Appendix I

- **Traffic Impact Assessment and Construction Staging Documents**

AECOM
3 – 30 Hannover Drive, St. Catharines, ON, Canada L2W 0A1
T 905.682.0212 F 905.682.4495 www.aecom.com

Memorandum

Date:	February 22, 2010
To:	Neil Harvey
From:	Greg Junnor/Jennifer Whittard
Project Number:	103621
Subject:	Preliminary Traffic Operational Assessment Findings MCC Watermain Municipal Class EA

draft for discussion

1. Background

The Region of Peel is currently undertaking a Municipal Class Environmental Assessment (Class EA) for a 1200-mm diameter watermain which will run from the Hanlan Reservoir and Pumping Station to the corner of Cawthra Road and Burnhamthorpe Road East. The Class EA examines three main potential routes for the watermain, with the preferred route running along Tomken Road southerly to Eastgate Parkway, then running westerly to Cawthra Road and finally south down Cawthra Road to Burnhamthorpe Road East.

It is expected that the watermain construction will impact traffic operations along the route. Therefore, in order to identify the potential impacts to the transportation network from a traffic operational perspective, a preliminary assessment of the impacts was undertaken at key intersections along the route.

A Terms of Reference was developed in conjunction with the Region of Peel, and it was agreed that this assessment would examine the traffic impacts at key types of intersections found along the route and based on conceptual construction staging (or traffic management) plans.

2. Special Considerations

2.1.1 Pedestrians and Other Vulnerable Road Users

The Region is committed to providing safe travel conditions for pedestrians and other vulnerable road users through the construction. The Region will ensure that a sidewalk on at least one side of the

road that is under construction will remain open, and that cyclists will be detoured to other parallel routes to bypass the construction areas. For example, should a sidewalk be closed, pedestrians will be instructed, though signage, to cross the roadway at the nearest safe crossing point adjacent to the construction area. These are typically adjacent intersections.

2.1.2 Transit

Transit routing and any required temporary transit stops will be examined under the detailed design phase of the project. The Region is committed to ensuring the most efficient transit service possible in conjunction with the watermain construction. During detailed design, mitigation measures to reduce impacts to transit will be developed with the City of Mississauga. Some temporary relocation of transit stops may be required along the route. These relocations will be reviewed with the City and plans to reduce their duration will be discussed. It should be noted that unless transit routes are re-assigned, transit vehicles will be subject to the same delay as general traffic. Therefore, the Region may wish to examine any potential for temporary transit priority through extremely congested areas that fall on major transit routes.

2.1.3 Commercial Access

The Region will attempt to provide commercial land uses with sufficient access to continue conducting business without major interruption during the watermain construction. This will be accomplished by having consideration for staging construction so that at least one vehicular access location remains open to travel while the adjacent roadway section is under construction. However, this may not always be possible in certain situations. Situations where this may occur could require temporary accesses to be constructed or alternate access points established off the watermain route.

3. Summary of Intersection Operational Conditions

In conjunction with the preliminary traffic management plans created for the Hanlan Feedermain Municipal Class EA (November 2009), AECOM has completed a more detailed traffic/transportation analysis of selected key intersections and roadways along the preliminary recommended watermain route. The intersections were selected because they were seen to be representative of the various types (volume, geometry, etc.) of intersections that are located along the entire watermain route. Roadways selected were representative of the potential for single one-way traffic. This was not an exhaustive analysis of every location along the route, but was meant as an initial proactive assessment of the magnitude of operational impact that the installation of the watermain could have on the roadway network.

It is recommended that once the preferred route is confirmed and the project proceeds to the detailed design stage, a more in-depth analysis of the final route should be completed. The following information is meant to be representative of the basic impact of construction and the selected mitigation methods that could be further developed during detailed design.

3.1 Tomken Road & Britannia Road East (Typical Minor 4-Leg Intersection)

For existing intersection information and staging plans, refer to drawing TMP-1.

The PM peak is the most critical time period. With the combination of lane reduction in the southbound direction and the narrowing of Britannia Road East to one lane in each direction between Tomken Road and Shawson Drive, there will be queuing past Shawson Drive without diversion of westbound traffic. Queues are expected to disperse during green time. There is opportunity for westbound and southbound traffic to divert to other routes during construction. With a diversion of approximately 20% of the westbound left-turn and southbound through traffic (100 WB LT vehicles and 155 SB TH), the maximum v/c ratio is reduced to 1.11 for the WB LT and overall intersection delay is reduced to 103.7 seconds and should reduce the potential for queuing past Shawson Drive. There are other parallel routes and access to the roadway network available for vehicles to be re-routed.

