ATHLETICS CENTRE TRAFFIC IMPACT ASSESSMENT

UNIVERITY OF VICTORIA, DISTRICT OF SAANICH

MARCH 18 2011

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Boulevard Transportation Group

EXECUTIVE SUMMARY

The University of Victoria is proposing to construct a new Athletics and Recreation Centre in the north part of the campus abutting McKenzie Ave. At the same time, the District of Saanich intends to re-develop McKenzie Ave in the vicinity to improve transportation for all road users (automobiles, cyclists, pedestrians, and transit). Therefore a traffic impact assessment was conducted by Boulevard Transportation Group on behalf of both The University of Victoria (UVIC) and the District of Saanich, to investigate traffic impacts, access and mitigation options, pedestrian and cyclist considerations, parking considerations, traffic demand management (TDM) and accessibility considerations.

Traffic Conditions

In terms of typical peak hour traffic operations (AM and PM peak) the following was concluded. Base 2013 conditions are generally acceptable (LOS D or better) except for one movement at Gordon Head Rd & McKenzie Rd, which operates at LOS E, and for northbound Gabriola Rd at McKenzie Ave, which operates at LOS F.

Trips for the site will be, as a worst-case, a function of the parkade rather than of the uses at the site itself. This is because the parkade is a resource for the campus as a whole, and therefore parkade capacity was used as the basis for analysis.

The parkade will require mitigation of either signal, roundabout, or right-turn-out only in order to function at an acceptable level (it will fail in peak hours otherwise). For the right-turn-out only options, existing traffic control at Gabriola Rd & McKenzie Ave and Finnerty Rd & McKenzie Ave would result in acceptable levels of service, as would a roundabout at Finnerty Rd & McKenzie Ave. However a roundabout at Gabriola Rd would have queuing that could extend back along McKenzie Rd to Finnerty Rd.

At other McKenzie Ave corridor intersections, the levels of service are reduced with the added parkade traffic. At Gordon Head Rd & McKenzie Ave, some movements drop to LOS F from LOS E in the AM, and from LOS D to LOS E in the PM peak hour. Similarly, worst case conditions at Finnerty Rd & McKenzie drop slightly to LOS D. Conditions remain at LOS F for Gabriola Rd northbound at McKenzie Ave.

Conditions in the 10-year post development horizon year (2023) are effectively the same as 2013, although some movements drop one level of service grade. Signalization or a roundabout still works for the parkade access at McKenzie Ave, a roundabout would have acceptable peak hour levels of

service at Finnerty Rd, but a roundabout at Gabriola Rd could have queuing issues where queues extend eastward on McKenzie Ave through Finnerty Rd.

A review of event traffic found that peak event traffic can be accommodated, and conditions will be better than during either the AM or PM peak hour. This is further mitigated by the fact that peak event traffic occurrences will be rare.

From a regional traffic perspective, the largest area trip generating and attracting zones are west on McKenzie Ave and south via Cedar Hill X Rd and Foul Bay Rd. As a means of ensuring shortcutting through residential neighbourhoods does not occur direct full movement access at the parkade access onto McKenzie Ave is a strong consideration.

Traffic Mitigation - Discussion

Direct traffic access at the parkade access & McKenzie Ave is the preferred mitigation approach, as the right-in, left-in, right-out option has drawbacks in terms of travel circuity and neighbourhood shortcutting. Either a roundabout or signalized intersection control would be viable from a traffic operations perspective at the parkade access & McKenzie Ave. Roundabouts have benefits in terms of slower vehicle speed, increased pedestrian crossing opportunities, and improved safety over conventional intersection designs. They are, however, more costly than signalization and require more land at the intersection. Also, signalization can be timed to facilitate better progression along McKenzie Ave, which is desirable since it is an arterial roadway.

With the wide corridor width (from building face to building face) along McKenzie Ave it is likely possible to construct a roundabout at the parkade entrance, Gabriola Rd, or Finnerty Rd. A roundabout would however likely encroach onto UVIC land, and may impact some existing tree / natural features.

The recommended traffic mitigation for the corridor is to signalize the parkade access at McKenzie Ave, and to convert McKenzie Ave & Finnerty Rd into a one-lane roundabout. Nonetheless, either signalization or a roundabout are viable alternatives at both intersections.

Parking

The proposed parkade consists of 500 stalls. Of this the anticipated demand of the athletics centre is less than 250 stalls. The rest of the parkade parking supply would be available and used by the campus as a whole. Large events may generate a demand of up to 1,000 stalls, which can be accommodated at the parkade, lot 2, and McGill Rd parking lots without anticipated spillover into the residential area to the north. If spillover becomes a concern then a more detailed study should be undertaken at that time.

Non Motorized Users

Cyclists and pedestrians should be accommodated with appropriate facilities, routes, and crossings in the vicinity of the Athletics Centre. A consideration is to convert Gabriola Rd south of Lot 2 into a pedestrian corridor (emergency and service vehicle access only). Improvements should be made for both user types in conjunction with McKenzie Ave streetscape improvements.

Transportation Demand Management

The development of the new Athletics Centre provides an opportunity to further the objectives of the 2003 UVIC TDM Study, specifically as they relate to parking and alternative transportation. Measures should be incorporated as possible.

Accessibility

Ensuring the area adjacent to the Athletics Centre is accessible to users of all abilities is important, particularly in consideration of the presence of the CanAssist organization. Provisions for a drop-off / pickup loading bay, gathering area, curb drops, and handicap parking stalls should all be provided.

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1.0 INTRODUCTION

The University of Victoria is proposing to construct a new Athletics and Recreation Centre in the north part of the campus abutting McKenzie Ave. At the same time, the District of Saanich intends to re-develop McKenzie Ave in the vicinity to improve transportation for all road users (automobiles, cyclists, pedestrians, and transit). This traffic impact assessment (TIA), conducted by Boulevard Transportation Group, was therefore requested as a joint initiative between the District of Saanich and the University (UVIC).

This TIA investigates the impacts of the proposed development in the context of the proposed corridor re-design. In addition consideration is given to other modes including pedestrians, cyclists, as well as consideration of TDM.

2.0 BACKGROUND

The University of Victoria proposes to construct a new athletics centre in the north-central part of the campus. This will replace the existing facility, with new top-of-the-line centre. This will feature an expanded arena seating capacity of up to 2,000 people (up from approximately 1,100 today). In addition, an adjoining parkade is proposed, with approximately 500 stalls. The proposed site location is at the southwest corner of Gabriola Rd and McKenzie Ave.

2.1 Study Area

The study area is broken into two areas; a larger overall study area that covers UVIC and the surrounding neighbourhood, and a focused corridor review area along McKenzie Ave between Finnerty Rd and Gordon Head Rd. See **Figure 1** for the study area and **Figure 2** for the corridor review area.

2.2 Road Network

McKenzie Avenue is an east-west arterial road in the District of Saanich, with four lanes at, and west of, Gordon Head Rd and two lanes east of Gordon Head Rd. The intersection of Finnerty Road/ McKenzie Avenue/Sinclair Road is signalized and provides a major access in the northern portion of University of Victoria. Gabriola Road is an access road to the campus parking lots (Parking Lot #2 and #3) and connects McKenzie Avenue with Ring Road of internal circular road. Gabriola Road is stop-controlled and has two exiting lanes (left-thru and right) onto McKenzie Avenue. McKenzie Avenue has a maximum speed of 50km/h within the study area.

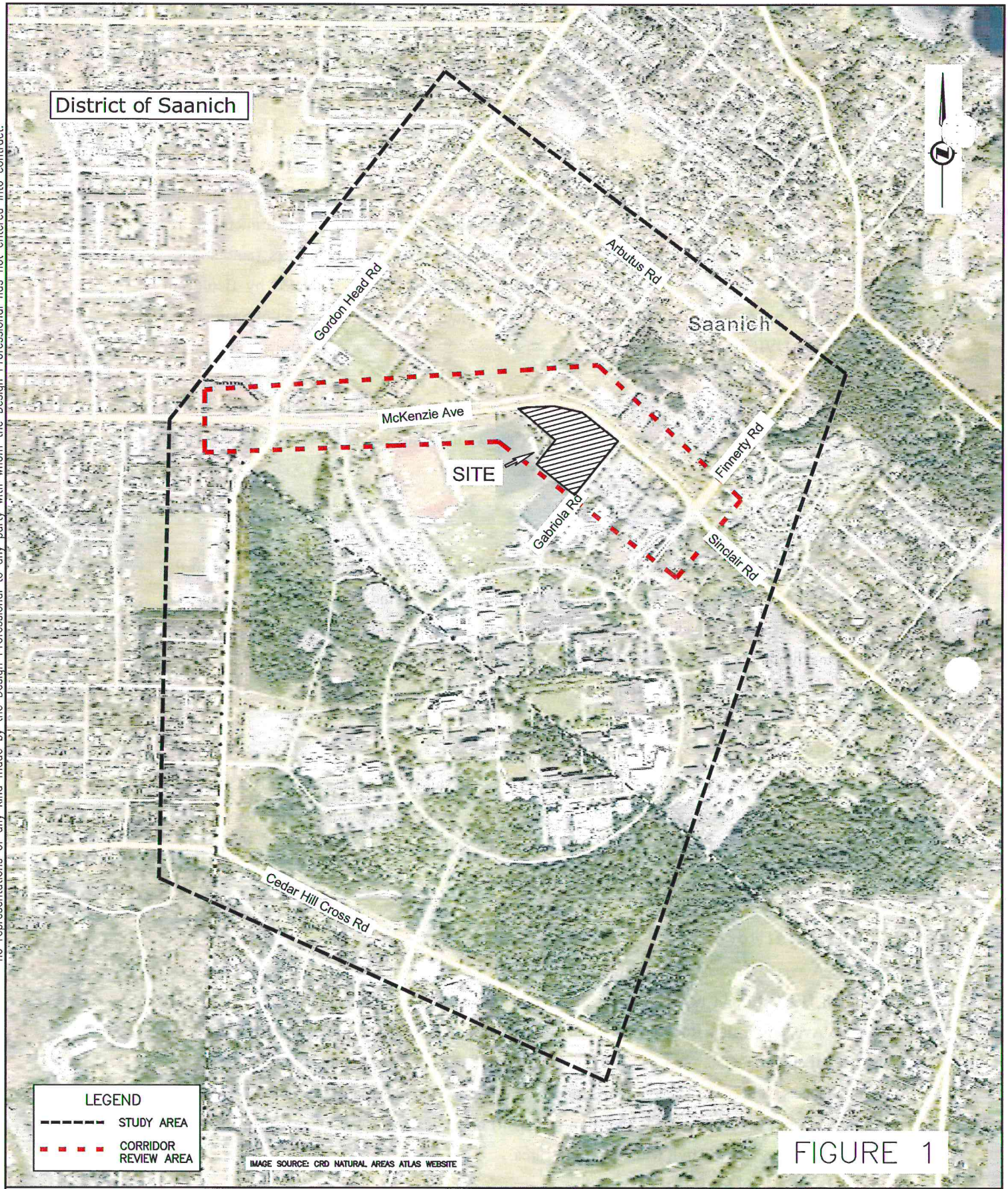

FIGURE 1

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PLOT DATE: 10/6/2010 2:18 PM
PLOTTED BY: MJ Oh

