

CHARTER MUNICIPAL DRAIN

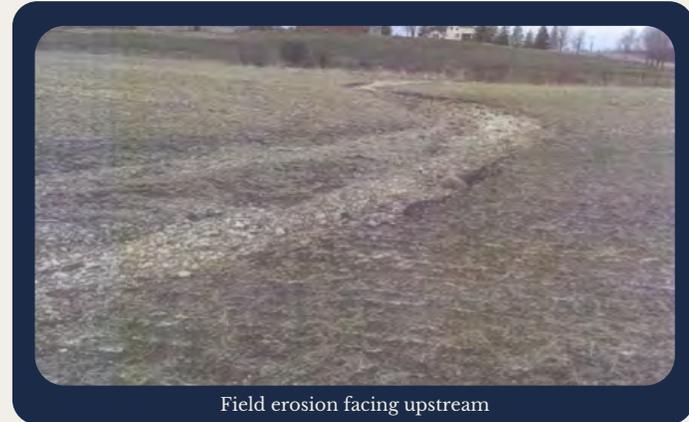
Blyth, Ontario (Moncrieff Road), Township of North Huron, Huron County

DRAIN HISTORY

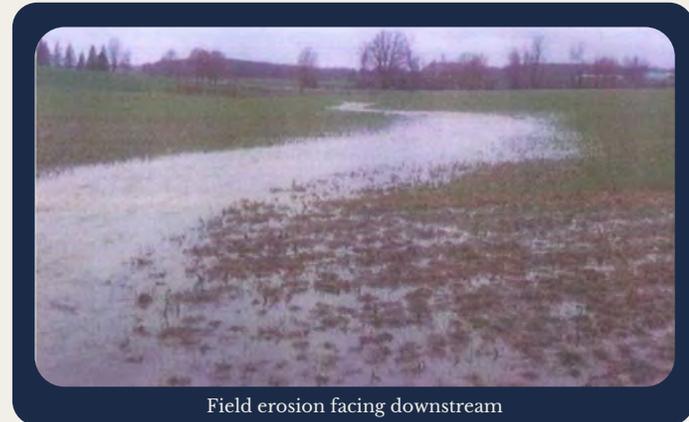
The Charter Municipal Drain was constructed in 1968 and consists of 780 m closed tile (varying in size from 125 mm to 300 mm), which outlets into the open Hallahan-Caldwell Municipal Drain. The Charter Drain services approximately 148 acres (60 ha) of rolling agricultural land, in which the predominant soil type is Harriston Loam.



Overview of Charter Municipal Drain - Source: R.J. Burnside & Associates, Wingham, ON



Field erosion facing upstream



Field erosion facing downstream

PROJECT GOALS

There is substantial runoff that occurs upstream, which generates overland flow towards the downstream section and outlet. This overland flow is generating significant soil erosion as it moves across the fields, which has significant environmental and economic implications. Several attempts had been made to construct a private berm with an existing catch basin to address this issue, but they were limited and did not adequately resolve the flooding and erosion concerns. The primary goals of this Section 78 project were to improve the drain outlet capacity and reduce overland flow on the downstream properties. As such, the closed drain was upsized and enhanced with several Rural Green Infrastructure (RGI) features which help to reduce soil erosion within the fields, as well as reduce and trap sediment within the drain itself. RGI is a series of structures and environmental features that help to reduce runoff impacts and build resiliency across rural landscapes.

