

**Construction Administrative and Inspection Specification for  
Pipe Subdrains**

**405.01 SCOPE**

This CAIS covers the construction administration and inspection requirements for pipe subdrains as specified in OPSS 405, ~~November 2017~~July 2024

**405.02 REFERENCES**

This CAIS refers to the following, standards, specifications, or publications:

**Ontario Provincial Standard Specifications, Construction:**

OPSS 405 Pipe Subdrains

**Construction Administration and Inspection Specifications (CAIS):**

- CAIS 320 Open Graded Drainage Layer
- CAIS 409 Closed-Circuit Television Inspection of Pipelines
- CAIS 421 Pipe Culvert Installation in Open Cut
- CAIS 501 Compacting
- CAIS 1004 Aggregates - Miscellaneous
- CAIS 1010 Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
- CAIS 1801 Corrugated Steel Pipe Products
- CAIS 1840 Non-Pressure Polyethylene Plastic Pipe Products
- CAIS 1841 Polyvinyl Chloride (PVC) Pipe Products
- CAIS 1860 Geotextiles

**405.03 DEFINITIONS**

For the purpose of this CAIS, the definitions shall be as specified in OPSS 405.

**405.04 DESIGN AND SUBMISSION REQUIREMENTS**

**405.04.01 Submission Requirements**

**405.05.01.01 Manufacturer’s Documentation**

Administrative Activities:

1	-	Prior to the placement of subdrain or outlet pipe, <del>r</del> Receive and <del>c</del> Check the documentation from the manufacturer verifying that the material supplied meets the Contract requirements according to OPSS 405 or as specified in the Contract Documents.	-
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**405.05 MATERIALS**

**405.05.01 General**

Inspection Activities:

1	-	Check the subdrains <u>pipes are</u> according to OPSS 405 or as specified in the Contract Documents.	25%
2	-	Check the outlet pipes <u>are</u> according to OPSS 405 or as specified in the Contract Documents.	25%
3	-	Check the outlets <u>are</u> according to OPSS 405 or as specified in the Contract Documents.	25%

**405.05.02 Corrugated Steel Pipe Products**

Inspection Activities:

1	-	Check corrugated steel pipe and coating are according to OPSS 1801 and as specified in the Contract Documents.	25%
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**405.05.03 Embedment Material**

**405.05.03.01 Clear Stone**

**Inspection Activities:**

<u>1</u>	<u>-</u>	<u>Check clear stone as specified in OPSS 405 and OPSS 1004.</u>	<u>25%</u>
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**405.05.03.02 Granular**

Inspection Activities:

<u>1</u>	<u>=</u>	<u>Check granular material according to OPSS 405 and OPSS 1010 and as specified in the Contract Documents.</u>	<u>25%</u>
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**405.05.03.01 Clear Stone**

Inspection Activities:

<u>1</u>	<u>=</u>	<u>Check clear stone as specified in OPSS 405 and OPSS 1004.</u>	<u>25%</u>
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**405.05.03.03 Open Graded Drainage Layer Aggregate**

Inspection Activities:

<u>1</u>	=	<u>Check open graded drainage layer aggregate as specified in OPSS 405 and OPSS 320.</u>	<u>25%</u>
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**405.05.04                      Fittings**

Inspection Activities:

<u>1</u>	=	<u>Check that fittings are suitable for and compatible with the class and type of pipe with which they will be used as specified in OPSS 405.</u>	<u>25%</u>
<u>2</u>	=	<u>Check caps are polyethylene according to OPSS 405 or as specified in the Contract Documents.</u>	<u>25%</u>
<u>3</u>	=	<u>Check galvanizing rodent gates are as specified in OPSS 405 and CSA G164.</u>	<u>25%</u>

**405.05.05                      Geotextiles**

Inspection Activities:

<u>1</u>	=	<u>Check geotextiles are according to OPSS 405, OPSS 1860, and as specified in the Contract Documents.</u>	<u>25%</u>
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**405.05.06                      Polyethylene Pipe Products**

Inspection Activities:

<u>1</u>	=	<u>Check polyethylene pipe according to OPSS 405, OPSS 1840 or <del>BNQ3624-115</del>, and as specified in the Contract Documents.</u>	<u>25%</u>
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**405.05.07                      Polyvinyl Chloride Pipe Products**

Inspection Activities:

<u>1</u>	=	<u>Check <u>polyvinyl chloride pipe products</u> <del>geotextiles</del> are according to OPSS 405, OPSS 184<u>160</u>, and as specified in the Contract Documents.</u>	<u>25%</u>
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~~**405.05.05                      Geotextiles**~~

~~Inspection Activities:~~

<del><u>1</u></del>	<del>=</del>	<del><u>Check geotextiles are according to OPSS 405, OPSS 1860, and as specified in the Contract Documents.</u></del>	<del><u>25%</u></del>
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~~**405.05.046                      Fittings**~~

Inspection Activities:

1	-	Check that fittings are suitable for and compatible with the class and type of pipe with which they will be used as specified in OPSS 405.	25%
2	-	Check caps are polyethylene according to OPSS 405 or as specified in the Contract Documents.	25%
3	-	Check galvanizing rodent gates are as specified in OPSS 405 and CSA G164.	25%

~~405.05.03.02~~ ~~Granular~~

~~Inspection Activities:~~

<del>1</del>	<del>-</del>	<del>Check granular material according to OPSS 405 and OPSS 1010 and as specified in the Contract Documents.</del>	<del>25%</del>
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~~405.05.03.01~~ ~~Clear Stone~~

~~Inspection Activities:~~

<del>1</del>	<del>-</del>	<del>Check clear stone as specified in OPSS 405 and OPSS 1004.</del>	<del>25%</del>
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~~405.05.03.03~~ ~~Open Graded Drainage Layer Aggregate~~

~~Inspection Activities:~~

<del>1</del>	<del>-</del>	<del>Check open graded drainage layer aggregate as specified in OPSS 405 and OPSS 320.</del>	<del>25%</del>
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**405.06 EQUIPMENT- NOT USED**

**405.07 ~~Construction~~ ONSTRUCTION**

**405.07.01 General**

Inspection Activities:

1	-	Check the trench alignment, grade and width at each outlet pipe connection and at the mid point between outlets according to OPSS 405 and as specified in the Contract Documents.	25%
2	-	Check grade of bedding material according to OPSS 405.	25%
3	-	Check the condition of subdrain, outlet pipe, and geotextile according to OPSS 405.	25%

14	-	<del>Ensure</del> <u>Check</u> that damaged geotextile, subdrain, or outlet pipe are replaced as specified in OPSS 405.	100%
25	-	<del>Ensure</del> <u>Check</u> that the stability of the subdrain and outlet pipe trenches are always maintained during excavation and backfilling according to OPSS 405 and as specified in the Contract Documents.	100%

~~Administrative Activities:~~

4	-	<del>Receive and Check the Contractor inspection reports upon request as specified in OPSS 405.</del>	-
2	M	<del>Notify the Contractor if the inspection report is approved.</del>	-

**405.07.02 Excavations**

Inspection Activities:

1	-	Check the trenches are excavated to the lines, grades, and dimensions according to OPSS 405 and as specified in the Contract Documents.	25%
2	-	<u>Oversee grade checks inspection performed by Contractor.</u>	<u>25%</u>

**405.07.03 Unstable Foundations**

Administrative Activities:

1	M	<del>Check if the E</del> <u>Check if the E</u> necessary steps are being taken by the contractor to provide stable foundation in situation where unstable foundation conditions are encountered as specified in OPSS 405.	-
2	-	Upon request, Receive and Check the Contractor inspection report to verify the foundation stability as specified in OPSS 405 or according to the Contract Documents.	-
3	M	<del>Notify the Contractor if the inspection report is approved.</del>	-

~~Inspection Activities:~~

4	-	<del>Check stable foundation is provided as specified in OPSS 405 or according to the Contract Documents.</del>	-
2	-	<del>Check the Contractor's inspection report upon request to verify the foundation stability as specified in OPSS 405 or according to the Contract Documents.</del>	25%