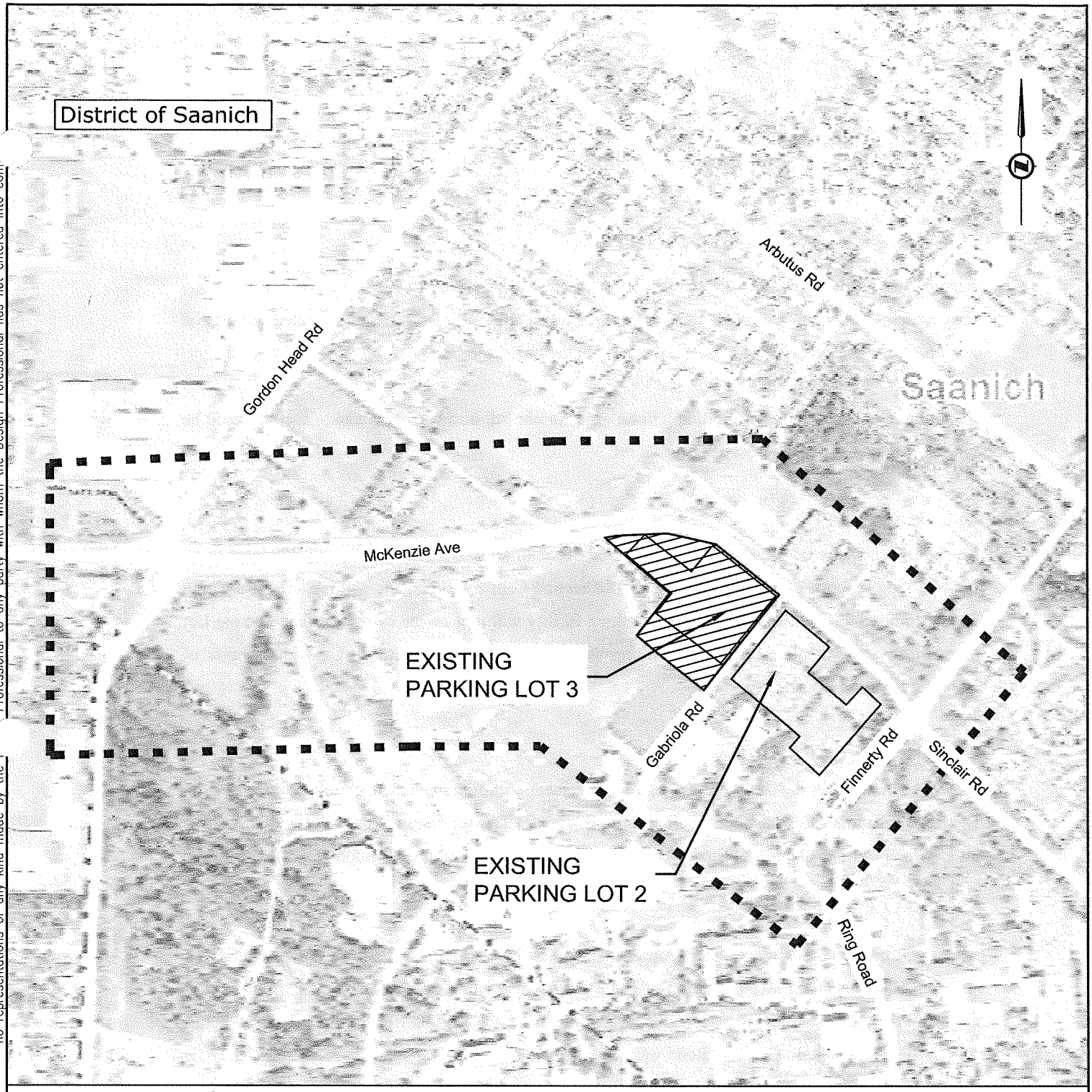
Boulevard Transportation Group

TITLE:

UVic REC CENTRE TIA

STUDY AREA MAP

DESIGNED: MJ	DRAWN: mjo	SCALE: NTS
DATE: SEP 9–10	DRAWING NO: 1159_FIG 1	REV.



LEGEND

- CORRIDOR REVIEW AREA
- DEVELOPMENT SITE

IMAGE SOURCE: CRD NATURAL AREAS ATLAS WEBSITE

FIGURE 2

Boulevard Transportation Group

TITLE:

UVic REC CENTRE TIA

CORRIDOR REVIEW AREA MAP

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PLOTTED BY: MJ Oh

For this study, McKenzie Avenue was assigned as east-west, and Gordon Head Rd, Gabriola Rd, and Finnerty Rd as north-south roads.

Saanich has proposed a streetscape redesign for the two-lane portion of McKenzie Ave in the study area, which would add bike lanes and a centre median that allows for left turn lanes at intersections and key accesses. This proposed streetscape was used in the traffic models.

The frontage of the proposed building will be on Gabriola Rd, however the parkade access would be onto McKenzie Ave to the west of Gabriola Rd.

2.3 Land Use

The site is currently occupied by the S hut, three decommissioned tennis courts, and Parking Lot #3 (274 parking spaces). The proposed Athletics-Recreation Centre and parkade will replace the existing and buildings and facilities. The proposed parking facility will replace the current surface Parking Lot #3 with an approximate total of 500 parking stalls in the southwest corner of the intersection of Gabriola Road/ McKenzie Avenue.

2.4 Traffic Count Data

Traffic count data for the study was taken from intersection turning movement counts provided by the District of Saanich and from counts collected by Boulevard Transportation Group. These counts cover all key intersections along McKenzie Ave, along with the intersection of Gordon Head Rd & Cedar Hill X Rd.

Additional traffic counts were undertaken at the accesses of Parking Lot Parking Lot #3 and #2 on Gabriola Rd. This count includes all turning movements at existing three accesses of Parking Lot #3 and #2 in the p.m. peak hour as well as the through volumes on Gabriola Road in the p.m. peak hour.. The traffic count data on Gabriola Road was used as the basis for trip assignment on/off of McKenzie Ave, while the parking lot trip rates were established and used as a means of estimating trip generation rates for the new parking facility.

3.0 TRAFFIC ANALYSIS – BASE CONDITIONS

Traffic conditions were analyzed for three scenarios to understand existing traffic issues, impacts of the development, and future traffic issues. This was done for the AM, PM, and off-peak event traffic hours. The primary analysis focuses on the AM and PM peak hours (in Sections 3, 4, and 5), with a follow-up review of off-peak traffic (in Section 6).

3.1 Base Traffic Volumes

Base traffic conditions were established for the 2013 horizon year, as this is the anticipated opening day of the Athletics Centre. These conditions were estimated based on applying a 0.5 percent growth rate to existing background traffic volumes at the intersections along the study corridor.

3.2 Traffic Analysis Approach

The analysis of the traffic conditions at the intersections within the study area was undertaken using Synchro traffic modelling software for standard intersections (stop control or signal) and aaSIDRA traffic modelling software for roundabout intersection options. The road geometric data, traffic volumes, and traffic control are entered in order to evaluate traffic conditions for the AM peak, PM peak, and off-peak event traffic periods.

Synchro software is used because of its ability to provide analysis using the Highway Capacity Manual methodology and a microsimulation of the traffic conditions, while aaSIDRA is the industry standard for roundabout traffic modelling softwawre. These programs produce analysis results in terms of measures of effectiveness, which include level of service (LOS), delay and 95th percentile queue length. The delays and type of traffic control (signalized versus unsignalized) are used to determine the level of service. The level of services are broken down into six letter grades with LOS A being excellent operations and LOS F being unstable/failing operations. Level of service C/D is considered to be an acceptable LOS by most municipalities. See *Appendix A* for additional details.

3.3 Base Traffic Conditions

The base traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd: acceptable conditions, AM and PM peak (LOS C or better)
- McKenzie Ave & Gabriola Rd: failing conditions on Gabriola Rd, in both AM and PM peak.
- McKenzie Ave & Gordon Head Rd: one movement at LOS E (southbound left turn, in the AM peak); else LOS D or better

See **Figure 3** for the base 2013 AM volumes and levels of service, and **Figure 4** for the 2013 base PM volumes and level of service.

4.0 POST DEVELOPMENT CONDITIONS

4.1 Site Access

For the parking lot access, one driveway is proposed on McKenzie Ave. For the purposes of traffic modelling it was aligned with the existing access to Enterprise Data Centre near Wallace Field, as this will provide a conservative review of conditions. This would be located approximately 200m west of Gabriola Rd along McKenzie Ave. The access road will lead to the proposed parkade with 500 parking stalls. The majority of the site traffic is expected to be accessed from the McKenzie Avenue west; therefore most of the site traffic will use left turns onto McKenzie Avenue from the site.

4.2 Trip Generation

Typically, the number of trips a site generates is estimated based on the type and size of the building in question. In this case, however, the adjacent parking lot will be the key determinant in establishing trip generation numbers to the site. Since parking on a campus is a campus-wide resource, it will be used by not only the new Athletics Centre but also the campus at large. An Athletics Centre on its own would not generate enough trips to fill the parkade, however pent-up parking demand from the entire campus will potentially, as a worst-case (from a traffic impacts perspective), fill the parkade to capacity. Therefore the parkade was used as the estimator for trip generation rather than the Athletics Centre.

The trip generation estimates for the site were established as follows.

Estimation of Development Trip Rate

- No ITE trip generation rate for a land use of parking facility
- Development trip rate based on manual counts at the existing parking lot #2. (Note that while both parking lot 2 and 3 were counted, lot 2 was busier and therefore represents the worst-case comparison)
- 340 trips (222 inbound, 118 outbound) were counted in the PM peak hour for the existing parking lot #2. Lot #2 has 400 stalls.
- 0.85 trips/stall produced for the PM peak hour trip generation. As a worst-case analysis, this trip rate was also used for the AM peak period.
- The trip rate is considered conservative; the counts were at the first week of the new academy year and the rate is based on the PM peak hour count which is 16% greater than the AM.

Table 1: Peak Hour Trip Generation

Land Use	Units	Trip Rate	Total Trips	Trips IN	Trips OUT
Parking Facility	500 stalls	0.85 trips/unit	425 (AM)	370 (87%)	55 (13%)
			425 (PM)	149 (35%)	276 (65%)

4.3 Trip Assignment

Trip assignment was based on the directional percentage of vehicles at adjacent intersections. All of the new trips were assigned to enter and exit via access on McKenzie Avenue. The following percentages were used to assign the new trips:

AM Peak Hour

- 68% of trips IN are eastbound right (252 Trips)
- 32% of trips IN are westbound left (118 Trips)
- 47% of trips OUT are northbound left (26 Trips)
- 53% of trips OUT are northbound right (27 Trips)

PM Peak Hour

- 55% of trips IN are eastbound right (82 Trips)
- 45% of trips IN are westbound left (67 Trips)
- 70% of trips OUT are northbound left (193 Trips)
- 30% of trips OUT are northbound right (83 Trips)

One option that UVIC is considering is to close Gabriola Rd south of Lot 2, to make it a more pedestrian friendly route. In this form it could still potentially be open to emergency and service vehicles, but otherwise closed south of parking lot #2. Since this would force all Gabriola Rd traffic onto McKenzie, this is a worst-case scenario and was therefore assumed for all post-development analyses, with all parking lot #2 trips being assigned to Gabriola Road/McKenzie Avenue.

Also, since the Athletics Centre and parkade will replace parking lot 3, current parking lot #3 trips were subtracted from the existing traffic on Gabriola Road. (i.e. those that currently park in lot 3 were assumed to park in the parkade in the post development situation.

See **Figures 5 and 6** for AM and PM trip assignment volumes.

4.4 Traffic Control Scenarios

Six traffic control scenarios were investigated:

1) Stop control for the Parkade access at McKenzie Ave
2) Signal at Parkade access & McKenzie Ave
3) One-lane roundabout at Parkade access & McKenzie Ave
4) Right in, left in, right out at Parkade access & McKenzie Ave, with:
    a) existing traffic control at Gabriola Rd & McKenzie Ave and Finnerty Rd & McKenzie Ave
    b) one-lane roundabout at Finnerty Rd & McKenzie Ave
    c) one-lane roundabout at Gabriola Rd & McKenzie Ave

The first three scenarios are based on existing traffic control being retained at other study area intersections. For the right-out scenario, the three options will result in different circulation for exiting vehicles. Where traffic control is retained as-is, all exiting westbound traffic will either turn left at Finnerty (through the Arbutus neighbourhood) or right, to get onto Ring Rd. With a roundabout at Finnerty, some westbound exiting traffic would u-turn at the roundabout, but some would still travel north by turning left onto Finnerty (rather than u-turn and turn north onto Gordon Head Rd). With a roundabout at Gabriola, it was assumed all westbound exiting traffic would take a u-turn manoeuvre at the roundabout.