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CHARTER DRAIN RGI FEATURES

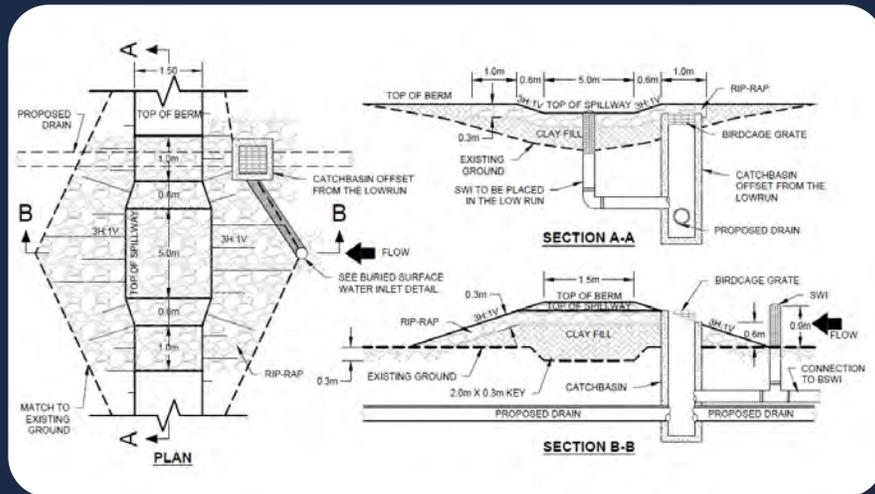
WATER AND SEDIMENT CONTROL BASIN (WASCOB)

A Water and Sediment Control Basin (WASCoB) was installed along the property line to intercept overland runoff and to drain it into the closed tile system. To help inform the design of the WASCoB berm, a hydrologic/hydraulic computer model was developed to simulate the impacts of 2 – 100-year storm events (24-hour rainfall). This process mainly aids in sizing the WASCoB to ensure it can appropriately handle and convey most rainfall events, while being considerate of not being oversized and too costly. Lastly, the WASCoB was constructed with approximately 6 m spillway that will help to maintain the structural stability of the WASCoB when it overtops during a more extreme rainfall event.

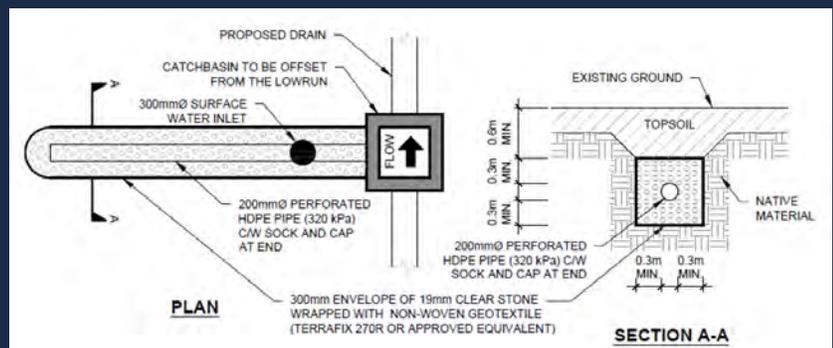
SURFACE WATER INLET (HICKENBOTTOM) AND BURIED SURFACE WATER INLET (FRENCH DRAIN)

The WASCoB described above has three surface water inlets: a raised catchbasin, hickenbottom and a buried surface water inlet (French Drain). The french drain is a short section of buried perforated drainpipe that is located on the lowest point where ponding will occur on the upstream side of the WASCoB. This inlet, along with the hickenbottom, will help slow down overland runoff before it enters the closed tile system, allowing for filtering and sediment deposition. These surface water inlets work in conjunction with a traditional raised catchbasin that ensures proper water conveyance during larger storm events. In other words, when these inlets are overwhelmed beyond its drainage capacity

and ponding is occurring upstream of the WASCoB, the raised catchbasin will drain the excess water and help avoid prolonged ponding.



WASCoB (above) and Inlet (to right) Details
Source: R.J. Burnside & Associates, Wingham, ON



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STILLING BASIN

A stilling basin was constructed downstream of the outlet, which provides protection from channel erosion and allows for sediment deposition and accumulation before entering the open watercourse downstream. This feature also services as an offline pool for aquatic habitat. The basin consists of a 450 mm layer of riprap, with an underlay of with non-woven geotextile. Furthermore, the basin includes riprap protection of the opposite bank of the outlet, helping to ensure erosion protection during high-flow storm events.

