Trainee Manual

B111

CITY OF SASKATOON

Water and Sewer Section

Sewer Main Repair Trainee Manual

CITY OF SASKATOON

Sewer Main Repair
Trainee Manual

Table of Contents

Introduction

The purpose of this manual is to train staff in repairing a sewer main correctly, efficiently and safely while minimizing disruption in service to the customer and insuring the sewer main repair meets current standards. Should substandard conditions of the peripheral infrastructure be identified, further renovations will be performed. Property damage from a failed sewer can be extensive. Quick response in bypassing and repairing the failed sewer is essential.

Procedural Overview

The Clearances and Locations Work Group will acquire clearances for all utilities, (Gas, power, water, sewer, phone, cable, etc.) before the excavation begins. The Clearances and Locations Work Group will provide the required location numbers, job numbers, drawings and forms to the Supervisor IV as well as organize the removal of some site obstructions i.e. trees and utility poles. The Clearances and Locations Work Group will notify the railway Roadmasters (CN&CP) in advance of work progress near railroad corridors. All vehicles must be circle checked and the results logged before use. The Supervisor IV or the Clearances and Locations Work Group representative will mark the water and sewer lines and meet the other utility representatives at the repair site.

The Supervisor IV ensures the Deep Excavation Notification form is submitted prior to excavation. The Supervisor IV will request that the Sign Shop and/or the labourers install the required traffic control devices. Every effort must be made to notify the public affected by a water outage prior to shutting down a water supply line. The Supervisor IV will ensure that any buried utilities have been de-energized, if required. The Supervisor IV will coordinate, select and acquire all required equipment and materials and deploy their crew to the job site.

Before using the equipment the tandem axle truck and excavator/backhoe operators must perform circle checks, log results and ensure that the regular maintenance schedule for that equipment has been adhered to. The tandem axle truck operator will ensure that the trailers are clean and in proper working order and the emergency water supply trailers are completely filled before storing. The tandem axle truck operator will haul the emergency water supply, shoring and crew trailers - transporting the emergency water supply trailer first and turning on its heater if required. The tandem axle truck operator will notify Central Dispatch of the emergency water supply trailer location.

The Supervisor IV will decide on the sewer main location and size of excavation and discuss with the excavator/backhoe operator the best method for excavating. All staff must wear the personal protective equipment required. The Supervisor IV will coordinate the plugging and/or diverting of the sewer main as required - with Sewer Operations. Asphalt and/or concrete must be stripped, separated and hauled to a designated reclamation site. Where possible, excavate parallel with the pipe being repaired. Consider the locations of other buried utilities. The labourers shall locate and expose (shallow buried) underground utilities by hand. The labourers shall communicate the location of all buried utilities to the excavator/backhoe operator. Support all buried utilities as required by their owner's specifications.

The labourers shall inspect shoring before use. The Supervisor IV will confirm that the shoring is in proper working order and installation is in accordance with regulations. Personnel must stay clear when lifting and lowering shoring and/or materials. The shoring is installed with the assistance of the excavator/backhoe and labourers, in accordance with manufacturer's recommendations. Shoring must be placed in the excavation in

such a manner as not to disturb any buried utilities. Shoring must be expanded to support trench walls - install endplates as required. The access/egress ladder must be in place while persons are in the excavation. Labourers shall observe the trench walls for signs of collapse throughout the repair. If at any time a bottom labourer is in danger the other labourers must immediately summon their exit from the excavation.

The labourers will ensure the tools and crew trailer are clean and in proper working order. The top labourer will assemble and pass all the required tools and materials to the bottom labourer. The sewer main is repaired in accordance with the Trainee Manual. The Supervisor IV will determine how much pipe to replace. Ensure the sewer main repair is properly bedded and coupled. (Patching the sewer main is not an acceptable repair). When reconnecting service connections to the sewer main, service saddles are to be installed. The Supervisor IV will ensure the repair meets all specifications and recommended practices.

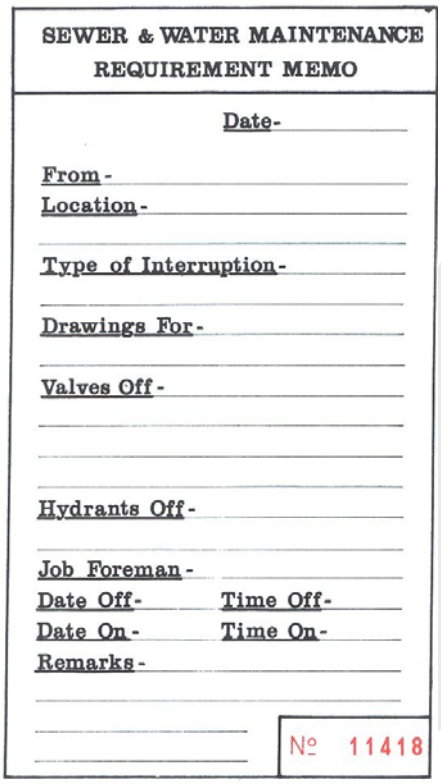
Backfill all buried utilities as required by their owner's specifications and confirm backfill specifications have been met. The top labourer will direct the tandem axle truck operator to dump the backfill material. The Supervisor IV ensures backfill material meets the requirements. Soil and granular material must be compacted to a standard proctor density minimum of 98% and be free from frozen or substandard backfill material. Non-shrink backfill must be used beneath concrete or paving stone sidewalks or driveways. Pavement cut will be left down if instructed by the Asphalt Supervisor. Final grade of all excavations must be smooth and level.