4.5 Option 1: Stop Control at Parkade Access

Under this configuration, the key traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd: LOS C or better in PM, LOS D or better in AM
- McKenzie Ave & Gabriola Rd: LOS F on Gabriola Rd, in both AM and PM peak
- McKenzie Ave & Parkade access: LOS F on the access
- McKenzie Ave & Gordon Head Rd: LOS F in AM peak and LOS E in PM peak for worst case turning movements

The results show that the access will have a failing level of service under full-movement traffic control. This is due primarily to the large volume of traffic on McKenzie Ave which does not provide sufficient gaps for exiting left-turn traffic from the parkade. Conditions remain failing on Gabriola Rd at McKenzie Ave. At Gordon Head Rd & McKenzie Ave, worst-case movement conditions drop to LOS F from LOS E in the AM, and from LOS D to LOS E in the PM peak.

Therefore, enhanced traffic control or geometry would be required at the Parkade access so that it does not operate at LOS F on opening day. See **Figure 7** for the 2013 Option 1 AM volumes and levels of service, and **Figure 8** for the 2013 Option 1 PM volumes and level of service.

4.6 Option 2: Signal at Parkade Access

Under this configuration, the key traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd:
  - Signal: LOS C or better in PM peak, LOS D or better in AM peak
  - One lane roundabout: LOS B or better, AM and PM peak
- McKenzie Ave & Gabriola Rd: LOS F on Gabriola Rd, in both AM and PM peak
- McKenzie Ave & Parkade access: LOS C or better for all approaches
- McKenzie Ave & Gordon Head Rd: worst case movements at LOS F in AM peak and LOS E in PM peak

The results show that the access will have acceptable operations with a signal (LOS C or better). Conditions remain failing on Gabriola Rd at McKenzie Ave. At Gordon Head Rd & McKenzie Ave, worst-case movement conditions drop to LOS F from LOS E in the AM, and from LOS D to LOS E in the PM peak (remain the same as Option 1 conditions). Conditions at McKenzie Ave & Finnerty Rd would be better with a roundabout than with signalization.

Therefore, a traffic signal is a potential mitigation measure for the Parkade access. See **Figure 9** for the 2013 Option 2 AM volumes and levels of service, and **Figure 10** for the 2013 Option 2 PM volumes and level of service.

4.7 Option 3: Roundabout at Parkade Access

Under this configuration, the key traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd:
  - Signal: LOS C or better in PM peak, LOS D or better in AM
  - One lane roundabout: LOS B or better, AM and PM peak
- McKenzie Ave & Gabriola Rd: LOS F on Gabriola Rd, in both AM and PM peak.
- McKenzie Ave & Parkade access: LOS B or better in both AM and PM
- McKenzie Ave & Gordon Head Rd: worst case movements at LOS F in AM peak and LOS E in PM peak.

The results show that the access will have good operations with a roundabout (LOS B or better). Conditions remain failing on Gabriola Rd at McKenzie Ave. At Gordon Head Rd & McKenzie Ave, worst-case movement conditions drop to LOS F from LOS E in the AM, and from LOS D to LOS E in the PM peak (remain the same as Option 1 conditions). Conditions at McKenzie Ave & Finnerty Rd would be better with a roundabout than with signalization.

Therefore, a roundabout is a potential mitigation measure for the Parkade access. See **Figure 11** for the 2013 Option 3 AM volumes and levels of service, and **Figure 12** for the 2013 Option 3 PM volumes and level of service.

4.8 Options 4a, 4b, and 4c: Parkade Right-In, Left-In, Right-Out

Under this configuration, whereby left turns are prohibited from the Parkade access onto McKenzie Ave, the key traffic conditions are as follows, for all three options:

- McKenzie Ave & Parkade access: LOS C or better in both AM and PM
- McKenzie Ave & Gordon Head Rd: worst case movements at LOS F in AM peak and LOS E in PM peak.
- McKenzie Ave & Finnerty Rd:
    - With roundabout: LOS A
    - with signal (existing control): LOS D or better
- McKenzie Ave & Gabriola Rd:
    - With roundabout: LOS A in AM, LOS D westbound, with 244m 95th percentile queue in the PM peak
    - with stop-control (existing control): LOS F on Gabriola Rd, in both AM and PM peak.

The results show that the access will have acceptable operations with this configuration. At Gordon Head Rd & McKenzie Ave, worst-case movement conditions drop to LOS F from LOS E in the AM, and from LOS D to LOS E in the PM peak (remain the same as Option 1 conditions). Note that conditions do not change at Gordon Head Rd & McKenzie Ave, despite the re-assignment of some traffic away from this intersection as per this scenario's network impacts.

Finnerty Rd & McKenzie Ave would operate with good level of service (LOS A) with a one-lane roundabout, while Gabriola Rd & McKenzie Ave would be approaching undesirable levels of service

with westbound McKenzie Ave at LOS D and 244m queue. This queue would extend back to Finnerty Rd (which is 200m to the east), and could therefore impact the operations at this intersection.

Therefore, from a capacity perspective, a right-in, left-in, right-out access is a potential mitigation measure for the Parkade access, but would work best, from an operational perspective, with a roundabout at Finnerty Rd & McKenzie Ave and existing traffic control at Gabriola Rd & McKenzie Ave.

However the type of traffic control at Gabriola Rd and/or Finnerty Rd can have an impact on adjoining neighbourhood and on campus / Ring Rd traffic volumes. See **Figures 13, 15, and 17** for the 2013 Option 4 AM volumes and levels of service, and **Figures 14, 16, and 18** for the 2013 Option 4 PM volumes and level of service.

5.0 10-YEAR POST DEVELOPMENT CONDITIONS

The 10-year post-development horizon 2023 traffic conditions were investigated to assess potential future traffic issues along the corridor. This was done for all the six scenarios. Future background traffic was assumed to have a 0.5 percent annual growth rate; this was applied to the base 2013 volumes, after which the site trips were added to obtain the 10-year post development conditions. The base

5.1 2023 Base Traffic Conditions

The 2023 base traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd: LOS C or better, AM and PM peak
- McKenzie Ave & Gabriola Rd: LOS F on Gabriola Rd, in both AM and PM peak.
- McKenzie Ave & Gordon Head Rd: one movement at LOS E (southbound left turn, in the AM peak); else LOS D or better

The 2023 base conditions are effectively the same as the 2013 base conditions. See **Figure 19** for the 2023 base AM volumes and levels of service, and **Figure 20** for the 2023 base PM volumes and level of service.

5.2 2023 Option 1: Stop Control at Parkade Access

Under this configuration, the key traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd: LOS C or better in PM, LOS D or better in AM
- McKenzie Ave & Gabriola Rd: LOS F on Gabriola Rd, in both AM and PM peak.
- McKenzie Ave & Parkade access: LOS F on the access
- McKenzie Ave & Gordon Head Rd: worst case movements at LOS F in AM peak and LOS E in PM peak (with signal optimization)

Similarly to the base 10-year horizon, The 2023 post-development Option 1 conditions are effectively the same as the 2013 Option 1 conditions.

The results show that the access will have a failing level of service under full-movement traffic control. This is due primarily to the large volume of traffic on McKenzie Ave which does not provide sufficient gaps for exiting left-turn traffic from the parkade. Conditions remain failing on Gabriola Rd at McKenzie Ave. At Gordon Head Rd & McKenzie Ave, worst-case movement conditions are LOS F in the AM and LOS E in the PM peak.

Therefore, enhanced traffic control or geometry would be required at the Parkade access so that it does not operate at LOS F in the 10-year horizon. See **Figure 21** for the 2023 Option 1 AM volumes and levels of service, and **Figure 22** for the 2023 Option 1 PM volumes and level of service.

5.3 2023 Option 2: Signal at Parkade Access

Under this configuration, the key traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd:
  - Signal: LOS C or better in PM peak, LOS D in AM peak
  - One lane roundabout: LOS B or better, AM and PM peak
- McKenzie Ave & Gabriola Rd: LOS F on Gabriola Rd, in both AM and PM peak.
- McKenzie Ave & Parkade access: LOS C or better in both AM and PM peak
- McKenzie Ave & Gordon Head Rd: worst case movements at LOS F in AM peak and LOS E in PM peak (with signal optimization)

Similarly to Option 1, the 2023 post-development Option 2 conditions are effectively the same as the 2013 Option 2 conditions.

The results show that the access will have acceptable operations with a signal (LOS C or better). Conditions remain failing on Gabriola Rd at McKenzie Ave. At Gordon Head Rd & McKenzie Ave, worst-case movement conditions are LOS F in the AM and LOS E in the PM peak. Conditions at McKenzie Ave & Finnerty Rd would be better with a roundabout than with signalization.

Therefore, a traffic signal is a potential mitigation measure for the Parkade access. See **Figure 23** for the 2023 Option 2 AM volumes and levels of service, and **Figure 24** for the 2023 Option 2 PM volumes and level of service.

5.4 2023 Option 3: Roundabout at Parkade Access

Under this configuration, the key traffic conditions are as follows:

- McKenzie Ave & Finnerty Rd:
  - Signal: LOS C or better in PM peak, LOS D or better in AM peak
  - One lane roundabout: LOS B or better, AM and PM peak
- McKenzie Ave & Gabriola Rd: LOS F on Gabriola Rd, in both AM and PM peak.
- McKenzie Ave & Parkade access: LOS A in AM, LOS C in the PM
- McKenzie Ave & Gordon Head Rd: worst case movements at LOS F in AM peak and LOS E in PM peak (with signal optimization)

The results show that the access will have acceptable operations with a roundabout (LOS C or better). Conditions remain failing on Gabriola Rd at McKenzie Ave. At Gordon Head Rd & McKenzie Ave, worst-case movement conditions are LOS F in the AM and LOS E in the PM peak. Conditions at McKenzie Ave & Finnerty Rd would be better with a roundabout than with signalization.

Therefore, a roundabout is a potential mitigation measure for the Parkade access. See **Figure 25** for the 2023 Option 3 AM volumes and levels of service, and **Figure 26** for the 2023 Option 3 PM volumes and level of service.

5.5 2023 Options 4a, 4b, and 4c: Parkade Right-In, Left-In, Right-Out

Under this configuration, whereby left turns are prohibited from the Parkade access onto McKenzie Ave, the key traffic conditions are as follows, for all three options:

- McKenzie Ave & Parkade access: LOS C or better in both AM and PM peak
- McKenzie Ave & Gordon Head Rd: worst case movements at LOS F in AM peak and LOS E in PM peak
- McKenzie Ave & Finnerty Rd:
    - With roundabout: LOS B or better in AM peak and LOS C or better in PM peak
    - with signal (existing control): LOS D or better in both AM and PM peak
- McKenzie Ave & Gabriola Rd:
    - With roundabout: LOS A in AM peak LOS E (with 320m 95th percentile queue) in westbound direction in the PM peak
    - with stop-control (existing control): LOS F on Gabriola Rd, in both AM and PM peak.

The results show that the access will have acceptable operations with this configuration. At Gordon Head Rd & McKenzie Ave, worst-case movements remain at LOS F in the AM and LOS E in the PM peak (remain the same as Option 1 conditions). Note that conditions do not change at Gordon Head Rd & McKenzie Ave, despite the re-assignment of some traffic away from this intersection as per this scenario's network impacts.

