



Moderate Hazard Atmosphere Confined Space Sanitary Sewer Manhole Repair Safe Work Procedure

0180-04 SWP Rev 0 13-06-19

MODERATE HAZARD ATMOSPHERE CSE SANITARY SEWER MANHOLE REPAIR - SAFE WORK PROCEDURE

PURPOSE

The purpose of this procedure is to ensure the safety of employees when repairing a sanitary sewer manhole.

SCOPE

This procedure covers all City of Kelowna worksites and properties that have sanitary sewer manholes.

APPLICABILITY

These procedures apply to all City of Kelowna employees who repair sanitary sewer manholes.

PREREQUISITES

- Confined Space Entry & Monitor Certification
- You must be trained to do this work, familiar with this safe work procedure and correlating risk assessment

REFERENCE SOURCES:

- City of Kelowna Safety Management System- Safety 8
- WorkSafe BC Regulations Part 9- Confined Space
- Risk Assessment- CSE Moderate Hazard Atmosphere-Utilities Sanitary Sewer Manhole Repair
- City of Kelowna Alternate Measures- WorkSafe BC Acceptance: AR201700089 (Valid: Nov 7, 2022)

PPE REQUIRED:

- | | | |
|--|--|---|
| • Hearing protection | • Waterproof steel-toed boots | • High visibility apparel- CSE Monitor |
| • Hard Hat | • Full Face Respirator-Acid Gas/Organic Vapour Cartridges w/ HEPA Filters | |
| • Gloves (Rubber or heavy nitrile) | • Half Face Respirator (with tight fitting goggles-NO SAFETY GLASSES) equipped with Acid Gas/Organic Vapour Cartridges w/ HEPA Filters | • Gas Detectors (O ₂ - 20.2% to 20.8%) (LEL- 5%) (H ₂ S- 5 ppm) (CO-25 ppm) |
| • Protective clothing (Washable coveralls or chest waders) | • Rescue Harness- affixed to tripod/Davit arm | • Ventilation (1100 cfm minimum positioned as close to worker as practicable) |

Effective Date	Revised Date	Authorized By	Approved By
Dec 13, 2016	Jan 17, 2019	Occupational Health & Safety Branch	<i>Nathan Peters CRSP</i>

TOOLS AND EQUIPMENT REQUIRED:

- Service truck (hand tools, power tools, materials)
- Solids pump and hoses
- Vacuum Truck (potentially)
- Traffic control devices

PRE - Work Procedure	
Responsibility	Activity
Supervisor	Ensure workers are fit-tested annually. Workers must be clean shaven prior to entering into space to allow for a proper seal of their full-face air purifying respirator. (Half mask with tight fitting goggles- No safety glasses are acceptable)
CSE Entrant & Supervisor	<ul style="list-style-type: none"> • Prior to heading out to the job-site, ensure the 4-gas monitors are bump tested daily and are calibrated according to manufacturer's specifications. • Clear peaks and zero monitor in fresh air prior to use. • Alarm settings on the gas monitors are as follows: Carbon Monoxide (CO) - 25 ppm Lower Explosive Limit (LEL) - 5% Hydrogen Sulphide (H₂S)- 5 ppm Oxygen Sensors (O₂) 20.2% to 20.8% Above set points are based on Terms of Acceptance- AR21700089 (Valid until: November 7, 2022)
CSE Entrant & Supervisor and/or TCP	<ul style="list-style-type: none"> • Secure work area as per Traffic Management Plan (if required). Ensure high visibility apparel is worn when near roadway.
CSE Entrant & Supervisor	<ul style="list-style-type: none"> • Ensure vehicles are positioned away from ventilation air intake, turn off engine if possible.
CSE Entrant & Supervisor	<ul style="list-style-type: none"> • Use Ground Fault Circuit Interrupter (GFCI) with any electrically powered equipment. Check all power cords and equipment for damage prior to use.
CSE Entrant & Supervisor	<ul style="list-style-type: none"> • Conduct a tailgate meeting or Field Level Risk Assessment (FLRA) with all involved workers prior to entering the space. The following must be reviewed but is not limited to: <ol style="list-style-type: none"> 1) Procedure and risk assessment 2) The scope of work and staging of tasks to be performed on-site and in the space. 3) Communication- ensure verbal and visual cues are understood by all. 4) Testing and verification- ensure that all PPE and equipment is in good working order 5) Work area surroundings- scan area for any changes in conditions or obstructions in area 6) Discuss the rescue plan 7) Ensure all rescue equipment is set-up and ready-to-go

Effective Date	Revised Date	Authorized By	Approved By
Dec 13, 2016	Jan 17, 2019	Occupational Health & Safety Branch	Nathan Peters CRSP

