Disclaimer

The members of the MMCD Association have taken care in preparing these documents, but neither the members nor the MMCD Association accepts any liability for any loss or damage which may be suffered by any person or corporation as a result of the use of the documents. These documents are made available without representation by the MMCD Association or its members as to the appropriateness of their use in any particular situation and issued on the strict understanding that each user accepts full responsibility for their use.

Supplementary Specification Disclaimer

This set of Supplemental Specifications is provided as the MMCDA method of continual and collective improvement of the Document Set. These changes have been reviewed by the members of the MMCDA for their applicability and relevance to the Documents, Specifications, and/or Standard Drawings and have been deemed important to the Documents to correct either errors or omissions since the release of the Documents.

Supplementary Specification Usage

Usage of Supplemental Specifications must be explicitly stated in order to be applicable - there is no inclusionary implication simply by their release by the MMCDA. Users of the MMCD are encouraged to review each Supplementary Specification for applicability in their contract environment and apply necessary processes to incorporate them into their Tender preparation activities.

In order for a Supplementary Specification to be applicable for a Tender, it must be identified explicitly in the Schedule of Contract Documents – Schedule 1 of the Form of Agreement.

Supplementary Numbering Protocol

While the Supplementary Specifications, General Conditions, and Drawings are released as a set, this is done more out of convenience and to reduce administrative overhead. As such, each individual Supplementary item (specification, General Condition, or Drawing) included in this document is uniquely identified to permit users the opportunity to selectively include individual Supplementary items without including this Supplementary document in its entirety.

If, following requisite review processes, all items in this document are applicable to the user's Tender and Contract process, it is possible to include all items by the collection identifier; i.e. "MMCD Supplemental Update 2011-08-04" would include all items in this document.

If, however, only one of the items was determined to be applicable to the user's Tender and Contract process, a particular item (or group of items) can be included by the individual item reference; i.e. "33 49 23S - 2011-018 (2011-08-08)" would represent the change to 33 49 23 included in this document.

Supplementary Specification:	**33 49 23S – 2011-018 (2011-08-08)**		
Affected Document(s)	Volume II	Change Type	Addition
Section:	33 49 23	Reference:	33 49 23
Change Summary			
Currently	<missing>		
Should Be	Added to Standard Specifications.		

1.0 GENERAL

.1 Section 33 49 23 refers to those portions of the work that are unique to the supply and installation of underground storm water infiltration / detention systems. Related appurtenances are included in other sections. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

.2 All details of storm sewer facilities not specifically covered in this section to comply with CSA, ASTM and CGSB standards and/or manuals of practice as specified in Contract Documents.

1.1 Related Work

.1	Temporary Facilities	Section 01 53 01
.2	Aggregates and Granular Materials	Section 31 05 17
.3	Excavating, Trenching and Backfilling	Section 31 23 01
.4	CCTV Inspection of Pipelines	Section 33 01 30.1
.5	Cleaning of Sewers	Section 33 01 30.2
.6	Pipe Culverts	Section 33 42 13
.7	Manholes and Catchbasins	Section 33 44 01

1.2 References

.1 The abbreviated standard specifications for testing, materials, fabrication and supply, referred to herein, are fully described in Section 01 42 00 –Reference Specifications – Site Infrastructure.

1.3 Samples

.1 Samples may be required.

1.4 Material Certification

.1 Aggregate surrounding infiltration systems shall have a minimum void ratio of 40%.

.2 At least 14 days prior to commencing work, submit to Contract Administrator the material manufacturer's recent test data and certification that materials to be incorporated into works are representative and meet requirements of this Section. Include manufacturer's drawings where pertinent

.3 Project specific shop drawings of the system components shall be sealed by a Professional Engineer registered in the Province of British Columbia. Shop drawing shall show general layout of the system and its structural design parameters such as assumed allowable bearing capacity and loadings.

1.5 Scheduling of Work

.1 Schedule work to minimize interruptions to existing services.

.2 Submit schedule of expected interruptions to Contract Administrator for approval and adhere to approved schedule.

1.6 Measurement and Payment

.1 Payment for underground storm water infiltration / detention system will be made separately for various sections of the system consistent with pipe materials and models, depths and backfill requirements shown on Contract Drawings and described under individual payment items in Schedule of Quantities and Prices.

Measurement for the system will be made based on specified design storage volume installed or as specified in Contract Document.

