

Utah Department of Transportation
Research Work Plan

1. Title: **CONTECH PVC Plastic "A2 Liner Pipe" in Highly Corrosive Environment**

X-File #: X(97)03

2. **Problem Statement:**

A battery of collapsed arch pipe at MP 9.0 on I-180 near Wendover, UT/NV was selected for this demonstration project. The site was beneath two lanes plus shoulder on east- and west-bound roadways. Construction was part of the existing project and was to mitigate total replacement of the arch pipe.

3. **Objectives:**

To demonstrate the application of PVC plastic A2 pipe liner in a highly corrosive soil environment. The construction method was also documented for future reference.

4. **Location Description:**

On I-80 near MP 9.0 for six each pipe arch culverts on both eastbound and westbound culverts.

5. **Cost/time to construct:**

This project was constructed by Change Order on project IM-80-1(25)0. Rex Friant, P.E. was the Resident Engineer of the project. Contractor was Cox Rock Products of Centerville, UT. Product was paid as bid unit price as per contract.
field

6. **Suppliers:**

Contech A2 PVC Liner Pipe // 1935 North 900 West // SLC, UT 84116. Product vendor is Bob Moore.

7. **Data collection/eval:**

Field observation of the construction installation. Interim visits to evaluate the condition of the pipe and it's general performance. No laboratory testing will be made. Manufacturers certification serves as proof of material properties. Field performance

8. **Schedule of eval data:**

Field installation during spring 1997. Site visit during fall 1997, summer 1998, summer 1999.

9. **Personnel used:**

Cox Rock products was the prime contractor on the project. Subcontractor was not documented. Rex Friant, P.E. was the Resident Engineer for the construction project inspection and field documentation. Bob Moore of CONTECH was technical support. Barry Sharp and Mujee Basha of r&d performed the site evaluation and construction reports.

Research Author: Mujeeb Basha, P.E.

Principal investigator: Rex Friant, P.E.

PI title: R-4 Resident Engineer

PI division: Construction

UTAH DEPARTMENT OF TRANSPORTATION

RESEARCH CONSTRUCTION, INTERIM AND FINAL REPORT

"A-2 LINER PIPE(pvc)

