# TRANSPORTATION ASSESSMENT AND MANAGEMENT STUDY GUIDELINES FOR CONSULTANTS

## 1 INTRODUCTION

This document is intended to provide guidelines for transportation consultants who produce Transportation reports for the City of Vancouver. Studies requested may include a Transportation Impact Study, a Parking Study, and a Transportation Demand Management Plan; collectively called a Transportation Assessment and Management Study (TAMS). These guidelines establish the scope, form and analysis required to properly assess the impacts of a proposed development on existing transportation infrastructure, determine the required mitigation measures and document the results.

## 2 TRANSPORTATION ASSESSMENT AND MANAGEMENT STUDY REPORT STRUCTURE

The format of Transportation Assessment and Management Studies (TAMS) should follow the guidelines outlined in this document. The following is a suggested report structure:

### 2.1 REPORT CONTEXT

Description of the development (include all of the following that are known at the time of the application):

- Municipal address;
- Development Application number;
- Location relative to existing transportation systems;
- Proposed land uses and relevant planning regulations to be used in the analysis;
- Proposed development size (building size, number of residential units, etc.) and location on site;
- Estimated date of occupancy;
- Planned phasing of development;
- Proposed number of parking spaces, number and type of loading spaces, number and type of bike parking spaces;
- Type of access (full turns, right-in/right-out, other turning restrictions, etc.);
- Proposed pedestrian, bicycle, vehicle and loading access points;
- Development time periods and phasing; and
- Horizon years for traffic (include reference to phased development)

The TAMS must include a key plan and a context plan that shows the general location of the development in relation to the surrounding area. The TAMS must define the study area and must also provide a draft site plan of a suitable scale that shows the proposed accesses and parking areas. If the proposed development is to be constructed in phases, a description must be provided for each phase, identifying the proposed timing of implementation. The TAMS must include, the proposed access locations, and the existing conditions in the surrounding area; figures documenting the existing travel demands by mode; and a summary of collisions for the affected study area roads. A photographic inventory of the transportation infrastructure in the vicinity of the proposed access points

would be beneficial for better context.

## 2.2 EXISTING CONDITIONS

Full description of relevant existing conditions, including:

- Existing vehicle, pedestrian, cyclist, and transit trip volumes, wherever possible
- Existing roads ramps and driveways in the study area, including classification and number of lanes
- Existing intersections, indicating type of control, lane configurations, turning restrictions, and any other relevant data (e.g., extraordinary lane widths, grades);
- Transit routes and facilities ;
- Existing access points to adjacent developments (both sides of all roads bordering the site);
- Existing on-and-off-road bicycle facilities and pedestrian sidewalks and pathway networks;
- Existing pedestrian network ( within 400 meters diameter) and existing bicycle network ( within 5 kilometre diameter)
- Assessment of existing intersection and roadway operations, including volume-to-capacity ratio (V/C) and levels of service (LOS)
- Major trip generators/attractors within the Study Area should be indicated.

## 2.3 DEMAND FORECASTING

For future time horizon(s) the TAMS must include**:**

- General background traffic growth , including a description and justification of how the background growth has been calculated;
- Other study area developments within one kilometre;
- Planned or anticipated changes to the study area road network;
- Future intersection and roadway operations (V/C, LOS, queue lengths)
- Include figures documenting future background travel demands at study area intersections by mode for each horizon year;
- Trip generation rates for vehicles, pedestrians, cyclists, and transit, including breakdown of new and pass-by trips, as well as description and justification for any adjustments;
- Trip distribution and assignment, include description of how distribution was determined;
- Current and future mode split ;
- Include figures documenting forecasted site trip generation and assignment by mode; and
- Include plans showing total (background plus site generated) future travel demands by mode for each horizon year.

## 2.4 TRANSPORTATION IMPACT ANALYSIS

Impact analysis methodologies shall be consistent with methodologies outlined in most current editions of ITE Trip Generation Manual, ITE Trip Generation Handbook, ITE Transportation Impact Analyses for Site Development, Highway Capacity Manual, and other guidelines, as applicable. Where deviations from industry-standard practices are proposed, additional data, rationale, and justification shall be provided to support this.

