

COMMITTEE OF THE WHOLE JUNE 18, 2001

KIRBY ROAD BRIDGE AND HUMBER RIVER BRIDGE

Recommendation

The Commissioner of Development Services & Public Works recommends:

1. That the current by-laws enacted by the City of Vaughan to limit the loading to 5 tonnes on the existing concrete bridge on Humber Bridge Trail east of Highway 27, and on Kirby Road east of Huntington Road be extended an additional period of 2 years.

Purpose

The purpose of this report is to defer major capital expenditure on two rural bridges.

Background - Analysis and Options

The Humber River Bridge (West Branch) Project 1217 is located on Humber Bridge Trail over the Humber River approximately 0.4 kilometres east of Highway 27. The Kirby Road Bridge, Project 1216, also known as the McEwen Bridge is located on Kirby Road over the Humber River approximately 0.2 kilometres east of Huntington Road. . (See Attachment No. 1 and 2).

In June 1998, Council of the City of Vaughan adopted Item 25, Report No. 51 (attached copy) whereby they recommended that by-laws be enacted limiting the loading to 5 tonnes on the existing concrete bridge on Humber Bridge Trail east of Highway 27, and on Kirby Road east of Huntington; and that the by-laws be in effect for a period of two years.

Included in the report of June 1998, was the condition of the existing bridge and possible alternatives available for the short and long term life of the two structures. Long term repairs and/or replacement of the existing structures were not recommended at that time as the City had no plans for these two sections of road.

The load restriction by-laws on the two structures are coming to an end and thus we recommend the by-laws for load restriction on the structures can be extended for another two years.

Conclusion

The two structures appear to be adequate at this time and until the City has plans for these two sections of road no further detailed investigations are required.

Attachments

1. Location Maps
2. Item 25, Report No. 51

Report prepared by:

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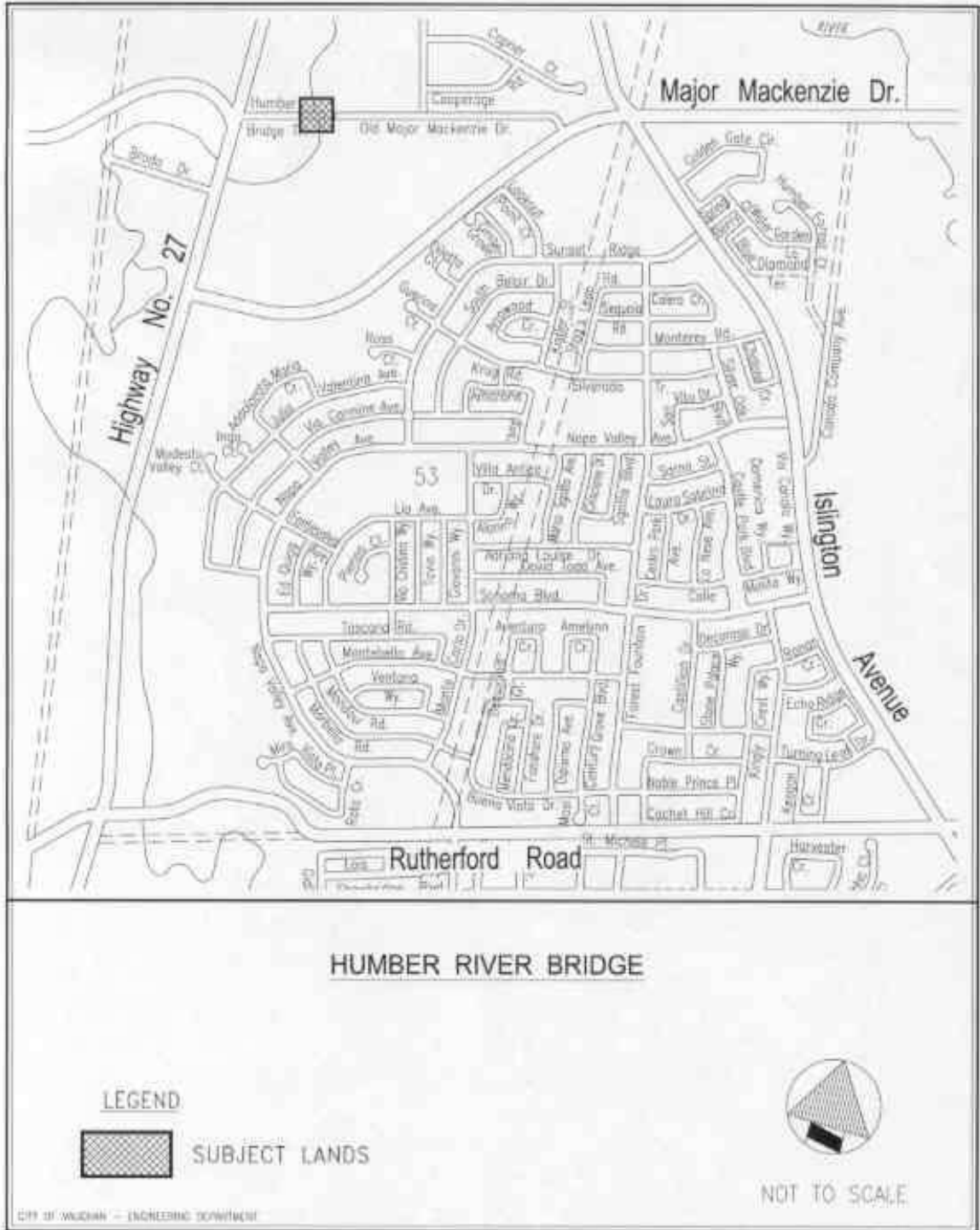
Respectfully submitted,

