

Municipality of Chatham-Kent

Infrastructure and Engineering Services

Engineering and Transportation Division

To: Mayor and Members of Council

From: Eric Gerrard, P.Eng.,
Engineering Technologist

Date: February 9, 2021

Subject: Tender Award: Contract T20-360 – McKay’s Line over Fields Creek Drain Culvert Replacement, Community of Howard.

Recommendations

It is recommended that:

1. The tender in the amount of \$259,825.04 (including HST) for the work associated with Contract T20-360 - McKay’s Line over Fields Creek Drain Culvert Replacement, Community of Howard, be awarded to H.E. Construction Inc. of Thamesville, Ontario.
2. The Mayor and Clerk be authorized to enter into the recommended agreements.

Background

The McKay’s Line over Fields Creek Drain structure was constructed in 1967 and has a southwest-northeast orientation located on McKay’s Line 1.4 km northeast of Scane Road in the Community of Howard. This cast-in-place concrete culvert carries 2 lanes of predominantly vehicular traffic across the Field’s Creek Drain with an existing span of 3.06 m with a total length of 10.8 m. The paved roadway has a travel width of 6.4 m.

With an Average Annual Daily Traffic volume (AADT) of 300, the crossing is moderately used with truck volumes accounting for less than 10 percent of the total traffic. The posted speed limit at the bridge location is 80 km/hr.

Bi-annual inspections have been conducted by the Municipality of Chatham-Kent (as legislated under the *Public Transportation and Highway Improvement Act*) to continually monitor the condition of the structures and to ensure public safety. All structures form part of the comprehensive 20-year Plan managed by the Engineering and Transportation Division. The McKay’s Line structure was identified through the 20-year plan as a candidate for replacement.

As per the 2019 Ontario Structure Inspection Manual (OSIM) inspection, the McKay's Line structure was documented as having:

- Light to severe disintegration of the barrel and end walls (sections of the west wall exhibiting significant deterioration)
- Severe to very severe movement cracking of the barrel and end walls
- Heavy efflorescence on the soffit and west wall
- Very wide cracking and severe spalling
- Moisture penetration and heavy leakage on the soffit
- Cold joints with cracking and spalling
- Isolated structural cracking of the south fascia
- Exposed footings
- OSIM inspection noted the structure is likely older than indicated

In October 2019, the McKay's Line structure was inspected by Chatham-Kent Engineering staff to confirm the above mentioned defects, and proceed with a replacement design.

In the design stages, it was determined that a neighbouring field has a drainage pipe out letting directly next to the structure. In order to accommodate the widening of the structure for clear zone requirements, the field drainage outlet will be repositioned across McKay's Line.



Figure 1. McKay's Line over Fields Creek Drain – Northwest Culvert End



Figure 2. McKay's Line over Fields Creek Drain – Interior Barrel with Deterioration, Wide Cracking, Severe Spalling, Efflorescence, and Exposed Footings

Comments

This contract consists of the following work:

- Excavation and installation of a new catch basin and road crossing for adjusted field drainage outlet (required for main culvert crossing replacement)
- Excavation and removal of the existing concrete culvert, including footings and wingwalls
- Installation of new polymer coated corrugated steel pipe arch culvert
- Backfill and reinstate road profile with improved roadside safety
- Installation of rip-rap erosion protection at culvert ends.

This replacement will provide approximately 75 years of service.

Innovation

Multiple structure type options were considered for the replacement structure, including steel and concrete options. Quotes were obtained for both precast concrete box sections, as well as polymer coated corrugated steel pipe (CSP) options. The costs for the precast concrete box option exceeded the costs of the steel pipe options. Additionally, the site has sufficient cover over the culvert to permit the use of a pipe structure.

Precast concrete box culverts are structurally superior and have higher durability resulting in less maintenance over the life of the structure. In terms of future rehabilitations to extend the life of the structure, concrete culverts provide various rehabilitation options when compared to steel pipes; where rehabilitation options are limited and typically require full replacement. Additionally, the higher complexity of CSP installations can result in increased risks for incorrect installations, which can significantly reduce the lifespan of the culvert.

Ultimately, the steel pipe option was selected. Corrugated steel pipes structures are offered with three main protective material properties (galvanized, aluminized, polymer coated). Of the three steel pipe options, the polymer coating provides the best protection against corrosion of the steel, which is typically the main source of deterioration in CSP culverts. The polymer coated CSP was selected due to the added durability and increased lifespan that is recognized in the industry.

