

COMMITTEE OF THE WHOLE - MAY 5, 2008

JANE STREET AND REGIONAL ROAD 7 INFRASTRUCTURE REPAIRS

The Commissioner of Engineering and Public Works recommends:

1. That this report on the cost of the major repairs to the underground infrastructure of Jane Street and Regional Road 7 (formerly provincial Highway 7), be received;
2. That the Regional Municipality of York be requested to share the costs incurred to repair the road and underground infrastructure at the intersection of Jane Street and Regional Road 7, based on the Region's share being \$3,289,135.00, and the City's portion being \$7,184,250.00.
3. That this request for payment be forwarded to the Regional Municipality of York for consideration.

Economic Impact

The costs to repair the infrastructure have been paid by the City in full, with the funds coming from the Water and Wastewater Reserve accounts. If the proposed cost sharing split is agreed to by both Regional Council and Vaughan City Council, the City would recover \$3,289,135.00 of the total costs.

Communications Plan

During the intersection failure, a detailed communications plan was developed by Public Works, Economic Development and Corporate Communications to update both City officials and the public.

Purpose

To seek approval of the cost sharing methodology between the City of Vaughan and the Regional Municipality of York for the costs to repair and restore the intersection and underground utilities.

Background - Analysis and Options

On the morning of February 7, 2006, a water main break and major ground subsidence was first noted in the northwest corner of the intersection of Regional Road 7 (formerly provincial Highway 7) and Jane Street. Subsequent inspection and survey of the subsidence confirmed that an existing sanitary sewer manhole located in this corner of the intersection (MH1A), had settled approximately 1.2 m, with evidence of ground movements in terms of surface cracks, vertical settlement and lateral soil movement being noted within an approximate 15 m radius of the manhole. Some evidence of ground movements at greater distances than this were evident, especially within the limits of the existing Shell service station, located within the northwest corner of the intersection. Importantly, this zone of subsidence encompassed the entire northwest quadrant of the intersection and the southbound lanes of Jane Street, effectively rendering the entire intersection impassable to traffic.

The key features of the intersection were as follows:

- Six lane Region Road 7, with additional east and westbound left turn lanes
- Four lane Jane Street, with additional north and southbound central left turn lanes and outside right hand turn lanes

- A series of three existing sewers entering and leaving settled manhole MH1A, i.e., a South flowing 900 mm diameter sewer exiting the manhole with an originally proposed design invert elevation of 190.8 m; an East flowing incoming 750 mm diameter sewer entering the manhole with an originally proposed design invert elevation of elevation 191.0 m; and, a South flowing incoming 600 mm diameter sewer on Jane Street, with a proposed design invert elevation of approximately 192.5 m, connected to MH1A via an external drop structure
- Existing 750 mm diameter water main along the north side of Highway 7 and related valve chamber just west and north of settled MH1A
- Existing Bell Canada duct just west of the alignment of the south flowing 900 mm diameter sewer below Highway 7 and the south flowing 600 mm diameter sewer along the west side of Jane Street.
- Existing gas main along the north side of Highway 7, west of Jane Street, turning north along the west side of Jane Street north of Highway 7

By way of reference, the top elevation of the Region Road 7 \ Jane Street intersection is approximately 200 m, indicating the existing sewers below the west side of the intersection, and along the north side of Region Road 7, were approximately 9 m deep.

In terms of construction, the main trunk sewer below Region Road 7 and related sewer to the west were installed in the mid 1980's with the trunk sewer extension north along Jane Street being completed sometime later. The water main east of Jane Street was also apparently installed in the mid 1980's, and extended from the west limit of the original two lane Jane Street in the mid 1990's. The trunk sewer below region Road 7 was installed within a hand mined tunnel supported using an approximately 1.5 m diameter bolted steel segmental liner.

After the subsidence of MH1A, all three connecting sewers were out of service, as was the case for the 750 mm water main. In addition to the immediate surface interruption to traffic, reinstatement of the sewers and water main was also required. The ultimately selected approach to the reinstatement of these key features was to essentially by-pass the settled manhole MH1A area to avoid possible long term settlement problems in the immediate area of the manhole, recognizing that the existing sewer below Region Road 7 was unsalvageable. In addition, this by-pass approach allowed the MH1A remedial works and the sewer and water main reinstatement works to be completed in tandem.

