

	CONFINED SPACE HAZARD ASSESSMENT		HA # 2
	CONFINED SPACE NAME: Sanitary Pump Stations	ID # N/A	LOCATION: 4 Bewicke Automall Waterfront Shipyard

Confined Space?	YES	
YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Enclosed or partially enclosed?		
YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Limited or restricted entry/exit?		
YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Intended for continuous human occupancy?		
YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Large enough that a worker can enter?		

SPACE INFORMATION/DETAILS (IN OPERATION):			
SPACE DESCRIPTION: Underground vertical shaped concrete well with steel grate located above the bottom of the floor (all 4 pump stations are wet wells). Side guard rails and chains (for removing pumps) and fixed ladders exist inside the space.			
CONTENTS: Sewage and wastewater (runoff from street, restaurants and buildings), various piping and valves (check valves, isolating valves, air release valves) <i>Equipment:</i> 1 or 2 electric powered pumps and a level transducer			
PROCESS/FUNCTION/USE DESCRIPTION: Collects and pumps sewage/wastewater to sanitary sewer manholes for further distribution. Sewage/wastewater is removed when it reaches a preset level.			
PHYSICAL CHARACTERISTICS: Vertical and cylindrical or rectangular shaped well			
DIMENSIONS: Approximate range (in feet –'ft'): 12 ft to 20 ft (D) x 6ft to 8 ft Ø & 12 ft (D) x 8 ft (L) x 5 ft (W)		VOLUME: Approximate range: 339 ft ³ to 804 ft ³	
SPACE MATERIAL: Precast or poured concrete, some with fibre glass reinforced plastic (FRP) bottom			
ENTRY CHARACTERISTICS: 1 or 2 side by side steel Bilco hatch doors			
LOCATIONS: 1 per pump station (on top at grade)		SIZE: 4 ft x 4 ft	
SECURING MECHANISM: Gravity/locked or locked hinged lids			
ADJACENT VESSELS/SPACES/PIPING:			
NAME OF SPACE/PIPE	CONTENTS	TEMPERATURE	PRESSURE
Inlets (8"-12" Ø)	Raw sewage/wastewater/surface water	No concern	No concern
Outlets (6"- 8" Ø)	Raw sewage/wastewater/surface water	No concern	No concern

SCOPE OF WORK: This Hazard Assessment (HA) refers to entry for the purpose of inspection (mostly from the outside of the space) and minor repairs (rarely conducted). Minor repairs includes replacing gaskets with manual tools, replacing steel grates with manual tools, minor concrete wall patchwork repair with ready mix cement, and removing and replacing damaged fixed ladder rungs which involves cutting steel ladder rungs with an angle grinder, drilling holes (one inch) with an
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HAZARDOUS ATMOSPHERIC RATING (LOW, MOD. HIGH)	Moderate	JUSTIFICATION: Potential for CO and H ₂ S to be greater than 10% of exposure limits.
COMPLETED BY:	Prepared by: Peter Bergholz, BSc, CIH, AMEC, November 2012 Reviewed by: Victor Leung, MSc, CIH, ROH, CRSP, AMEC, November 2012	INFO. SOURCE: Paul Elsoff & Dave Cooper

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electric powered-drill (e.g., Hilti-type drill) and pressure fitting new ladder rungs into the drilled-holes with an impact device (e.g., impact driver).

The removal of objects with a sucker truck and washing the inner walls with a low-pressure water hose are additional tasks that occur from outside the space. Repairs to transducers and pumps also occur outside the space and are removed from the space via the side guard rails and chains.

Hot work and other atmospheric contaminant generating activities are not included in this Hazard Assessment.

