

# CSE Open Channel Sewer - Moderate Hazard Atmosphere Risk Assessment

0180-00 RA Rev 0 12-07-06

## 1. RISK ASSESSMENT FOR: MODERATE HAZARD ATMOSPHERE CSE INTO OPEN CHANNEL SEWER SYSTEMS

<b>WORK LOCATION:</b>	Various open channel sewers throughout city – depth up to 7.5 meters (25 feet)	<b>DESCRIPTION OF WORK:</b>	Entering into open channel sewers to perform inspections, cleaning, modifications of the wastewater collection system, and, installation, routine maintenance, removal and calibration of temporary flow monitoring instrumentation.		
<b>COMPLETED BY:</b>	Mike Murrell, Nathan Peters, Sarah Josefson	<b>ASSESSMENT DATE:</b>	June 15, 2017	<b>RANKING:</b>	Medium

## 2. WORK ACTIVITIES: (Include PPE Requirements for Quick Reference)

**List Task Activity:** Entering into open channel sewers to perform inspections, cleaning, modifications of the wastewater collection system, and, installation, routine maintenance, removal and calibration of temporary flow monitoring instrumentation.

**PPE Required:** Hard hat (entrant must have chin strap), hearing protection (class B as a minimum), high-visibility clothing, coveralls/work clothes, leather/rubber/nitrile gloves (task dependent), full-body harness with dorsal D-ring, full-faced air-purifying respirator with combination of AG/OV/P100 cartridge, CSA approved steel-toed rubber boots (must have good tread and ankle protection)

**Equipment Required:** battery-powered temporary LED lighting, battery-powered head lamp, ground fault circuit interrupter (GFCI), ventilation fan (must be capable of 1500 CFM – 1800 CFM, 12" duct), first aid kit, tripod and winch with Type 3 SRL (greater than 3m/10ft in length), sharps container and tongs on-site, delineators/barricades/cones (for traffic management), decontamination supplies (hand sanitizer, BZK wipes to field clean hands), personal 4-gas detectors (O<sub>2</sub>, H<sub>2</sub>S, CO, LEL)

*\*Note: all powered equipment/PPE must be intrinsically safe\**

## 3. HAZARDS & RISK LEVEL RATINGS: SCORE = C + P + E = Rate (3-4 are LOW) (5-6-7 are MEDIUM) (8-9 are HIGH) priority

HAZARD #	HAZARD IDENTIFICATION	CONSEQUENCES	PROBABILITY	EXPOSURE	RISK	RATING L/M/H
1	Carbon monoxide (CO) and other combustion by products (ex. exhaust from vehicles near the entrance)	2	2	3	7	Medium
2	Hydrogen Sulfide (H <sub>2</sub> S) from wastewater in channel	3	2	3	8	High
3	Oxygen deficiency (O <sub>2</sub> ) due to available oxygen being used by rust, corrosion etc.	3	2	3	7	Medium
4	Particulates (bio-aerosols from wastewater in channel)	2	2	3	7	Medium
5	Combustible gases (ex. methane, misc. fuel vapours and solvents)	3	2	3	8	High

6	Contact with toxic and/or corrosive material (ex. wastewater in channel)	2	2	3	7	Medium
7	Biological hazards (wastewater in channel – wet or dry surfaces)	2	3	3	8	High
8	Sharps/puncture wounds (possible discarded sharps/needles in water)	2	2	3	7	Medium
9	Noise/vibration	2	2	3	7	Medium
10	Restricted access/egress (vertical entry through manhole)	2	3	3	8	High
11	Congested/restricted work area (small space)	2	2	3	7	Medium
12	Ergonomic hazards (limited workspace, awkward body positioning)	2	2	3	7	Medium
13	Electrical/electrocution/explosion hazards (generator or inverter electrically-powered equipment)	3	2	3	8	High
14	Structural hazards (deteriorated condition of concrete, ladder etc.)	2	1	3	6	Medium
15	Engulfment or immersion hazards (wastewater flow in channel)	3	1	3	7	Medium
16	Entanglement	2	2	3	7	Medium
17	Falling hazard (around access through manhole and while using a ladder)	3	2	3	8	High
18	Slip and trip hazards (trip on equipment, slip on ladder rungs, benching or invert)	2	2	3	7	Medium
19	Limited visibility (low light due to limited natural lighting)	2	3	3	8	High
20	Vehicular/pedestrian traffic (near entrance to space)	3	2	3	8	High
21	Insect/animal bites	2	2	3	7	Medium
22	Overhead/falling objects	3	2	3	8	High
23	Restricted means of communication (noise from traffic and equipment)	2	2	3	7	Medium
<b>RISK TOTAL:</b>		<b>2</b>	<b>2</b>	<b>3</b>	<b>7</b>	<b>Medium</b>

