

Administration and Inspection Activities for Precast Concrete Culverts with Spans Greater than 3.0 m

(As Specified in OPSS 912)

912.01 SCOPE

This CAIS covers the construction administration and inspection requirements for the construction of single and adjacent side-by-side (multi-cell) precast concrete box culverts with spans greater than 3.0 m, and associated precast concrete appurtenances, in open cut, for both new culverts and replacement of existing culverts as specified in OPSS 912, November 2025.

912.02 REFERENCES

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

Ontario Provincial Standard Specifications, Construction:

OPSS 904 Concrete Structures
OPSS 912 Precast Concrete Culverts with Spans Greater than 3.0 m

Ontario Provincial Standard Specifications, Material:

OPSS 1205 Clay Seal
OPSS 1350 Concrete – Materials and Production
OPSS 1355 Precast Concrete – Materials and Production

Standard Special Provisions:

599S30 Waterproofing of Precast Concrete Culverts

Construction Administration and Inspection Specifications (CAIS):

CAIS 209 Embankments Over Swamps
CAIS 404 Support Systems
CAIS 501 Compacting
CAIS 517 Dewatering
CAIS 539 Temporary Protection Systems
CAIS 599-30 Waterproofing of Precast Concrete Culverts
CAIS 902 Excavating and Backfilling - Structures
CAIS 904 Concrete Structures
CAIS 905 Concrete Reinforcement
CAIS 905 Steel Reinforcement for Concrete
CAIS 909 Prestressed Concrete - Precast Girders
CAIS 910 Stressing Systems for Post Tensioning
CAIS 919 Formwork and Falsework

CAIS 929 Abrasive Blast Cleaning - Concrete Construction
 CAIS 930 Structure Rehabilitation - Concrete Patches, Refacing, and Overlays
 CAIS 932 Crack Repair - Concrete
 CAIS 1002 Aggregates - Concrete
 CAIS 1004 Aggregates - Miscellaneous
 CAIS 1010 Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
 CAIS 1205 Clay Seal
 CAIS 1302 Water
 CAIS 1306 Burlap
 CAIS 1350 Concrete - Materials and Production
 CAIS 1440 Steel Reinforcement for Concrete
 CAIS 1860 Geotextiles
 CAIS 999-29 Installation of Metallic Dowels Into Concrete

MTO Forms:

PH-CC-322 Concrete Construction Report
 PH-CC-433A Concrete Mix Design Form A
 PH-CC-701 Request to Proceed
 PH-CC-702 Notice to Proceed

MTO Structural Manual

912.03 DEFINITIONS

For the purposes of this CAIS, the definitions shall be as specified in OPSS 912.

912.04 DESIGN AND SUBMISSION REQUIREMENTS

912.04.01 Design Requirements

912.04.01.01 Culvert

Administrative Activities:

1	M	Check that any culvert design is according to CSA S6, the MTO Structural Manual Division 1, and as specified in the Contract Documents.	-
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912.04.02 Submission Requirements

912.04.02.01 Working Drawings

Administrative Activities:

1	M	Verify that one electronic copy in PDF format of fabrication Working Drawings including supporting documents are received at least 7 Days prior to commencement of fabrication of the elements, or 35 Days when other authorities are involved in the approval of the design or construction.	-
2	M	When other authorities are involved in the approval of the design or construction, verify that one additional copy of the Working Drawings and supporting documentation submission is provided for each authority.	
3	M	Check that the Working Drawings bear the seal and signature of an Engineer certifying they are according to the Contract Documents.	-
4	M	Check that the Working Drawings and supporting documents are submitted and contain the information listed in the Contract Documents.	-
5	-	Check that the waterproofing of the precast culvert is as specified in the Contract Documents.	-
6	-	After reviewing the Working Drawings and technical documentation submissions, submit with comments, to the Contractor, MTO CSA and MTO Structural within 2 Business Days of receipt.	-
7	-	Ensure a final copy of all Contractor submissions is shared with inspection staff and available to perform on-site administration and inspection duties.	-
7	-	Ensure a final copy is sent to MTO Structural Section.	-

912.04.02.02 Preformed Joint Seal

Administrative Activities:

1	-	Receive the manufacturer's recommended installation procedures for the preformed joint seal a minimum of 5 Days prior to the commencement of installation.	-
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912.05 MATERIALS**912.05.01 Backfill****912.05.01.01 Backfill to Structure**

Inspection Activities:

1	-	Check that backfill material is as specified in OPSS 912.05.01.01 and the Contract Documents.	100%
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912.05.01.02 Backfill Beyond Structure

Inspection Activities:

1	-	Check that backfill material beyond the structure is as specified in OPSS 912.05.01.02 or the Contract Documents.	100%
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912.05.02 Bedding

Inspection Activities:

1	-	Check that bedding material is as specified in OPSS 912.05.02 or the Contract Documents.	-
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912.05.03 Clay Seal

Administrative Activities:

1	-	Check that clay seal is according to OPSS 1205 and CAIS 1205.	-
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912.05.04 Concrete

Administrative Activities:

1	-	Check that concrete is as specified in OPSS 912.	-
2	-	For precast concrete culverts and appurtenances, Check that precast concrete is as specified in OPSS 1355 in its entirety. For precast concrete, additional inspection and administrative activities shall be as specified in CAIS 1355.	-

3	-	Check that cast-in-place concrete, including concrete appurtenances, protections slabs and distributions slabs, are according to OPSS 1350 in its entirety. Additional inspection and administrative activities shall be as specified in CAIS 1350.	-
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912.05.05 Geotextile

Inspection Activities:

1	-	Check that geotextile is as specified in OPSS 912.05.05 and the Contract Documents.	50%
2	-	Check geotextile is according to CAIS 1860 and the Contract Documents.	-

912.05.06 Granular Cover

Inspection Activities:

1	-	Check that granular cover material is as specified in OPSS 912.05.06 and the Contract Documents.	-
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912.05.07 Grout

Administrative Activities:

1	-	Check that grout material is as specified in OPSS 912.05.07 and the Contract Documents.	-
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912.05.08 Levelling Course

Administrative Activities:

1	-	Check that levelling course fine aggregate material is as specified in OPSS 912.05.08 and the Contract Documents.	-
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912.05.09 Native Material

Administrative Activities:

1	-	Check all native and imported material is as specified in OPSS 912.05.09, the recommendations in the Foundations Investigation and Design Report for this site and approve their use.	-
2	-	If native or imported material is not specified in the contract but is requested by the Contractor submit request to MTO's Quality Assurance Section and MTO's Structures Office, Foundations Section for review.	-

912.05.10 Preformed Joint Seal

Administrative Activities:

1	-	Check that preformed joint seal is as specified in OPSS 912.05.10 and the Contract Documents.	-
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912.05.11 Proprietary Patching Materials

Administrative Activities:

1	-	Receive the Owner's list of proprietary concrete patching materials from MTO Quality Assurance Section and provide to the Contractor, when required.	-
2	-	Verify that the selected proprietary patching materials are from the Owner's List of Acceptable Concrete Patching Materials.	-

912.07 CONSTRUCTION**912.07.01 Foundations****912.07.01.01 General**

Administrative Activities:

1	-	If unsuitable material is encountered during excavation consult the Foundations Engineering Specialist for recommendations.	-
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Inspection Activities:

1	M	Check the foundation is prepared as specified in the Contract Documents and according to 912.07.01.01.	100%
2	M	Check the final elevation of the top of the levelling course is as specified in the Contract Documents.	100%

912.07.01.02 Support Systems

Inspection Activities:

1	M	Check support systems is according to OPSS 404 and CAIS 404.	50%
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912.07.01.03 Temporary Protection Systems

Inspection Activities:

1	M	Check temporary protection systems is according to OPSS 539 and CAIS 539.	50%
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912.07.01.04 Excavation

Inspection Activities:

1	M	Check excavation is according to OPSS 902 and CAIS 902.	100%
2	M	Check swamp excavation if required is according to OPSS 209 CAIS 209.	100%

912.07.01.05 Dewatering

Inspection Activities:

1	M	Check dewatering is according to OPSS 517 and CAIS 517.	100%
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912.07.01.06 Bedding

Inspection Activities:

1	-	Check that bedding placement is as specified in the Contract Documents.	100%
2	-	Check compaction is according to OPSS 501 and CAIS 501.	100%
3	-	Check that bedding provides uniform support under the full width and length if the culvert.	100%
4	-	Check that bedding and subgrade material is protected from disturbance during construction.	50%

912.07.01.07 Levelling Course

Inspection Activities:

1	-	Check leveling course material is as specified in OPSS 912.07.01.07.	50%
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912.07.02 Placement of Geotextile at Joints Prior to Installation of Elements

Inspection Activities:

1	-	Check that geotextile at joints placed prior to installation of elements is as per OPSS 912.07.02.	100%
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912.07.03 Inspection of Elements Prior to Installation

Inspection Activities:

1	M	If any defects or deficiencies are present on the elements receive notification from the contractor.	-
2	M	If no defects or deficiencies are present or have been repaired, receive the MTO form PH-CC-701, Request to Proceed from the Contractor, after delivery of the elements to site before installation.	-
3	M	Check the elements for defects and deficiencies prior to installation, and that the repairs have been completed according to the Defects and Deficiencies clause of OPSS 1355.	-
4	M	If defects or deficiencies are found, Notify the Contractor of the type, size, and quantity and which element that they occur on.	-
5	-	Check that the repairs have been completed according to the Defects and Deficiencies clause of OPSS 1355 when applicable.	-
6	M	Once all repairs have been made, and the elements are acceptable issue a MTO form PH-CC-702, Notice to Proceed, in a timely manner, and prior to installation of the elements on site.	-

912.07.04 Installation of Elements

912.07.04.01 General

Inspection Activities:

1	M	Check that the installation of the elements is according to the Working Drawings and Contract Documents.	100%
2	M	Check that precast culverts with defects and deficiencies causing rejection according to the Contract Documents, are not included in the Work.	100%
3	M	Check that the precast elements are not overstressed, unstable or unsafe at any time during installation.	100%
4	M	Check that the culvert is installed true to the elevations and alignment in the Contract Documents.	100%

Administrative Activities:

1	M	Receive Contractor's written notification a minimum of 3 Business Days prior to the commencement of installation.	-
2	M	Receive report from Contractor documenting any culvert installation requirements that were not met, if applicable.	-

3	M	If repairs to erected elements are required, receive and Review repair procedures from the Contractor. Depending on the nature of the repair forward the submission to the Quality Assurance Section.	-
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912.07.04.02 Joints Between Elements

Inspection Activities:

1	M	Check all the joints between elements of the culverts are constructed and treated as specified in the Contract Documents and OPSS 912.07.04.02.	100%
2	-	Check all connection plates are installed between units in accordance with the Contract Drawings.	100%

912.07.04.03 Additional Requirements for Side-By-Side Culverts

Inspection Activities:

1	M	Check that the gap between the culverts meets the requirements of the Contract Documents and clause 912.07.04.03.	100%
2	M	Check that the vertical faces between the side-by-side culverts was not waterproofed.	100%
3	M	Check that grout was placed according to clause 912.07.04.03 and the Contract Documents.	100%

912.07.05 Filling of Holes for Lifting Devices

Inspection Activities:

1	-	Check that the holes for lifting devices are patched after installation with a proprietary patching material as per OPSS 912.07.05.	100%
2	-	Check proprietary patching material according to CAIS 904.	100%

912.07.06 Inspection after the Installation of the Culvert and Prior to Waterproofing

Administrative Activities:

1	M	Receive and Check a MTO form PH-CC-701, Request to Proceed from the Contractor, after the installation of all elements of a culvert within a construction stage, prior to waterproofing.	-
2	M	Check that culverts have been installed according to the Contract Documents and any defects or deficiencies have been repaired according to OPSS 1355.	-
3	M	Issue a MTO form PH-CC-702, Notice to Proceed, in a timely manner, and prior to the next operation.	-

912.07.07 Cast-in-Place Concrete Appurtenances, Protection Slabs, and Distribution Slabs

Inspection Activities:

1	-	Check cast-in-place concrete appurtenances, protection slabs, and distribution slabs are according to OPSS 904 in its entirety. Additional administration and inspection activities shall be as specified in CAIS 904.	100%
2	-	Check reinforcing steel is according to OPSS 905 in its entirety. Additional administration and inspection activities shall be as specified in CAIS 905.	100%
3	-	Check abrasive blast cleaning is according to OPSS 929 and CAIS 929.	100%
4	-	Check that protection slabs or distribution slabs, when required, are according to the requirements of the Contract Documents.	100%

912.07.08 Waterproofing of the Culvert

Inspection Activities:

1	M	Check waterproofing is as specified in SSP 599S30 and CAIS 599-30.	100%
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912.07.09 Inspection after the Waterproofing of the Culvert and Prior to Backfilling

Administrative Activities:

1	-	Receive and Check a MTO form PH-CC-701, Request to Proceed from the Contractor, after the waterproofing of all elements of a culvert within a construction stage, prior to backfilling.	-
2	-	Issue a MTO form PH-CC-702, Notice to Proceed, in a timely manner, and prior to the next operation.	-

912.07.10 Placement of Geotextile at Joints After Waterproofing

Inspection Activities:

1	-	Check that all joints are covered with geotextile after completion of waterproofing and placement of protection board is according to OPSS 912.07.10.	100%
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912.07.11 Backfilling

Inspection Activities:

1	M	Check backfilling is according to OPSS 902 and CAIS 902.	100%
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2	M	Check that the uncompacted lift thickness does not exceed 300 mm.	50%
3	M	Check that backfill is placed without any damage or movement of the elements.	100%

912.07.12 Granular Cover

Inspection Activities:

1	M	Check granular cover placement and compaction according to OPSS 501 and CAIS 501.	100%
2	M	Check that granular cover is placed with maximum uncompacted lift thickness of 200 mm.	50%
3	M	Check that cover material is placed without any damage or movement of the elements.	100%

912.07.13 Clay Seals

Inspection Activities:

1	M	Select representative sample of clay for maximum dry density test according to LS-706.	100%
2	-	Check that clay seal placement is according to OPSS 912.07.12.	100%

Administrative Activities:

1	-	Select a single representative sample from the clay seal for testing by the Contractor according to LS-706, as per OPSS 912.07.12.	-
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912.07.14 Access for Quality Assurance

Inspection Activities:

1	M	Check that access for quality assurance is provided according to OPSS 912.07.13.	100%
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Administrative Activities:

1	-	Receive written notification from Contractor when the culvert is ready for verification measurements and inspection according to OPSS 912.07.14.	-
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912.07.15 Management of Excess Materials

Administrative Activities:

1	-	Check that management of excess material is as specified in the Contract Documents.	-
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912.08 QUALITY ASSURANCE**912.08.01 General**

Inspection Activities:

1	-	Confirm acceptance of precast concrete culverts is according to OPSS 912.08.01.	100%
2	-	For precast concrete culverts and appurtenances, Inspect the elements for defects or deficiencies as specified in OPSS 1355. Additional inspection activities shall be as specified in CAIS 1355.	100%
3	-	For cast-in-place concrete appurtenances, protection slabs and distribution slabs, additional inspection activities shall be as specified in CAIS 904 and CAIS 1350.	100%
4	M	Conduct inspection for dowels as specified in the Contract Documents.	100%
5	-	Confirm acceptance of reinforcing steel according to CAIS 905.	100%

Administrative Activities:

1	-	Check that quality assurance and acceptance of precast concrete culverts is as specified in OPSS 912.	-
2	-	For precast concrete culverts and appurtenances, Check that quality assurance and acceptance is as specified in OPSS 1355. Check that precast concrete culverts and appurtenances meet the quality assurance requirement as specified in OPSS 1355, including acceptable 28-Day compressive strength, air void system parameters, and rapid chloride permeability. For precast concrete, additional administrative activities shall be as specified in CAIS 1355.	-
3	-	For cast-in-place concrete, including appurtenances, protection slabs and distribution slabs, Check that quality assurance and acceptance is as specified in OPSS 904 and OPSS 1350. For cast-in-place concrete, additional administration activities shall be as specified in CAIS 904 and CAIS 1350.	-
4	-	Notify MTO's Quality Assurance Section for any concrete culverts, appurtenances, protection slabs or distribution slabs that fail to meet the acceptance requirements. Provide written notification to the Contractor, after consultation with MTO, for rejectable work.	-

912.08.02 Acceptance of Installation Tolerances

Inspection Activities:

1	M	Check measurements on the culvert after installation but prior to waterproofing or backfilling operations to confirm compliance with the requirements of OPSS 912.08.02.	100%
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912.08.03 Dowels

Inspection Activities:

1	M	Check that dowels, if required, are installed according to SP999F29 and CAIS 999-29	100%
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912.08.04 Field Inspection

Inspection Activities:

1	M	Inspect the culverts and the work for any defects and deficiencies. Notify MTO's Quality Assurance Section of any defects or deficiencies.	100%
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912.09 MEASUREMENT FOR PAYMENT

Administrative Activities:

1	-	Measurement for payment shall be as specified in OPSS 912.09.	-
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912.10 BASIS OF PAYMENT

Administrative Activities:

1	-	Basis of payment shall be as specified in OPSS 912.10.	-
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