CITY OF PRINCE GEORGE

Utility Operations
In Pursuit of Service Excellence
3990 – 18th Ave Prince George, BC V2N 4R8
Phone: 250-561-7600 Fax: 250-614-7883

GUIDELINES FOR SAFE CONSTRUCTION IN THE PROXIMITY OF THE DISTRICT ENERGY DISTRIBUTION PIPING SYSTEM

GENERAL INFORMATION

This document is to provide information regarding any construction works to be performed within the proximity of the City of Prince George's District Energy Distribution Piping System (DPS). The attached map shows an approximate location of the alignment only; if the exact location of the DPS is required please contact the City of Prince George for more detailed drawings. If the location of the DPS shown on the attached map doesn't correspond with the information requested through BC ONE CALL please contact the City at 250-561-7600 and ask for the Utility Locator.

The DPS is a pressurized hot water piping system that provides heating to district energy customers. The system operates at temperatures between 50°C and 115°C with pressures up to 11600 kPa (232 psig). The DPS is comprised of a set of insulated pipes acting as a supply and a return that run parallel to each other. Each insulated pipe is encased in HDPE and ranges in sizes from 60mm – 220mm with the separation distances varying based on size of pipe. In addition the pipe has two leak detection wires running through the insulation that are very sensitive to moisture so it is imperative that the HDPE jacket isn't punctured or that the pipe be stressed in any way.

The pipes are installed in a trench that is backfilled with an engineered fill to maintain a proper envelope of approximately 200mm around the pipes. This engineered fill provides the proper friction anchorage between the pipe and the ground around it as the pipe is continually in a state of compression due to its ambient temperature. Therefore the pipe has the capacity to shift laterally or vertically if not restrained by the ground around it.

ANY CONSTRUCTION WITHIN THE PROXIMITY OF THE DPS MUST ADHERE TO THE FOLLOWING GUIDELINES

DOCUMENTATION

A permit to construct within the City of Prince George right of way must be obtained prior to any works being commenced and be onsite during construction.

A BC One-Call information request must be completed.

DPS LOCATE

All DPS pipes must be located and marked in **purple** at the location of each pipe or the centerline of the two parallel pipes by an accredited locator.

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EXPOSURE METHOD GUIDELINES

The hand exposure zone extends for **2 meters** on either side of the outer most painted lines when the two pipes are located or **2.5 meters** of the center line marker.

Hand exposure is to be completed by non-destructive means (ex hydrovac). Use of picks, motorized digging equipment, etc., is not acceptable in the hand exposure zone.

Hydrovac Requirements:

- Wand tip and suction hose end to be covered with Teflon or rubber to prevent damage to the external HDPE jacket encased on the pipes
- Wand to remain in a circular motion at all times when in use.
- Wand tip to remain a minimum of 300mm from the DPS lines
- Do not exceed pressures of 10,300kPag (1,500psig) or temperature of 38^{o}C (100^{o}F)
- Wand tip is to be an agitating spinner assembly or three-jet tip.

EXPOSURE & PARALLEL EXCAVATION LIMITS

Due to the ambient temperatures of the DPS the pipes are continually in a state of compression and have the capacity to shift laterally or vertically if not restrained by the ground around it. As such the limits of pipe length that can be exposed at a given time are restricted and vary depending on the diameter of the pipe.

Refer to drawing DPS-GL-02 for permitted exposer limits. Any exposures that are to exceed the permitted limit must to be approved by the City of Prince George prior to beginning construction works.

Un-shored parallel trenches are permitted if they maintain minimum separations as shown on the attached drawings. When the required minimum separations cannot be met the Contractor must work with the City of Prince George to develop a suitable shored trench installation.

These limits may be adjusted when the operating temperature is less than 117^{O}C at the City of Prince George's discretion.

CROSSING GUIDELINES

When crossing the DPS the following applies:

All DPS pipes must be exposed by non-destructive means at the crossing to determine the elevations and alignment of each pipe.

The width of the trench crossing the DPS is to adhere to the maximum lengths for exposure as outlined in the Parallel Guidelines above.

The crossing utility must maintain a minimum of 300mm vertically (edge to edge) from the DPS Pipes

INSPECTION

Contact the City of Prince George **2 days** prior to any construction works proceeding near the DPS to arrange an inspector to be onsite during any activities that may affect the DPS.