As per the emergency provisions of the City's Purchasing Policy, a contractor (Clearway Group) was retained to perform the required repair and restorative works. A total time period of approximately 15 weeks (February 7 to May 19, 2006) was required to complete the foregoing intersection repair / replacement / restoration works, which were roughly broken down as follows:

- 1 week (February 7 to February 13) – problem definition and outline of required major repair works.
- 7 weeks (February 13 to March 30) – dewatering related works, including preparation of Permit To Take Water application and dewatering installation and operation to lower water levels such that sewer replacement works could be initiated.
- 4 weeks (March 30 to April 28) – sewer and water main replacement works
- 3 weeks (April 28 to May 19) – intersection restoration.

The works involved the combined efforts of Vaughan Engineering Services and Public Works staff, York Region Transportation and Works staff, the prime contractor (Clearway), numerous sub-contractors, and three consulting engineering firms.

It is important to note, that the intersection collapse was one of the largest of its kind, and the overall impact on the City, the Region, local businesses, and the travelling public, was immense. Notwithstanding that this was one of the largest failures recorded recently, and the amount of damaged infrastructure to be restored was considerable, the restoration was completed within a relatively quick time period.

In total, the cost to repair the underground infrastructure, and restore the intersection itself, was \$10,473,385.00. Staff from York Region, City of Vaughan, and MacViro (one of the City's consulting engineering firms used on this project), met and reviewed the detailed cost breakdowns provided by the contractor for these repairs. After reviewing the costs, and the associated benefactor(s) of the works, the following is how the costs are recommended to be divided up between the City and the Region:

Total Cost of Repairs	City's Share (69%)	Region's Share (31%)
\$10,473,385	\$7,184,250.00	\$3,289,135.00

The rationale for the cost sharing is based on infrastructure ownership, as well as the resulting benefactor(s) of the works. As an example, due to the high ground water table and extensive damage to the infrastructure, special measures were taken to ensure soil conditions were stabilized and the new infrastructure was properly supported. Compaction grouting was done to stabilize the area around the collapse, and provide a firm base on which to rebuild the some of the infrastructure as well as support the new road base. However, to ensure the stability of the entire area, additional grouting took place outside the disturbed area. As re-opening the intersection as quickly as possible was a prime consideration, and there were concerns regarding the naturally high water table under the intersection, the use of un-shrinkable fill was chosen over native backfill. This not only expedited the intersection opening, but provided for a more stable base and support for both the underground infrastructure and the road platform itself. Both of these operations were determined to have joint benefits to the City and the Region, and the costs are shared accordingly. Other costs, such as replacement of the water main and sewer pipes, were deemed to benefit the City exclusively, and as such, the City assumed 100% of these costs. Similarly, the cost for new road base and top asphalt, along with traffic signal infrastructure, is a direct benefit to the Region, and they are assuming 100% of those costs.

The details of the repair costs incurred in the project have been reviewed extensively with York Region staff. The costs have been apportioned on the rationale described above, and staff have agreed to a potential cost sharing which they could justify advancing to their respective Councils for consideration.

Relationship to Vaughan Vision 2020

This report is consistent with the priorities previously set by Council and the necessary resources have been allocated and approved. This report ties into the following Vaughan Vision objectives:

- Value and Encourage a Highly Motivated Workforce
- Maintain Assets & Infrastructure Integrity

Regional Implications

As noted in the recommendations, the proposed cost sharing for the repairs and reconstruction of the intersection and underground infrastructure have a direct financial impact on the Region.

Conclusion

The proposed cost sharing noted in this report is based on the premise of infrastructure ownership and overall relationship to the benefactor(s), as a result of the services and repairs completed. On a percent basis, it is approximately 69% for the City, and 31% for the Region.

The collapse of this intersection and the overall impact on the City, the Region, local businesses, and the travelling public, was immense. This collapse was one of the largest of its kind recorded to date, and received unprecedented media coverage during and after the event. Given the magnitude of its size, the complexity of the repairs, and the quick time frame in which the repairs were completed, the staff that were involved from Public Works, and Engineering Services, are to be comended for their outstanding efforts.

Sincere appreciation is also expressed to staff of the Economic Development and Corporate Communications Departments, and the Regional Municipality of York, for their assistance in this project. In addition, the efforts of Clearway Construction, and their respective sub-contractors, along with the co-operation and understanding of the local business community, were duly noted and appreciated.

Attachments

N/A

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Respectfully submitted,

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Commissioner of Engineering and Public Works

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