FRANK MIELE
Commissioner of Development Services & Public Works

Bill Robinson, P. Eng.
Director of Engineering

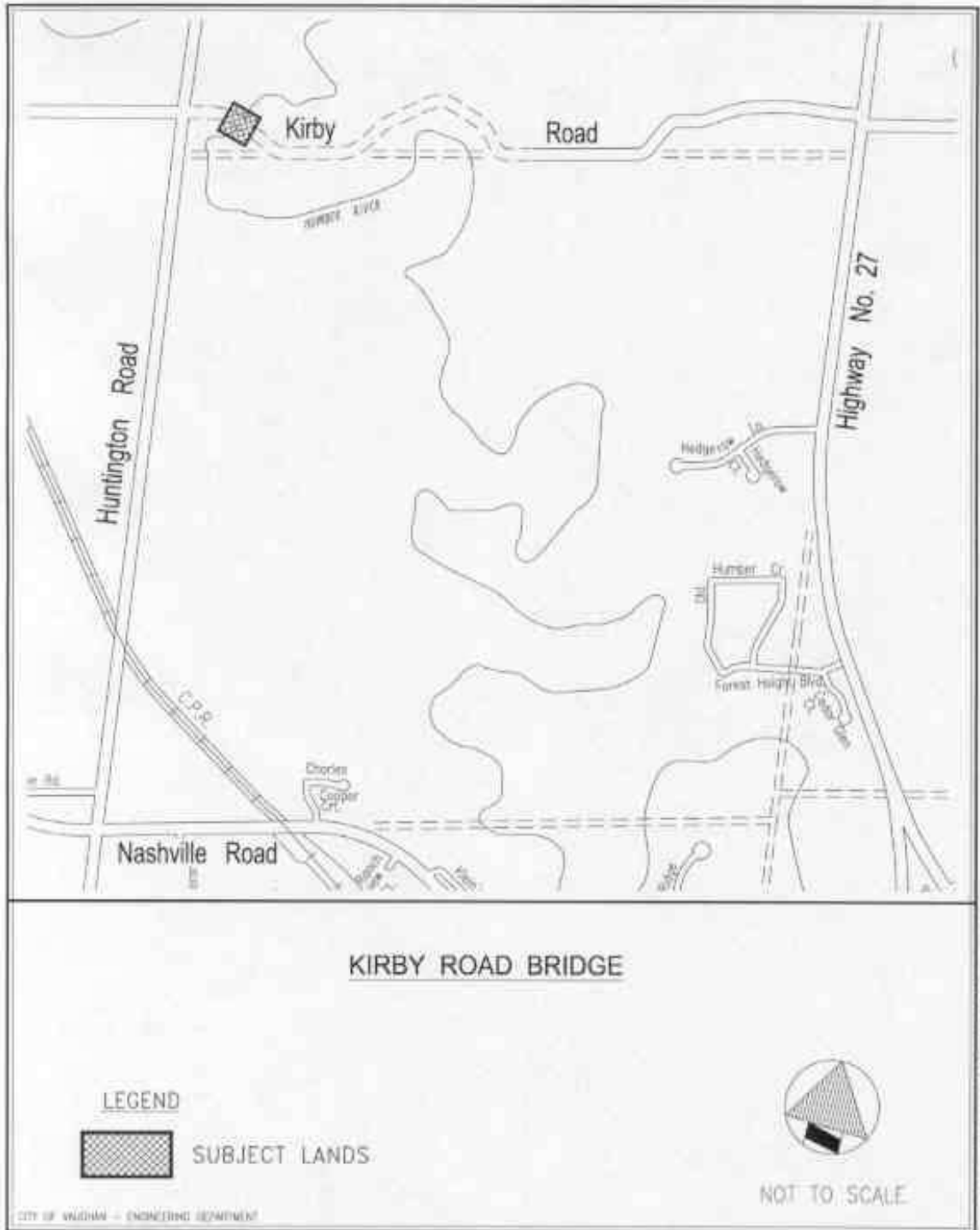
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ATTACHMENT No. 1



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ATTACHMENT No. 2



2. The bridge is adequate to support a safe superimposed live load of 5 tonnes.
3. If no repairs are carried out to the bridge, the bridge will continue to have a functional service life of five (5) to ten (10) years with continued deterioration. Adjustment of the load limit posting may be required from time to time.
4. Short term repairs to maintain the structure in its existing condition will involve installation of steel flex beam in locations where the handrail is excessively deteriorated. Short term repairs will not affect the remaining service life or the load carrying capacity of the structure.
5. Long term repairs to extend the service life of the structure by about ten (10) to fifteen (15) years will involve the following work:
 - a) Removal of unsound concrete from the concrete curbs, arch members, deck, deck soffit, floor beams, abutments and wingwalls and restoration of concrete surfaces to original dimensions with concrete and/or concrete repair materials.
 - b) Reconstruction of concrete handrails.Following completion of long term repairs, the bridge will be adequate to support a safe superimposed live load of 15 tonnes. The preliminary estimated long term repair cost is \$100,000.00 (based on current 1999 construction prices).
6. Removal of the existing structure will necessitate purchase of properties serviced by the structure or construction of a roadway on an alternate alignment. The estimated removal cost is \$50,000.00 (based on current 1999 construction prices).
7. The "ball-park" cost of a two lane replacement bridge of similar span with a 50 year design life is \$440,000.00 (based on current 1999 construction prices). A hydraulic and geotechnical investigation will be required to confirm the replacement cost.

