

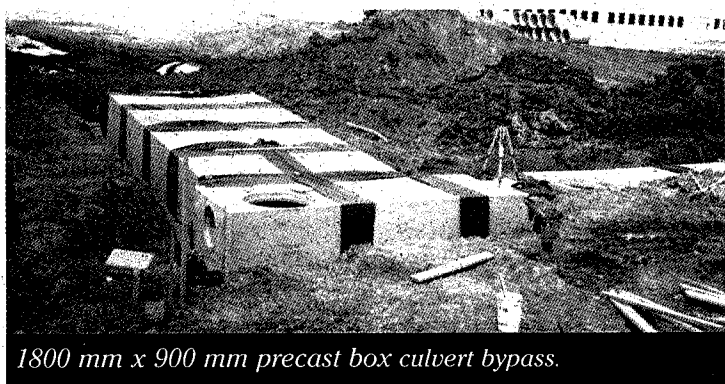
PRECAST CONCRETE BOX SECTIONS PROVIDE RELIEF (Hydraulically & Financially)

By: Fabian Papa, M.A.Sc., P.Eng., Valdor Engineering
 Peter S. Zourntos, P.Eng., C.E., Valdor Engineering
 Harold Kroecker, B.Sc., Centennial Concrete Pipe & Products

The Durham Business Centre is currently under construction in the Town of Whitby. This project by Nordeagel Developments Ltd. generates approximately 60 hectares (150 acres) of prestige industrial land.

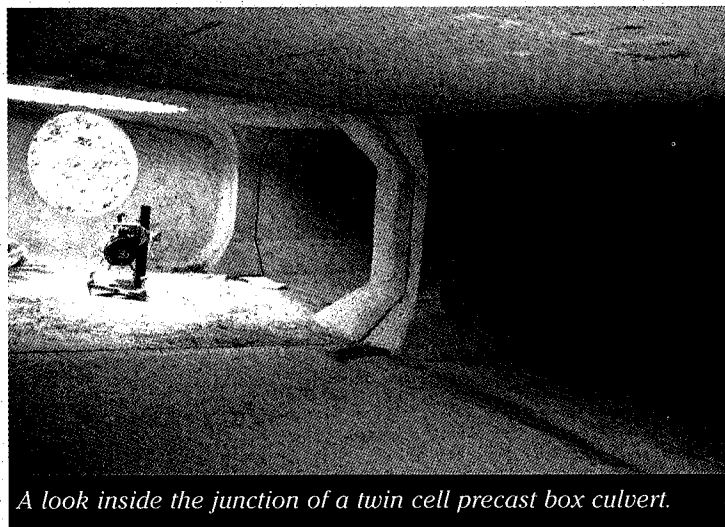
The stormwater runoff for 85 hectares (210 acres) of land is directed to a water quality pond designed to provide MOE Level 1 protection. This is achieved primarily through the settling of suspended solids and erosion control. Runoff quantity control is not required due to the close proximity of the site to Lake Ontario. Since runoff water quality and the erosion of downstream watercourses are heavily influenced by low intensity, more frequent rainfall events, the pond is designed to handle these smaller events. Moreover, it is beneficial to by-pass the larger flows around the pond in order to minimize the disturbing detained runoff undergoing treatment and the resuspension of previously settled pollutants. The inlet to the pond is designed to surcharge under the less frequent flows when the water level in the pond is at or near its capacity.

Bypassing of larger flows is achieved by way of an 1800 mm x 900 mm twin cell precast concrete box culvert, designed to act as a siphon, diverting larger flows to a by-pass channel. To minimize the size and cost of the pond inlet pipe, this siphon is located as far upstream as possible. The siphon begins conveying flows when the hydraulic grade line of the pipe leading to the pond exceeds its obvert, and thus acts as a relief for the stormwater which backs up during less frequent, high intensity rainfalls.



1800 mm x 900 mm precast box culvert bypass.

1800 mm x 900 mm culvert. The connection of the twin cell to the single cell mainline was made as jointed bell & spigot connections. The bell end was formed into the sidewall of the mainline box culvert.



A look inside the junction of a twin cell precast box culvert.

The box culvert required eighteen (18) special design sections including two vertical radius sections, one maintenance hole tee section, with a concrete bulkhead and a formed opening for a 1800 mm x 900 mm box section. The special fittings were designed for easy and efficient installation and to reduce the amount of on-site parging.

All the customized fittings were manufactured at Centennial Concrete Pipe & Products at the Cambridge plant.