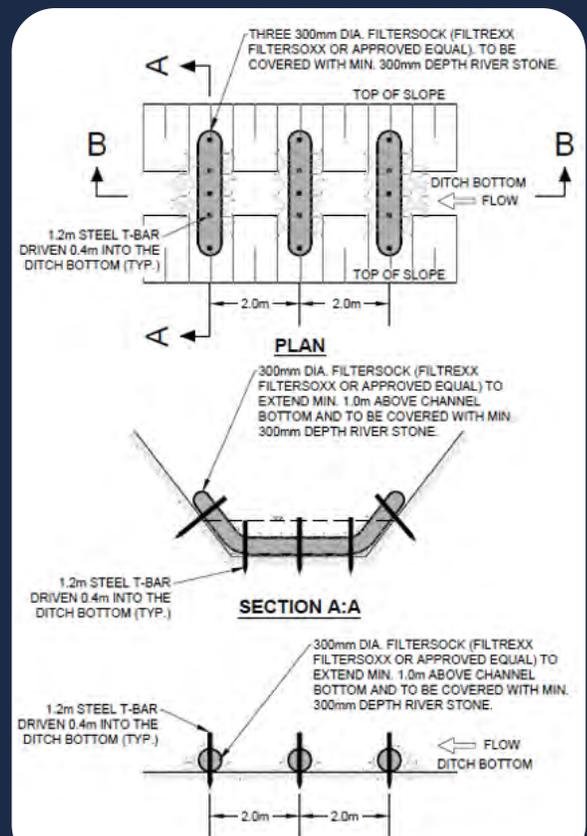
Stilling Basin Plan

Source: R.J. Burnside & Associates, Wingham, ON

SEDIMENT CONTROL

Three sediment control devices (Filtersoxx) were installed in the channel downstream of the stilling basin to provide additional water quality improvements. The Filtersoxx are mesh tubes filled with an organic substrate that easily binds with suspended sediment and nutrients as drain water flows through them. They were driven into the open ditch bottom with t-posts and covered with 300mm river stone. These devices will help reduce sediment transport downstream during construction, and following construction as disturbed areas revegetate.

Sediment Control Details - Source: R.J. Burnside & Associates, Wingham, ON



CHARTER MUNICIPAL DRAIN

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Huron, Huron County*

**ENGINEER COMMENTS: TREVOR KUEPFER, P. ENG
R. J. BURNSIDE & ASSOCIATES LTD.**

DESIGN

- Berm and inlet structures if properly designed can improve the quality of stormwater leaving the site by allowing suspended solids and the contaminants that they carry (ie fertilizers) from being directed downstream
- Berm and inlet structures provided stormwater quantity control by slowing the rate that flows are outletted helping to reduce erosion in downstream watercourses. This also prevents the erosion of topsoil on lands and keeps land more productive. Furthermore, these systems can be designed to ensure flooding does not inundate crops for too long of time resulting in economic loss.

BENEFITS OF INCORPORATING INTO ENGINEER'S REPORT

- Municipal berm allows for cost sharing amongst and property owners within the watershed area
- Municipal berm would be designed by a qualified professional
- Municipal berm can be repaired as needed by the Municipality and maintenance costs can be shared by the properties within the watershed in a fair and equitable manner.

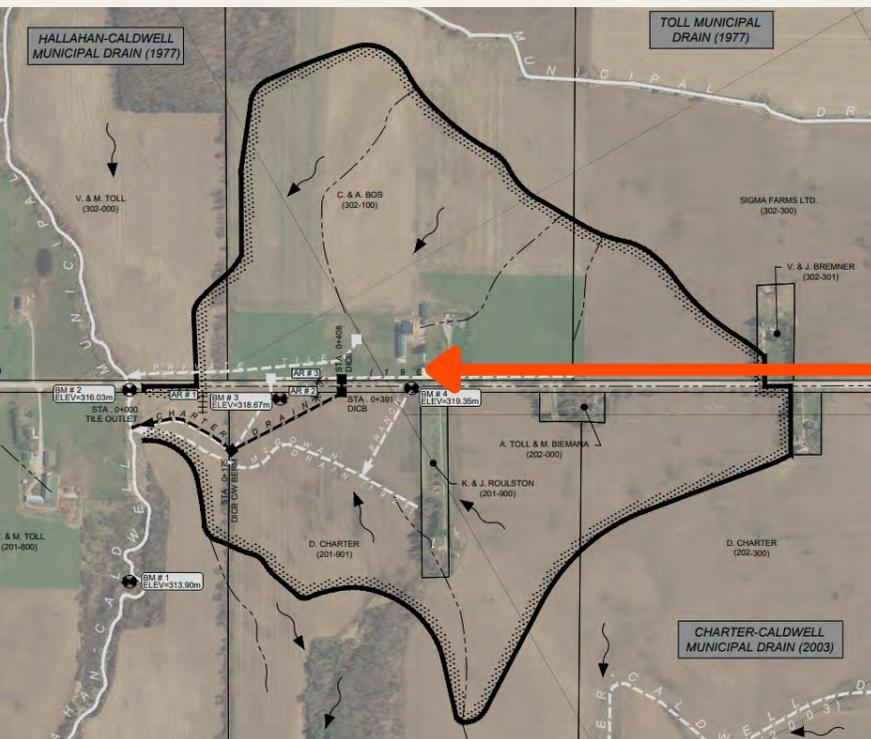
Check out the rest of our cast study series! You can find them on the Healthy Lake Huron website in the Technical Reports section at <https://healthylakehuron.ca/reports/>