This project was designed and managed internally by Chatham-Kent Engineering staff to reduce the costs spent on consulting that is required to manage and maintain Chatham-Kent's large bridge inventory.

This tender allows the bidders to choose their preferred construction schedule within a two (2) year window. This method has been implemented to allow the contractor additional flexibility when scheduling the work. Due to this flexibility, Chatham-Kent receives a large number of bidders and more competitive prices. However, once mobilized to site the Contractor must complete the contract within the allocated working days.

The Tender was let on December 22, 2020 and the Purchasing Officer received the digitally submitted tenders on February 4, 2021. The following table summarizes the bids received.

Bidder	Location	Bid (including HST)
H.E. Construction Inc.	Thamesville, ON	\$ 259,825.04
Murray Mills Excavating & Trucking (Sarnia) Ltd.	Sarnia, ON	\$ 262,686.58 *
Schouten Excavating Inc.	Watford, ON	\$ 275,414.90
Clarke Construction Inc.	Blenheim, ON	\$ 278,658.00
Darrell Dick Excavating	Wallacetown, ON	\$ 279,339.96 **
Delway Contractors Ltd.	Chatham, ON	\$ 296,060.00
BF Environmental Consultants Ltd.	Port Lambton, ON	\$ 301,402.23
Intrepid General Limited	Belle River, ON	\$ 304,502.34
South Shore Contracting of Essex County Inc.	Amherstburg, ON	\$ 315,987.55
Sterling Ridge Infrastructure Inc.	Windsor, Ontario	\$ 342,277.00
Henry Heyink Construction Ltd.	Chatham, ON	\$ 344,214.95
Alexman Contracting Inc.	Thornton, ON	\$ 657,592.20

* Denotes the bid contained a clerical error but did not affect the ranking.

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Per the terms of the tender, work may commence after tender award with a total completion date of November 25, 2022. The road will be closed for the duration of construction, however a detour will be in place.

The lowest tender bid submitted by H.E. Construction Inc. was approximately 38% lower than the budget estimate.

Areas of Strategic Focus and Critical Success Factors

The recommendations in this report support the following areas of strategic focus:

- Economic Prosperity:**
Chatham-Kent is an innovative and thriving community with a diversified economy
- A Healthy and Safe Community:** Chatham-Kent is a healthy and safe community with sustainable population growth
- People and Culture:**
Chatham-Kent is recognized as a culturally vibrant, dynamic, and creative community
- Environmental Sustainability:**
Chatham-Kent is a community that is environmentally sustainable and promotes stewardship of our natural resources

The recommendations in this report support the following critical success factors:

- Financial Sustainability:**
The Corporation of the Municipality of Chatham-Kent is financially sustainable
- Open, Transparent and Effective Governance:**
The Corporation of the Municipality of Chatham-Kent is open, transparent and effectively governed with efficient and bold, visionary leadership
- Has the potential to support all areas of strategic focus & critical success factors**
- Neutral issues (does not support negatively or positively)**

Consultation

The Tenders were opened by the Purchasing Officer and reviewed by Chatham-Kent's Engineering and Transportation Division.

Financial Implications

Project fees associated with this contract will be funded as summarized in the following table:

Financial Implications
McKay's Line over Fields Creek Drain Culvert Replacement
Project Costs

Recommended Tender ^A (Including HST)	\$ 259,825.04
Less HST Rebate 11.24%	- \$ 25,844.54
Total Current Project Costs	\$ 233,980.50
Total Current Project Funding	\$ 233,980.50

Note A: Contingency and Material testing and Inspection is carried as a total of \$40,000 allowance in the contract and is accounted for in the Recommended Tender.

Contingency allowance may or may not be expended and is recommended to address any unforeseen issues which present during the course of the project and are not covered by the contract specifications.

Materials Testing and Inspection allowance may or may not be expended and is recommended to test and inspect construction materials for compliance with the contract specifications during the course of the project.

The culvert project costs listed above will be funded from Bridge Lifecycle Reserve.

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Attachments: None

(RTC:\Infrastructure & Engineering\I&ES\2021\4343 – Tender Award T20-360 McKay's
Line over Fields Creek Drain Culvert Replacement)