All tools and the excavator bucket must be disinfected. Driveways, road surfaces and sidewalks must be swept clean. The Supervisor IV will inspect the site for cleanliness before leaving the site. All unnecessary traffic control devices will be removed from the roadway prior to leaving the site. The Supervisor IV will ensure that all the required forms and documentation are complete and submitted - at the end of the day the job is completed. The Clearances and Locations Work Group will update the manual and electronic records.

Method and Techniques

As the Water and Sewer Maintenance Requirement Memo's are created, each request for repairs needs to be followed through first by prioritizing them, then submitting them to the Clearances and Locations Work Group. The Memo must include a WRR#.

Notes:



SEWER & WATER MAINTENANCE
REQUIREMENT MEMO

Date-

From -
Location -

Type of Interruption -

Drawings For -

Valves Off -

Hydrants Off -

Job Foreman -
Date Off - Time Off -
Date On - Time On -
Remarks -

№ 11418

Figure 1 - Sewer & Water Maintenance Requirement Memo

The Clearances and Locations Work Group will provide drawings, utility locations, location numbers and any required forms. If required, the Clearances and Locations Work Group will coordinate the removal of objects obstructing the excavation, like trees and utility poles.

Notes:

Figure 2 - Clearances and Locations Work Group

A daily work sheet is created to provide other departments of the location of Water & Sewer work being preformed that day.

Notes:

DATE: Friday May 9 - 03

Water and Sewer Maintenance Section

PIECOWYEW&SMT1

STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL	SIGNING:	GIS	UTL>LOC:	STAFFING:	
Current	1006 Tiffin Crescent	Sanitary Connection	MBL	664	3112	5-6500	05-270	S/S			LABOURERS -	Parker/Klassen
2nd	Massey Drive & Marr Avenue	Water Main	MP1	146	3114	5-6100	02-150	On Site			BACKHOE OPERATOR -	Dmytrowich - 2343
Hold	175/303 Delaronde Road	Repair C/B Lead	MP1	775	3079	5-6710	07-310	On Site	27126		T/A OPERATORS -	Pingue
Hold	Arnhem St. & McNaughton Avenue	Hydrant (McAvity)	MP2	243	3059	5-6300	02-160	On Site	23535			
Hold	Field House	Water Connection	MBL	49246	1724067	5-6410	02-170	Crew				

:W&SMT2

STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL	SIGNING:	GIS	UTL>LOC:	STAFFING:	
Hold	Clarence Avenue - 8th St. - 9th St.	Water Main	MP1	146	3115	5-6100	02-150	S/S			LABOURERS -	
Hold	15 Moxon Crescent	Sanitary Connection	MBL	664	3108	5-6500	05-270	S/S			BACKHOE OPERATOR -	
			MBL								T/A OPERATORS -	
			MBL									
			MBL									

:W&SMT3

STATUS	LOCATION:	REPAIR TY	PRIORITY	JOB #	Loc:	ACTIVITY:	GL	SIGNING:	GIS	UTL>LOC	STAFFING:	
Hold	Dudley Street	athodic Prot	FMP	46806	1724067	5-6100	17-596	N/A			LABOURERS -	
			MBL								CKHOE OPERA	
			MBL								OPERATORS -	
			MBL									
Hold	8th Street Yard	Cleanup Yard	MBL	49195	1724067	5-6100	02-150	N/A				

:W&SMT4

STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL	SIGNING:	GIS	UTL>LOC:	STAFFING:	
			MBL								LABOURERS -	
Hold	Isabella Street / Eastlake Avenue	Repair C/B Lead	MBL	48959	1724067	5-6710	07-310	S/S			BACKHOE OPERATOR -	
Hold	Isabella Street / Eastlake Avenue	Valve (WPL)	MP2	146	3031	5-6200	02-150	S/S	1168		T/A OPERATORS -	
			MBL									
			MBL									

DAY OFF/EDO	VACATION:	SICK:		OTHER:	ADDITIONAL STAFFING:
Ross, Young, Maskwa & Crews, Olchove,	Hilton, Swidzinski		Collins - Medical		Loader - Cousins @ Landfill -

Priority Legend

(MP1) Maintenance Priority - (MBL) Maintenance Backlog - (MPS) Maintenance Program Support - (FMP) Funded Maintenance Program

Pending Water & Sewer Work

STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL	SIGNING:	GIS
Hold	Boychuck Dr. South of Taylor St.	m MH F&C	MBL	760	3010	5-6620	07-310	Crew	21925
Hold	Boychuck Dr. South of Taylor St.	m MH F&C	MBL	760	3010	5-6620	07-310	Crew	21924
Hold	4200 Block Taylor Street	tary MH F&C	MBL	563		5-6620	05-260	Crew	8575
Hold	412 Avenue C South	Stop (C&S)	MP2	48237	1724067	5-6400	02-170	S/S	
Hold	213 Avenue I South	Stop (C&S)	MP2	48150	1724067	5-6400	02-170	S/S	
Hold	4th Avenue & 23th Street	San Bev Top	MBL	573	3012	5-6620	05-260	S/S	3813
Hold	Ottawa Avenue / 20th Street	San Bev Top	FMP	573	3068	5-6620	05-260	S/S	3231

Figure 3 - Daily Work Sheet

Section A shows the tasks for each Supervisor IV. In this view status, location, repair type, priority, job#, location #, activity #, and GL# are shown. Staff not at work are listed at the bottom of the section.