Finnerty Rd & McKenzie Ave would operate with acceptable level of service (LOS C) with a one-lane roundabout, while Gabriola Rd & McKenzie Ave would be approaching undesirable levels of service with westbound McKenzie Ave at LOS D and 244m 95th percentile queue. This queue would extend back to Finnerty Rd (which is 200m to the east), and could therefore impact the operations at this intersection.

Therefore, from a capacity perspective, a right-in, left-in, right-out access is a potential mitigation measure for the Parkade access, but would work best, from an operational perspective, with a roundabout at Finnerty Rd & McKenzie Ave and existing traffic control at Gabriola Rd & McKenzie Ave.

However the type of traffic control at Gabriola Rd and/or Finnerty Rd can have an impact on adjoining neighbourhood and on campus / Ring Rd traffic volumes. See **Figures 27, 29, and 31** for the 2023 Option 4 AM volumes and levels of service, and **Figures 28, 30, and 32** for the 2023 Option 4 PM volumes and level of service.

6.0 EVENT TRAFFIC CONDITIONS

A review of traffic conditions for event traffic was conducted, to assess what the effect of event traffic may have on the street network to see what, if any, additional mitigation concerns may be required. These events can have large peak traffic volumes to or from the site, but this is typically offset by lower network traffic volumes since these events occur on evenings or weekends.

The "peak" event traffic condition was assumed to be an event on a weekday evening, when the Athletics Centre could potentially be used to full capacity (2,000 patrons). Note that it is anticipated that full capacity would likely only occur once per year during a homecoming event. As a conservative estimate, all 2,000 patrons were assumed to arrive by private automobile, where a 0.4 vehicles / patron rate was assumed plus an additional 200 vehicles for other Athletics Centre uses (see Section 8 for details). Therefore 1,000 vehicles were assumed to be peak event related. Of these, it was assumed, once again as a worst-case scenario, that 500 vehicles would fill the parkade, 400 vehicles would fill lot 2 off of Gabriola Rd, and 100 would use the parking lots off McGill Rd.

Under this scenario, worst case event traffic was assumed to occur where both the parkade and lot 2 are full, with all traffic exiting these parking lots at the same time. It was assumed that exiting event traffic would depart between 9 and 10 pm, when traffic is typically 50 percent of PM peak hour volumes. Therefore 50 percent of the PM peak hour volume was assumed at all corridor intersections, to which full parkade and parking lot 2 volumes were applied.

6.1 Base Off Peak Traffic

The base off-peak traffic volumes and results are shown in **Figure 33**.

All intersections have LOS D or better in the off-peak, and therefore there are no existing off-peak traffic issues.

6.2 Event Off Peak Traffic – Full Movement Parkade Access

With peak event traffic to the off-peak time period, the following traffic results are observed:

- McKenzie Ave & Parkade access:
  - with stop control, LOS F for exiting parkade traffic (200+m 95th percentile queue back into the parkade)
  - with signal, LOS C or better (80m 95th percentile queue back into the parkade)
  - with roundabout, LOS C or better (41m 95th percentile queue back into the parkade)
- McKenzie Ave & Gordon Head Rd: one movement at LOS D, all others LOS C or better
- McKenzie Ave & Finnerty Rd, with signal: LOS B or better
- McKenzie Ave & Gabriola Rd, with stop-control (existing control): LOS F on Gabriola Rd

Based on the analysis, peak event traffic conditions are better than during the AM and PM peak hours, and can be adequately accommodated so long as some form of traffic control beyond basic stop-control at the parkade access is incorporated. There are no adverse queuing conditions along McKenzie Ave after an event lets out in any of the configurations or at any of the intersections, although some queuing may occur along the parkade access backing into the parkade. See **Figure 34** for the results.

6.3 Event Off Peak Traffic – Right-Out Parkade Access

With peak event traffic to the off-peak time period, the following traffic results are observed when the parkade access is right-in, left-in, and right-out only:

- McKenzie Ave & Parkade access, LOS C or better. (44m 95th percentile queue back into the parkade)
- McKenzie Ave & Gordon Head Rd: one movement at LOS D, all others LOS C or better
- McKenzie Ave & Finnerty Rd,
  - with signal, and no roundabout at Gabriola Rd: LOS D or better
  - with signal and roundabout at Gabriola Rd: LOS B or better
  - with roundabout: LOS B or better
- McKenzie Ave & Gabriola Rd,
  - with stop-control (existing control): LOS F on Gabriola Rd
  - with roundabout: LOS C or better (no queuing issues along McKenzie; 92m 95th percentile queue backup into parking lot)

Based on the analysis, peak event traffic conditions are better than during the AM and PM peak hours for this right-out configuration, and can be adequately accommodated, without any special event traffic mitigation measures. Therefore, from a capacity perspective, a right-in, left-in, right-out access is a potential mitigation measure for the Parkade access, but would work best, from an operational perspective, with a roundabout at Finnerty Rd & McKenzie Ave or at Gabriola Rd & McKenzie Ave. See **Figure 35** for the results.

7.0 REGIONAL AREA CONSIDERATIONS

Consideration of traffic and travel patterns on the regional area surrounding UVIC and in adjacent neighbourhoods was undertaken, considering key intersections such as Cedar Hill X Rd & Gordon Head Rd, Cedar Hill X Rd & Henderson Rd, Cadboro Bay Rd & Sinclair Rd, and Finnerty Rd & Arbutus Rd. This analysis provides a high-level overview of what traffic impacts may be expected in the adjoining area beyond the main study corridor.

Overall, the primary origin-destination areas are McKenzie Ave west, and areas to the south (Saanich, Victoria, and Oak Bay). Only a small percentage of vehicle trips are to from the neighbourhood to the north or Sinclair Rd to the east. This is advantageous, since an increase in traffic resulting from additional campus growth will almost exclusively see traffic growth on major area roads (McKenzie Ave, Gordon Head Rd, Cedar Hill X Rd, Foul Bay Rd) rather than on residential streets nearby.

Nonetheless it is important to facilitate campus vehicular movements on mainline roads as much as possible. For this reason, the option 4a investigated in Sections 4 and 5, whereby the parkade access would operate as right-in, left-in, and right-out only but without a roundabout at either Gabriola Rd or Finnerty Rd would be undesirable as it would result in an increase in traffic through residential areas. Even a roundabout at Finnerty Rd under this configuration would result in increased residential neighbourhood traffic. The Gabriola roundabout option would serve best under this configuration to minimize additional neighbourhood shortcutting, but this option could have adverse queuing characteristics. It is therefore preferable, from a regional traffic perspective, to provide full and direct access to the parkade.

8.0 TRAFFIC MITIGATION - DISCUSSION

The key findings of the traffic condition investigation with the Athletics Centre and parkade constructed are as follows:

- mitigation at the parkade access and McKenzie Rd is required, where either a roundabout, signal, or right-in, left-in, right-out configuration would work.
- Gabriola Rd will continue to have poor peak hour levels of service at McKenzie Ave.
- For the right-in, left-in, right-out configuration option at the parkade access and McKenzie Ave, a roundabout would work well at Finnerty Rd & McKenzie Ave (and could serve as a turn-around for exiting parkade traffic), but would not be recommended at Gabriola Rd, as queuing concerns on the east approach along McKenzie Ave would arise.
- In the longer term, a roundabout at Finnerty Rd could be effective for traffic control (regardless of traffic control at the parkade access & McKenzie Ave), but is not triggered as a requirement by the Athletics Centre.

Out of the three options for mitigating the traffic conditions at the parkade access and McKenzie Ave, the right-in, left-in, and right-out option has several characteristics that make it a less favourable option than either a signal or roundabout. As it does not have a direct left-turn onto McKenzie Ave, all exiting vehicles must turn to the right. However, as previously mentioned it is not readily feasible to install a one-lane roundabout at Gabriola Rd & McKenzie Rd. Therefore exiting vehicles must drive at least two blocks (to Finnerty Rd) to be able to: (1) turn around if a roundabout is built, or (2) circulate through the neighbourhood or campus via Finnerty Rd if a roundabout is not built at Finnerty Rd and McKenzie Ave. This may lead to vehicles attempting turn-around manoeuvres in parking lots off of Gabriola Rd, or potentially even u-turns on McKenzie Ave (which will be possible with a future widened 3-lane cross section). For that reason addressing the traffic issues directly at the parkade access is the preferable solution, via roundabout or signal.

8.1 Roundabouts Overview

When installed at appropriate locations roundabouts can improve safety and traffic operation over unsignalized and signalized intersections. Drivers deal firstly with pedestrians in a crosswalk prior to dealing with other decisions of when to enter a roundabout. Slower speeds and having all vehicles travelling in the same direction eliminate right angle and head-on collisions. The other benefit is achieved by eliminating or reducing the number of stops or traffic delays as drivers are approaching a yield condition and may proceed without stopping, if traffic conditions permit. For these reasons of improved safety and operation, roundabouts have become a good solution to traffic conflicts and

congestion. Roundabouts also have aesthetic benefits (with opportunities to landscape the central island), can serve as a gateway feature, and do not require electrical costs or signal system maintenance (unlike a signalized intersection). When designed appropriately, transit buses can easily navigate a roundabout, and large trucks are also accommodated with a mountable truck apron.

Roundabouts are also beneficial for pedestrians. Pedestrians have only one vehicular travel direction to cross at a time and have a refuge in the splitter island before negotiating the next direction of travel. Therefore acceptable crossing gaps are easier to find, and the crossing task is easier as only one direction needs to be considered at a time.

For one-lane roundabouts, cyclists can either merge into the middle of the travel lane and circulate like a car, or in some cases they may be permitted to by-pass the roundabout and circulate on a multi-use path with pedestrians. It is actually safest for a cyclist to overtake the lane in a one-lane roundabout, as it minimizes potential conflict points with motor vehicles and bikes can travel through a roundabout at approximately the same speed as a car, therefore minimizing safety concerns associated with speed differential. Some cyclists, however, may be uncomfortable with fully merging into the travel lane. Since there are cyclists of all abilities at the University, the provision of a multi-use trail roundabout bypass would be beneficial.

8.2 Signalized Intersection Overview

While there are a number of benefits associated with roundabouts, signal control is still often a viable, and in many cases, preferable mitigation measure. Land requirements are generally less with a signalized intersection than for a similar capacity roundabout. Also, signalized intersections can be programmed to better serve main routes, so as to not unduly impede the majority of traffic, whilst still allowing the minor approach leg(s) access opportunities. Also, signalized intersections provide a protected crossing phase for pedestrians, thus allowing pedestrians to cross with less uncertainty than at a marked / signed crosswalk. Also, at an existing intersection it is typically cheaper to install signalization than it is to rebuild into a roundabout configuration (approximately half the price).

8.3 Mitigation for the Parkade Access & McKenzie Ave

As discussed in Sections 8.1 and 8.2, both a roundabout and signalized intersection are viable mitigation measures that would be effective for the intersection of the parkade access & McKenzie Ave, in terms of addressing any traffic capacity concerns whilst also serving pedestrians and cyclists. It is likely possible to construct a roundabout at this location given the large clear area (building-face to building-face), but University land would likely be required in addition to Saanich-owned McKenzie

Ave right-of-way. The decision of which measure to implement is therefore a consideration between the roundabout's benefits of improved safety, pedestrian connectivity, and aesthetics with the added land and construction cost they incur, as well as consideration for traffic progression along McKenzie Ave.

8.4 Preferred Mitigation Plan

Based on the above discussion the preferred traffic operations plan near the site is to signalize the parking lot access onto McKenzie Ave, leave Gabriola Rd two-way stop control as-is, and convert the intersection of McKenzie Ave & Finnerty Rd into a one-lane roundabout. Alternatively, a roundabout at the parking lot access on McKenzie Ave and signalization of McKenzie Ave & Finnerty Rd are also viable, but not as beneficial as the preferred plan.

