Manitoba Hydro

Corporate Safety & Health Division

Directional Boring Guidelines

For further information, please contact:
Safety Policies, Publications and Training Department 204-360-3766

Publication Number: **0086/06** Replacing: **06 08 04** Revised: **2009 10**

Disclaimer:

All printed versions of this publication are not controlled documents.

For the most up-to-date version, refer to the CS&H website at:
http://coil.hydro.mb.ca/esh/publications/publications/publications.html

Forms are available at: http://coil.hydro.mb.ca/esh/services/_____

For any concerns or questions, please contact Safety Policies, Publications and Training Department at 204-360-3766.

Directional Boring - Contractor Guidelines

This guideline is intended to provide direction when directional boring in the Province of Manitoba. The guideline applies to the crossing of Manitoba Hydro electrical conductors and natural gas pipelines only. When Manitoba Hydro fibre optic cables are present contractors will be referred by the Manitoba Hydro Facilities Locator to the Manitoba Hydro Communications department for more information.

Definitions

Ground Disturbance: Any activity that disturbs more than the top 15 cm of the ground.

Safety Hold-Off: A Manitoba Hydro procedure which affects a precaution to prohibit re-energizing (by either automatic or manual means) an electrical conductor in case of a trip-out. This procedure includes the application of protective cards. Requirement for a Safety Hold-Off is determined by Manitoba Hydro personnel.

Sonde: A transmitter behind the bore head which registers angle, rotation, direction and temperature data.

Tolerance Zone: The space in which a line or facility is located, and in which special care is to be taken.

Consistency of Alignment: The uniformity of the alignment of the electrical conductor or natural gas pipeline as determined by the locate flags and marks and/or the repeatability of the physical location of the facility to property lines.

General

- As with all ground disturbance activity, the excavator must first obtain a facilities locate from Manitoba Hydro.

- The distance measured to Manitoba Hydro electrical conductor or gas pipeline must always be measured from the outside diameter or wall of the Manitoba Hydro facility to the outside diameter of the back reamer. The same measuring methodology must be used when paralleling Manitoba Hydro's facilities.

- When boring within the tolerance zone of a high pressure gas pipeline or any critical distribution gas pipeline or electrical conductor, as identified by Manitoba Hydro's Facilities Locate personnel, a qualified natural gas or electric safety watcher is required.

Electrical Conductors

Prior to directional boring across Manitoba Hydro electrical conductors the burial depth must be confirmed. Acceptable practice to verify conductor depth is to:

- Expose the conductor by hand digging; or
- Expose the conductor by water pressure/vacuum excavation; or
- locating on the side wall of a trench that has been excavated one metre on either side of the surface locates; or
- by use of reference measurements that are known to be accurate, i.e. electrical duct lines

The drill head and/or back reamer must at all times maintain a minimum of one metre clearance from Manitoba Hydro electrical conductors.

Gas Pipeline

Prior to directional boring across a Manitoba Hydro natural gas pipeline the burial depth and location of all natural gas pipelines being crossed must be **visually** verified. Acceptable practice to verify pipeline depth is to:

- Expose the pipeline by hand digging; or
- Expose the pipeline by water pressure/vacuum excavation

Note: Mechanical excavating equipment cannot be used with in 1.0 metre (3 ft) of a natural gas pipeline until the gas pipelines have been exposed. After visual confirmation of the pipelines location, mechanical excavating can be used to excavate no closer than 0.3 metre (1 ft) from a natural gas pipe line.

Note: The drill head and/or back reamer must at all times maintain a minimum of one metre clearance from Manitoba Hydro natural gas pipelines. Where underground facility congestion does not effectively allow a 1.0 metre clearance/separation from Manitoba Hydro facilities, the contractor may consult with Manitoba Hydro Engineering for site specific direction. Any deviations in clearances/separations must be provided in writing and must be present on-site when the work is being performed.

Observation Hole Required When Crossing *Any* Manitoba Hydro Facility (Figure 1, 2 & 3)

The accuracy of the drill head location and depth must be visually verified 1 metre prior to crossing Manitoba Hydro facilities. An observation or discovery hole is required.