3.1.1 Preliminary Observations and/or Recommended Action(s)

- Divert westbound and southbound traffic to alternate routes (i.e., Tomken Road to Dixie Road). This could be done in the field utilizing informational signing and variable message boards and through the media utilizing newspapers or radio. Sensitivity analysis to determine the approximate percentage of traffic that would be required to be diverted would be undertaken during detailed design.

3.1.2 Intersection and Operational Assessment Summary

	Existing	**Stage 1**	**Stage 1 with 20% traffic reduction WB LT and SB TH**
Lane Configuration	1 EBL, 1 EBTR, 1 WBL, 1 WBT, 1 WBR, 1 NBL, 1 NBT, 1 NBTR, 1 SBL, 1 SBT, 1 SBTR	1 EBL, 1 EBTR, 1 WBL, 1 WBT, 1 WBR, 1 NBL, 1 NBT, 1 NBTR, 1 SBL, 1 SBT, 1 SBR (reduction to one southbound through lane)	
AM Peak LOS	LOS: C Max. V/C: 0.80	LOS: C Max. V/C: 0.91(sbt) CRITICAL MOVEMENTS: WBL (LOS F delay 91.2) SBT (v/c0.91)	

	Existing	**Stage 1**	**Stage 1 with 20% traffic reduction WB LT and SB TH**
Off Peak LOS	LOS: C Max. V/C: 0.62	LOS: C Max. V/C: 0.63	
PM Peak LOS	LOS: F Max. V/C: 1.06 (wbl) CRITICAL MOVEMENTS: EBT (v/c1.02), WBL (v/c1.06) NBT(v/c .1.0) SBL(v/c 1.01)	LOS: F Max. V/C: 1.28 (wbl) CRITICAL MOVEMENTS: EBT(v/c1.24), WBL (v/c1.28) SBT(v/c 1.14) (NBL pro. phase added) Int. Delay=231.6 sec.	LOS: F Max. V/C: 1.11 (wbl) CRITICAL MOVEMENTS: EBT(v/c1.06), WBL (v/c1.11) SBT(v/c 1.00) Int. Delay=103.7 sec.

3.2 Tomken Road under Highway 401 (Typical Lane Reduction on Municipal Roadway)

For existing roadway information and staging plans, refer to drawings TMP-2 and TMP-3.

Single lane operation will not operate satisfactorily during AM, mid-day and PM peak hours due to volume of traffic. Significant queuing will result during these peak times with a single lane operation. The traffic volumes drop significantly in the evening and early morning and a single lane operation can be accommodated on Tomken Road under the Highway 401 section during this time period. Two-way two-lane operations would be possible during the daytime hours.

3.2.1 Preliminary Observations and/or Recommended Action(s)

- Undertake lane closures only during evening / overnight periods and re-open roadway for traffic before the AM peak;
- Divert traffic to alternate routes. This could be done in the field utilizing informational signing and variable message boards and through the media utilizing newspapers or radio. Sensitivity analysis to determine the approximate percentage of traffic that would be required to be diverted would be undertaken during detailed design; or
- Consider tunnelling to reduce impact on traffic.

.

3.2.2 Intersection and Operational Assessment Summary

	Two lane operation	**Single Lane Operation**
Lane Configuration	Narrow lane configuration to one lane in each direction	Single lane operation (Shared lane for northbound and southbound movements.)
AM Peak LOS		LOS: F NB: v/c=2.24 Approach delay=2513 sec SB: v/c=2.43 Approach delay=2723.4 sec
Off Peak (Mid-Day) LOS		LOS: F NB: v/c=1.47 Approach delay=979.7 sec SB: v/c=1.25 Approach delay=479.5 sec
PM Peak LOS		LOS: F NB: v/c=1.43 Approach delay=818 sec SB: v/c=3.55 Approach delay=4604 sec
Off Peak (between 8pm-6am) LOS		LOS: B NB: v/c=0.5 Approach delay=26.2 sec SB: v/c=0.5 Approach delay=1.8 sec

3.3 Tomken Road & Matheson Boulevard East (Typical Major Intersection)

There is currently no TMP for this intersection.