CSE Entrant & Supervisor	<ul style="list-style-type: none"> Isolation and lockout of a municipal sewer system is not possible, as such, follow the requirements of the approved Terms of Acceptance from WorkSafe BC. The flow depth must be less 0.5 m or lower. In the extremely rare occasion that the observed flow exceeds 0.5 meter in depth, do not enter. Report to supervisor and perform task at a different time (lower flow)
CSE Entrant & Supervisor	<ul style="list-style-type: none"> Start to fill out the confined space entry permit and ensure all documents are on-site (procedure, risk assessment, tailgate/FLRA)
CSE Entrant & Supervisor	<ul style="list-style-type: none"> Ensure good housekeeping is maintained near the access point and in the space throughout the entry.
CSE Entrant & Supervisor	<ul style="list-style-type: none"> Confirm ventilation fan specification/output (review label) matches the requirement in the Tools and Equipment Required section Set-up the ventilation system, positioning the fan intake upwind and away from any vehicle or equipment exhausts or traffic. Position the end of the duct close to the bottom of the space for pre-ventilation and as close to the worker as possible during entry. Only push air into the space, DO NOT draw air out of the space Ensure the space is ventilated for 20 minutes prior to person entering space
CSE Entrant & Supervisor	<ul style="list-style-type: none"> Set-up the tripod (Davitt Arm), mechanical winch and Type 3 SRL over the access point (manhole) When entering into a space with fixed ladder access, the entrant must wear a full body harness with dorsal D-ring during entry and remain connected to the lifeline/fall protection system during entire entry. Always maintain 3-points of contact while using access ladder. When entries must occur in manholes (<2% of all manholes and likeminded spaces), the CSE Entrant & Supervisor must set-up and secure a portable ladder for entry. Entrants must remain connected to the lifeline/fall protection system during entire entry. Always maintain 3-points of contact while using portable ladder.
CSE Entrant & Supervisor	<ul style="list-style-type: none"> Pre-entry, test the atmosphere to bottom of space (all areas of space)-use built in pump with tubing. Allow for 2 seconds per foot of tubing to allow for the sample to travel from the far end to the monitor's sensors.
CSE Entrant & Supervisor	<ul style="list-style-type: none"> Visually inspect concrete rungs for signs of deterioration prior to entry. If significant structural deterioration is observed, do not enter. Report deficiencies to supervisor.
Entrant	<ul style="list-style-type: none"> A fit-tested full face air-purifying respirator equipped with organic vapour/acid gas/HEPA filtered cartridge as the minimum required respiratory protection for this entry. If entrant travels outside the line of sight, horizontally upstream or downstream in the pipe, ventilation must be re-positioned to ensure continuous supply of air is directed at the entrant. Conduct a positive and negative seal/fit check before entry. Ensure all PPE as per the PPE Required section is in good repair and is worn prior to entry.
CSE Supervisor	<ul style="list-style-type: none"> A CSE Supervisor must be stationed at the entrance of the space. They are responsible for the following: <ul style="list-style-type: none"> Continuously monitoring the atmosphere of the space the entire time the entrant is in the space. Record readings on CSE permit every 20 minutes (as a minimum, you could record the readings in shorter time intervals but no longer than 20 minutes)

Effective Date	Revised Date	Authorized By	Approved By
Dec 13, 2016	Jan 17, 2019	Occupational Health & Safety Branch	<i>Nathan Peters CRSP</i>

	<ul style="list-style-type: none"> Visually observe and check on the wellbeing of the worker in the space every 20 minutes (as a minimum, you can check on the entrant in shorter time intervals but no longer than 20 minutes)
--	--

Safe Work Procedure	
Responsibility	Activity
Entrant	Once space is deemed safe, entrant climbs down sanitary manhole using 3 points of contact.
CSE Supervisor	CSE Supervisor will lower tethered tools to entrant using rope and pail
Entrant	Entrant will start the repair (Chip away at old concrete, grout for benching repairs, etc.)
Entrant	Standing water may be present while working on “live systems” Use solids pump and hoses to pump out standing water.
Entrant/ CSE Supervisor	Once repaired the entrant will signal the CSE Supervisor to start pulling the tethered tools in the pail back up.
Entrant	Once tools and excess materials are out of space, the entrant will climb out of space using the 3 points of contact.

POST - House keeping	
Responsibility	Activity
Entrant/ CSE Supervisor	Collect, clean, and store all tools, equipment, materials appropriately and conduct a final sweep of site to ensure safe, secure and clean. Update supervisor on completion of task.

Written By:	Utilities Construction & Utilities Maintenance	Title:	Sewer Operators	Dept.	UTILITIES
-------------	---	--------	-----------------	-------	-----------

Effective Date	Revised Date	Authorized By	Approved By
Dec 13, 2016	Jan 17, 2019	Occupational Health & Safety Branch	<i>Nathan Peters CRSP</i>