Acceptable practice for opening up the observation hole is using water pressure/vacuum or hand digging.

- When boring head and/or back reamers path is crossing above a natural gas pipeline or electrical conductor the boring head and/or back reamer must be visually observed crossing the facility.

- When boring head and/or back reamers path is crossing below a natural gas pipeline or electrical conductor an observer must verify the bore head and/or reamer does not enter the observation hole.

- The minimum dimensions of the observation/discovery hole shall be (see figure 1):
  - 1.0m (3ft) beside the natural gas pipeline or electrical conductor on the near side of the bore path
  - 0.3m (1ft) on the far side of the bore path
  - 0.3m (1ft) on each side of the bore path
  - 0.3m (1ft) below natural gas pipeline or electrical conductor

Figure 1 Observation Hole - Plan View

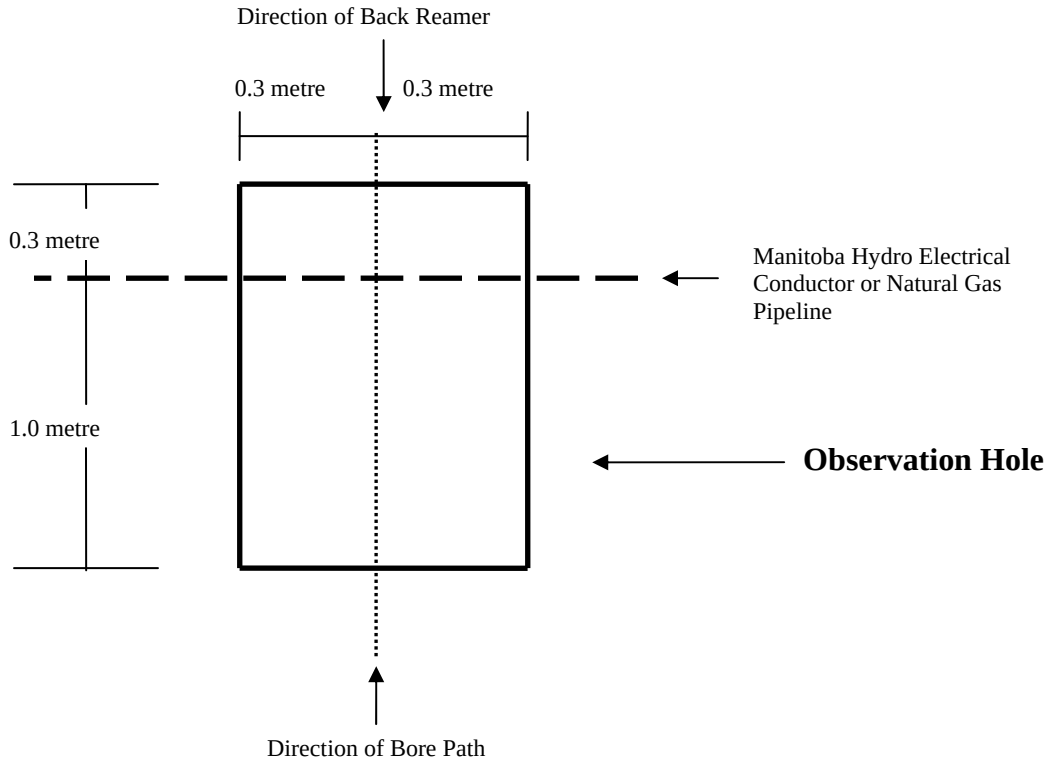


Figure 2 Observation Hole - Profile View

Drilling Below a Manitoba Hydro Electrical Conductor or Natural Gas Pipeline

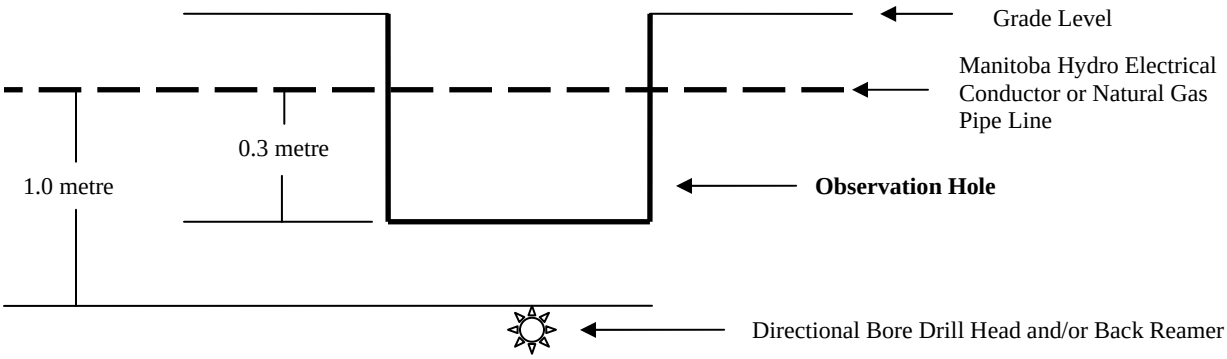
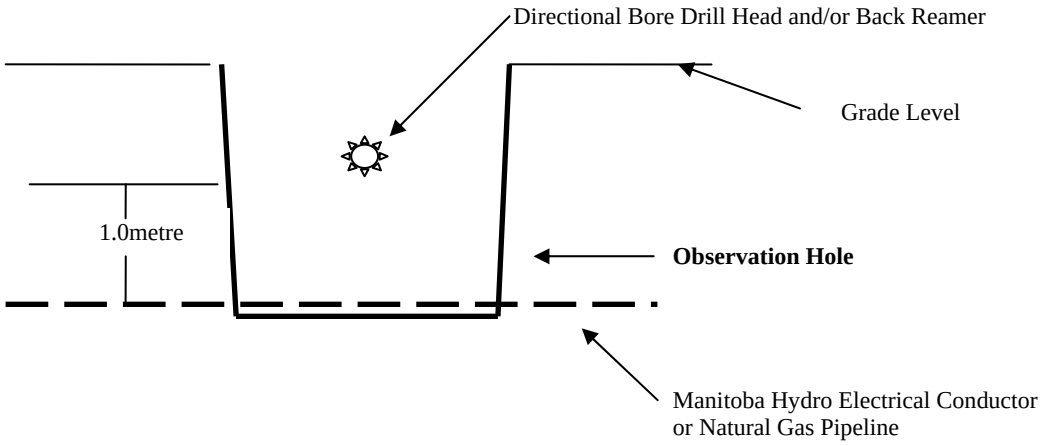


Figure 3 Observation Hole - Profile View

Drilling Above a Manitoba Hydro Electrical Conductor or Natural Gas Pipeline



Paralleling Electrical Conductors & Natural Gas Pipelines (Figures 4, 5 & 6)

- There must be 1.0 metre (3 ft) of separation between the outside diameter of the back reamer assembly and the outside diameter of any Manitoba Hydro electrical conductors or natural gas pipelines.

  Note When drilling within 1.0 metre (3 ft) **horizontally**, the drill must be kept at a depth either deeper or shallower than the existing electrical conductor or natural gas pipeline to maintain 1.0 metre (3 ft) separation when measured diagonally.

- If 1.0 metre (3 ft) **horizontal** separation cannot be maintained, the electrical conductor or natural gas pipeline adjacent to the bore path must be exposed. When it is not possible to de-energize electrical conductors, a Safety Hold-Off must be in place and a qualified Safety Watcher must be on site.

- When suspected of drilling within 1.0 metre (3 ft) of any electrical conductors or natural gas pipelines determined by the boring head (sonde) position readings and the proximity to the locate marks, the location of the conductor or pipeline shall be verified; the electrical conductor or natural gas pipeline adjacent to the bore path must be hand exposed or exposed by water pressure/vacuum excavation as determined by Manitoba Hydro.

- The frequency of exposures depends on the consistency of the alignment of the existing facility.