Under existing traffic conditions, the intersection of Matheson Boulevard and Tomken Road operates at capacity during both the AM and PM peak hours. The reduction of the northbound and southbound legs to an exclusive left lane and a shared through right lanes significantly increases delays and queuing to these movements. Construction Stages 2 and 3 with the reduction of the eastbound movement to a single shared left, through and right lane has a significant impact on the operation of the intersection. The proposed intersection configuration cannot accommodate the existing traffic volumes.

Testing with 50% reduction in traffic volumes for all movements, the intersection during the PM peak hour under Stage 2 scenario is still expected to operate over capacity and have significant delays to the eastbound, southbound and westbound movements.

3.3.1 Preliminary Observations and/or Recommended Action(s)

Proposed Stage 1 and Stage 2 intersection configuration cannot accommodate traffic volumes.

- Consider working during the evening / overnight periods and re-open intersection to traffic before the AM peak; or
- Consider tunnelling to reduce impact on traffic.

3.3.2 Intersection and Operational Assessment Summary

	Existing	Stage 1	Stage 2	Stage 3	Stage 4
Lane Configuration	1 EBL, 1 EBT, 1 EBTR, 1 WBL, 2 WBT, 1 WBR, 1 NBL, 1 NBT, 1 NBTR, 1 SBL, 2 SBT, 1 SBR	1 EBL, 1 EBT, 1 EBTR, 1 WBL, 2 WBT, 1 WBR, 1 NBL, 1 NBTR, 1 SBL, 1 SBTR (single nbt and conversion of 2sbt+sbr to a single shared sbtr)	1 EBLTR, 1 WBLT, 1 WBR, 1 NBL, 1 NBTR, 1 SBL, 1 SBTR (shared ebltr, wb shared through left, single nb shared through right, shared sb through right)	1 EBLTR, 1 WBL, 1 WBTR, 1 NBL, 1 NBTR, 1 SBL, 1 SBT, 1 SBR (shared ebltr, wb shared through right, single nb shared through right, shared sbl,sbt,sbr)	1 EBL, 1 EBT, 1 EBTR, 1 WBL, 2 WBT, 1 WBR, 1 NBL, 1 NBTR, 1 SBL, 1 SBTR (removal of 1 nbt, conversion of 2sbt+sbr to a single shared sbtr)
AM Peak LOS	LOS: E Max. V/C: 1.01(ebt) CRITICAL MOVEMENTS: EBT(1.01) NBT (0.95) SBL(1.0)	LOS: F Max. V/C: 1.32(ebt) CRITICAL MOVEMENTS: EBL(0.87) EBT(1.32) NBT (1.30) SBL(1.26) Approach delay=382.3 sec	LOS: F Max. V/C: 4.08(ebt) CRITICAL MOVEMENTS: EBLRT(4.08) WBLT(1.01) NBL(1.30) NBT (1.75) SBL(1.46) SBT(1.16) Approach delay=2623.3 sec	LOS: F Max. V/C: 3.59(ebt) CRITICAL MOVEMENTS: EBLRT(3.59) NBL(1.49) NBT (1.78) SBL(1.70) SBT(1.04) Approach delay=2288 sec	LOS: F Max. V/C: 1.32(ebt) CRITICAL MOVEMENTS: EBL(0.95) EBT(1.32) NBT (1.30) SBL(1.26) Approach delay=384.9 sec

