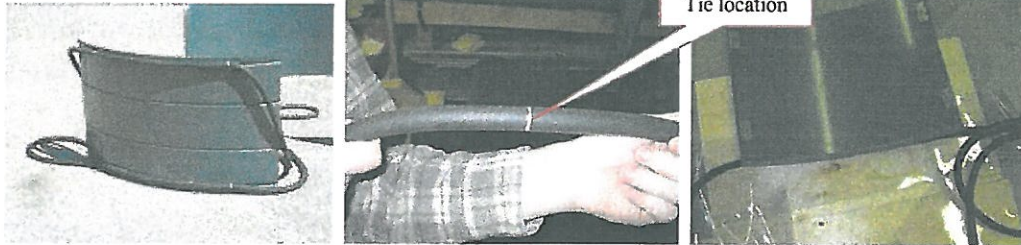


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1. Prepare and set up the bottom piece 'B'. Fix the O-ring with the cable tie and place it onto the bottom of the pipe. The cable ties locations are marked on the O-Rings. Put flexible skirt underneath the piece 'B' (where this skirt is needed in accordance with drawing below).



2. Prepare and set up one of the side piece 'S'. Screw the hinges and fix the o-rings.

Note: Keep in mind that only the sleeves numbers 2 and 3 have no any fillet. The sleeves number 1 and 4 have fillet from one side only. So, when these sleeves are assembled, their fillet should be kept on one side.

Wrong Assembly Shown



3. Prepare and set up another side piece 'A'. Screw the hinges and fix the o-rings.



4. Assemble the top part, the flaps 'C's.



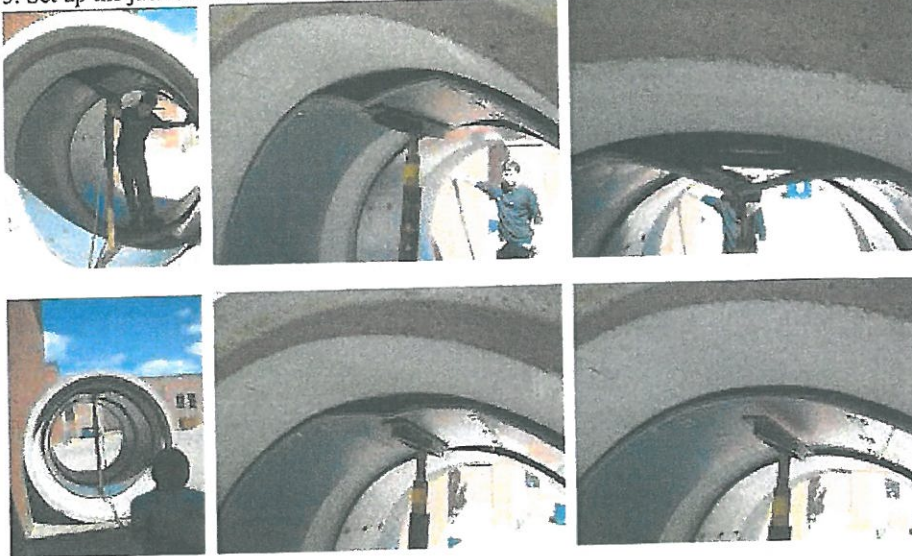


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5. Set up the jack for the installation.



5. Installation is completed.



Note:

1. When hand holding the sleeve, never place hand/fingers to the sleeve segment joints or you may have your fingers clamed as the **PVC material is very slippery**.
2. Before you start to pump the jack, **make sure all tongue grooves are matched**.
3. Pump the jack slowly with caution. When you feel the pump is very tight, it is advised that you give about 20 seconds for the sleeve to settle after you have every 2-3 pumps.
4. When all the sleeves are installed, screw the 1/4" NPT copper fittings (in the grout package) to the 'B' and connect a piece of flexible hose for grout pumping. First pour about 0.5-1litter of water into the pipe gap through this hole for the grout to react and foam up. There is a small-predrilled hole at the top segment "C" to let the air out while grout is being pumped. Use a screw (the hinge screw in the package) to stop when finishing pumping the grout and also fold and tighten the flexible plastic hose till the grout is cured.
5. Pictures above are from other files for your reference only.