McEwen Bridge

1. The bridge is in poor condition and has continued to deteriorate since the previous inspection in 1995. The concrete has satisfactory compressive strength and density.
2. The bridge is adequate to support a safe superimposed live load of 5 tonnes.
3. If no repairs are carried out to the bridge, the bridge will continue to have a functional service life of five (5) to ten (10) years with continued deterioration. Adjustment of the load limit posting may be required from time to time.
4. Short term repairs to maintain the structure in its existing condition will involve installation of steel flex beam in locations where the handrail is excessively deteriorated. Short term repairs will not affect the remaining service life or the load carrying capacity of the structure.
5. Long term repairs to extend the service life of the structure by about (10) to fifteen (15) years will involve the following work:
 - a) Removal and reconstruction of the concrete deck, curbs and handrails.
 - b) Reinforce and encase concrete floor beams.
 - c) Removal of unsound concrete from the concrete arch members, abutments and wingwalls and restoration of concrete surfaces to original dimensions with concrete and/or concrete repair materials.

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Following completion of long term repairs, the bridge will be adequate to support full highway loading. The preliminary estimated long term repair cost is \$200,000.00 (based on current 1999 construction prices).

6. The estimated removal cost is \$50,000.00 (based on current 1999 construction prices).
7. The "ball-park" cost of a two lane replacement bridge of similar span with a 50 year design life is \$440,000.00 (based on current 1999 construction prices). A hydraulic and geotechnical investigation will be required to confirm the replacement cost.

Based on the above findings, the two bridges appear to be structurally adequate and it is recommended that by-laws be passed for a load restriction of 5 tonnes for both structures for a period of 2 years.

PM:MC

Report prepared by: Pat Marcantonio, C.E.T.

Attachments

1. Location Map
2. Location Map

(A copy of the attachments referred to in the foregoing have been forwarded to each Member of Council and a copy thereof is also on file in the office of the City Clerk.)

CITY OF VAUGHAN

Item 25; Report No. 51, of the Committee of the Whole, which was adopted without amendment by the Council of the City of Vaughan on June 28, 1999.

25 LOAD RESTRICTION BY-LAW ON HUMBER BRIDGE TRAIL AND KIRBY ROAD

The Committee of the Whole recommends approval of the recommendation contained in the following report of the Commissioner of Development Services, dated June 21, 1999:

Recommendation

The Commissioner of Development Services recommends:

1. That by-laws be enacted by the City of Vaughan to limit the loading to 5 tonnes on the existing concrete bridge on Humber Bridge Trail east of Highway 27, and on Kirby Road east of Huntington Road; and
2. That the by-laws be in effect for a period of 2 years;

Background

Humber River (West Branch) Bridge (Bridge No. 008601) is located on Humber Bridge Trail over the Humber River approximately 0.4 kilometres east of Highway 27. (See Attachment No. 1)

The existing bridge which was constructed about 1914, is a single span of about 18.3 metres concrete bowstring arch bridge, with a concrete deck and a concrete wearing surface. The concrete deck is supported on concrete floor beams. The concrete floor beams are suspended from the top chords of the concrete arches by reinforced concrete hangers and the arches bear directly on the concrete abutments.

The bridge provides a roadway width of 4.9 metres and accommodates a single lane of vehicular traffic and presently serves as an access to one property east of the Humber River, 5789 Humber Bridge Trail. The bridge is posted with a load limit of 5 tonnes.

The McEwen Bridge (Bridge No. 011601) is located on Kirby Road over the Humber River approximately 0.2 kilometres east of Huntington Road. (See Attachment No. 2)

The existing bridge which was constructed about 1923 is a similar structure to the Humber River Bridge. This bridge has a span of about 18.3 metres and it provides a roadway width of 4.6 metres, accommodates a single lane of vehicular traffic and it serves as an access to T.R.C.A. lands east of the Humber River and is posted with a load limit of 5 tonnes.

The City of Vaughan retained Totten Sims Hubicki Associates in the fall of 1996 to re-evaluate the structural condition of the two structures and provide us with recommendations in a report on the short term and long term solution for each structure. The report was finalized and submitted to the City with the following conclusions:

Humber River (West Branch Bridge)

1. The bridge is in poor condition and has continued to deteriorate since the previous inspection in 1992. The concrete has satisfactory compressive strength and density. The concrete deck is saturated with chlorides at the locations tested.