9.0 PARKING

9.1 Expected Demand

The expected demand for the ATRS building must be considered for two (2) scenarios – mid-day during a typical school day and during an evening or weekend special event.

9.1.1 Mid-day Demand

Mid-day parking demand accounts for the peak demand period due to vehicles parked for day-to-day purposes. Conventional parking demand generation rates suggest that the mid-day parking demand generated by the ATRS building will be approximately 500 to 550 vehicles. This figure does not consider the fact that visitors of the fitness centre, gymnasium, field house, or aquatics centre are likely to be students or staff of the University who are already parked on-campus for other purposes. If half of all vehicles assigned to the fitness / weight centre, aquatics centre, gymnasium, and field house are assumed to be parked on-campus for other purposes, the expected mid-day demand is for 225 to 275 vehicles. See Appendix B for parking generation rates.

9.1.2 Event-based Demand

Event-based demand accounts for the peak demand period due to vehicles parked when the gymnasium is at capacity, typically during basketball games on evenings or weekends.

The following are examples of parking demand rates for similar facilities:

- In 2003 the City of Colwood approved the Bear Mountain Arena. The Bear Mountain Arena includes 2,300 seats and was approved for 1,200 parking spaces, a supply rate of 0.52 spaces per seat. The arena has been built and there are no known difficulties with parking.

- A 2003 study for the True North Centre in the City of Winnipeg suggested that expected demand is 0.35 vehicles per attendee.

- While on a completely different scale, analysis of the Meadowlands Arena in New Jersey revealed that spectators demand between 0.25 and 0.35 vehicle spaces per attendee for events such as pro sports and concerts.

The examples above suggest that a demand rate of 0.40 vehicles per seat is appropriate for a typical arena / sports venue with gate admission. However this demand rate likely represents a conservative value (i.e. over-estimated) for the Athletics Centre, since it is known that students will comprise the majority of attendees, and that students have lower driving rates than the general public (because of the U-pass transit program, higher cycling mode split, students that live on-campus in residences etc). Nonetheless this rate was used to provide a conservative estimate of event parking conditions. The gymnasium will have capacity for 2,000 spectators and, if all seats are occupied, will result in a demand for 800 parking spaces. During special events there is also potential for other portions of the ATRS building to be used, particularly the field house, aquatics, and fitness centre, which may add demand for an additional 200 parking spaces. In total, the expected peak period for special events is approximately 1,000 spaces.

9.2 University-wide Impact

It is important to recognize the shared nature of the campus environment, where the new parkade will help satisfy any unmet parking demand in other areas of the campus, and unmet demand at the ATRS site will be absorbed in unoccupied spaces elsewhere on the campus. For the mid-week the new 500-space parkade will exceed parking demand generated by the site by approximately 250 spaces. This is additional supply that will help satisfy future demand for the University, and it is not expected to result in parking spillover into surrounding areas. Parking demand when special events are at capacity is expected to be approximately 1,000 vehicles, which exceeds the parkade capacity by approximately 500 vehicles. However, special events are expected to occur during weekday evenings and weekends, when parking demand is low elsewhere on-campus and there is sufficient capacity to accommodate

spillover parking from the ATRS building. Additionally, the adjacent Lot 2 on Gabriola Rd has 400 stalls that can largely accommodate excess demand, and the nearby lots on McGill Rd also provide ample parking opportunities for event parking.

9.3 Spillover Issue

Any additional parking spillover of vehicles from the ATRS building into surrounding neighbourhoods is expected to be a result of supply failing to meet demand on the campus and an unwillingness to pay current University parking rates. The previous section notes that the new parkade will result in a net increase in parking supply, suggesting that no additional spillover will occur. Parking rates will remain unchanged, and those vehicles parking in surrounding neighbourhoods to avoid paying on-campus will continue to do so.

It is not recommended that the ATRS development requires a mitigation plan to avoid spillover into surrounding areas. If there is an on-going issue of campus parking spillover, a more comprehensive review should be considered which includes data collection and observations specific to the areas and times of concern.

10.0 NON-MOTORIZED USERS

10.1 Cycling Review

This section provides a review of cycling accommodation and considerations in the vicinity of the Athletics Centre.

Cycling Routes

Key cycling routes to/from the Athletics Centre and the campus are along McKenzie Ave, Gabriola Rd, and through to the adjoining neighbourhood. As part of the redevelopment, the existing chip trail that runs along the southwest edge of the development site will be redeveloped and will be too narrow for both cyclists and pedestrians. It is therefore of extra importance that quality cycling facilities be provided along McKenzie Ave up to Gabriola.

Bicycle Parking

Cycling TDM strategies are an important measure that can reduce automobile dependency. As part of the Athletics Centre project, a location for bicycle parking facilities has been identified near the new building, on Gabriola Rd south of parking lot 2. It is recommended that bicycle parking facilities be installed here; further details are outlined in Section 10.

The recommended bicycle route plan is shown in the attached **Figure – Cyclist Routing.**

10.2 Pedestrian Review

Pedestrian Routes

Key pedestrian routes are along McKenzie Ave, into the neighbourhood to the north, along Gabriola Rd, and towards the transit exchange to the east. In addition there are specific accessibility considerations associated with this site; these are considered in Section 11.

The potential for converting Gabriola Rd to a pedestrian corridor south of Lot 2 would be beneficial for pedestrians. This would see Gabriola Rd south of the parking lot only accessible to pedestrians, emergency, and service vehicles. This would provide a good direct connection to the Athletics Centre from the heart of the campus, which is important since at present there is minimal pedestrian right-of-way along Gabriola Rd.

There is a main bus station on Finnerty Road close to the McKenzie intersection. Several BC Transit's Route buses use the intersection of Finnerty Road/McKenzie Avenue to access the UVic bus station. Upgrades to any bus stops along McKenzie Ave in terms of bus pads, pull-outs, benches, and shelters should be considered and discussed with BC Transit as part of the proposed McKenzie Ave streetscape plan.