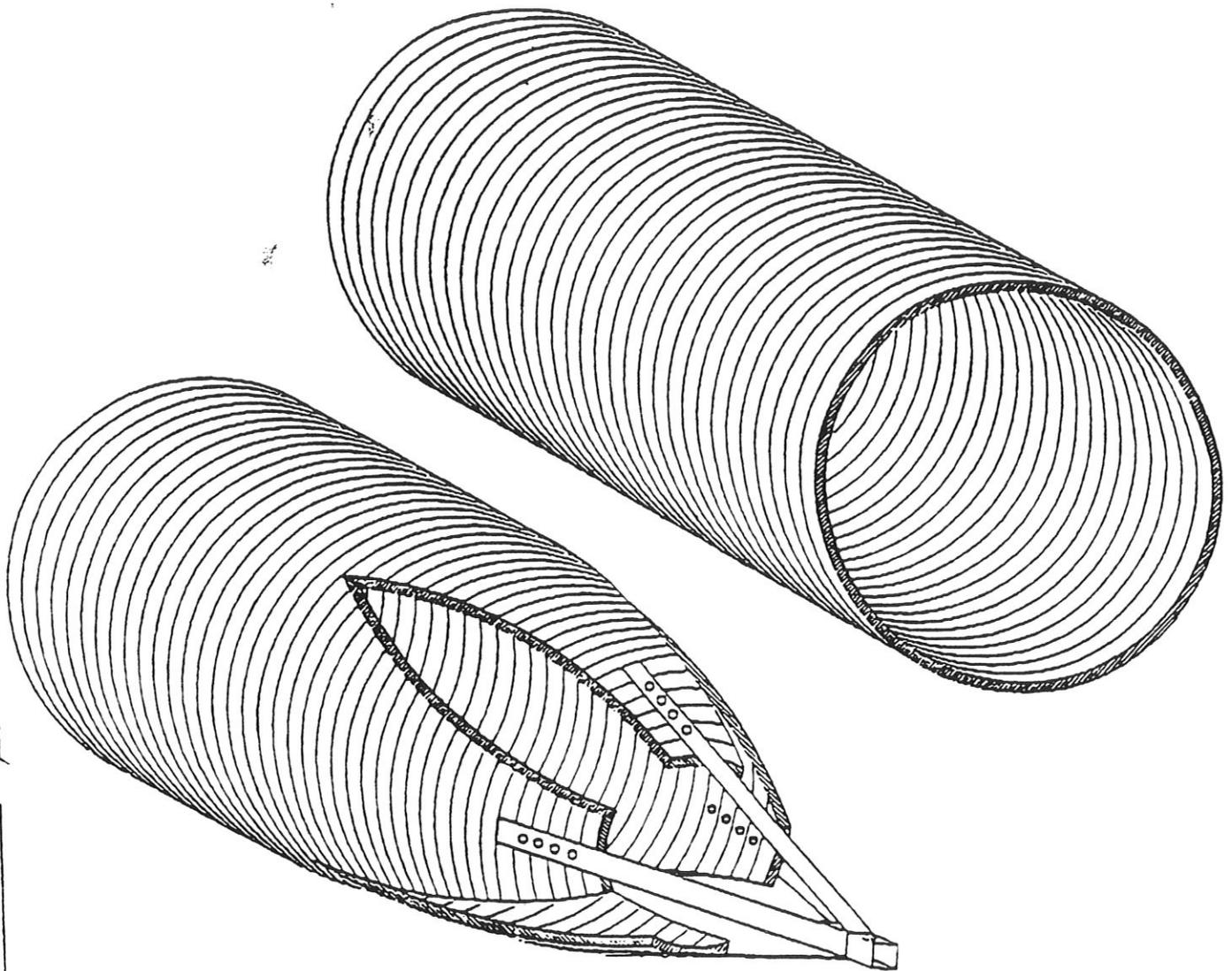
1. Title: Contech Construction Products, Inc., PVC Plastic "A-2 Liner Pipe" in a Highly Corrosive Environment
2. Problem Statement: A battery of collapsed arch pipe at MP 9.0 on I-80 near Wendover, Ut/Nv was selected for this demonstration project. The site was beneath two lanes plus shoulder on east and west bound roadways. Construction was part of the existing project and was to mitigate total replacement of the arch pipe. Also the UDOT Standard Specification for plastic pipe included polyethylene and not polyvinyl chloride.
3. Objectives: To demonstrate the application of PVC plastic A2 pipe liner in a highly corrosive environment. The construction method was also documented for future reference. This installation afforded UDOT a test site for the determination of the effectiveness of PVC in any environment. Also, this test allowed the addition of PVC in the UDOT Standard Specification.
4. Location/Description: I-80 at MP 9.0 for six each pipe culverts on both east and west bound traffic lanes.
5. Cost/Time to Construct: Project was constructed by Change Order on Project IM-80-1(25)0. Rex Friant, P.E. was the Resident Engineer on this project. Cox Rock Products from Centerfield, Utah was the contractor. Product was paid for at bid unit price as per contract. Liners were pushed through the existing CMP and even though the PVC was smaller the smooth lining allowed for the same if not more flow. In constructing the pipe liners the contractor elected to push them through rather than pull them and then grout each end opening from the larger CMP to the smaller PVC to seal the ends. The contractor encountered no difficulties in this installation and the work progressed very well.
6. Suppliers: Contech Construction Products, Inc.
1935 North 900 West
Salt Lake City, Utah 84116

Vendors Representative : Mr. Bob Moore

7. Data Collection and Evaluation: Field observation of the construction installation. Interim visits to evaluate the condition of the pipe and its general performance. No laboratory testing will be made. Manufacturers certification serves as proof of material properties. Product does meet with accepted PASHTO M 304M criteria and when the change was made in the DOT Standard to include PVC this product will be acceptable for uses that compliment the product in drainage situations.
8. Schedule of Evaluations: Product was installed in spring of 1997 and site visits in 1997, 1998 and 1999 are sufficient to determine its capabilities. *(Hydraulics added PVC to the DOT Standards in 1998.)*

NOTE: PVC Pipe is included in the new DOT CAI format in section 02610, page 2.