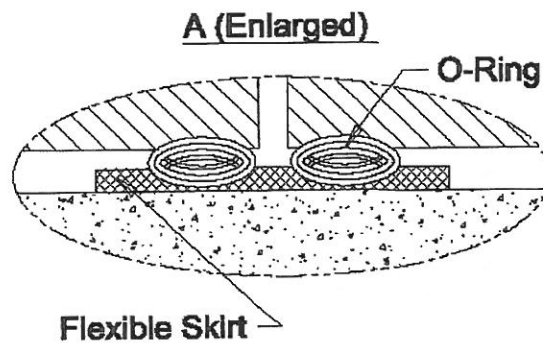
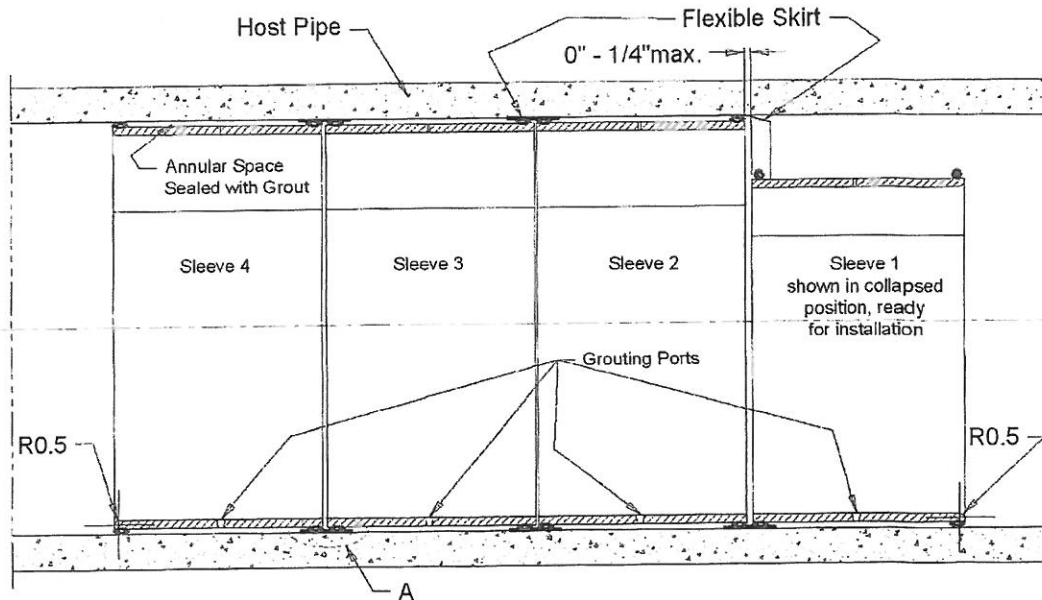


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In your case, the sleeves will be installed continuously. Please connect these sleeves with the 8-inches wide clear PVC skirts as the drawing below.





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Manufacturer of No-Dig Pipe Repair Products

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Link-Pipe Hydraulic Jack Set-up Information (For LPR 1010 jack only)

For the vertical jack set-up, you need

1. One hydraulic cylinder of model #R1010 from 'SIMPLEX' or model #RC1010 from 'ENERPAC'. (These 2 kinds of cylinders both have 10 tons capacity with a 10-inch stroke. They are almost the same, just from different manufacturers.)
2. A steel pipe spacer (Refer to the chart below) of 2.25" O.D. can be used to extend the height of the cylinder. Join the cylinder and the steel pipe spacer with a connector of 24" length x 2.25" I.D. (approximately) thin pipe.
3. Two pieces of 3" x 24" long heavy-duty channel iron pushers at both ends.

A model #P-392 from 'ENERPAC' or model #P42 from 'SIMPLEX' hydraulic hand pump will be able to control the system. You will also need the appropriate length of hydraulic hose and fittings.

Spacer reference
(In inches)

Pipe Dia.	36	39	42	48	54	60	66	72				
Spacer length	10	13	16	22	28	34	40	46				

Note:

- 1) The hydraulic cylinder has a 2.24" O.D., however, with paint the dimension can vary up to 2.29". The pipe selected to host the cylinder and the spacer (This is here call the connector) may have to be about 2.29" I.D. or greater.
- 2) And this cylinder host pipe as the connector wall thickness may be thinner as 1/8" in order for the whole assembly to be lighter in weight. The spacer wall thickness can be 3/16" or thicker.