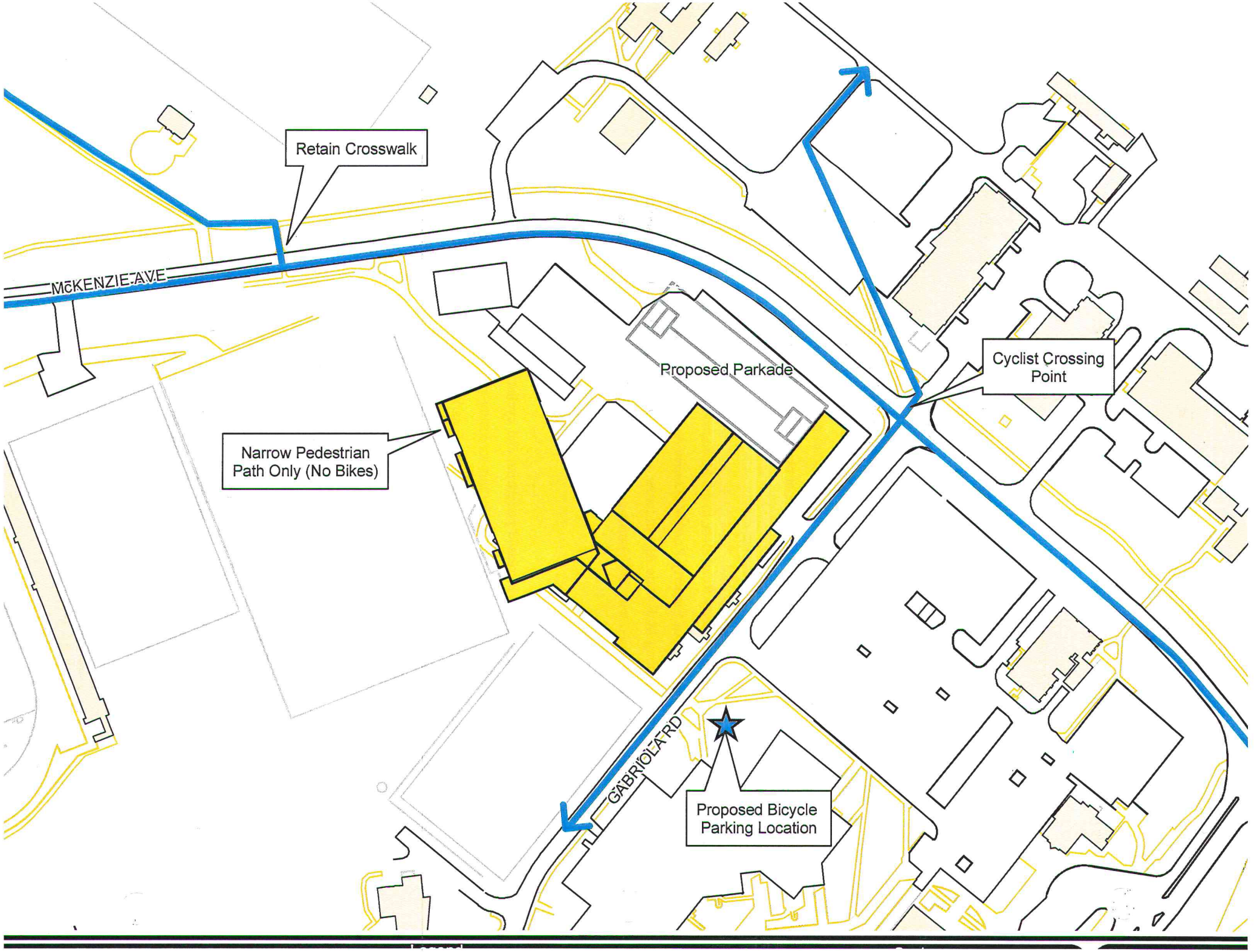
Pedestrian Crossing Features

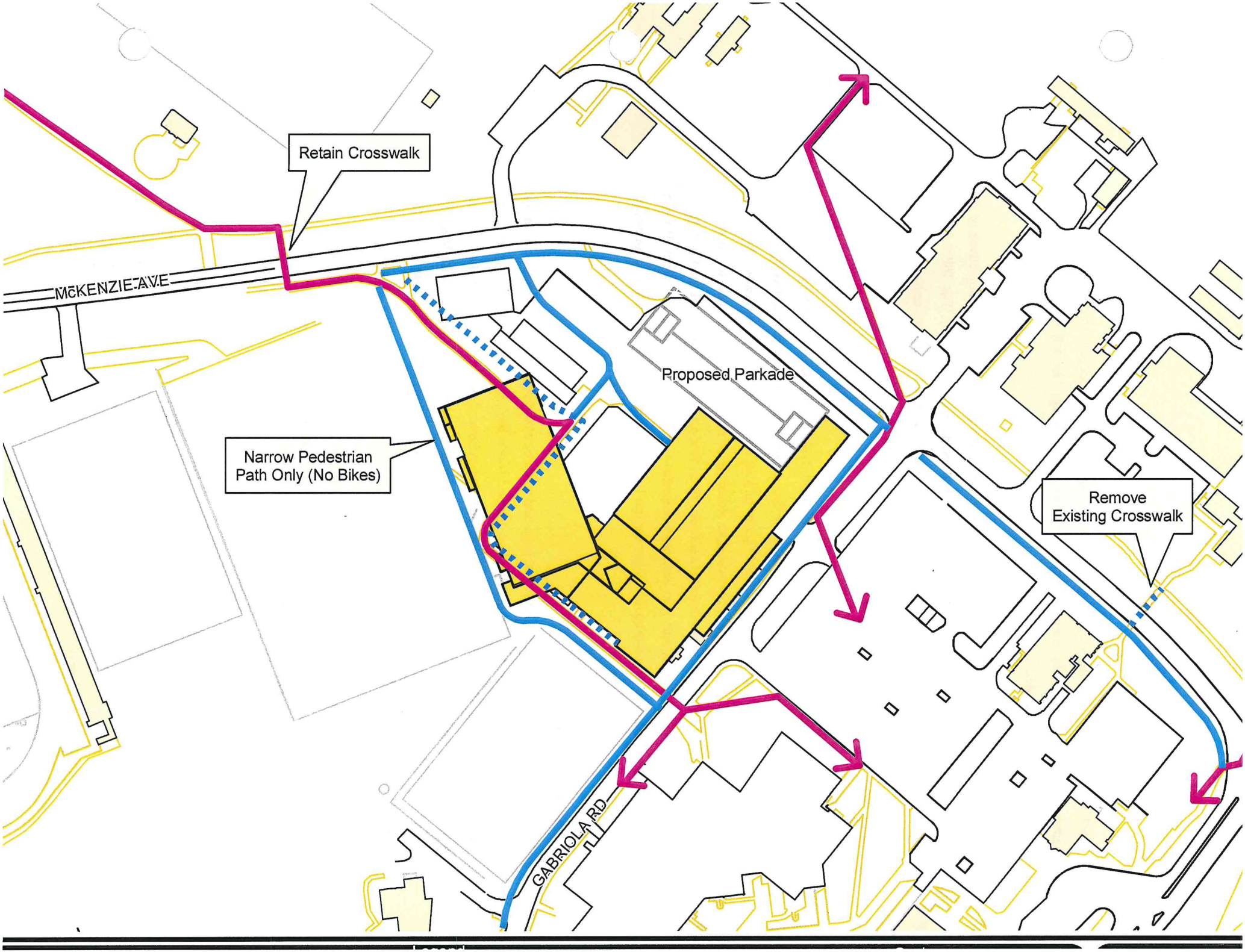
Regardless of the option, there will be increased pedestrian and cyclist activity at the intersection of Gabriola Rd & McKenzie Ave. It is therefore important to ensure pedestrians are accommodated, either by special crosswalk (e.g. overhead flashers and zebra markings) if existing stop-control is retained, or by inherent improvements that would result from a roundabout or full signalization. Consideration should be given to installing a multi-use path type crossing, to provide an area for cyclists to cross adjacent to pedestrians.

The recommended bicycle route plan is shown in the attached **Figure – Pedestrian Routing.**

11.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management (TDM), also known as "mobility management", refers to infrastructure and programs that influence travel behavior to increase the efficient use of existing transportation infrastructure and delay the need for costly new facilities. In 2003 the University of Victoria developed a comprehensive TDM Study aimed at developing a list of options which would


Retain Crosswalk
McKENZIE AVE
Proposed Parkade
Cyclist Crossing Point
Narrow Pedestrian Path Only (No Bikes)
GABRIOLA RD
Proposed Bicycle Parking Location


Retain Crosswalk
McKENZIE AVE
Proposed Parkade
Narrow Pedestrian
Path Only (No Bikes)
Remove
Existing Crosswalk
GABRIOLA RD

assist the University in achieving its goal of both reducing single-occupant vehicle traffic to the campus and increasing public transit ridership, cycling and walking. The full list of recommended TDM strategies are included in Appendix C.

The development of the new Athletics Centre provides an opportunity to further the objectives of the TDM Study, specifically as they relate to parking and alternative transportation. The following are strategies recommended in the 2003 study that should be addressed in the Athletics Centre.

11.1 Parking Management

Priority Spaces

Priority parking spaces are those spaces in highest demand, typically found at the centre of the campus or nearest building entrances. These spaces often fill first creating the impression that parking is scarce at peak times, when in fact there is often an excess of less desired spaces. To counteract this trend, priority spaces should be managed to encourage constant turnover and be reserved to encourage desirable travel behaviour. Consideration should be given to providing reserved spaces for carpool vehicles, motorcycles/scooters, and low emissions vehicles (typically hybrids or SmartCar). Priority spaces are also needed to accommodate access for the large number of disbabled parkers expected at the site.

Special Event Management

Parking conditions at the Athletics Centre are expected to be most constrained when special events are hosted, typically on evenings and weekends when demand is low throughout the rest of the cmapus. To better utilize parking supplies elsewhere on-campus and relieve demand at the Athletics Centre, consideration should be given to establishing a shuttle service that connects the facility with large on-campus surface parking lots. Such a service should be considered if demand continually exceeds supply during special events.

The University may also consider raising parking rates in the new 500-space parkade during special events as a means to prioritize these convenient spaces during special events and encourage use of under-used supplies elsewhere on-campus.

Improved Payment System

The 2003 TDM Study recommended a "smart card" parking payment system, which could be coordinated with payment systems for other services on-campus. The advantages of the "smart card" system are in the flexibility it offers to the University and the convenience it offers to parkers. The University will have the opportunity to offer rebate incentives for desired parking behaviour, charge

variable rates in individual lots, and provide pricing incentives/disincentives that respond to peak demand periods. The system also permits more comprehensive monitoring of parking usage for future campus planning. The development of the proposed parkade, a significant increase in parking supply for the campus as a whole, is an ideal opportunity to begin to phase in such a system.

Spillover Hotline

The 2003 Study recommended a "parking spillover hotline" in case of regular spillover of parking from the UVic campus into adjacent neighbourhoods. It is expected that the Athletics Centre will provide parking supply that exceeds the demand generated, resulting in no new net spillover into adjacent areas. However, this joint process between the University and the District of Saanich may be an opportunity to create a partnership of such as service.

11.2 Transit

Special Event Buses

The University may consider coordinating a special event bus service during special events. Such a service must be offered consistently in order to be effective. It could stop at key points throughout Greater Victoria, including the downtown and park-and-rides.

Special Event Transit Subsidy

Should parking spillover become a consistent issue during special events, the University may consider coordinating a subsidy program with BC Transit. Such a program might include offering free transit fare for any non-UVic student/staff (already have UPass) displaying a valid ticket stub from the special event. This would require coordination with BC Transit.

11.3 Walking/Cycling

The Athletics Centre is to be a recreation-oriented facility and, as such, it is important that it facilitate opportunities for active transportation for both its users and those of the general campus. Generally, the design and programming of the site should seek to exceed requirements for active transportation facilities in both seeking to provide high quality facilities, as well as in setting a higher standard for design and setting an example for future development on the campus.

Bike + Pedestrian Routes

Good bicycle and pedestrian routes are an important consideration in the vicinity of the development, not only for the Athletics Centre but for the campus as a whole.

The primary walking and cycling route connecting the Gordon Head neighbourhood and the UVic campus runs along the south edge of the proposed Athletics building. The new building and site must be designed acknowledge the importance of this route in facilitating active transportation and to the campus as a whole. The following is suggested:

- This route should be preserved in the design of the site;
- Adequate width should be given to facilitate conflict-free pedestrian and cyclist travel;
- Consideration should be given to a more direct alignment of the existing corridor to improve wayfinding and reduce travel distance; and
- The building should provide a high quality "frontage" along this corridor, giving consideration to an "active" building façade, pedestrian amenities, wayfinding signage, surface treatments, and CPTED principles for personal safety and security.

Bike Parking

The Athletics Centre will be a recreation-oriented facility and is expected to experience cycling demand greater than a typical academic building. It is important that adequate bike parking is provide to facilitate this increased demand. It is recommended that both Class I and Class II bike parking is provided at rates greater than those required in the District's Zoning Bylaw to account for the increased bicycle use expected at the site.

Class I parking spaces are intended for long-term parking at the site. These spaces have a controlled access point and are weather protected. Class II spaces are intended for short-term parking. They are typically racks provided near major building entrances.

The Athletics Centre might also provide an opportunity for the University to establish a higher-order long-term bicycle parking option. This might be a service where bicycle are "checked in" to a manned service booth and the attendant is responsible to park the bike in a secured area which only they have access to. This would offer additional assurance that the users bicycle is secure and protected from weather. Such a service could be offered at a small fee per use, per month, or per semester, and may be coordinated with other bicycle services offered such as regular tune-ups or cleaning.

After-trip Cycling Facilities

All staff and students of the Athletics Centre should be granted access to shower and locker facilities as a means to encourage cycling to the site.

12.0 ACCESSIBILITY REVIEW

The issue of accessibility, while always important, is particularly relevant to the Athletics Centre as it will be the location of CanAssist. CanAssist is an organization that develops technologies, services, and programs to help and assist those with special needs. As CanAssist helps people with a wide range of physical abilities, it is important to ensure they are accommodated safely and as conveniently as possible.

Drop-off / Pickup Areas

A drop-off / pickup zone should be located as close as safely and conveniently possible to the building. As such, a drop-off area along the west side of Gabriola Rd fronting the Athletics Centre is recommended. Incoming drop-off / pickup vehicles would load in a dedicated loading bay in front of the main doors to the Athletics Centre.

In off-peak / non-daytime hours, the loading bay could be used by buses for sports teams, where loading/unloading would take place, with the buses then exiting by circulating through parking lot 2.

Gathering Areas

The area between the Athletics Centre and the loading bay should be wide enough to serve as a waiting area without undue inconvenience to other pedestrians that are either passing through or travelling to the Athletics Centre. An additional consideration is for a canopy and area immediately adjacent to, but not in front of, the main doors that can serve as a waiting area that is at least partially out of the elements.

Curb Drops

Curb drops can be difficult for some mobility challenged users to negotiate, but at the same time they are a safety feature protecting pedestrians from vehicular traffic by making it difficult for an errant vehicle to leave the roadway. In this location, at the recommended loading bay consideration should be given to a textured and effectively level transition between the loading bay and the sidewalk. Bollards are also recommended to help delineate the loading bay and differentiate from the sidewalk. This can improve accessibility for the Athletics Centre.

Handicap Parking

It is recommended that some stalls be reserved in Lot 2 for handicap parking. In particular the consideration for "mini-bus" or handi-transit vehicles should be given. This would be "storage" for these vehicles, where it would still be recommended for all drop-off / pickup activity to occur on the Gabriola Rd loading bay frontage.

13.0 CONCLUSIONS

The following conclusions are made regarding the traffic impact assessment for the proposed Athletics Centre at UVIC.

Traffic Conditions

In terms of typical peak hour traffic operations (AM and PM peak) the following was concluded. Base 2013 conditions are generally acceptable (LOS D or better) except for one movement at Gordon Head Rd & McKenzie Rd, which operates at LOS E, and for northbound Gabriola Rd at McKenzie Ave, which operates at LOS F.

Trips for the site will be, as a worst-case, a function of the parkade rather than of the uses at the site itself. This is because the parkade is a resource for the campus as a whole, and therefore parkade capacity was used as the basis for analysis.

The parkade will require mitigation of either signal, roundabout, or right-turn-out only in order to function at an acceptable level (it will fail in peak hours otherwise). For the right-turn-out only options, existing traffic control at Gabriola Rd & McKenzie Ave and Finnerty Rd & McKenzie Ave would result in acceptable levels of service, as would a roundabout at Finnerty Rd & McKenzie Ave. However a roundabout at Gabriola Rd would have 95th percentile queuing that could extend back along McKenzie Rd to Finnerty Rd.

At other McKenzie Ave corridor intersections, the levels of service are reduced with the added parkade traffic. At Gordon Head Rd & McKenzie Ave, some movements drop to LOS F from LOS E in the AM, and from LOS D to LOS E in the PM peak hour. Similarly, worst case conditions at Finnerty Rd & McKenzie drop slightly to LOS D. Conditions remain at LOS F for Gabriola Rd northbound at McKenzie Ave.

Conditions in the 10-year post development horizon year (2023) are effectively the same as 2013, although some movements drop one level of service grade. Signalization or a roundabout still works

for the parkade access at McKenzie Ave, a roundabout would have acceptable peak hour levels of service at Finnerty Rd, but a roundabout at Gabriola Rd could have queuing issues where queues extend eastward on McKenzie Ave through Finnerty Rd.

