



CON CAST PIPE

Concrete Pipe Debuts Under Highway 401 Medians

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New special provisions in Ministry of Transportation Ontario (MTO) contracts for major highways address the long-overdue quality standards for the acceptance of drainage product specifications. As a minimum quality control procedure for pipe products, the contractor must now inspect the pipe received at the job site and complete a comprehensive checklist that includes a letter signed by a professional engineer that states that all pipe supplied to the contract complies with the contract documents. Highway 401 widening between Regional Road 97 and Homer Watson Boulevard in the Regional Municipality of Waterloo was the first contract that specified reinforced concrete pipe (RCP) for median drainage. AECON worked with Delcan (contract administrator) and Con Cast Pipe to ensure that the quality of the installation matched the quality of the product shipped to the site.

The contract called for the widening of Highway 401 from 4 lanes to six over a distance of 7.8 km from 2.0 km west of Cedar Creek Road (Regional Road 97) to 1.3 km west of Homer Watson Boulevard (Regional Road 28). Included in the contract was the construction of a concrete median barrier, the reconstruction of the eastbound ramps of the Cedar Creek Road interchange and improvements to the horizontal curve west of Roseville Road (Regional Road 46). AECON's five crews, who worked

simultaneously about 750 metres to one kilometre apart, installed approximately 7 km of the sulphate-resistant RCP median storm sewer.

Shipped to the project were:

- 61 metres of 1050 mm diameter (50-D) RCP
- 293 metres of 600 mm diameter (50-D) RCP
- 435 metres of 525 mm diameter (50-D) RCP
- 1,944 metres of 450 mm diameter (50-D) RCP
- 2,454 metres of 375 mm diameter (50-D) RCP
- 1,597 metres of 300 mm diameter (50-D) RCP

The majority of the pipe supplied to the project is considered small diameter, suggesting that applications for this range of concrete pipe is no longer limited to alternate products such as high-density polyethylene conduit or corrugated metal pipe. Since 400 series highways are managed during winter conditions with periodic applications of sand and salt mixes, the pipe design had to withstand any potential corrosion from road salts. Today's standard concrete pipe design accounts for harsh environments such as road salts in stormwater and snowmelt by testing for concrete density and appropriate placement of steel reinforcement before product is shipped to projects.

At the beginning of Stage 2 of the contract, AECON received approximately 35 loads of RCP for immediate installation by its crews. Key to the safety of the job site and movement of product into the site was the maintenance of a haul road for deliveries and movement of equipment. All construction had to take place without significantly interrupting the flow of traffic on Highway 401 since it connects major urban centers in Ontario with Québec and the U.S.A. Proper scheduling and no delays in delivery of product were

critical considerations of the contractor in accepting the specification for concrete pipe. Because quality product was delivered on site when required and soil conditions were favourable, the crews discovered that working with concrete pipe did not cause any delays in constructing the storm sewer. With the right equipment and experienced pipe installation crews on site, any misconceptions about difficulties in laying concrete pipe due to lengths, weights and durability were soon left behind. The pipe-laying phase of the project was completed within the scheduled time.

Changes introduced to MTO's contracts are monumental in terms of recognizing the inconsistency of contract specifications with respect to quality assurance and quality control. Situations where there may be lack of uniformity and supporting logic for the specification of gravity pipe are beginning to fade. Design guidelines used by MTO incorporate life cycle costing and cost/benefit methodologies into the selection process of pipe materials used for drainage installations. In addition, other risk factors such as corrosion and abrasion are incorporated into the selection process to assist designers in specifying the most appropriate, cost effective pipe material for environmental conditions encountered.

Reinforced concrete pipe has long been excluded from use as a product for storm sewers under the concrete barriers of 400 series highway medians. MTO's special provisions has opened new opportunities for Ontario's traveling public and tax payers to enjoy the benefits of reinforced concrete pipelines. MTO is monitoring the success of the Highway 401/Regional Road 97 project as it issues the special provisions for gravity drainage products on other highway projects. Ontario's concrete pipe industry

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continues to demonstrate that it produces quality products that can be tested for quality assurance before it goes in the ground, and out of sight for generations.