	Existing	Stage 1	Stage 2	Stage 3	Stage 4
Off Peak LOS	LOS: C Max. V/C: 0.64	LOS: D Max. V/C: 0.87(ebt) CRITICAL MOVEMENTS: EBT(0.87)	LOS: F Max. V/C: 1.66(ebt) CRITICAL MOVEMENTS: EBLRT(1.66) WBTL(0.87) NBL(0.88) NBT (1.28) SBT(1.37) Approach delay=600 sec	LOS: F Max. V/C: 1.73(ebt) CRITICAL MOVEMENTS: EBLRT(1.73) NBL(0.88) NBT (1.28) SBT(1.10) Approach delay=523 sec	LOS: C Max. V/C: 0.82(sbt)
PM Peak LOS	LOS: F Max. V/C: 1.16(ebl) CRITICAL MOVEMENTS: EBL (1.16) EBT (0.89) WBT(1.10) NBL(1.16) SBT(1.08) Signal delay=157.3	LOS: F Max. V/C: 1.98(sbt) CRITICAL MOVEMENTS: EBL (0.90) EBT (1.16) WBL(1.13) WBT(1.66) NBL(1.40) SBT(1.98) Signal delay=979.3	LOS: F Max. V/C: 24.84(ebt) CRITICAL MOVEMENTS: EBLTR (24.84) WBTL(3.56) NBL(1.39) SBT(2.37) Signal delay=10992.6	LOS: F Max. V/C: 24.84(ebt) CRITICAL MOVEMENTS: EBLTR (24.84) WBL(1.54) WBT(2.06) NBL(1.39) SBT(1.88) Signal delay=9832	LOS: F Max. V/C: 2.11(sbt) CRITICAL MOVEMENTS: EBL (1.16) WBL(2.00) WBT(1.50) NBL(1.40) SBT(2.11) Signal delay=976.1

3.4 Tomken Road & Eglinton Avenue East (Typical Major 4-Leg Intersection)

For existing intersection information and staging plans, refer to drawings TMP-4 and TMP-5.

Volumes at the intersection should be confirmed (from counts taken in 2005). Volumes are very similar to Matheson Boulevard at Tomken Road with Matheson Boulevard only 4 lanes whereas Eglinton Avenue East is 6 lanes. Expect queuing on single through lanes in the three scenarios. With reduction in through lane volume as a result of diversion of traffic due to construction, the operations of the movements are expected to improve.

3.4.1 Preliminary Observations and/or Recommended Action(s)

- Divert traffic to alternate routes. This could be done in the field utilizing informational signing and variable message boards and through the media utilizing newspapers or radio. Sensitivity analysis to determine the approximate percentage of traffic that would be required to be diverted would be undertaken during detailed design; or
- Consider tunnelling to reduce impact on traffic.

3.4.2 Intersection and Operational Assessment Summary

	Existing	Stage 1	Stage 2	Stage 3
Lane Configuration	2 EBL, 3 EBT, 1 EBR, 1 WBL, 3 WBT, 1 WBR, 1 NBL, 2 NBT, 1 NBR, 1 SBL, 2 SBT, 1 SBR	1 EBL, 3 EBT, 1 EBR, 1 WBL, 1 WBT, 1 NBL, 1 NBT, 1 NBR, 1 SBL, 1 SBT, 1 SBR (reduction of wb to one left and one through lane, removal of one nb through lane and one sb through lane)	1 EBL, 1 EBT, 1 EBR, 1 WBL, 1 WBT, 1 WBR, 1 NBL, 1 NBT, 1 NBR, 1 SBL, 1 SBT, 1 SBR (reduction of eb to one left, through and right lane, wb to one left and one through one right lane, removal of one nb through lane and one sb through lane)	1 EBL, 1 EBT, 1 EBR, 1 WBL, 3 WBT, 1 WBR, 1 NBL, 1 NBT, 1 SBL, 1 SBT, 1 SBR (reduction of eb to one left, through and right lane, wb reinstated removal of one nb through lane and nb right lane and removal of one sb through lane)
AM Peak LOS	LOS: D Max. V/C: 0.82(ebt)	LOS: F Max. V/C: 1.49(ebl) CRITICAL MOVEMENTS: EBL (1.49) WBT(1.44) NBT(1.36) SBL(1.09) Signal delay=382.9	LOS: F Max. V/C: 1.77(ebt) CRITICAL MOVEMENTS: EBL (1.03) EBT (1.77) NBT(1.63) SBL(1.09) Signal delay=719	LOS: F Max. V/C: 2.23(nbt) CRITICAL MOVEMENTS: EBT (1.77) NBT(2.23) SBL(1.09) Signal delay=1127
Off Peak LOS	LOS: C Max. V/C: 0.60(wbt)	LOS: F Max. V/C: 1.16 (sbl) CRITICAL MOVEMENTS: EBL (1.09) WBT(1.07) NBT(1.02) SBL(1.16) Signal delay=112	LOS: F Max. V/C: 1.16 (sbl) CRITICAL MOVEMENTS: EBL (1.09) WBT(1.07) NBT(1.02) SBL(1.16) Signal delay=112	LOS: F Max. V/C: 1.08 (nbt) CRITICAL MOVEMENTS: EBT (1.04) NBT(1.08) SBL(1.00) Signal delay=89.9
PM Peak LOS	LOS: E Max. V/C: 0.99(nbl) CRITICAL MOVEMENTS: EBL (0.89) WBL(0.89) WBT(0.98) NBL(0.99) SBR(0.94)	LOS: F Max. V/C: 2.04 (wbt) CRITICAL MOVEMENTS: EBL (1.50) WBT(2.04) NBL(1.63) NBT(0. 89) SBL(0.88) SBT(1.65) SBR(1.11) Signal delay=898	LOS: F Max. V/C: 2.04 (wbt) CRITICAL MOVEMENTS: EBL (1.50) EBT (1.53) WBT(2.04) NBL(1.63) NBT(0.89) SBL(0.88) SBT(1.65) SBR(1.11) Signal delay=940	LOS: F Max. V/C: 1.55 (wbl) CRITICAL MOVEMENTS: EBL (1.11) EBT (1.33) WBL(1.55) WBT(1.02) NBL(1.41) SBT(1.35) SBR(1.87) Signal delay=340

THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY AND DOES NOT CONSTITUTE A TRAFFIC SAFETY PLAN OR A TRAFFIC CONTROL PLAN TO BE USED DURING CONSTRUCTION.

TOMKEN ROAD

BRITANNIA ROAD E

WORK ZONE

TC-12 TC-116EL TC-54 @ 5-10m SPACING TC-13 TC-34 TC-3R TC-1 TC-9 TC-4 Rb-31 Rb-24

NOTE: TAPER LENGTHS 40-60m (TYP)

PROFESSIONAL SEALS

A								
I/R	YY/MM/DD	ISSUE/REVISION DESCRIPTION	DRN	CHK	QES	ENG	IDR	APP

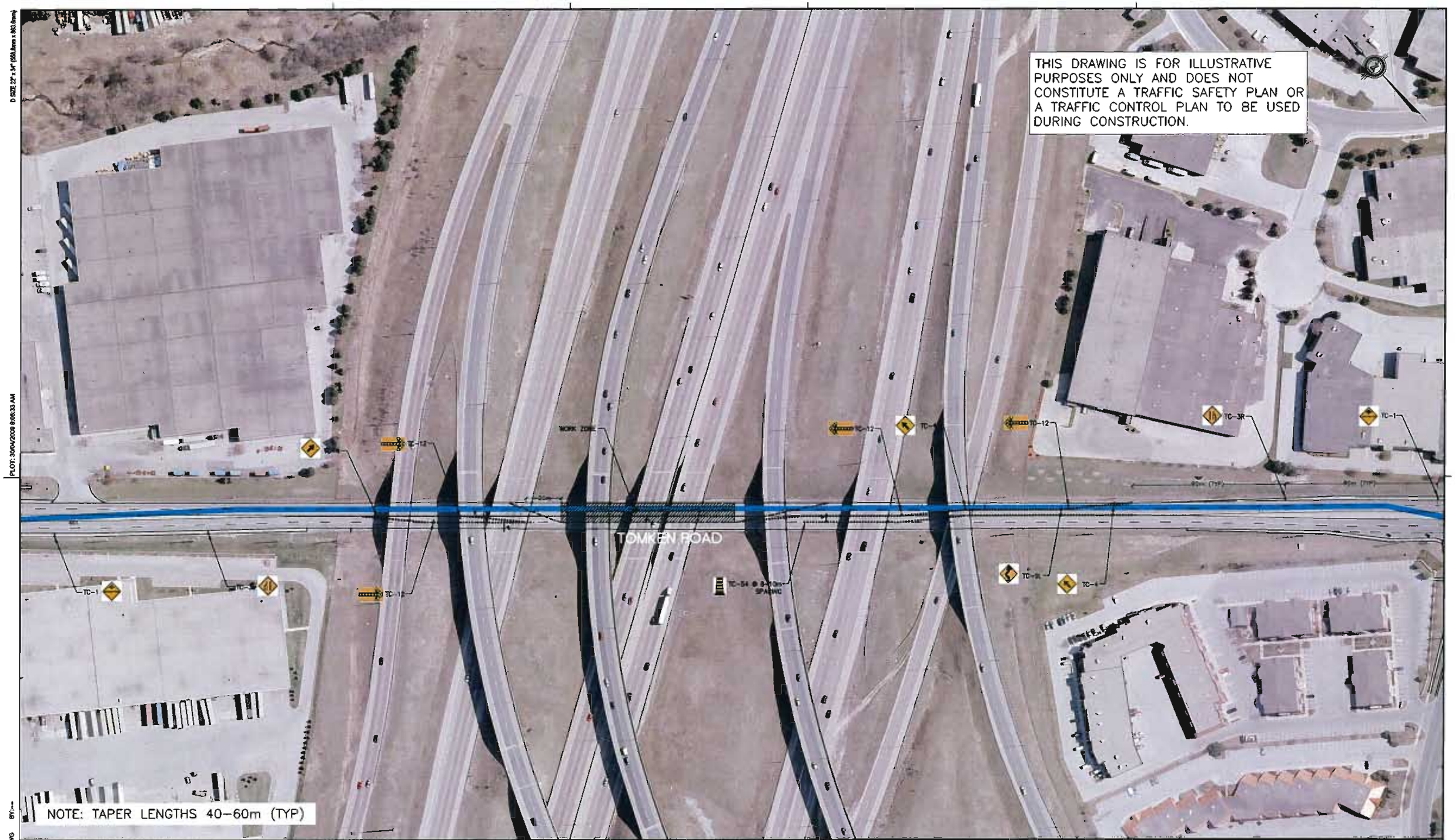
Region of Peel
Working for you

AECOM

REGION OF PEEL

HANLAN FEEDERMAIN
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PROJECT NUMBER	DRAWING NUMBER	ISSUE/REVISION
103621	TMP-1	X



DO NOT SCALE THIS DOCUMENT. ALL MEASUREMENTS MUST BE OBTAINED FROM STATED DIMENSIONS.