.2 Payment for underground storm water infiltration / detention system includes saw cutting pavement, excavation, disposal of surplus excavated material, supply and installation of the system, fittings and related materials, bedding, surrounding aggregates, system access including connection to the distribution header, geotextile and if required impermeable liner, imported or native backfill as shown on Contract Drawings, cleaning, all surface restoration as specified under Excavating, Trenching and Backfilling Section 31 23 01 – Sub-section 3.6, except permanent pavement restoration, and all other work and materials necessary to complete installation as shown on Contract Drawings and specified under this Section.

.3 Payment for Inspection and Testing of underground storm water infiltration / detention systems shall be lump sum.

.4 Payment for flushing of underground storm water infiltration / detention systems shall be lump sum.

2.0 PRODUCTS

.1 Pipe culverts used for infiltration and detention purposes shall be referred to Section 33 42 13 – Pipe Culverts.

.2 All products shall withstand H-20 loading.

2.1 Concrete Box Culvert

.1 Concrete Box Culvert: to ASTM C1433-08

.2 End caps/walls: to ASTM C1433-08

.3 Box culverts to be manufactured in accordance to depth of fill tables specified in ASTM C1443-08 to suit site conditions.

.4 Box culvert lay lengths: Up to 2.44m, or as specified on Contract Drawings.

.5 Geotextile fabric to be used at joints.

.6 All concrete box culvert system shall incorporate at least one manhole access point to allow for inspection and maintenance.

.7 Manholes access tees and/or flow control structures including bases and lids: manufactured to CSA A257.4 and/or ASTM C478.

2.2 Polypropylene Arched Chamber, Corrugated Wall

.1 Raw materials and processes used in the manufacture of storm water chambers shall meet the requirements of ASTM F 2418 and CSA B184.

2.3 Polyethylene Arched Chamber, Corrugated Wall

.1 Raw materials and processes used in the manufacture of storm water chambers shall meet the requirements of CSA B184.

2.4 Corrugated Steel Pipe System, Corrugated Wall

.1 Corrugated steel pipe to Section 33 42 13. Pipe material to be Galvanized Steel, Aluminized Type 2 Steel or Polymer Laminated Steel to CSA G401.

.2 . Couplers shall be Hugger Band type couplers complete with o-ring gaskets to Section 33 40 01.

.3 Integral CSP manholes shall be detailed as per shop drawings. Pre-cast concrete manhole tops shall be designed such that the top bears on the surrounding backfill so that all live load is transmitted to the backfill zone adjacent to the CSP manhole riser.

.4 Steel plate bulkheads shall be fabricated from steel plate with continuously welded reinforcing steel members. Bulkheads shall be factory coated with 2 coats of zinc-rich paint as per CSA G401. Bulkheads shall be attached to the CSP pipe barrel with a continuous fillet weld.

2.5 Polymeric Cubic Structure

1. Cubic structure materials to be polypropylene copolymer (CPP) to ASTM D4101 and supporting columns to be poly vinyl chloride (PVC) to ASTM D1784.

2. Module interactions: adjacent modules must be capable of transferring the applied side and vertical loads to adjacent modules through an assembly of modules.

2.6 Geotextile and Liner

.1 Geotextile fabric used for separating bedding and surrounding aggregate from native soils and backfill shall be AASHTO M288 Class 2 non-woven geotextile..

.2 Impermeable liner used in detention system for separating bedding and surrounding aggregate from native soils and backfill shall be minimum 30 mil thick PVC or LLDPE liner.

2.7 Granular Chambre Bedding and Surround Material

.1 As shown on Contract Drawings.

.2 Refer to Section 31 05 17 - Aggregates and Granular Materials for material specifications.

.3 Approved Bedding and Surround Materials: 19mm or 40mm clear crushed gravels with a minimum porosity of 40% after installation.

2.8 Backfill Material

.1 As shown on Contract Drawings.

.2 Refer to Section 31 05 17 - Aggregates and Granular Materials for material specifications.

3.0 EXECUTION

3.1 General

.1 System bedding details, including granular surround and material specifications to be as shown on Contract Drawings, including Standard Detail Drawing G4.

.2 The component supplier's representative shall beavailable to provide project start-up assistance and provide technical support. Should site conditions deviate from the sealed shop drawings during construction, the Contract Administrator shall be notified.

3.2 Preparation

.1 Carefully inspect materials for defects before installing. Remove defective materials from site. Clean system components of debris and water before installation.

3.3 Excavation

.1 Excavate in accordance with Section 31 23 01 - Excavating, Trenching and Backfilling.