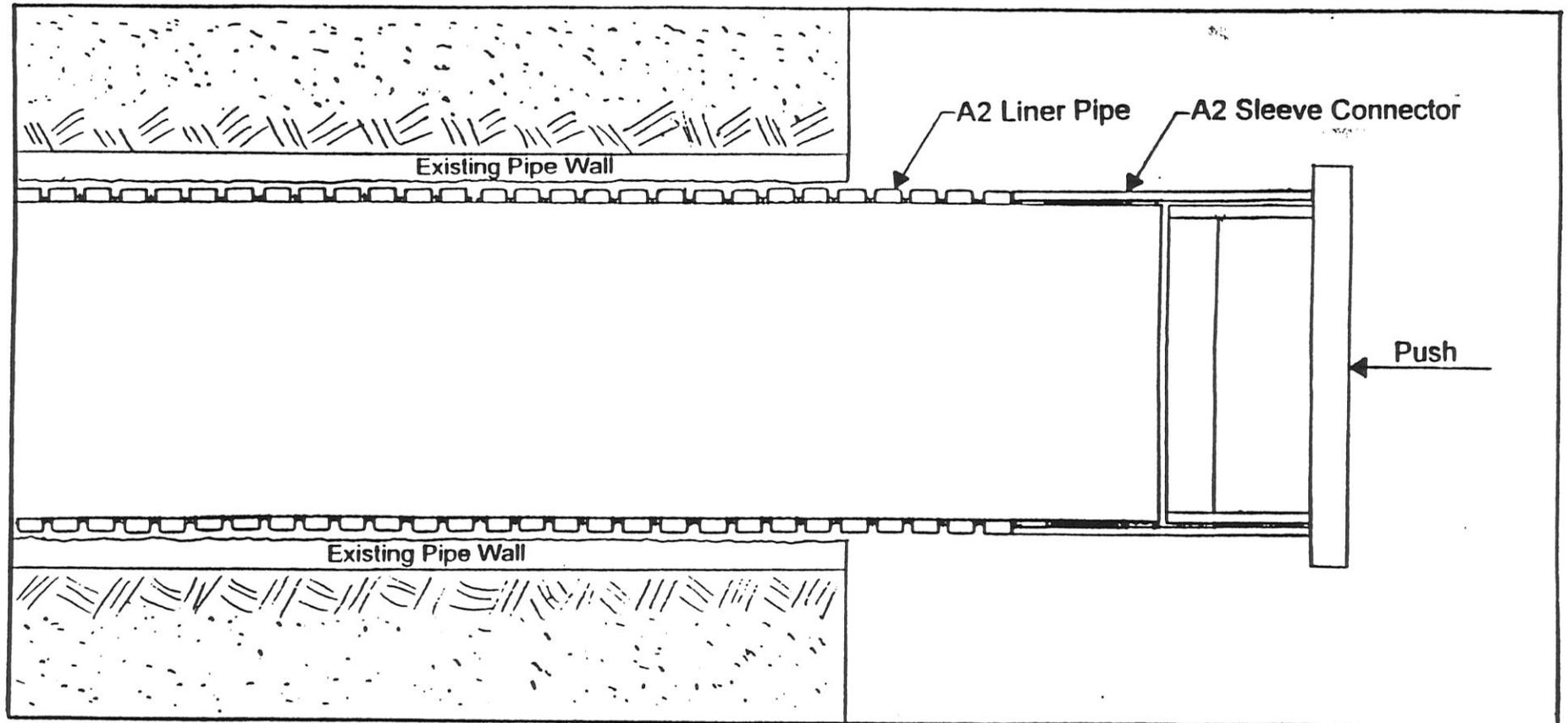
9. Personnel Used: Cox Rock Products was the prime contractor on the project. The subcontractor was not documented. Rex Riant, P.E. was the Resident Engineer for the construction project inspection and field documentation. Bob Moore of Conduce was the technical support and Mujeeb Basha and Barry Sharp from Research and Development performed the site evaluations and reports.