Add up the individual columns: (Consequence, Probability, Exposure, Risk and divide by number of Hazards)

#### 4. MATRIX FOR RANKING THE HAZARDS:

SCORE	1	2	3
CONSEQUENCES:	first aid / minor damage	lost time injury/moderate damage	fatality / major damage
PROBABILITY:	unlikely	possible	likely
EXPOSURE:	rarely (less than 1/month)	often (3 times/week)	everyday

**5. CONTROL MEASURES FOR EACH HAZARD IDENTIFIED IN SECTION 3**

<b>HAZARD #</b>	<b>LIST ALL EXISTING CONTROL MEASURES (Eliminate, Substitute, Engineering, Administrative, PPE)</b>	<b>RECOMMENDATIONS</b>	<b>Date required</b>	<b>Person Responsible</b>	<b>Initial when complete</b>
<b>1</b>	Ensure proper ventilation, atmospheric monitoring (pre-entry and during entry), keep vehicle exhaust away from fan air intake				
<b>2</b>	Ensure proper ventilation, atmospheric monitoring (pre-entry and during entry), work when flow is low				
<b>3</b>	Ensure proper ventilation, atmospheric monitoring (pre-entry and during entry), work when flow is low				
<b>4</b>	Ensure proper ventilation, wear your respiratory protection, work when flow is low				
<b>5</b>	Ensure proper ventilation, wear your respiratory protection, atmospheric monitoring (pre-entry and during entry), visually monitoring sewage				
<b>6</b>	Wear proper PPE (eye, face, respiratory protection; wear protective clothing), work when flow is low, visual monitoring, decontaminate when job complete				
<b>7</b>	Wear proper PPE (eye, face protection; protective clothing), work when flow is low, decontaminate when job complete				
<b>8</b>	Wear required PPE and clothing, exercise situational awareness, ensure sharps container and tongs are on-site, internal sharps awareness training				
<b>9</b>	Hearing protection, positioning of fan, ensure good communication (pre-job meeting, verbal and visual cues)				
<b>10</b>	Use tripod and SRL, rescue plan				
<b>11</b>	Good housekeeping in space and near manhole, situational awareness, rescue plan in place				
<b>12</b>	Proper body positioning, take micro breaks, vary task/role when possible, stretch, we aware of surroundings				
<b>13</b>	Use GFCI, intrinsically safe equipment				
<b>14</b>	Visual inspection of structure				
<b>15</b>	Self-retracting lifeline, work when flow is low, visually monitor flow when in space, follow-alternate measures procedure				
<b>16</b>	Good housekeeping, line management, awareness of surroundings				
<b>17</b>	Wear harness and use fall protection equipment, maintain 3-point contact on ladder, situational awareness, fall protection training				
<b>18</b>	Proper footwear, situational awareness, maintain 3-points of contact				
<b>19</b>	Portable lighting and headlamp/flashlight (must be intrinsically safe)				
<b>20</b>	Traffic control plan, high visibility attire, situational awareness				
<b>21</b>	Wear PPE, situational awareness, visual inspection of space				
<b>22</b>	Good housekeeping, raise and lower tools securely, wear hard hats				

