HydroOttawa	TITLE: Engineering Specification	
RECOMMENDED: Mike Wyndham, P.Eng	NO: UDS0013	REV: 1
APPROVED: Ben Hazlett, P.Eng		
REV. DATE: 2019-12-12		

TEMPORARY AND PERMANENT SUPPORT OF HYDRO OTTAWA DUCT BANKS WHEN UNDERCUT BY AN EXCAVATION

REVISION SHEET

Revision	Description	Date	Initials
0	Original Document	2002-09-12	cp/csm
1	Removed phone number from section 6.0 Removed inspection req, added back fill option to section 5, updated concrete section, updated formatting	2019-12-12	mw

TABLE OF CONTENTS PAGE

1.0 Introduction

In large-scale excavations involving the location of Hydro Ottawa duct banks, arrangements shall be make for supporting the duct banks in a temporary way during the excavation and in a permanent way during the backfilling operation.

Hydro Ottawa duct banks are constructed in various sizes. Generally the formations are about 630 mm wide by 630 mm high, and weight approximately 900 kg per linear metre.

Existing duct banks could be constructed with unreinforced concrete and therefore have very little ability to be self-supporting in a free span. If any excavation undermines more than 1.5 meters of duct bank, intermediate supports shall be installed under the duct bank, and a permanent support shall be installed during the backfilling operation.

Hydro Ottawa Standard Work Methods are to be followed during the installation of the duct support structures. Applicable requirements of GCS0005 shall be met.

2.0 References

- Hydro Ottawa – GCS0005: Installation of Civil Works for Underground Distribution
- Hydro Ottawa – UDS0011: Duct Support Temporary of Existing Structure
- Hydro Ottawa – UDS0012: Duct Support Permanent of Existing Structure

3.0 Locating Ducts

Prior to excavating, Hydro Ottawa shall be notified. An approved Hydro Ottawa Locate Service Provider **shall be sent** to the site to indicate the location of the underground duct structure. The ducts shall be located by hand, i.e. not using mechanical excavating equipment

4.0 Temporary Support

Hydro Ottawa Specification UDS0011 shows the method of support.

On shorter spans, up to approximately 3 meters, a wood-supporting beam may be adequate. On spans over 6 meters, provisions shall be made to counteract any possible torsion or horizontal deflection in the supporting beam. Such forces arise due to unequal loading at the edge of the flange by the ratcheting straps. Methods of counteracting such forces are by lateral bracing of the supporting beam or by using a box-girder as the supporting beam. In most cases, a wide flanged I-beam of acceptable strength is adequate.

If the trench is properly shored at the location of the supporting beam, it will be sufficient for the beam to extend 1 meter on each side of the trench limit. If the trench is not shored, the supporting beam shall extend on each side of the trench limit a distance not less than one-half of the trench depth.

For an un-shored trench, the ratcheting straps shall start immediately adjacent to the trench face. For a shored trench, the ratcheting straps shall start no further than 1 meter from the trench face.

Engineer approved drawings showing temporary support of duct structures require approval by Hydro Ottawa

5.0 Permanent Support

Hydro Ottawa Specification UDS0012 shows two methods of supporting the duct bank after construction is complete. The Hydro Ottawa representative will specify if Detail A or Detail B shall apply.

In either case the backfill shall be compacted to not less than 95% of the maximum density under the duct bank. Certified test results shall be presented to the Hydro Ottawa representative if requested. The backfill shall be brought up as close to the ducts as possible.

Special care shall be taken to ensure that no voids exist in the concrete under the duct structure. It is suggested that the cradle support (Detail B, of drawing UDS0012) be place in two operations.

For a period of seven days after the concrete is placed, no equipment shall be allowed to pass over the duct structure.

All forms shall be adequately braced.

If it is possible to fill compacted backfill up to the height of the supported duct bank, than the permanent structure is not necessary.

6.0 Concreting

Concrete for permanent duct bank support shall meet the following criteria

a. Minimum compressive strength of 20MPa at 28 days test
e. Air entrainment of 5-8% as specified in CSA A23.1/A23.2 Table 4.
b. Maximum aggregate size shall be 10mm.
c. Maximum slump of 120 mm.

7.0 Miscellaneous

All work shall be subject to the approval of the Hydro Ottawa representative. Additional provisions may be required if Hydro Ottawa considers that the safety of their cable is jeopardized.

On smaller excavations (maximum trench of approx. 1.5 m) permanent support may consist of a concrete column from undisturbed earth up to the center of the duct structure, but this will be subject to approval by Hydro Ottawa.

To obtain exact sizes and weights of duct structures contact Hydro Ottawa.

Prior to the commencement of any large-scale excavation, Hydro Ottawa shall be notified of the detail of the proposed work.