A review of event traffic found that peak event traffic can be accommodated, and conditions will be better than during either the AM or PM peak hour. This is further mitigated by the fact that peak event traffic occurrences will be rare.

From a regional traffic perspective, the largest area trip generating and attracting zones are west on McKenzie Ave and south via Cedar Hill X Rd and Foul Bay Rd. As a means of ensuring shortcutting through residential neighbourhoods does not occur direct full movement access at the parkade access onto McKenzie Ave is a consideration.

Traffic Mitigation - Discussion

Direct traffic access at the parkade access & McKenzie Ave is the preferred mitigation approach, as the right-in, left-in, right-out option has drawbacks in terms of travel circuity and neighbourhood shortcutting. Either a roundabout or signalized intersection control would be viable from a traffic operations perspective at the parkade access & McKenzie Ave. Roundabouts have benefits in terms of slower vehicle speed, increased pedestrian crossing opportunities, and improved safety over conventional intersection designs. They are, however, more costly than signalization and require more land at the intersection. Also, signalization can be timed to facilitate better progression along McKenzie Ave, which is desirable since it is an arterial roadway.

With the wide corridor width (from building face to building face) along McKenzie Ave it is likely possible to construct a roundabout at the parkade entrance, Gabriola Rd, or Finnerty Rd. A roundabout would however likely encroach onto UVIC land, and may impact some existing tree / natural features.

The preferred traffic operations plan near the site is to signalize the parking lot access onto McKenzie Ave, leave Gabriola Rd two-way stop control as-is, and convert the intersection of McKenzie Ave & Finnerty Rd into a one-lane roundabout. Nonetheless, either signalization or a roundabout are feasible traffic control options at both the parkade access onto McKenzie Ave and at McKenzie Ave & Finnerty Rd.

Parking

In terms of expected parking demand, it was found that less than 250 stalls would likely be required for the Athletics Centre. The rest of the parkade would be available and used by the campus as a whole.

Large events may generate a demand of up to 1,000 stalls, which can be accommodated at the parkade, lot 2, and McGill Rd parking lots without anticipated spillover into the residential area to the north. If spillover becomes a concern then a more detailed study should be undertaken at that time.

Non Motorized Users

Cyclists and pedestrians should be accommodated with appropriate facilities, routes, and crossings in the vicinity of the Athletics Centre. A consideration is to convert Gabriola Rd south of Lot 2 into a pedestrian corridor (emergency and service vehicle access only). Improvements should be made for both user types in conjunction with McKenzie Ave streetscape improvements.

Transportation Demand Management

The development of the new Athletics Centre provides an opportunity to further the objectives of the 2003 UVIC TDM Study, specifically as they relate to parking and alternative transportation. Measures should be incorporated as possible.

Accessibility

Ensuring the area adjacent to the Athletics Centre is accessible to users of all abilities is important, particularly in consideration of the presence of the CanAssist organization. Provisions for a drop-off / pickup loading bay, gathering area, curb drops, and handicap parking stalls should all be provided.

14.0 RECOMMENDATIONS

The following recommendations are made:

Traffic Control:

- Install a signal at the parkade access and McKenzie Ave, as part of the Athetics Centre construction. A roundabout could alternatively be installed, but a signal is the preferred control.
- In the future, consider a roundabout at Finnerty Rd & McKenzie Ave; this could be beneficial for both Finnerty Rd and exiting Gabriola Rd traffic (providing Gabriola traffic with a u-turn alternative to the long left-turn wait). (Note that this is based on existing and future traffic operations along the study corridor and is not a by-product of Athletics Centre induced traffic.)

Non-Motorized Users

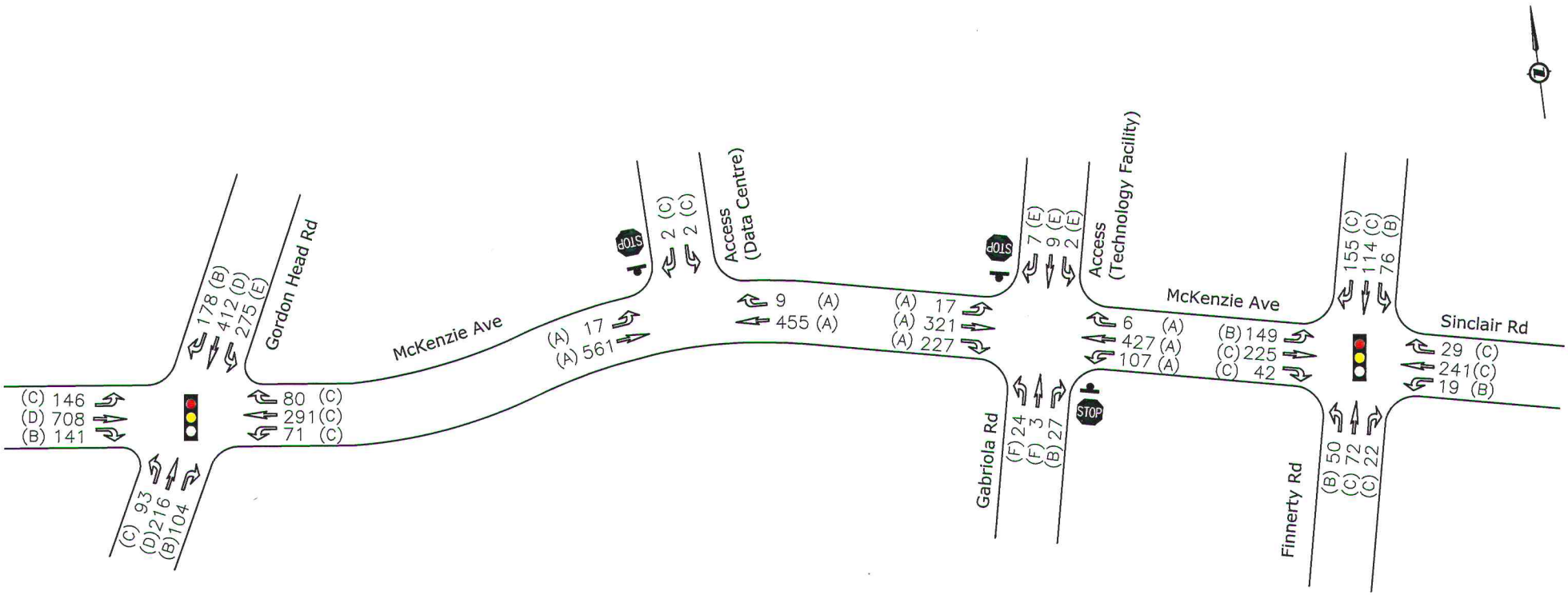
- Facilitate mobility through sidewalk / trails on both sides of McKenzie for pedestrians
- Bike lanes on McKenzie for cyclists
- Trails as possible
- Bike racks

TDM

- Incorporate measures as possible, in particular bike parking

Accessibility

- Provide for a drop-off / pickup loading bay, gathering area, curb drops, and handicap parking stalls



##: Traffic Volumes
(##): Levels of Service

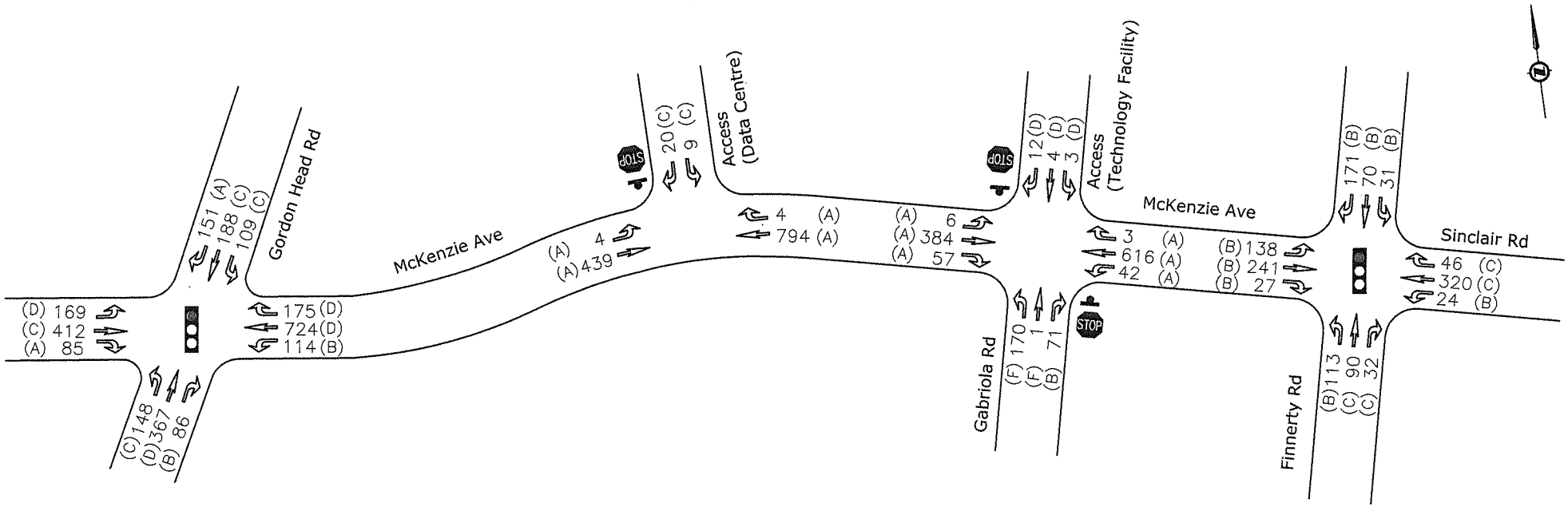
Note: Based on the proposed streetscape plan for McKenzie Avenue

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2013 BACKGROUND CONDITION
AM Peak Hour – Volumes & LOS

DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 3	REV.

FIGURE 3



##: Traffic Volumes
(##): Levels of Service

Note: Based on the proposed streetscape plan for McKenzie Avenue

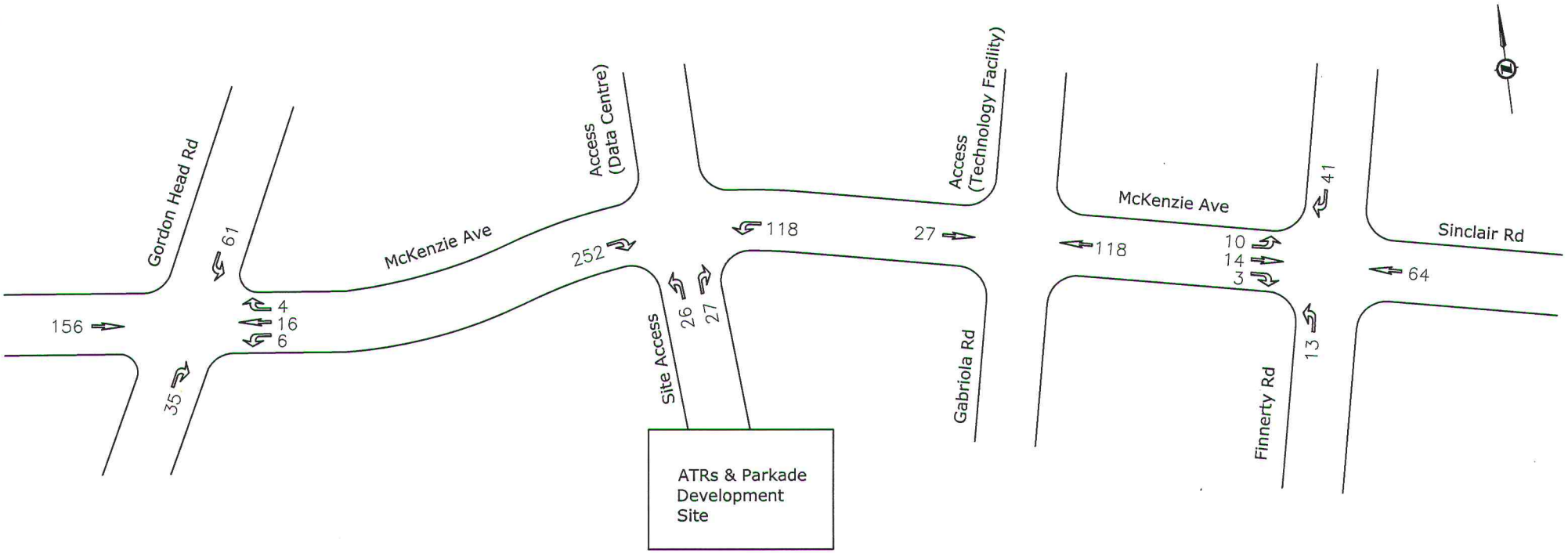
Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2013 BACKGROUND CONDITION
PM Peak Hour – Volumes & LOS

DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 4	REV.