HAZARDS		UNDISTURBED SPACE POTENTIAL HAZARDS	WORK TASKS POTENTIAL HAZARDS	CONTROL MEASURES
ATMOSPHERE	Oxygen (O ₂) Deficiency	Yes Possible for closed up space prior to entry.	No	Monitoring for O ₂ . Continuous ventilation during entry.
	O ₂ Enrichment	No	No	
	Chemical	Yes Potential for hydrogen sulphide (H ₂ S) and methane to be present in spaces and carbon monoxide (CO) from adjacent vehicular traffic.	Yes <u>Drilling - silica dust:</u> If required (rare), short duration drilling tasks (drilling 1 inch holes) for ladder repair will potentially present minor exposures to silica and dust. <u>Grinding - metallic dust:</u> If required (rare), short duration grinding tasks of grinding carbon steel ladder rungs with angle grinders will potentially present minor exposures to metallic dusts. MSDSs for grinding wheels typically contain metals.	Monitoring for H ₂ S, methane and CO. Continuous ventilation during entry. General PPE: Coveralls, safety boots, work gloves, hard hat and safety glasses with side shields. Disposable Tyvek coveralls and disposable nitrile gloves are recommended. Drilling & Grinding PPE: General PPE, full face shield (grinding only), hearing protection and disposable dust mask (e.g., N95 type). If multiple ladder rungs are required to be repaired, a half face respirator with P100 cartridges is required. Note: respirator requirements are recommended in the absence of space-specific exposure monitoring data.
	Biological	Yes Vermin (rats, mice or their excrement) may be present. Bacteria/fungi are possible in spaces that are wet or are not opened for prolonged periods. The presence of pathogenic bacteria and sludge are possible in spaces at all times. Needles/sharps (potentially containing bodily fluids) may be present. Raw sewage passes through the pump stations.	No	Rinse space prior to entry and wear General PPE (disposable Tyvek coveralls and disposable nitrile gloves are recommended). Remove objects from outside the space at all times with sucker truck.
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HAZARDS		UNDISTURBED SPACE POTENTIAL HAZARDS	WORK TASKS POTENTIAL HAZARDS	CONTROL MEASURES
	Fire/Explosion	Yes Potential for combustion gases (methane) or volatile chemical substances to be present emitted from wastewater or from accidental/illicit dumping.	No	Monitoring for LEL. Continuous ventilation during entry.
SAFETY	Structural Hazard	No	No	
	Engulfment	Yes Spaces that are not disturbed or emptied for a prolonged period may contain raw sewage at a sufficient height above the well floor and below the automatic sensor of the level transducer.	No	Entry Supervisor to evaluate liquid level prior to entry. Entry prohibited if the flow level is surcharging (level transducer automatically initiates pump to remove liquids via outlet piping above a certain height but pump and level transducers must be locked out prior to entry). Harness and lifeline must remain connected during entry.
	Entrapment	No	No	
	Electrical	No	Yes Electrical powered tools required (drills, impact drivers, grinders).	GFCI for power cords and electrical equipment (drills, impact drivers, grinders) is required.
	Access/Egress	No	No	
	Fall	Yes Fixed ladders present in all spaces except in Shipyard Pump Station (requires a portable ladder).	Yes May require working on fixed or portable ladder at heights (i.e., ladder rung repair). Sections of steel grates inside space may be removed and replaced (with manual tools) – steel grates are situated several feet above floor surface of well.	Fixed ladder or portable ladder required. Maintain 3 points of contact on the ladder at all times. Use caution upon initial entry (inspect fixed ladder condition). Portable ladders may substitute fixed ladders where opening permits usage. Fall protection required when climbing up and down ladders. Lifeline attached at all times. Work with care while removing steel grate sections and replace new sections one at a time – lifeline attached at all times.
	Slip/Trip	Yes Interior of space, ladder rungs and floor surface may be wet and slippery.	No	Wear General PPE (safety boots) and work with care.
	Visibility/Light Level	Yes Insufficient lighting	No	Portable lighting (flashlight or portable light with GFCI) required.

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PHYSICAL	Baffles/Internal Arrangement	No	No	
	Floor Openings in Space	No	No	
	Noise/Vibration	Yes Potential for noise to exceed regulatory limits due to pump noise.	Yes Grinding/impact driver tasks may be required	Pump must be locked out prior to entry. Hearing protection required (wear Drilling & Grinding PPE).
	Temperature	Yes Entry into space may occur during hot/cold weather conditions (spaces are located outside).	Yes Surfaces are immediately hot after cutting ladder rungs with grinder.	Wear General PPE and dress appropriate for outside weather conditions. Provide heat stress awareness sessions to work crews if working during hot summer days. Wear work gloves (General PPE) and work with care.
	Non/Ionizing Radiation	No	No	
	Laser	No	No	
OTHERS	Ingestion/Skin Contact Hazard	Yes Contact with raw sewage/wastewater may occur in spaces.	Yes Concrete wall repair: If required (rare), short duration concrete wall repair tasks will involve minor surface patchwork with ready-mix cement products and manual tools – MSDSs for ready cement mixes typically contain portland cement and potentially silica and the dusts are potential eye/skin irritations. No concrete removal (i.e., jackhammering) is expected.	Rinse space prior to entry. Practice good personal hygiene and wash hands thoroughly prior to break and at end of work shift. Work with care and wear General PPE . Concrete Wall Repair: wear General PPE . Minor concrete wall repair tasks (short duration) will involve mixing ready-mix cement products outside the space with water. Minimal dust (portland cement dust and silica dust) is expected during mixing with water and the wet cement product will be applied inside the space – no portland cement dust or silica dust is expected inside the space. No concrete removal (i.e., jackhammering) is expected only patchwork of minor cracks in concrete walls. If mixing large amounts of cement product is necessary (outside the space), monogoggles and a disposable dust mask is recommended (e.g., N95 type).
	Mechanical Hazard	Yes Electric powered pumps and level transducers present inside space	No	Pumps and level transducers must be locked out prior to entry.