23	Plan communication methods prior to entry (verbal and visual cues)				
----	--	--	--	--	--

## 6. HIERARCHY OF CONTROL MEASURES: (Must be followed in the order below)

ORDER	CONTROL	DESCRIPTION
1	<b>ELIMINATION:</b>	Can the hazard be removed at the source? Can the task be eliminated entirely? <u>Example:</u> eliminating the need to have a worker enter an excavation by hydro-excavating to expose underground infrastructure.
2	<b>SUBSTITUTION:</b>	Can a hazard, hazardous process or hazardous material be substituted with one with no hazards? <u>Example:</u> using salt water brine instead of a chemical for deicing the roads.
3	<b>ENGINEERING:</b>	Engineering controls include isolation, ventilation and equipment modification. These controls focus on the source of the hazard. <u>Example:</u> a guard placed around a saw blade, or a shoring system placed in an excavation.
4	<b>ADMINISTRATIVE:</b>	Remove or reduce the exposures by reducing the duration, frequency and severity of exposure to hazards. <u>Example:</u> changes to work procedures & practices, scheduling, job rotation, breaks during heat/cold exposure.
5	<b>PPE:</b>	Personal Protective Equipment does not control the hazard but reduces the effect of exposure to the hazard has on the worker. PPE must always be the last line of defense <u>Example:</u> earplugs, latex gloves, CSA boots, CSA Hard Hats

## 7. REVIEWED BY:

DATE	REVISION DATE	PRINT NAME	POSITION	SIGNATURE
Aug 25/17		Nathan Peters	OHS Advisor	<i>Nathan Peters CRSP</i>
Jan 17/2019		Nathan Peters	OHS Advisor	<i>Nathan Peters CRSP</i>

### THE HAZARD IDENTIFICATION AND ASSESSMENT PROCESS

1. Identify the task to be assessed, determine if the task is **High**, **Medium** or **Low** risk
2. Include workers who have experience in performing the task, ensure the process is lead by someone who has training and experience in conducting hazard assessments. These individuals must have some type of formal training.
3. Identify hazards associated with the tasks. Consider PHYSICAL, CHEMICAL, BIOLOGICAL, AND PSYCHOLOGICAL
4. Rate the hazards by degree of risk using the following matrix:

SCORE	1	2	3
CONSEQUENCES:	first aid / minor damage	lost time injury/moderate damage	fatality / major damage
PROBABILITY:	unlikely	possible	likely
EXPOSURE:	rarely (less than 1/month)	often ( 3 times/week)	everyday

**TOTAL** the three columns: **(T)**

- 3-4 are **low** priority hazards
- 5-7 are **medium** priority hazards
- 8-9 are **high** priority hazards

The **high** priority hazards are addressed first, followed by the **medium** priority hazards. **Low** priority hazards may not require attention at this time, they may simply require monitoring. The Hierarchy of Control Measures must be followed when eliminating or mitigating hazards in the following order:

1	<b>ELIMINATION:</b>	Can the hazard be removed at the source? Can the task be eliminated entirely? <u>Example:</u> eliminating the need to have a worker enter an excavation by hydro-excavating to expose underground infrastructure.
2	<b>SUBSTITUTION:</b>	Can a hazard, hazardous process or hazardous material be substituted with one with no hazards? <u>Example:</u> using salt water brine instead of a chemical for deicing the roads.
3	<b>ENGINEERING:</b>	Engineering controls include isolation, ventilation and equipment modification. These controls focus on the source of the hazard. <u>Example:</u> a guard placed around a saw blade, or a shoring system placed in an excavation.
4	<b>ADMINISTRATIVE:</b>	Remove or reduce the exposures by reducing the duration, frequency and severity of exposure to hazards. <u>Example:</u> changes to work procedures & practices, scheduling, job rotation, breaks during heat/cold exposure.
5	<b>PPE</b>	Personal Protective Equipment does not control the hazard but reduces the effect of exposure to the hazard has on the worker. PPE must always be the last line of defense <u>Example:</u> earplugs, latex gloves, CSA boots, CSA Hard Hats

Hazard Assessments **must be reviewed** in accordance with Hazard Assessment Program Guide.