- Assessment of intersection and roadway operations (V/C, LOS, queue lengths);
- Traffic, pedestrian and bike signal and auxiliary lane warrants, as required ;
- Operational/Safety assessment (e.g., sight line assessment where vertical and/or horizontal alignment are an issue) ;
- Storage analysis for closely spaced intersections and identification of operational and safety issues;
- Site access location assessment;
- Pedestrian and bicycle network connections and continuity;
- On-site vehicle, pedestrian, and cycling circulation and design;
- Potential for neighbourhood impacts; and
- Potential for impacts on existing and planned cycling infrastructure.

### *2.4.1 TRANSPORTATION IMPACT STUDY REQUIRMENTS*

#### *2.4.1.1 OPERATIONAL ANALYSIS*

An operational evaluation of all intersections and roadway sections within the study area that will be affected by site generated traffic volumes during any or all of the relevant periods and scenarios is required. Summaries are to be provided in tabular format clearly identifying intersection performance under existing, future background, and total future traffic conditions including impacts of any adjacent future developments anticipated.

Operational analysis shall be completed using indursty-standard simulation software (e.g. Synchro/SimTraffic, VISSIM, VISTRO, HCS, SIDRA etc.) and shall be consistent with methodologies outlined in most current edition of the Highway Capacity Manual, the Canadian Capacity Guideline for Signalized Intersections, and other guidelines, as applicable. Where deviations from industry-standard practices are proposed, additional data, rationale, and justification shall be provided to support this.

Volume-capacity (V/C) calculations relating to future conditions should be determined using signal timing optimized for the volume conditions being studied. In cases where minimum pedestrian phase times prevent equalizing the level of service for critical movements, then the V/C ratio for the most heavily saturated critical movement should be considered as the V/C ratio for the intersection.

The Consultant must undertake at least one hour of continuous observations during each of the am peak, pm peak, and peak hour traffic conditions to verify that the traffic volumes through the intersections reflect existing demands and to identify unusual operating conditions. Mid-day and/or weekend peaks shall be analyzed, as required, to reflect the revised/proposed land use. Timing of observations and conditions observed should be documented in the report.

Intersection evaluations should identify:

- Signalized intersections – V/C ratios for the overall intersection, as defined above, and for individual movements and
- Un-signalized intersections – Level of service (LOS) and capacity based on gap analysis.

Existing signal timing information such as cycle length, offset, phasing, pedestrian minimums, and clearance intervals must be used as a base to analyze the existing

capacity of signalized intersections. This signal timing data can be obtained from the City of Vancouver Traffic Management Branch.

In cases where roadways have closely spaced signalized intersections where there are heavy turning movements, the analysis should confirm that vehicle storage limitations would not prevent signalized intersections from operating at the predicted V/C ratio.

#### *2.4.1.2 QUEUING CAPACITY AND DELAY AT MAJOR INTERSECTIONS*

Intersection evaluation should identify projected queue lengths and available storage for left turn and through lanes on all approaches. Mitigation measures in the form of the additional lane capacity, signal timing/phasing adjustments and/or transportation demand management (TDM) measures will be required where the projected 95$^{th}$ percentile queue lengths exceed available storage. Traffic signal and auxiliary lane warrants using the most current methodologies from the Transportation Association of Canada (TAC), and/or other applicable guidelines should also be completed and documented in the report, as required, to supplement operational recommendations.

#### *2.4.1.3 SYSTEM OPERATIONS, SAFETY, AND PERCEIVED SAFETY*

An evaluation is required of potential operational and safety concerns at intersections, on road segments or at driveways that will be created or affected by site generated traffic during any or all of the relevant periods and scenarios. Consideration must be given to the potential to exacerbate existing safety concerns, and operational issues such as:

- Pedestrian and Cycling conflicts
- Vulnerable road users
- Access points for non-vehicular modes
- Vehicle-pedestrian and vehicle-cyclist conflicts;
- Weaving;
- Merging/diverging;
- Corner clearances;
- Sight distances/sight line assessment (where grades at access points are an issue); and
- Access conflicts.

The consultant must undertake at least one hour of continuous observations during am peak and pm peak traffic conditions and any other “critical traffic” time periods to evaluate operating conditions and any safety issues along the study area roadways.

Where there are known safety concerns, a desktop review of the five-year collision history at key intersection and roadway segments may be required.