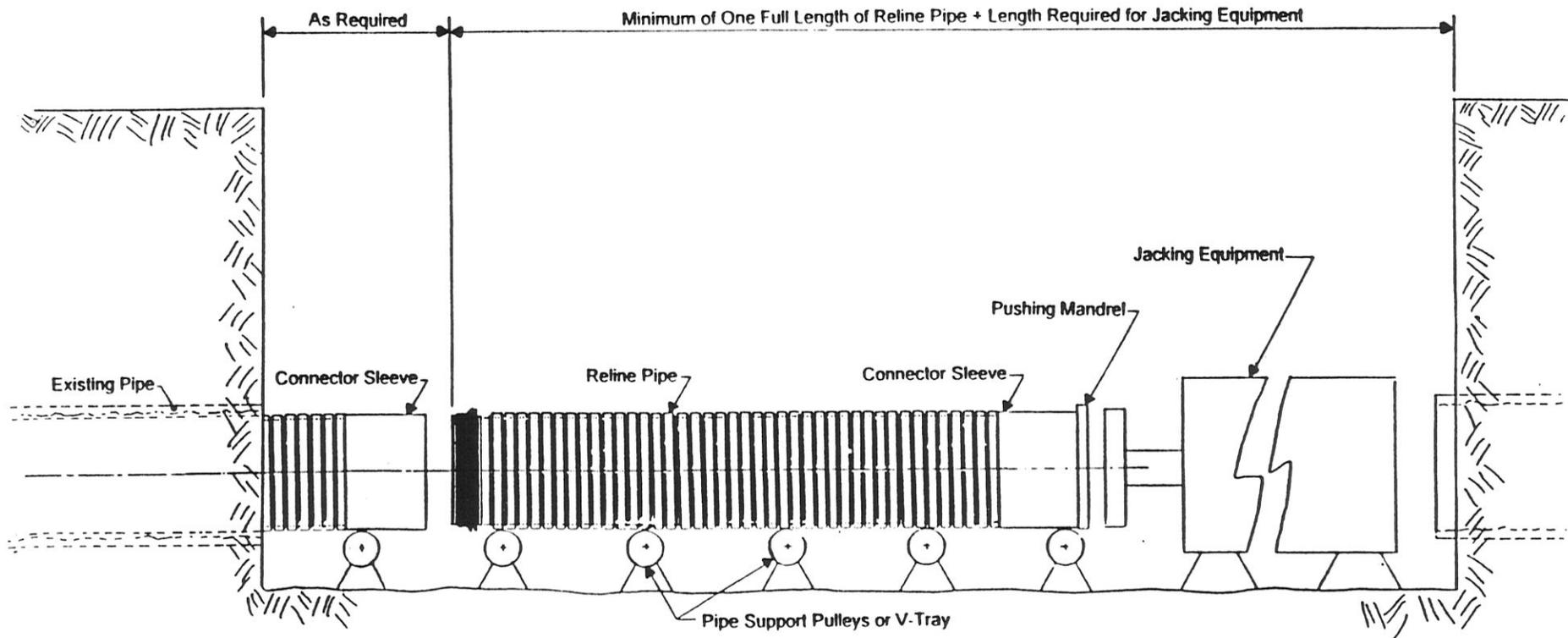
NOTES:

1. Nose cone pulling head available with male or female Thread Loc end.
2. Nose cone pulling head does not include any chains, wire roping etc. used to pull pipe through existing pipe.