**CHARTER MUNICIPAL
DRAIN**

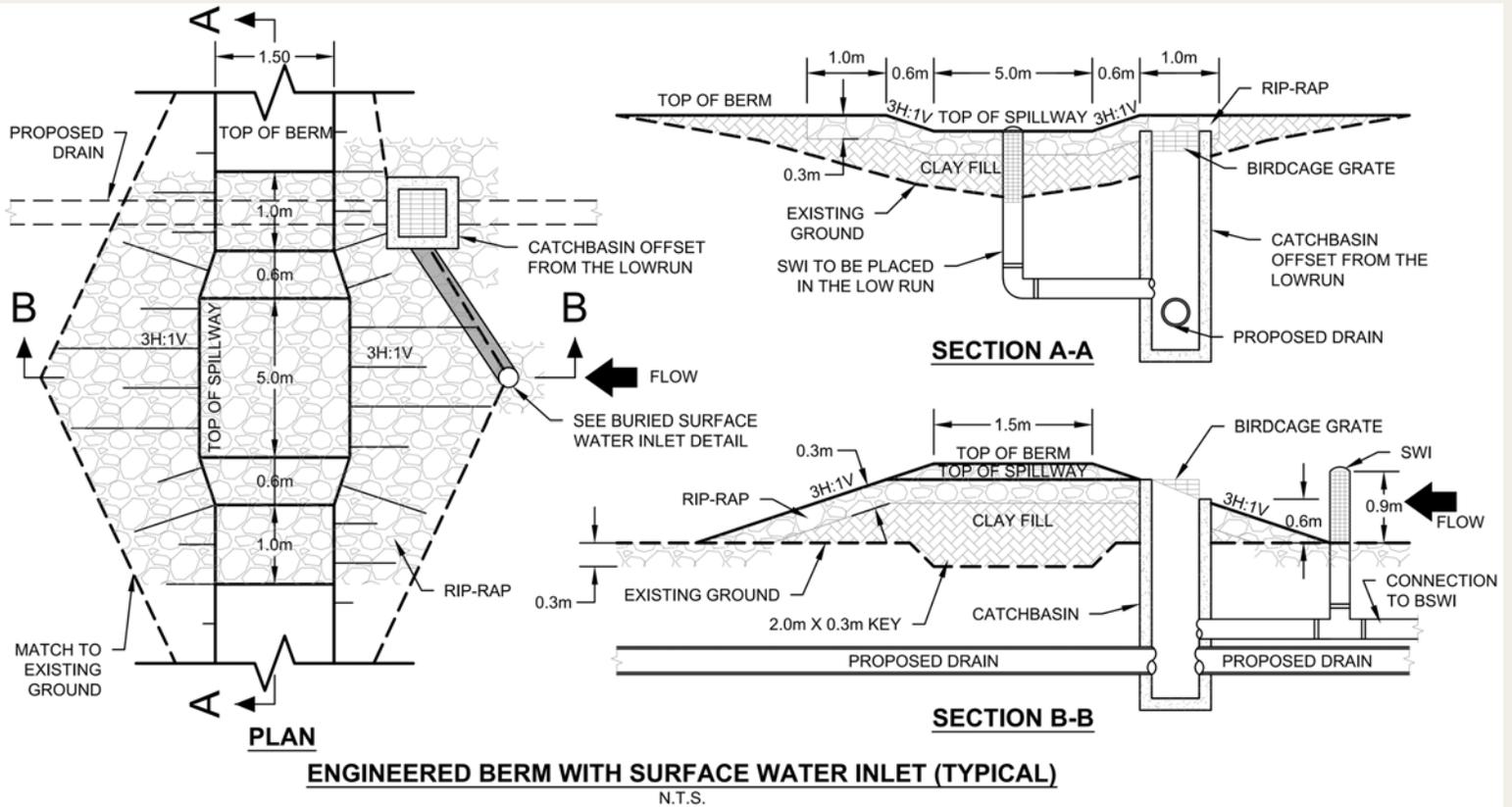
Appendix

Overview of Charter Municipal Drain

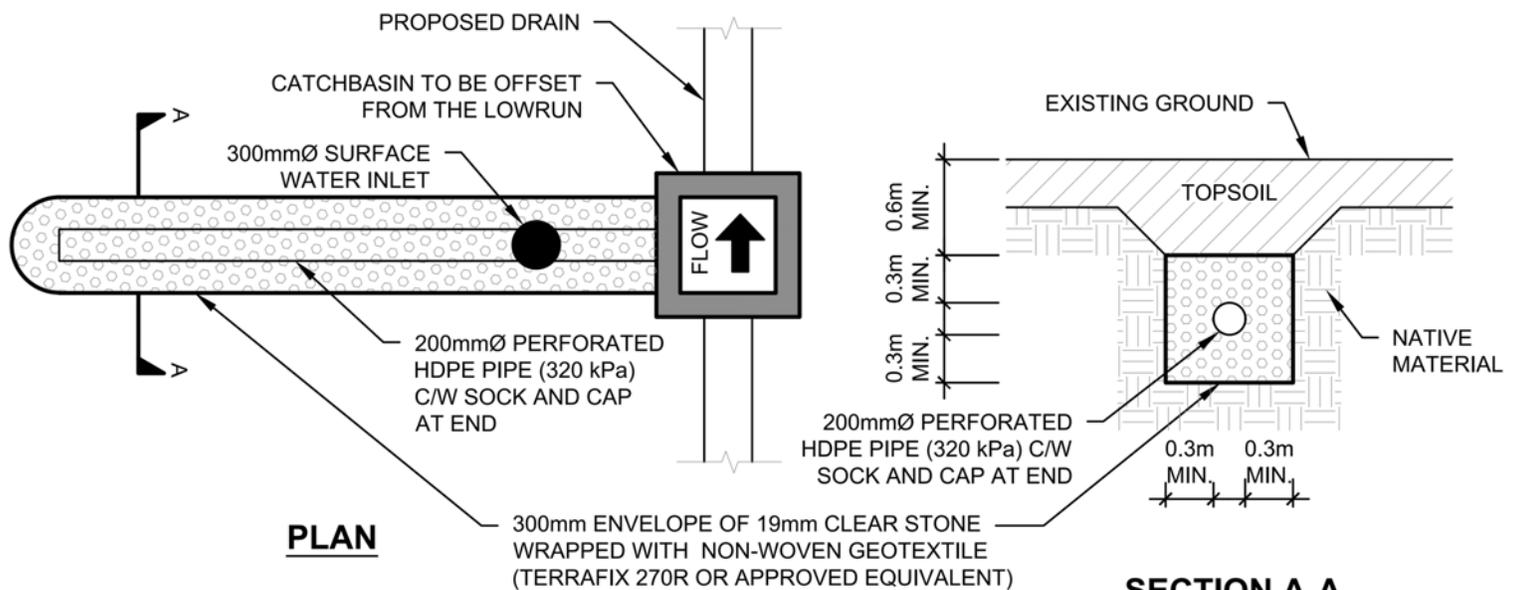