Notes:

DATE: **Friday May 9 - 03**

Water and Sewer Maintenance Secti

	PIECOWYE:W&SMT1						
STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL
Current	**1006 Tiffin Crescent**	Sanitary Connection	**MBL**	**664**	**3112**	**5-6500**	05-270
2nd	**Massey Drive & Marr Avenue**	Water Main	**MP1**	**146**	**3114**	**5-6100**	02-150
Hold	**175/303 Delaronde Road**	Repair C/B Lead	**MP1**	**775**	**3079**	**5-6710**	07-310
Hold	**Arnhem St. & McNaughton Avenue**	Hydrant (McAvity)	**MP2**	**243**	**3059**	**5-6300**	02-160
Hold	**Field House**	Water Connection	**MBL**	**49246**	**1724067**	**5-6410**	02-170
	:W&SMT2						
STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL
Hold	**Clarence Avenue - 8th St. - 9th St.**	Water Main	**MP1**	**146**	**3115**	**5-6100**	02-150
Hold	**15 Moxon Crescent**	Sanitary Connection	**MBL**	**664**	**3108**	**5-6500**	05-270
			MBL				
			MBL				
			MBL				
	:W&SMT3						
STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL
Hold	**Dudley Street**	Cathodic Protection	**FMP**	**46806**	**1724067**	**5-6100**	17-596
			MBL				
			MBL				
			MBL				
Hold	**8th Street Yard**	Cleanup Yard	**MBL**	**49195**	**1724067**	**5-6100**	02-150
	:W&SMT4						
STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL
			MBL				
Hold	**Isabella Street / Eastlake Avenue**	Repair C/B Lead	**MBL**	**48959**	**1724067**	**5-6710**	07-310
Hold	**Isabella Street / Eastlake Avenue**	Valve (WPL)	**MP2**	**146**	**3031**	**5-6200**	02-150
			MBL				
			MBL				

DAY OFF/EDO	VACATION:	SICK:	
Ross, Young, Maskwa & Crews, Olchove,	Hilton, Swidzinski		Collins - Medical

Priority Legend

(MP1) Maintenance Priority - (MBL) Maintenance Backlog - (MPS) Maintenance Program Support - (FMP) F

Figure 4 - Daily Work Sheet Section A

Section B of the Daily Work Sheet shows additional information on signing, GIS#, utility locations, staffing and comments.

Notes:

on

SIGNING:	GIS	UTL>LOC:	STAFFING:		COMMENTS:
S/S			LABOURERS -	Parker/Klassen	
On Site			BACKHOE OPERATOR -	Dmytrowich - 2343	
On Site	27126		T/A OPERATORS -	Pingue	Gravel required to complete
On Site	23535				
Crew					

SIGNING:	GIS	UTL>LOC:	STAFFING:		COMMENTS:
S/S			LABOURERS -		No homes out!
S/S			BACKHOE OPERATOR -		
			T/A OPERATORS -		

SIGNING:	GIS	UTL>LOC:	STAFFING:		COMMENTS:
N/A			LABOURERS -		
			BACKHOE OPERATOR -		
			T/A OPERATORS -		
N/A					

SIGNING:	GIS	UTL>LOC:	STAFFING:		COMMENTS:
			LABOURERS -		
S/S			BACKHOE OPERATOR -		
S/S	1168		T/A OPERATORS -		

OTHER:	ADDITIONAL STAFFING:		COMMENTS:
	Loader - Cousins @ Landfill -		

unded Maintenance Program

Figure 5 - Daily Work Sheet Section B

Section C shows work pending.

Notes:

Pending Water & Sewer Work

STATUS	LOCATION:	REPAIR TYPE:	PRIORITY	JOB #	Loc:	ACTIVITY:	GL	SIGNING:	GIS
Hold	**Boychuck Dr. South of Taylor St.**	Storm MH F&C	**MBL**	**760**	**3010**	**5-6620**	07-310	Crew	21925
Hold	**Boychuck Dr. South of Taylor St.**	Storm MH F&C	**MBL**	**760**	**3010**	**5-6620**	07-310	Crew	21924
Hold	**4200 Block Taylor Street**	Sanitary MH F&C	**MBL**	**563**		**5-6620**	05-260	Crew	8575
Hold	**412 Avenue C South**	Curb Stop (C&S)	**MP2**	**48237**	**1724067**	**5-6400**	02-170	S/S	
Hold	**213 Avenue I South**	Curb Stop (C&S)	**MP2**	**48150**	**1724067**	**5-6400**	02-170	S/S	
Hold	**4th Avenue & 23th Street**	San Bev Top	**MBL**	**573**	**3012**	**5-6620**	05-260	S/S	3813
Hold	**Ottawa Avenue / 20th Street**	San Bev Top	**FMP**	**573**	**3068**	**5-6620**	05-260	S/S	3231