**405.07.04 Support Systems**

Administrative Activities:

1	-	<u>Check the support systems are according to OPSS 404 when specified in Contract Documents.</u>	25%
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**405.07.054 Geotextile**

Inspection Activities:

1	-	Check the subdrain is wrapped with a knitted sock geotextile as specified in OPSS 405 or according to the Contract Documents.	25%
<u>2</u>	-	<u>Check the subdrain trench and outlet pipe trench are wrapped with geotextile when OGD or 19 mm clear stone embedment are specified in the Contract Documents.</u>	

**405.07.065 Bedding**

Inspection Activities:

1	-	Check the bedding is placed in the trench to the depth <u>specified in the Contract Documents</u> , prior to laying the subdrain or outlet pipe, as specified in OPSS 405 or according to the Contract Documents.	100%
2	-	Check the pipe bedding grade <u>is inspected</u> with grade checks and certified by the Contractor, prior to laying the subdrain or outlet pipe, as specified in OPSS 405.	25%

**405.07.076 Laying Subdrain and Outlet Pipe**

**405.07.076.01 General**

Inspection Activities:

1	-	Check the pipe installation according to OPSS 405 and OPSS 421.	25%
2	-	Check the pipe is firmly placed in a manner that meets the requirements according to OPSS 405 and OPSS 421.	25%
3	-	Check the connections between the subdrain and outlet pipe are as specified in OPSS 405.	25%
4	-	Check the outlet pipes are installed as specified in OPSS 405.	25%
5	-	Check the subdrain and outlet pipe installation is inspected <u>and approved</u> by the Contractor, prior to backfilling, as specified in OPSS 405.	25%

**405.07.076.02 Outlets**

**405.07.067.02.01 General**

Inspection Activities:

1	-	Check the properties of the outlet meet the requirements according to OPSS 405 and as specified in the Contract Documents.	25%
2	-	Check the outlets are extended beyond the front of the ditch or fill slope for a distance of 300 mm according to OPSS 405 or as specified in the Contract Documents.	25%
3	-	Check the ends of all outlets are fitted with galvanized rodent gates according to OPSS 405.	25%
4	-	Check the joint between the outlet pipe and the outlet is wrapped with a 0.5 m width of geotextile according to OPSS 405 or as specified in the Contract Documents.	25%

**405.07.076.02.02 Marking of Outlets**

Inspection Activities:

1	-	Check the marking on each outlet location meets the requirements specified in OPSS 405.	25%
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**405.07.076.03 Connection to Drainage Structures**

Inspection Activities:

<u>1</u>		<u>Check subdrains are connected to maintenance holes, catch basins and ditch inlets by a 1 m section of non-perforated pipe.</u>	<u>25%</u>
<u>24</u>	-	Check the subdrain is connected to maintenance holes, catch basins, and ditch inlets <del>by specified connection, cored and grouted</del> according to OPSS 4085 <del>and</del> as specified in the Contract Documents.	25%

**405.07.087 Embedment and Backfill Material**

**405.07.08.01 General**

Inspection Activities:

1	-	Check the embedment material is according to OPSS 405 and as specified in the Contract Documents.	25%
2	-	Check the backfill material is according to OPSS 405 and as specified in the Contract Documents.	25%

3	-	Check <del>the Contractor has ensured that</del> the subdrain and outlet pipe are not damaged or dislodged during the placement and compaction of embedment and backfill material and that the damaged or dislodged subdrain and outlet pipe are removed and replaced as specified in OPSS 405.	25%
4	-	Check any earth from cave-ins and all other unsuitable material are removed from embedment and backfill material as specified in OPSS 405.	100%
5	-	Check compaction of material according to OPSS 501.	25%
6	-	Check backfilling is complete over all subdrain and outlet pipe placed at the end of a day's work as specified in OPSS 405.	50%
<u>7</u>		<u>Check the outlet pipe is on grade and unobstructed for its full length after backfilling.</u>	<u>25%</u>