#### *2.4.1.4 PROVISION FOR NON-AUTO MODES*

As per the policy directions established by the City of Vancouver Transportation 2040 Plan (2012), proposals must support pedestrian movements, cycling, transit ridership, and goods movement. Pedestrian and bicycle network continuity should be considered, as should the City of Vancouver Transportation Plan requirements related to the provision of infrastructure to promote sustainable modes of transportation.

An assessment of potential impacts on transit operations must be undertaken where the

site accesses connect to or cross any bus route. The assessment will identify the potential for increased delay to transit vehicles, safety concerns/conflicts with transit vehicles and any impacts on bus stops.

Gaps in pedestrian and cycling network continuity should be identified.

Site accesses from intersecting existing or planned bike routes are not supported and should be avoided wherever possible. Where site access along a bike route is unavoidable, the consultant should identify measures to mitigate the impacts on bicycle route(s).

A detailed assessment of pedestrian facility level of service will be required in the vicinity of the site where the development is expected to produce significant pedestrian volumes. The consultant shall identify any conflicts between any two modes of travel accessing to the site. The consultant shall also identify pedestrian and cycling facilities in the public realm. Additional sidewalk or facility width or a 'bicycle hub' may be required in such circumstances. Pedestrian warrants following the most current methodologies of the Transportation Association of Canada (TAC) and/or British Columbia Pedestrian Crossing Control manual should be provided to supplement recommendations.

#### *2.4.1.5 ON-SITE DESIGN AND OPERATIONS*

Particular attention must be paid to the potential for on-site traffic operations to affect the safe and efficient operation of the adjacent roads. It is expected that the consultant will provide:

- Evaluation of proposed on-site circulation and provision for pedestrian and cycling movements (clear and direct pedestrian and cycling pathways must be provided, including connections to existing facilities);
- Identification of end of trip facilities for cyclists ;
- Identification of potential for conflict/spill-back from on-site parking aisles/stalls to driveway intersections with the City's road network; and
- Identification of truck access location and loading/unloading facilities

#### *2.4.1.6 COMMUNITY TRANSPORTATION IMPACTS*

A transportation impact study report will review the local transportation network in the vicinity of the proposed development and identify potential neighbourhood impacts during both the commuter peak and the projected site peak as well as appropriate mitigation strategy, where required.

#### *2.4.1.7 PARKING AND LOADING STUDY*

A parking and loading study shall be provided for developments where deviations from the requirements of the Parking By-law are proposed. Recommendations shall adhere to the principles of City of Vancouver Parking and Loading Design Supplement, and consider vehicle and bicycle parking, as well as, loading requirements.

The proposed parking and loading supply is to be compared to the minimum requirements set by the Parking By-law. Acceptable justification and rationale for providing less than the minimum standards shall be included in this section. Full parking survey study of off-street

and on-street conditions may be required, including as assessment of parking supply, occupancy, turnover, and duration, may be required if a significant shortfall is proposed.

An assessment of vehicle maneuvering, including vehicle turn swaths, should also be included where access and maneuvering for vehicles and loading may be challenging.

#### *2.4.1.8 TRANSPORTATION DEMAND MANAGEMENT (TDM) PLANS*

Where Transportation Demand Management (TDM) strategies are required as part of a rezoning or development application, or where a TDM strategies is being provided to support a proposed relaxation, a TDM Plan shall be provided in accordance with the minimum standards set by the Parking By-law and the Administrative Bulletin: Transportation Demand Management for New Developments Program.

## 2.5 MITIGATION MEASURES AND SITE DESIGN CHARACTERISTICS

The TAMS must identify all physical and operational mitigation measures required to offset network impacts from the development and justification for those measures.

The TAMS must include all of the following where they are required by the subject development:

- Mitigation measures required to offset impacts to and/or encourage increased usage of the Transit networks;
- Mitigation measures required to offset impacts to and/or encourage increased usage of cycling and pedestrian networks and facilities;
- Mitigation measures required to offset impacts on existing and planned cycling and pedestrian facilities;
- Location and timing of proposed changes to existing traffic controls at intersections (e.g., new traffic signals, Stop signs, etc.);
- Location and timing of new intersections, including proposed traffic control measures (.e.g., traffic signals, etc.);
- Requirements for left turn lanes and in some cases right turn lanes;
- Operational changes (e.g. turn restrictions);

## 2.6 SUBMISSION

All Transportation Assessment and Management Studies should be signed and sealed by a Professional Engineer.