Figure 6 - Daily Work Sheet Section C

Supervisor IV will pick up all materials that can be transported by a ¾ ton truck. (For larger material a truck hoist or tandem truck will be used)

Notes:

Figure 7 – Public Works Stores

Representatives from utility companies can field locate their lines if required. All buried utilities shall be identified and marked prior to beginning an excavation. The Clearances and Locations Work Group representative, or the Supervisor IV, will mark the city owned utilities. Locations of the utilities will be the determining factors in performing the excavation. Proposed excavation may be marked in pink or white paint.

Notes:

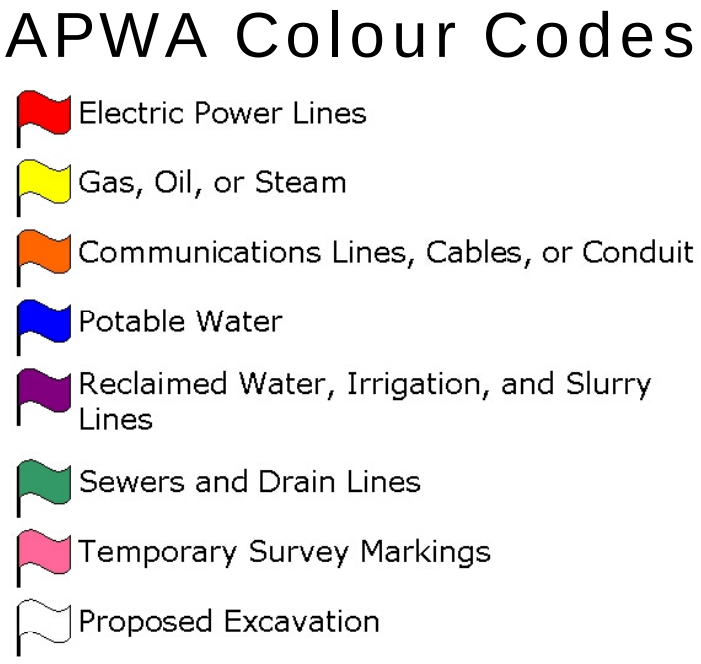


Figure 8 - APWA Colour Codes

Upon arrival at the work site, a location for the trailers will be determined in order to keep them clear of the excavation site.

Notes:

Figure 9 - Trailer Location

Every effort should be made to cut the asphalt or concrete with an earth saw (winter), quickie saw or asphalt saw (summer) prior to excavating.

When using a saw, a face shield and goggles must be worn.

Notes:

Figure 10 – Cutting Asphalt

Asphalt or concrete will be stripped, separated and hauled away to the designated reclamation site. Asphalt and concrete are to be recycled.

Notes:

Figure 11 - Recycling

Excavator/backhoe and type of shoring will be chosen based on type and condition of soil, and the width and depth of excavation/trench.

Notes:

Figure 12 - Shoring on Trailer

When excavating, watch the trench for any unmarked utilities.

Notes:

Figure 13 - Excavating

Protect labourers in an excavation by sloping the walls or installing shoring. A combination 1:1 (45 degree) slope and vertical face may be used, as long as the vertical face does not exceed 1.2m (4feet) and the overall depth of the excavation is not greater than 5m (15feet)

Notes:

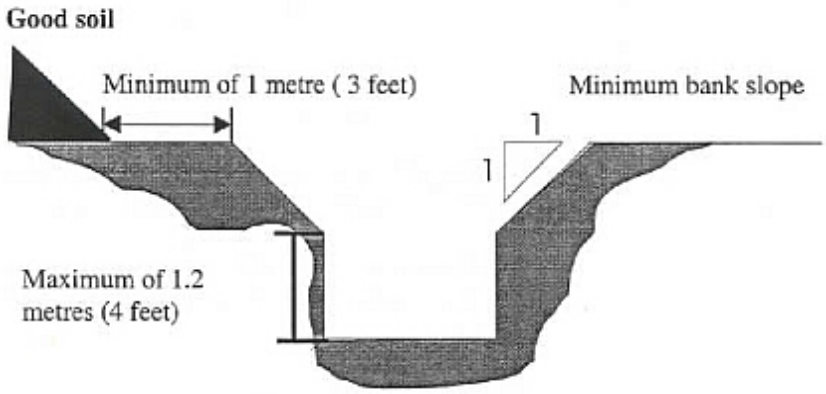


Figure 14 - Sloping the excavation walls.