REINSTATEMENT GUIDELINES

All bedding around the piping must be reinstated as per the following requirements:

- Minimum of 150mm bedding and 200mm cover of approved backfill over DPS pipes of with a compaction to 98% of Standard Proctor Maximum dry density.
- Warning tape above all pipe
- Remainder of backfill and resurfacing are to meet the City of Prince George design Guidelines as per Bylaw 7652 Section 210271

Refer to drawing DPS-GL-01 for general guidelines for backfill reinstatement requirements

An inspector from the City of Prince George must be contacted prior to backfilling and reserves the right to be onsite during reinstatement of backfill material.

A copy of the compaction reports are to be given to the inspector.

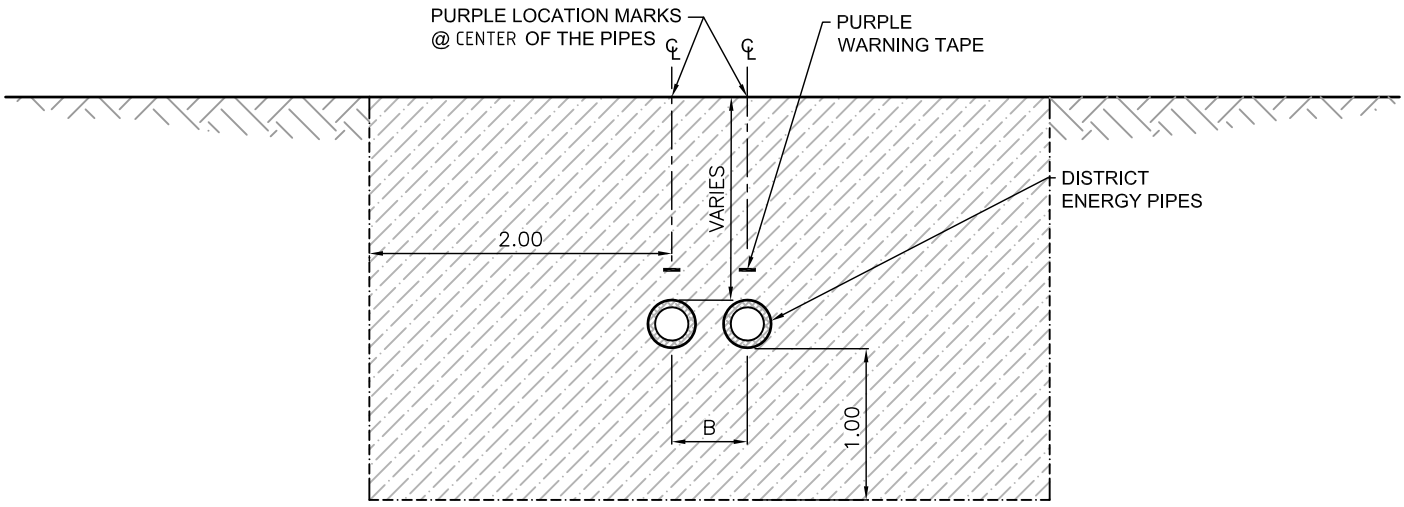
Any DPS facilities damaged by the construction work are to be repaired by the City of Prince George.

EMERGENCY CONSTRUCTION

Emergency construction is work that must occur immediately to remedy damage to utilities in the proximity of the DPS. If emergency construction is required immediately contact **BC One-Call** and the **City of Prince George** and clearly state that the work is being performed as an emergency situation.

DPS Emergency Contacts:

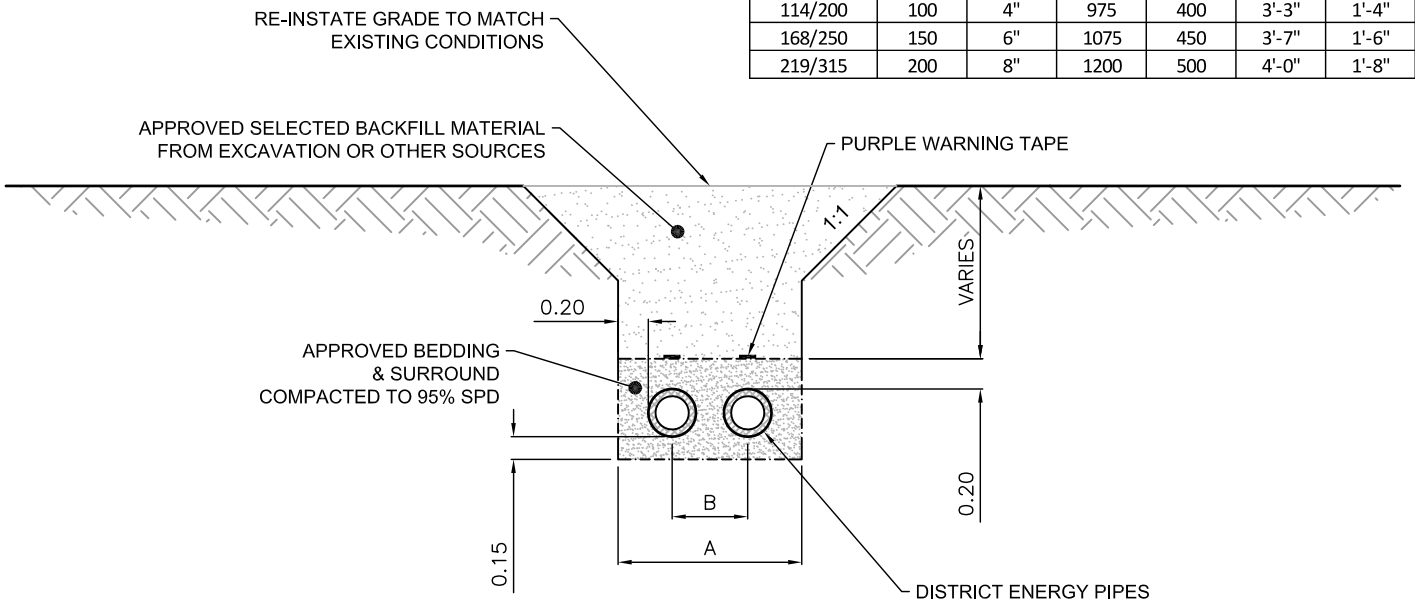
Kristy Brown Supervisor Utilities Engineering	250-613-9338
Jeff MacIvor Utilities Operations Foreman	250-617-9759
Kim Hattle Engineering Assistant, Operations	250-961-3061



HAND EXPOSURE ZONE

NTS

PIPE SIZE STEEL/HDPE	NPS (mm)	NPS (in)	A (mm)	B (mm)	A (ft-in)	B (ft-in)
60/125	50	2"	825	325	2'-9"	1'-1"
88/140	80	3"	900	350	3'-0"	1'-2"
114/200	100	4"	975	400	3'-3"	1'-4"
168/250	150	6"	1075	450	3'-7"	1'-6"
219/315	200	8"	1200	500	4'-0"	1'-8"



REINSTATEMENT GUIDELINES

NTS

NOTES:

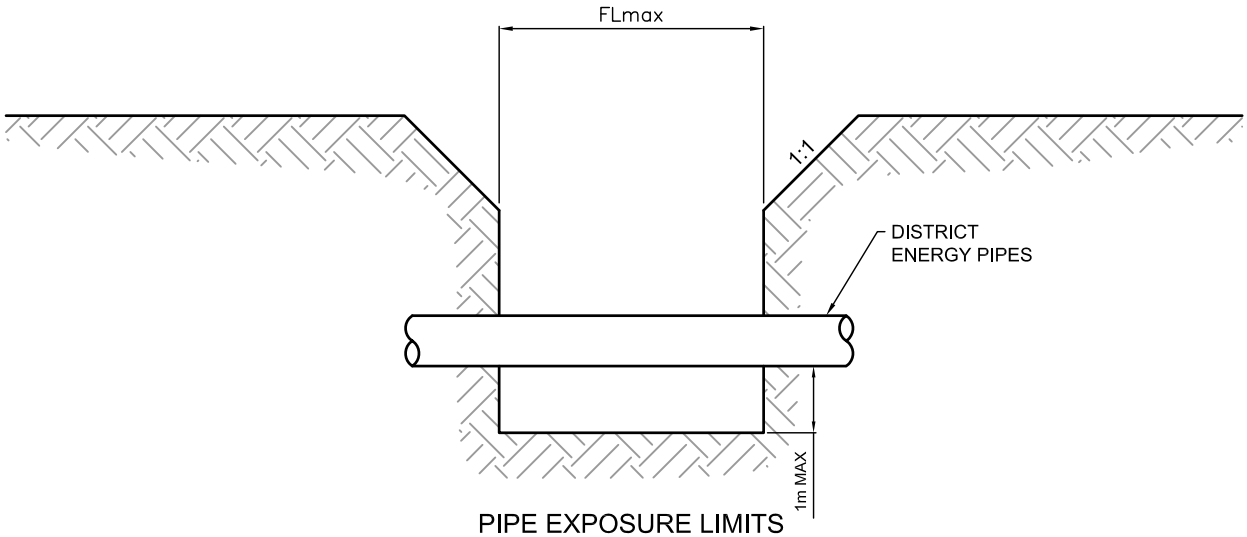
1. HAND EXPOSURE IS TO BE COMPLETED BY NON–DESTRUCTIVE MEANS (EX HYDROVAC).
2. USE OF PICKS, MOTORIZED DIGGING EQUIPMENT, ETC., IS NOT ACCEPTABLE IN THE HAND EXPOSURE ZONE.
3. HYDROVAC REQUIREMENTS:
   - WAND TIP AND SUCTION HOSE END TO BE COVERED WITH TEFLON OR
   - RUBBER TO PREVENT DAMAGE TO THE EXTERNAL HDPE JACKET ENCASED ON THE PIPES
   - WAND TO REMAIN IN A CIRCULAR MOTION AT ALL TIMES WHEN IN USE.
   - WAND TIP TO REMAIN A MINIMUM OF 300MM FROM THE DPS LINES
   - DO NOT EXCEED PRESSURES OF 10,300KPAG (1,500PSIG) OR TEMPERATURE OF 380C (1000F)
   - WAND TIP IS TO BE AN AGITATING SPINNER ASSEMBLY OR THREE–JET TIP.
4. CONTACT THE CITY OF PRINCE GEORGE PRIOR TO EXCAVATION & REINSTATEMENT.