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Traffic Hazard	Yes Spaces exist at street locations and at high-frequented public locations (Waterfront).	No	Entrance to space must be physically isolated from vehicular and pedestrian traffic. Standby person or designated road-traffic crew must monitor traffic in the area.
Hydraulic/ Pneumatic Hazard	Yes Potential for water pressure to build up inside sewer piping.	No	Entry Supervisor to evaluate liquid level prior to entry. Entry prohibited if the flow level is surcharging (level transducer automatically initiates pump to remove liquids via outlet piping above a certain height but pump and level transducers must be locked out prior to entry).

CONTROL MEASURES REQUIRED:	
Confined Space Permit:	Yes
Atmospheric Testing:	Gas monitor with sensors for O ₂ , LEL, CO & H ₂ S. Monitor for methane (CH ₄) with LEL sensor.
Ventilation Requirements:	Provide mechanical ventilation (minimum 268 CFM) through the opening. Minimum ventilation requirements are based on achieving 20 air changes per hour. The atmosphere inside the space will be controlled through air pressurization achieved by providing increased mechanical ventilation (over-ventilating the space).
PPE Requirements:	General PPE: Coveralls, safety boots, work gloves, hard hat and safety glasses with side shields. Disposable Tyvek coveralls and disposable nitrile gloves are recommended. Drilling & Grinding PPE: General PPE, full face shield (grinding only), hearing protection and disposable dust mask (e.g., N95 type). If multiple ladder rungs are required to be repaired, a half face respirator with P100 cartridges is required. Concrete Wall Repair: wear General PPE . If mixing large amounts of cement product is necessary (outside the space), monogoggles and a disposable dust mask is recommended (e.g., N95 type). Note: respirator requirements are recommended in the absence of space-specific exposure monitoring data.
Lockout/Isolation:	Isolation is not possible. Pumps and level transducers must be locked out prior to entry. Entry Supervisor to evaluate liquid level prior to entry. Entry prohibited if the flow level is surcharging (level transducer automatically initiates pump to remove liquids via outlet piping above a certain height but pump and level transducers must be locked out prior to entry).
Standby Person:	Yes, at or near entrance.
Communication Procedures:	Radio, voice
Rescue Procedures:	Standby person calls 911 and calls Entry Supervisor. Entry Supervisor will respond to scene. Self rescue (if possible) or removal by Standby Person (from outside space) using winch.
Required Rescue and Safety Equipment	Two-way radio, cellular telephone, harness (must be worn), tripod, winch, lifeline (attached at all times).
Other:	Minor concrete wall repair tasks (short duration) will involve mixing ready-mix cement products outside the space with water. Minimal dust (portland cement dust and silica dust) is expected during mixing with water and the wet cement product will be applied inside the space – no portland cement dust or silica dust is expected inside the space. No concrete removal (i.e., jackhammering) is expected only patchwork of minor cracks in concrete walls. If mixing large amounts of cement product is necessary (outside the space), a disposable dust mask is recommended (e.g., N95 type). Rinse space prior to entry and wear General PPE (disposable Tyvek coveralls and disposable nitrile gloves are recommended). Practice good personal hygiene and wash hands thoroughly prior to break and at end of work shift. Remove objects from outside the space at all times with sucker truck.
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CONFINED SPACE NAME:

ID #

Sanitary Pump Stations

N/A

LOCATION: 4

Bewicke Waterfront
Automall Shipyard

HA # 2

DATE: November 2012

CONTROL MEASURES REQUIRED:

GFCI for power cords and electrical equipment (drills, impact drivers, grinders) is required.
Fixed ladder or portable ladder required. Maintain 3 points of contact on the ladder at all times.
Use caution upon initial entry (inspect fixed ladder condition). Portable ladders may substitute fixed ladders where opening permits usage.
Fall protection required when climbing up and down ladders. Lifeline attached at all times.
Work with care while removing steel grate sections and replace new sections one at a time – lifeline attached at all times.
Portable lighting (flashlight or portable light with GFCI) required.
Wear **General PPE** and dress appropriate for outside weather conditions. Provide heat stress awareness sessions to work crews if working during hot summer days.
Entrance to space must be physically isolated from vehicular and pedestrian traffic. Standby person or designated road-traffic crew must monitor traffic in the area.

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ATMOSPHERIC RATING
(LOW, MOD. HIGH)**

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