PROFESSIONAL SEALS

I/R	YY/MM/DD	ISSUE/REVISION DESCRIPTION	ORH	CHK	DES	ENG	IDR	APP
A	--							

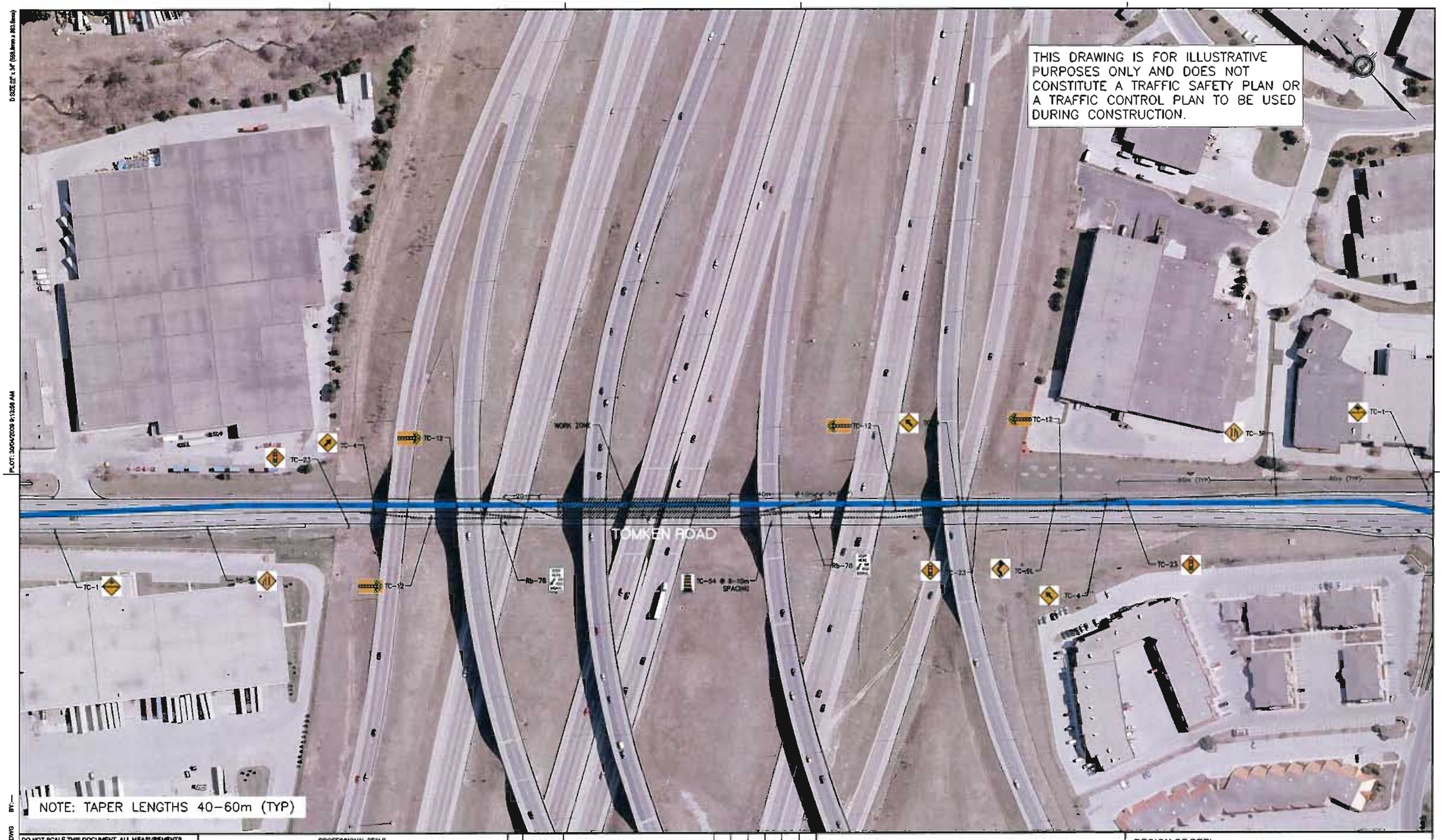
Region of Peel
Working for you

AECOM

REGION OF PEEL

HANLAN FEEDERMAIN
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PROJECT NUMBER	DRAWING NUMBER	ISSUE/REVISION
103621	TMP-2	X



DO NOT SCALE THIS DOCUMENT. ALL MEASUREMENTS MUST BE OBTAINED FROM STATED DIMENSIONS.

PROFESSIONAL SEALS

I/R	YY/MM/DD	ISSUE/REVISION DESCRIPTION	DRN	CHK	DES	ENG	IDR	APP
A								

Region of Peel
Working for you

AECOM

REGION OF PEEL

HANLAN FEEDERMAIN
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PROJECT NUMBER	DRAWING NUMBER	ISSUE/REVISION
103621	TMP-3	X

THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY AND DOES NOT CONSTITUTE A TRAFFIC SAFETY PLAN OR A TRAFFIC CONTROL PLAN TO BE USED DURING CONSTRUCTION.

EGLINGTON AVE E

NUVIK CRT

SISBRO CRT

TOMKEN ROAD

TIMBERLEA BLVD

WORK ZONE

TC-12

TC-1

TC-4

TC-54 @ 8-10m SPACING

NOTE: TAPER LENGTHS 40-60m (TYP.)