The layout of the box sections was proposed by Centennial and approved by Valdor Engineering & Carillion Construction. Once approvals were granted, Centennial's production staff worked extended days to manufacture all the special boxes for the required delivery date. Carillion Construction installed all 32 units in one day. Carillion's crew was very impressed with the quality of the box units and how easily the fittings went together. Jointing for the box sections was done using a combination of butyl rubber gasket as well as an external wrap of filter cloth at each box joint.

The Durham Business Centre project demonstrates the versatility of precast concrete box sections for various storm sewer applications including special design.

Fabian Papa of Valdor Engineering stated that although other pipe shapes were considered in the design process, precast boxes were selected primarily for their efficiency in conveying flow out of the surcharged minor sewer system and also that the amount of earth cover over the siphon was minimal and the strength, durability & longevity of concrete was a desirable characteristic. The availability of standard precast box sections also assisted the designers in the selection of the configuration, which balances the cost of installation with hydraulic performance.

The siphon consists of 12.5 m of twin cell OHBDC Design, 1800 mm x 900 mm precast box culvert with 0.0 m to 0.6 m cover, which lie perpendicular to the mainline of single cell OPSS 1821, 1800 mm x 900 mm box culvert with 0.6 m to 4.3 m cover.

The twin 1800 mm x 900 mm box tees into the mainline

Along with the connection of the twin cell to the mainline, there were also jointed connections for 975 mm, 900 mm, 600 mm circular concrete pipe and a jointed connection for a 735 mm x 1145 mm horizontal elliptical concrete pipe. Catch basin lead openings, 250 mm & 300 mm PVC DR35, were made as cored tee connections, which provided a gasketed connection cored right into the sidewall of the box sections.

M CON PRODUCTS INC.

Celebrating 10 years of serving the construction industry

PROUD MEMBERS OF THE: **ocpa**
Ontario Concrete Pipe Association

EASTERN ONTARIO'S LEADING PRODUCER OF UNDERGROUND CONCRETE PRODUCTS

MANUFACTURERS OF:

- Circular Maintenance Holes
- Box Maintenance Holes
- Box Culverts
- Valve Chambers
- Concrete Pipe
- Catch Basins
- Grade Rings
- Headwalls

SPECIALITY PRODUCTS include:

- Sand/Oil Interceptors
- Wet Wells
- Diversion Chambers
- Holding Tanks
- Bypass Chambers
- Siphon Chambers
- Pumping Stations
- Trench Covers

Please call **1-800-267-5515** or email at sales@mconproducts.com

We hold up to the closest scrutiny

CONCAST PIPE

ISO 9002 REGISTERED

Get a little closer. Con Cast Pipe is focused on service, innovation, and exceptional quality standards. Our recent ISO 9002 registration is a testament to that. Speak to someone on our sales or engineering team, because they can answer any of your precast concrete questions. So come on... the closer you look, the better we look.

CON CAST PIPE
ISO 9002 REGISTERED

299 Brock Road South, R.R.#3 Guelph, Ontario N1H 6H9 1 800 668-PIPE www.concastpipe.com

CALENDAR OF EVENTS	
DECEMBER 1 TO 3, 1999	CONSTRUCT CANADA AT THE TORONTO CONVENTION CENTRE
DECEMBER 6, 1999	PLANT PREQUALIFICATION INFORMATION SESSION FOR PRECAST CONCRETE MANUFACTURERS AT THE HOLIDAY INN IN BURLINGTON
JANUARY 9 TO 13, 2000	79TH ANNUAL TRB MEETING, IN WASHINGTON, D.C.
FEBRUARY 2 TO 5, 2000	ACPA SPRING SHORT COURSE SCHOOL/MCX 2000 AT THE KANSAS CITY MARRIOTT DOWNTOWN IN KANSAS CITY, MISSOURI
FEBRUARY 10 AND 11, 2000	ONTARIO AND CANADIAN CONCRETE PIPE ASSOCIATIONS ANNUAL GENERAL MEETINGS, IN WHISTLER, BC
FEBRUARY 20 TO 23, 2000	RURAL ONTARIO MUNICIPAL ASSOCIATION (ROMA) AND ONTARIO GOOD ROADS ASSOCIATION (OGRA) COMBINED CONFERENCE AT THE ROYAL YORK HOTEL
MARCH 12 TO 14, 2000	92ND ANNUAL ACPA ANNUAL CONVENTION IN SAN ANTONIO, TEXAS
APRIL 17 AND 18, 2000	WATER ENVIRONMENT ASSOCIATION OF ONTARIO (WEAO) CONFERENCE AT THE HAMILTON CONVENTION CENTRE