CITY OF PRINCE GEORGE
Engineering Services

SCALE HORIZ. NTS SCALE VERT. NTS
SHEET 1 OF 2
DRAWING NO. DPS-GL-01

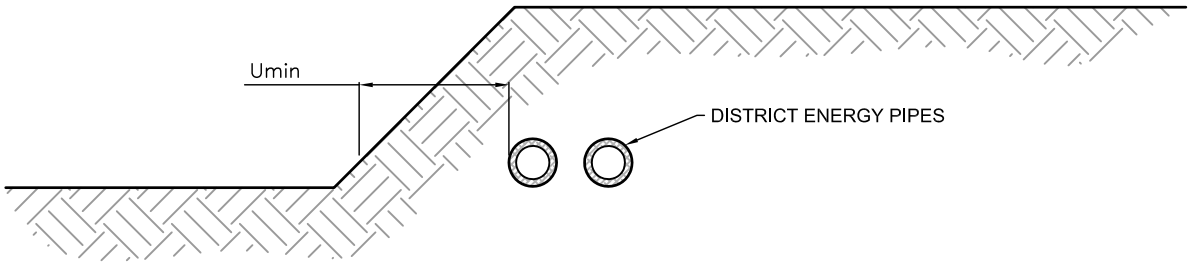
PROJECT HAND EXPOSURE & REINSTATEMENT GUIDELINES

DESCRIPTION EXCAVATION & REINSTATEMENT GUIDELINES WHEN WORKING WITHIN THE PROXMIMITY OF THE DISTRICT ENERGY PIPES



PIPE EXPOSURE LIMITS

NTS



PARALLEL EXCAVATION

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NOTES:

1. DUE TO AMBIENT TEMPERATURES THE DISTRICT ENERGY PIPES ARE SUBJECT TO CONSIDERABLE AXIAL STRESSES. EXPOSURE LENGTHS ARE RESTRICTED TO PREVENT LATERAL OR VERTICAL MOVEMENTS.
2. THE ALLOWABLE LENGTH OF EXPOSURE IS FLmax.
3. THE DISTANCE ALLOWABLE WHEN EXCAVATING PARALLEL TO THE PIPES IS Umin.
4. CONTACT THE CITY OF PRINCE GEORGE FOR APPROVAL IF THESE LIMITS ARE TO BE EXCEEDED

PIPE SIZE STEEL/HDPE	NPS (mm)	NPS (in)	Flmax (m)	Umin (m)	Flmax (ft-in)	Umin (ft-in)
60/125	50	2"	1.3	0.4	4'-3"	1'-4"
88/140	80	3"	1.9	0.5	6'-2"	1'-8"
114/200	100	4"	2.4	0.6	7'-10"	2'-11"
168/250	150	6"	3.6	0.8	11'-10"	2'-8"
219/315	200	8"	4.7	0.8	15'-5"	2'-8"

CITY OF PRINCE GEORGE
Engineering Services

SCALE HORIZ. NTS SCALE VERT. NTS
SHEET 2 OF 2
DRAWING NO. DPS-GL-02

PROJECT PIPE EXPOSURE & PARALLEL EXCAVATION GUIDELINES

DESCRIPTION EXCAVATION GUIDELINES WHEN WORKING WITHIN THE PROXMIMITY OF THE DISTRICT ENERGY PIPES