To calculate the size of the excavation if shoring is not used, determine the depth required. The depth can be determined by measuring manhole depths, valve casings, valve chambers etc. Use the following formula given in Figure 15 - Excavation Width Calculation

Notes:

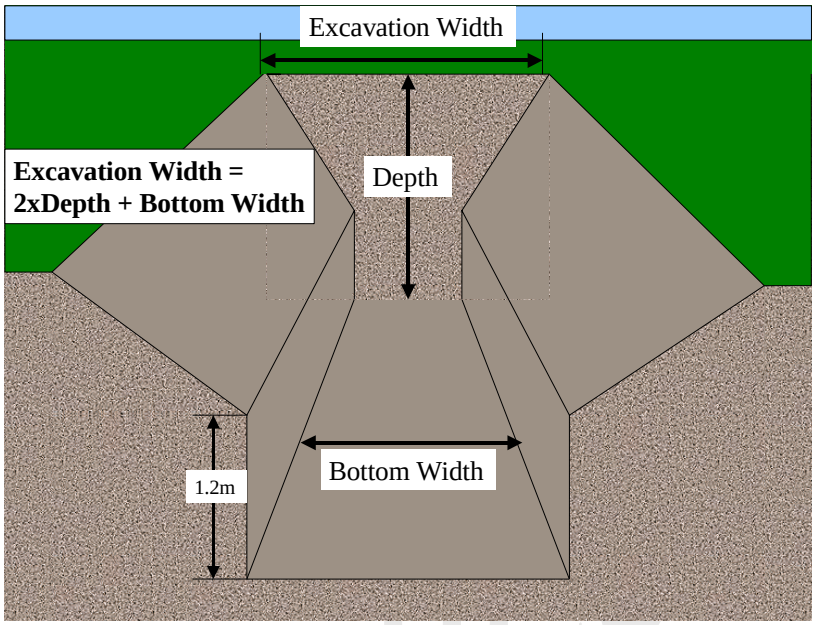


Figure 15 - Excavation Width Calculation

It is best practice to minimize the size of the excavation by installing shoring instead of sloping the excavation walls.

Notes:

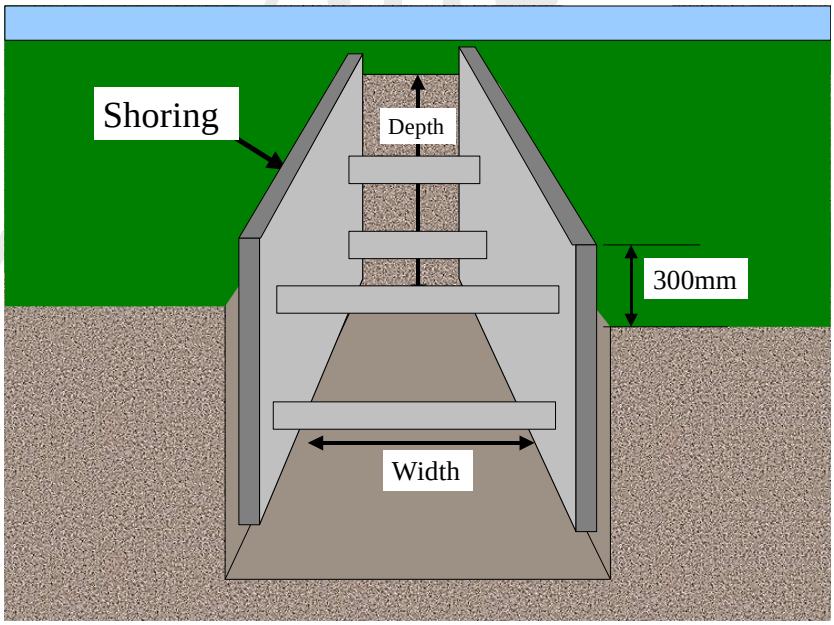


Figure 16 - Excavation With Shoring

Material from the trench will be sorted into salvageable material (wet or dry) and non-salvageable material. If stockpiling of salvageable material on site is not a viable option a dumpsite will be used. The toe of the spoil piles must be a minimum of 1m (3Feet) from the edge of the excavation.

Notes:

Figure 17 – Spoil Pile

While locating a buried utility deeper than 1.2m (4feet), shoring **must be** placed in excavation prior to worker probing for the utility.

Notes:

Figure 18 - Feeling Rod

Buried utilities will be supported as required during the excavation.

Notes:

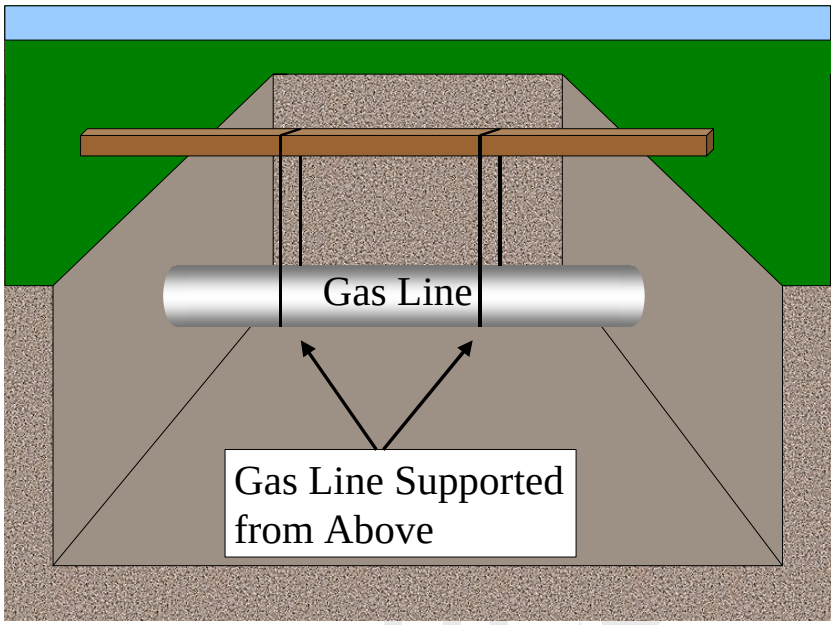


Figure 19 - Supported Utility

General Excavation Safety

In the event that a natural gas line is hit, the machine must be immediately turned off as the engine may ignite the gas (especially in calm conditions).

Notes:

Figure 20 - Excavator/Backhoe on fire.

If the vehicle contacts overhead power lines, do not exit the vehicle until the lines have been de-energized.

Notes:

Figure 21 - Truck contacting overhead power lines.

Do not go in between the excavator bucket and the truck being loaded. Do not stand under the bucket of the excavator/backhoe. Keep clear of the swing of the turntable and reach of the excavator/backhoe.

Notes:

Figure 22 – Danger Zone

No worker will enter a trench greater than 1.2m (4feet) in depth, without the installation of a temporary protective structure.

Notes:

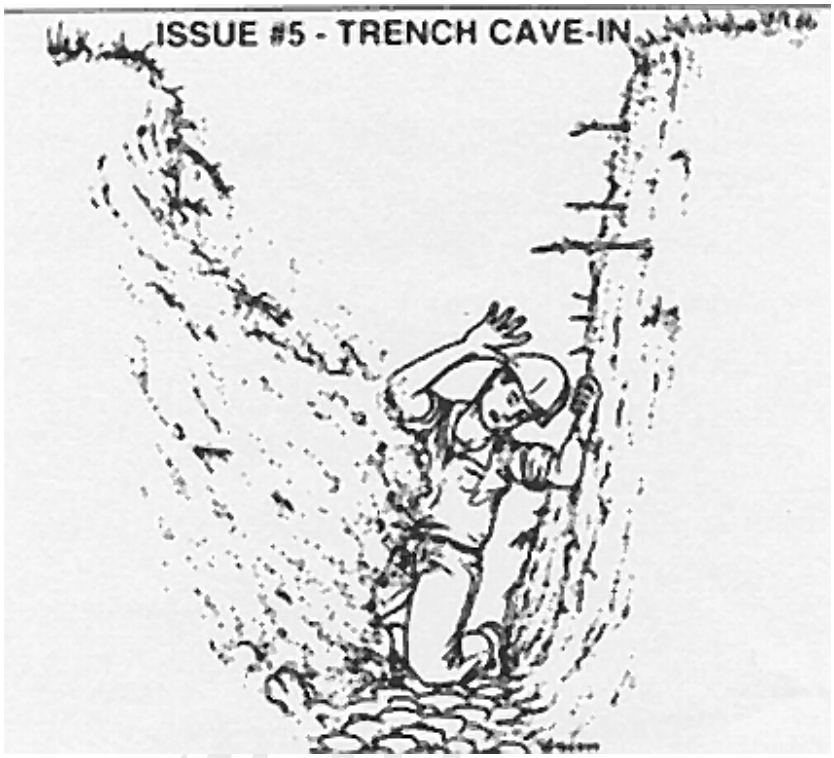


Figure 23 - Trench Cave-in

Sewer Diversion

If required the Sewer Operations Section will set up a sewer diversion.

Notes:

Figure 24 - Sewer Diversion

A sewer plug is installed in the sewer main, and the sewer pumped to the next available manhole to eliminate the flow of sewage at the repair.

Notes:

Figure 25 - Sewer Plug

Lower a pump into the manhole upstream of the sewer repair. Connect and place the discharge hose in to the nearest manhole that will not interfere with the repair work.

Notes:

Figure 26 - Pump

Begin pumping as soon as possible in order to minimize damage and continue until the repair is completed and pumping is no longer required. Periodically monitor the pump while in use to ensure proper operation.

Notes:

Figure 27 – Pump in Excavation.

De-energize and/or remove water main if it is in the excavation and cannot be properly supported during the sewer main repair. Additional preventative measures and disinfection must be adhered to, to prevent contamination of the water main.

Notes:

Figure 28 - Water Main Removal

Make sure shoring and trailer are clean and in proper working order for transporting. Shoring trailers shall not be used to transport material unless designated for such use. Park trailer where there are no overhead lines or tree branches. Look for cracks on eyebolts and chains. Ensure that tie down straps are in good condition (Not frayed or torn).

Notes:

Figure 29 - Shoring on Trailer.

Hook up chains appropriately. Keep the chain short when transporting the shoring from the trailer to the excavation, this prevents shoring from swinging excessively.

Notes:

Figure 30 - Shoring being lifted off the trailer.