- Manitoba Hydro facility must be exposed once for each lot, or a minimum of once every 15 metres (50 ft), whichever is the shorter distance, to confirm alignment.

- Where there is an alignment change indicated by the locator marks, the Manitoba Hydro facility shall be visually confirmed at each alignment deviation.

Figure 4 Drilling Parallel to Manitoba Hydro Conductors and Pipelines - Plan View

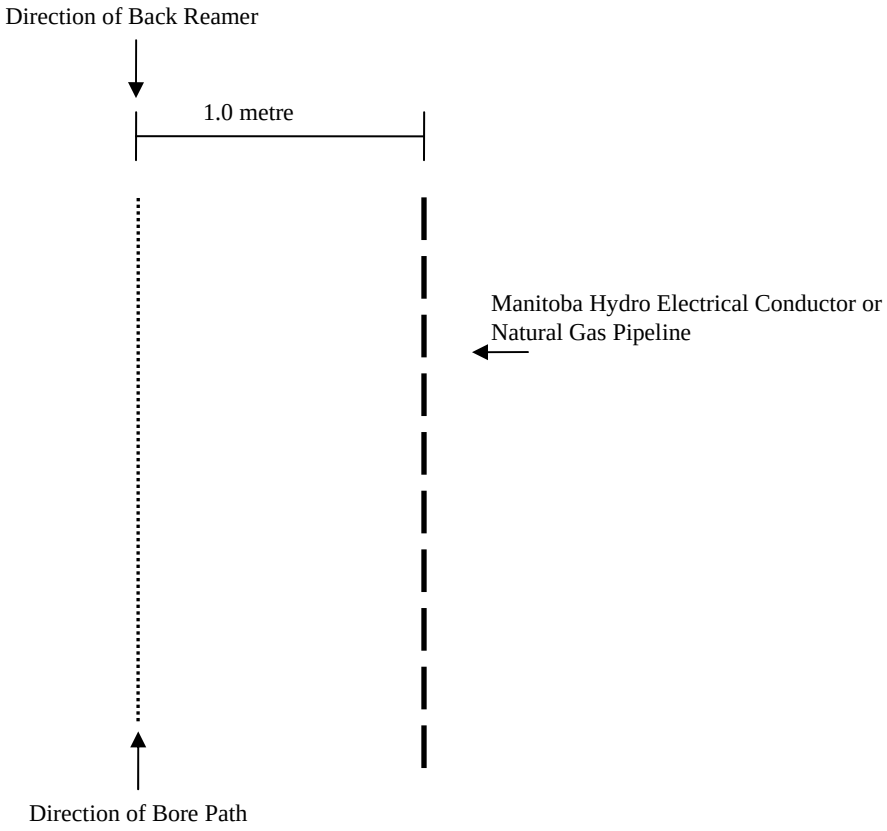


Figure 5 Drilling Parallel to Manitoba Hydro Conductors and Pipelines - Profile View

Observation hole required every 15 metres

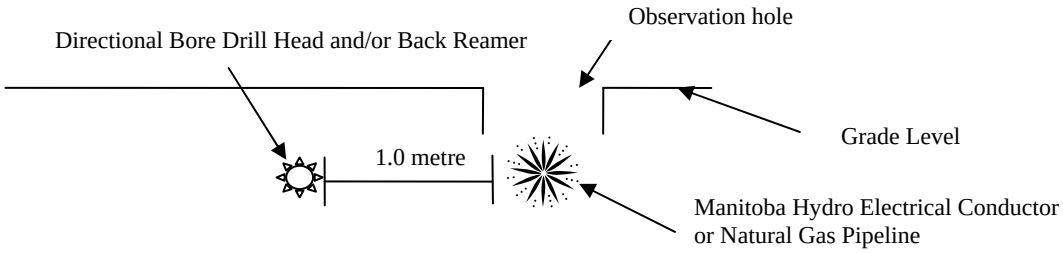


Figure 6 Drilling Parallel to Manitoba Hydro Conductors and Pipelines - Profile View

1.0 metre (3 ft) horizontal separation not maintained, conductor or pipeline continuously exposed