Maps Source: R.J. Burnside & Associates, Wingham, ON

WASCoB Details



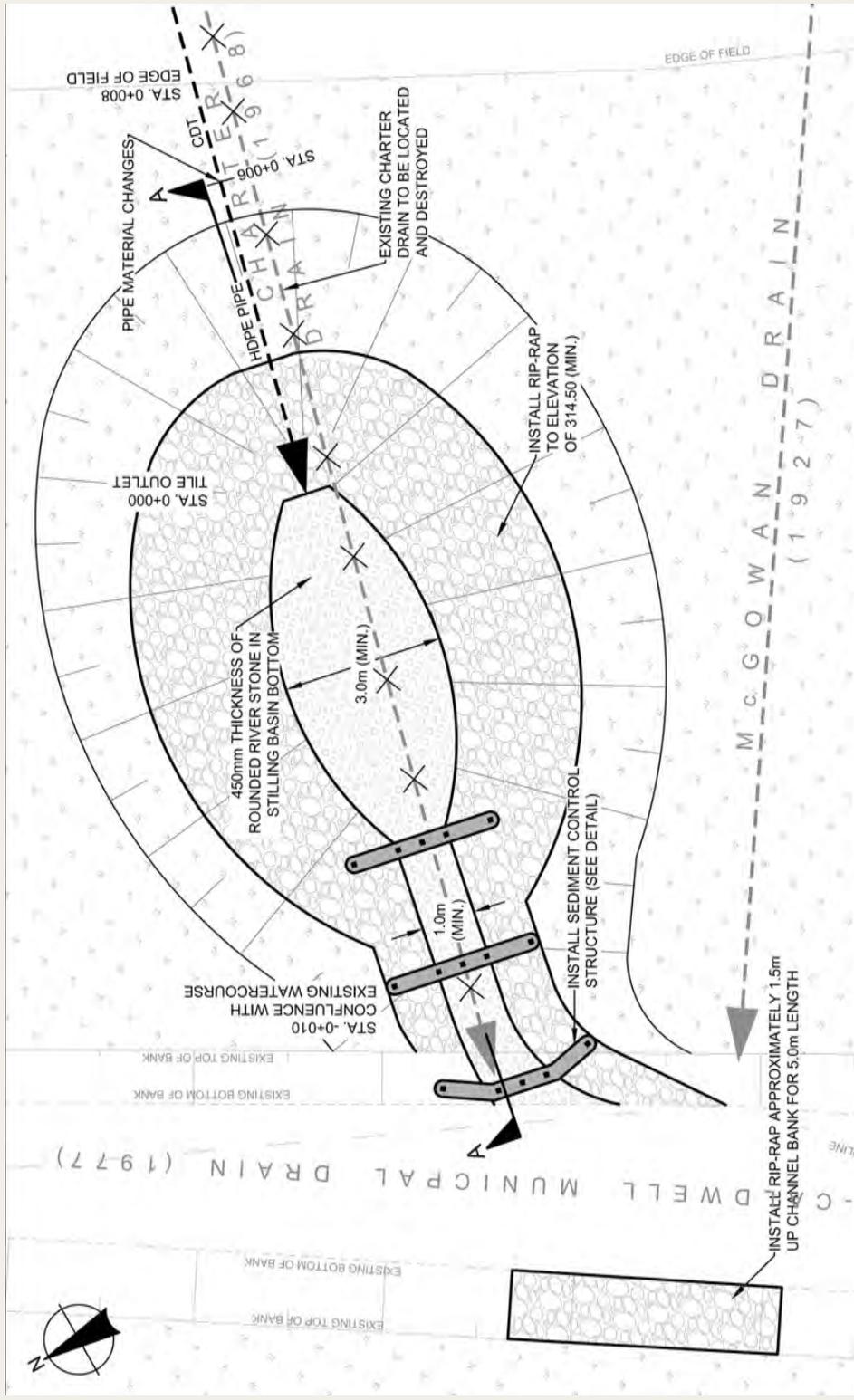
Inlet/French Drain Details



BURIED SURFACE WATER INLET (I.E., FRENCH DRAIN) DETAIL

N.T.S.

Stilling Basin Details



Sediment Control Details