D SIZE 22" x 34" (558.8mm x 863.6mm)

PLOT: 30/04/2009 11:03:46 AM

BY—

FILE NAME: TOMKEN FIREHALL.DWG

PROFESSIONAL SEALS

VR	YY/MM/DD	ISSUE/REVISION DESCRIPTION	DRN	CHK	DES	ENG	IDR	APP
A	..	.	.	.	.	.	.	.

Region of Peel
Working for you

AECOM

REGION OF PEEL

HANLAN FEEDERMAIN
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PROJECT NUMBER	DRAWING NUMBER	ISSUE/REVISION
103621	TMP-4	X

THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY AND DOES NOT CONSTITUTE A TRAFFIC SAFETY PLAN OR A TRAFFIC CONTROL PLAN TO BE USED DURING CONSTRUCTION.

EGLINGTON AVE E

NUYK CRT

SISBRO CRT

TOMKEN ROAD

TIMBERLEA BLVD

TC-1

TC-4

TC-12

TC-34 @ 8–10m SPACING

NOTE: TAPER LENGTHS 40–60m (TYP.)

PROFESSIONAL SEALS

VR	YY/MM/DD	ISSUE/REVISION DESCRIPTION	ORN	CHK	DES	ENG	IDR	APP
A	..	.	-	-	-	-	-	-

Region of Peel
Working for you

AECOM

REGION OF PEEL

HANLAN FEEDERMAIN
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

PROJECT NUMBER	DRAWING NUMBER	ISSUE/REVISION
103821	TMP-5	X