3 C - A2 LINER - PUSHING PLATE/RING



3 C- A2 LINER - PUSH TECHNIQUE



3 B- A2 LINER INSERTION

A2 Liner Pipe can be either pushed or pulled through an existing sewer line. Pushing will be the most common method used and requires excavating a pit at one end of the section to be lined. Insertion pits may be located at badly displaced joints or distressed pipe. At the designated pit locations, the existing pipe is cut/broken out at the springline to expose a channel for insertion of the A2 Liner Pipe.

The A2 Liner Pipe is placed, spigot end first with the coupling/bell end trailing, into the existing pipe. The leading spigot end should be protected by a nose piece (see detail Section 3C) designed to pass offset joints or other minor inconsistencies, debris etc. in the invert. A pushing ring/plate (see Section 3C) should be used over the coupling/bell end to distribute the load from the pipe pusher. Both the gasket on the A2 Liner spigot and the inside of the coupling/bell should be lubricated prior to joining. The previously inserted pipe is then held in place by an appropriate locking device (see Section 3C) and the next spigot is joined into the inserted pipe coupling. Pipe can be joined by use of a hydraulic or mechanical pipe pusher. This procedure is repeated until the section is lined. Depending upon the liner pipe diameter, the push length, inconsistencies in the existing pipe etc., exterior lubricants (i.e. bentonite) may be required. Unobstructed push lengths for A2 Liner are limited to:

<u>Diameter</u>	<u>Push Length</u>
12" - 18"	1250 LF
21" - 36"	1500 LF

To pull A2 Liner Pipe through an existing sewer, a steel cable is threaded through the existing pipe and attached to a pulling head (see Section 3D) positioned against the liner coupling. Similar to the pushing method, the leading spigot end should be protected by a nose piece (see detail Section 3C) which guides the pipe end past minor obstructions and prevents the entry of any debris (it also may be necessary to put guards over the edges of the existing pipe at the inlet end to prevent damage to the A2 Liner Pipe during the insertion procedure). The cable is attached to a winch assembly to facilitate pulling the liner through the existing pipe section (see Section 3D).

A2 Liner, being a gasketed joint, segmental (10' or 20' lengths) slipliner, does not require any disruption of flow during installation. In fact, leaving the sewer line flow in-service will aid the insertion process and eliminates the added costs associated with by-pass pumping.



The Existing Culverts Are Cleaned Using Pressurized Water



**A Nose Cone Is
Sometimes Used To Help
Maneuver The Pipe
Through The Existing Line.**



The First Segments Are Inserted Into The Existing Lines



The Gasket And Coupling Must Be Lubricated.



Two segments can be easily joined using a come-along

UTAH DEPARTMENT OF TRANSPORTATION

RESEARCH DIVISION

In House Experimental Features for 1997

<u>NO.</u>	<u>DESCRIPTION</u>	<u>LOCATION</u>	<u>STATUS</u>	<u>DELIVERABLES</u>
97-01	Alternate Material-Sign Post	SR167, MP1	Final	Competitive Bid/Lower Cost
97-02	Street Print Asphalt Texture			Project not done!
97-03	PVC Pipe in Corrosive Env.	I-80 @ MP9	Final	Specification Change- Includes PVC
97-04	Rubber Manhole Cover	Provo	Final	Alternate to existing Standard Competitive Bid/Lower Cost
97-05	Cold Mix Recycling	I-15		Project not done!
97-06	Flexx 20/20 Legends	SR 201, etc.	Final	Promotes Competition/Performance Acceptance
97-07	No Project			
97-08	Urethane Injection-Concrete	Stru.C625	Final	Test to severe/will try another
97-09	Plastic Stop Sign	Wendover	Final	Alternate to Standard/Creates Competition