.2 System alignment and depth as shown on Contract Drawings.

3.4 Granular Bedding

.1 Fill over-excavation below design elevation of bottom of specified bedding with approved bedding and surround materials placed and compacted to 95% Modified Proctor Density. Drain rock may be used for backfill of over-excavation only with Contract Administrator's approval.

.2 Shape bed true to grade to provide continuous, uniform bearing surface for the system.

.3 Geotextile fabric shall be laid in accordance to the approved shop drawings

.4 For detention systems using an impermeable liner, a subsequent manufacturer approved impermeable liner and geotextile fabric shall be placed on top of the initial fabric layer and secured per the manufacturer's recommendations.

.5 Place granular bedding material in 150mm lifts across width of the excavation and compact to 95% Modified Proctor Density in compliance with ASTM D1557.

3.5 System Installation

.1 Handle system components in accordance with manufacturer's recommendations.

.2 Lay and join system components in accordance to the manufacturer's instructions and specifications except as noted otherwise herein. Pipe culvert systems shall be installed in general compliance with Section 33 42 13 - Pipe Culverts.

.3 Lay system components on prepared bed, true to line and grade. Ensure section is in contact with shaped bed throughout its full length.

.4 Keep jointing materials and installed sections free of dirt, water and other foreign materials. Whenever work is stopped, install removable bulkhead at open end to prevent entry of water and foreign materials.

.5 Cut system component, as recommended by the manufacturer, without damaging unit.

3.6 Surround Materials

.1 After assembling the system and the Contract Administrator has inspected work in place, place surrounding material in uniform layers not exceeding 150 mm compacted thickness simultaneously on both sides. Material can be placed directly over the assembled sections and allowed to build up equally on each side of the system, as long as care is taken to ensure assembled sections remain true to line and grade

.2 Compact each layer from bedding to underside of backfill to minimum 95% Modified Proctor Density.

3.7 Backfill

.1 Place and compact backfill material in accordance with Section 31 23 01 - Excavating, Trenching and Backfilling.

.2 Backfill requirements, including type of material and compaction requirements, as shown on Contract Drawings, including Standard Detail Drawing G4.

3.8 Inspection

.1 Where specified, install inspection chamber at specified location, set plumb and to specified elevation as shown on Standard Detail Drawing S7 or Drawing S10 as applicable. If inspection chamber located in driveway, lane or paved surface install cover or lid as shown on Standard Detail Drawing S9 or Drawing S10 as applicable.

3.9 Flushing

.1 Flush completed system per Section 33 01 30.2 Cleaning of Sewers. Before flushing and testing, ensure infiltration / detention system is completely finished and make arrangements with Contract Administrator for scheduling of testing.

.2 Water may be supplied from Municipal fire hydrants upon application for a Hydrant Use Permit.

.3 Obtain municipal approval prior to discharging flushing water to municipal sewers or drainage ditches.

.4 Comply with General Conditions, Clause 20.4, Environmental Laws, in regard to discharge of flushing water.

.5 Provide Contract Administrator with all required approvals prior to discharging flushing water.

.6 Remove foreign material from assembled system and related appurtenances by flushing with water. System to be flushed at water velocities as high as can be obtained from available water sources. Continue flushing at least until flow from most distant point has reached discharge point and until water discharged is clean and clear.

3.10 Testing

.1 Following installation of a system and prior to substantial completion, the completed installation shall be visibly inspected to ascertain the requirement for cleaning.

.2 Visual inspection shall consist of either physical manual inspection or CCTV camera which shall be submitted to the Contract Administrator for review.

.3 System shall be cleaned, if by Contract Administrator's determination, it is apparent that accumulated solids or siltation exceed acceptable limits which may impede the proper operation of the system design.

.4 Cleaning shall be done in accordance with manufacturer's recommended approved practices, owner's requirement and Contract Administrator's approval.

.5 After cleaning has been completed, a re-inspection may be required to insure effective removal of materials present.

.6 An operating manual, complete with recommended maintenance schedule shall be provided to the Owner and/or Contract Administrator with submission of design proposal.

3.11 Installation Standard

.1 Repair all deficiencies and visible leaks.

.2 Repair procedures and materials subject to approval of Contract Administrator.

.3 Contract Administrator reserves right to require Contractor to replace defective installations at Contractor's sole cost.

.4 Test procedures, including video inspection, to be repeated and repairs made until satisfactory results are obtained.

END OF SECTION 33 49 23