Position the excavator/backhoe far enough back so the shoring can be lifted and lowered safely. Use tag lines wherever possible. Naturally frozen soil is not considered safe and therefore must be shored.

Notes:

Figure 31 - Shoring Installation

Once the shoring is in the excavation the side panels must be expanded hydraulically to be tight against the excavation walls. Endplates must be installed if the ends of the excavation are not sloped.

Notes:

Figure 32 – Shoring with Endplates.

After shoring is in place, install and secure the ladder in the excavation. Labourers must wear all the required personal protective equipment.

All hand tools are lowered into the excavation using a bucket and rope. **Never** throw tools into or out of the excavation.

Notes:

Figure 33 - Entering Excavation

Three points of contact must be kept on the ladder when in use.

Notes:

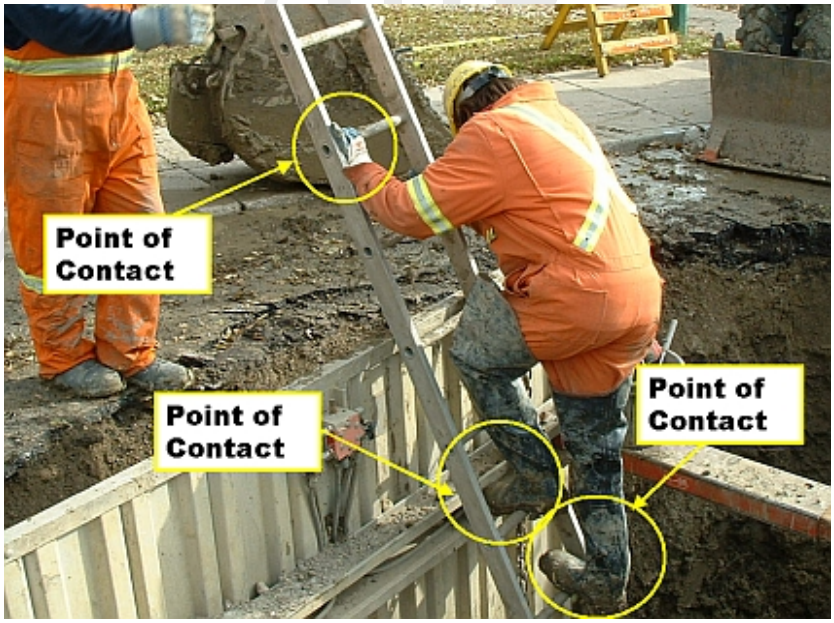


Figure 34 - Three Point Contact

Expose and clean around both ends of failure, (inside and outside).

Notes:

Figure 35 - Sewer Main

Cut pipe and roll out of bedding. Pipe may be removed later or broken into small pieces.

Notes:

Figure 36 - Broken Pipe

Measure between the ends of existing pipe and relay measurement to top labourer. It is beneficial to take measurements from the invert and top of pipe (pipe may not be square) to ensure that the new pipe is cut to the proper length.

Notes:

Figure 37 - Measuring pipe distance.

Cut the replacement sewer pipe with the quickie saw. Safety goggles and a facemask must be worn when using the quickie saw.

Notes:

Figure 38 - Cutting Sewer Pipe

If soil conditions at base of excavation are unstable, remove unsuitable material and replace with crushed rock and/or granular material.

Notes:

Figure 39 - Saturated Soil

Proper preparation of bedding is critical. The Supervisor IV will approve the bedding before the pipe is installed.

Notes:

Figure 40 - New pipe over crushed rocks.

Place bedding over top of the pipe and compact. A walk behind tamper will be required for this process.

Notes:

Figure 41 - Compacting bedding.

Lower the new pipe into the trench with a rope or any other safe method that will not endanger the labourers below.

Notes:

Figure 42 – Lowering Pipe

Slip coupler over the end of the replacement pipe.

Notes:

Figure 43 – Coupler

Align the replacement pipe and the existing pipe and tighten the 2 stainless steel clamps.

Notes:

Figure 44 Aligning pipe

Block couplers so they will not offset during backfilling.

Notes:

Figure 45 - Blocked Coupler

Arrange to have the sewer bypass removed.

Notes:

Figure 46 - Sewer Plug

Backfill, General Information

Cover services connection and mains with 150mm (6inch) of granular material and compact. Use spoil material if suitable. If not bring in clean backfill material.

Notes:

Figure 47 - Backfill

Non-shrink backfill shall be used beneath (concrete or paving stone), sidewalks or driveways. Leave non-shrink backfill a minimum of 300mm (12inch) below grade.

Notes:

Figure 48 - Non-shrink backfill

Ensure utilities are backfilled according to the specifications of the owner of the utility. A representative from the utility may be required to inspect and approve the bedding.

Notes:

Figure 49 - Backfilling with shovel

Backfill material should be free from loam [fertile material], sod, boulders or foreign material and frozen lumps.

Notes:

Figure 50 - Backfill Material

Method of compaction to be used will be decided based on suitability.