#### **405.07.087.024 Winter Grading of Material**

Inspection Activities:

1	-	Check all ice, snow, and frozen material are removed from the work area and <del>the final grading and compaction is done after the underlying materials were thawed</del> frozen material is not incorporated into the work according to OPSS 405, <del>and as specified in the Contract Documents.</del> <u>Check the embedment and backfill material is not placed over frozen ground, ice or snow.</u>	50%
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#### **405.07.09 Construction Inspection Report**

Administrative Activities:

<u>1</u>		<u>Check the construction inspection report address the items specified in OPSS 405.</u>	<u>25%</u>
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#### **405.07.01098 Closed-Circuit Television Inspection**

##### **405.07.1009.01 General**

Administrative Activities:

1	M	Check the Contractor has inspected the drainage system using CCTV inspection as specified in OPSS 409, when specified in the Contract Documents, to <del>ensure-verify</del> that the subdrain and outlet pipes are intact and not crushed or damaged during construction	-
2	M	Prior to commencement of the CCTV inspection, <del>ensure-Check</del> that the equipment used for CCTV inspection is as specified in OPSS 409 with the <del>exceptions</del> <u>additions</u> provided in OPSS 405.	-
3	-	<del>Ensure that the CCTV inspection is based on selected sampling at identified locations as specified in OPSS 405 or according to the Contract Documents.</del>	-



Inspection Activities:

<u>1</u>	-	<u>Identify the sampling locations for CCTV inspection of a minimum of 5% of the entire length of the subdrain pipe and 100% of the outlet pipes.</u>	<u>25%</u>
<u>2</u>	-	<u>Ensure-Check that CCTV inspections are conducted in a manner that meets the requirements according to of OPSS 405 and OPSS 409, as specified in the Contract Documents.</u>	25%
<u>3</u>	-	<u>Request additional CCTV inspection if defective, damaged or improperly installed pipes are encountered.</u>	<u>25%</u>

**405.07.10.02** CCTV Inspection Report

Administrative Activities:

<u>1</u>		<u>Check the inspection report address the items specified in OPSS 405.</u>	<u>25%</u>
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**405.07.110** Remedial Work

<u>1</u>		<u>When notified about encountered defects as defined in OPSS 405 and MSCC manual request pipe/joint replacement to be done.</u>	<u>25%</u>
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**405.07.12109** **Management of Excess Material**

Inspection Activities:

1		Check the management of excess material as specified in the Contract Documents.	25%
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**405.08** **QUALITY ASSURANCE**

Inspection Activities:

<u>4</u>		<u>Check the Contractor demonstrates that the outlet pipe is on grade and unobstructed for its full length after backfilling as specified in OPSS 405.</u>	<u>25%</u>
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**405.08.01**                 **Acceptance Criteria**

Inspection Activities:

<u>1</u>		<u>Check the subdrains and outlet pipes for any damage or defects and that installation is according to Contract Documents.</u>	<u>25%</u>
<u>2</u>	-	Check the subdrains and outlet pipes with damage or defects or that is improperly installed are removed and replaced according to the requirements of OPSS 405 and the Contract Documents.	100%

~~Administrative Activities:~~

<del>1</del>	<del>M</del>	<del>Ensure that subdrains and outlet pipes with damage or defects or that is improperly installed are removed and replaced according to the requirements of the Contract Documents.</del>	<del>-</del>
<del>2</del>	<del>M</del>	<del>Notify the Contractor if the subdrain and outlet pipe with damage or defects or that is improperly installed has been removed and installed as specified in the Contract Documents.</del>	<del>-</del>

**405.09**                      **MEASUREMENT FOR PAYMENT**

Administrative Activities:

1	-	Measurement for payment shall be as specified in OPSS 405.	-
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**405.10**                      **BASIS OFF FOR PAYMENT**

Administrative Activities:

1	-	<del>Measurement for</del> <u>Basis of</u> payment shall be as specified in OPSS 405.	-
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WARRANT: Always with OPSS 405, Construction Specification for Pipe Subdrains