Notes:

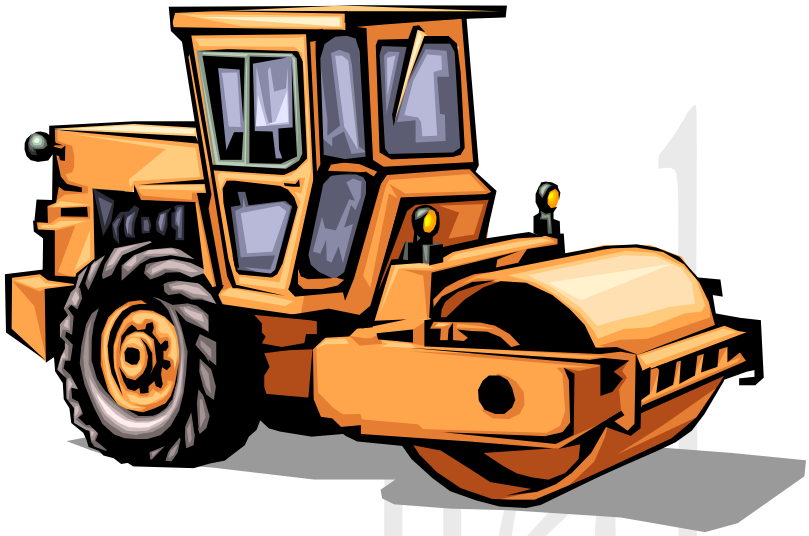


Figure 51 - Compactor

Hydraulic tamper (excavator attachment) cannot be used closer than 1m(3feet) directly above pipe or service. Use with 150mm (6inch) lifts.

Notes:

Figure 52 - Hydraulic Tamper (Excavator Attachment)

Walk behind vibratory compactor can be used around mains, connections and manhole barrels etc. Backfill shall be placed in 150mm (6inch) lifts.

Notes:

Figure 53 - Walk Behind Vibratory Compactor

Handheld plate tampers are to be used for compacting in the pipe zone, around manholes etc. Backfill shall be placed in 150mm (6 inch) lifts.

Notes:

Figure 54 - Handheld Plate Tamper

Vibratory Sheep's foot packer must be used for larger excavations. Backfill shall be placed in 150mm (6inch) lifts.

Notes:

Figure 55 - Vibratory Sheep's Foot Packer

Bucket tamping is not an approved method of compacting.

Notes:

Figure 56 - Excavator/Backhoe backfilling

Leave adequate room for asphalt or concrete as per the Roadway Section's instruction. If on grass do not leave topsoil higher than existing grade to accommodate turf.

Notes:

Figure 57 - Finished Backfill

All tools must be disinfected after use on a sewer repair. Ensure that the proper disinfectant applicator is used.

Notes:

Figure 58 - Disinfectant Applicator

Excess dirt should be cleaned with a wire brush and a rag prior to soaking with disinfectant. Soak items with disinfectant solution (min 5% sodium hypo-chlorite solution), let soak for a minimum of 7 seconds. Scrub item with a clean rag then rinse clean with disinfectant solution. Let tools dry before storing.

Notes:

Figure 59 - Disinfecting

Others will perform site restoration.

Notes:

Figure 60 – Traffic Control Devices

Others will perform site restoration.

Notes:

Figure 61 - Site Restoration

Resources

People

1 – Supervisor IV

2 – Labourers

1 - Excavator/Backhoe Operator

2 - Tandem Axle Truck Operators

1 - Loader Operator

Equipment

Figure 62 - Feeling Rod

Notes:

Figure 63 - Tunnelling Shovel

Notes:

Figure 64 – Shovels

Notes:

Figure 65 – Broom

Notes:

Figure 66 - Scraper

Notes:

Figure 67 - Rasp / File

Notes:

Figure 68 - Nut Driver

Notes:

Figure 69 - Flathead Screwdriver

Notes:

Figure 70 - Sledge Hammer

Notes:

Figure 71 - Pick Axe

Notes:

Figure 72 - Disinfectant Sprayer

Notes:

Figure 73 – Asphalt/Concrete Saw

Notes:

Figure 74 - Quickie Saw

Notes:

Figure 75 - Tile Cutter

Notes:

Figure 76 - Crew Trailer

Notes:

Figure 77 - Excavator/Backhoe

Notes:

Figure 78 - Shoring & Trailer

Notes:

Figure 79 - Truck

Notes:

Figure 80 - Front End Loader

Notes:

Figure 81 - Hydraulic Tamper [excavator attachment]

Notes:

Figure 82 - Vibratory Sheep's Foot Packer

Notes:

Figure 83 - Handheld Plate Tamper

Notes:

Figure 84 - Vibratory Compactor

Notes:

Figure 85 - High Volume Pump

Notes:

Figure 86 - Bypass Pump

Notes:

Figure 87 - Vac-Truck

Notes:

Figure 88 - Non-collapsible Hose

Notes:

Figure 89 - Collapsible Hose

Notes:

Figure 90 - Sewer Plug

Notes:

Materials

Figure 91 - PVC Sewer Pipes

Notes:

Figure 92 - Straight Coupler

Notes:

Figure 93 - Transition Coupler

Notes:

Figure 94 - Treated Blocks

Notes:

Figure 95 - Cleaning Rags

Notes:

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