FIGURE 4

PLOT DATE: 10/8/2010 3:25 PM PLOTTED BY: MJ Oh



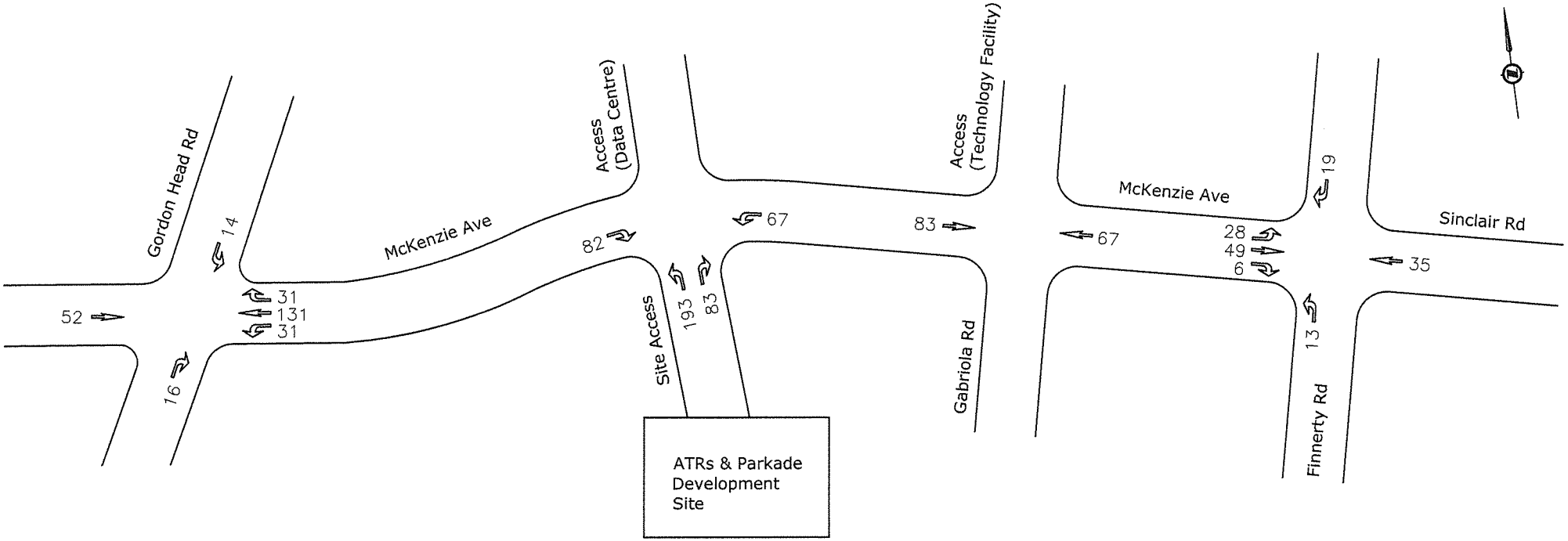
Note:
- Based on the existing directional splits at Finnerty Road/McKenzie Avenue
- Based on the following directional splits (existing distribution) at Godon Head Road and McGill Road on McKenzie Avenue. At the intersection of Gordon Head Rd/McKenzie Ave, it is assumed that 50% of the southbound left and eastbound through traffic would turn onto McGill Road to access UVic while 25% of the northbound right traffic would turn onto McGill Road.

Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
Development Traffic Assignment
AM Peak Hour Volumes

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: JUL 26-10	DRAWING NO: 1159_FIG 5	REV.

FIGURE 5



Note:
–Based on the existing directional splits at Finnerty Road/McKenzie Avenue

–Based on the following directional splits at Godon Head Road and McGill Road on McKenzie Avenue. At the intersection of Gordon Head Road/McKenzie Avenue, it is assumed that 50% of the southbound left and eastbound through traffic would turn onto McGill Road to access UVic while 25% of the northbound right traffic would turn onto McGill Road.

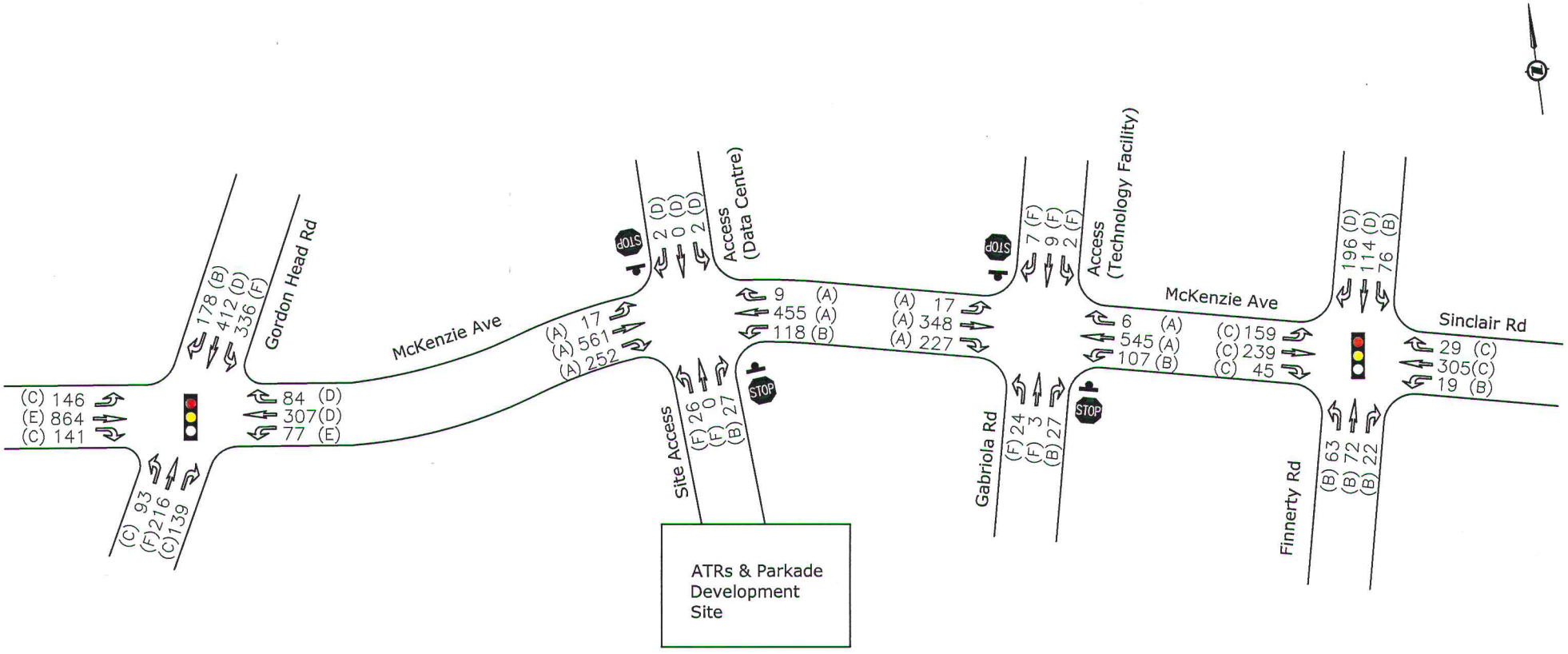
Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
Development Traffic Assignment
PM Peak Hour Volumes

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: JUL 26–10	DRAWING NO: 1159_FIG 6	REV.

FIGURE 6

PLOT DATE: 10/6/2010 3:27 PM PLOTTED BY: MJ 06



##: Traffic Volumes
(##): Levels of Service

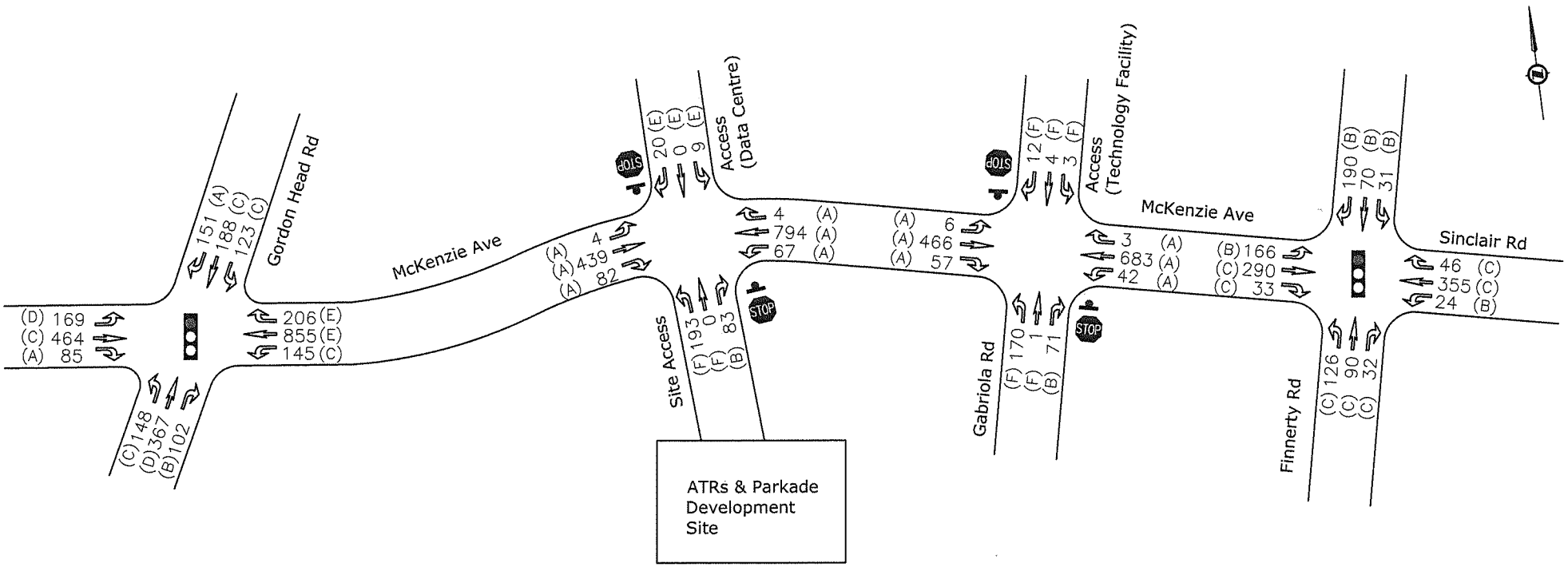
Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2013 AM POST DEVELOPMENT_OPTION 1
STOP CONTROL AT SITE ACCESS

DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12-10	DRAWING NO: 1159_FIG 7	REV.

FIGURE 7



##: Traffic Volumes
(##): Levels of Service

Note: Based on the proposed streetscape plan on McKenzie Avenue

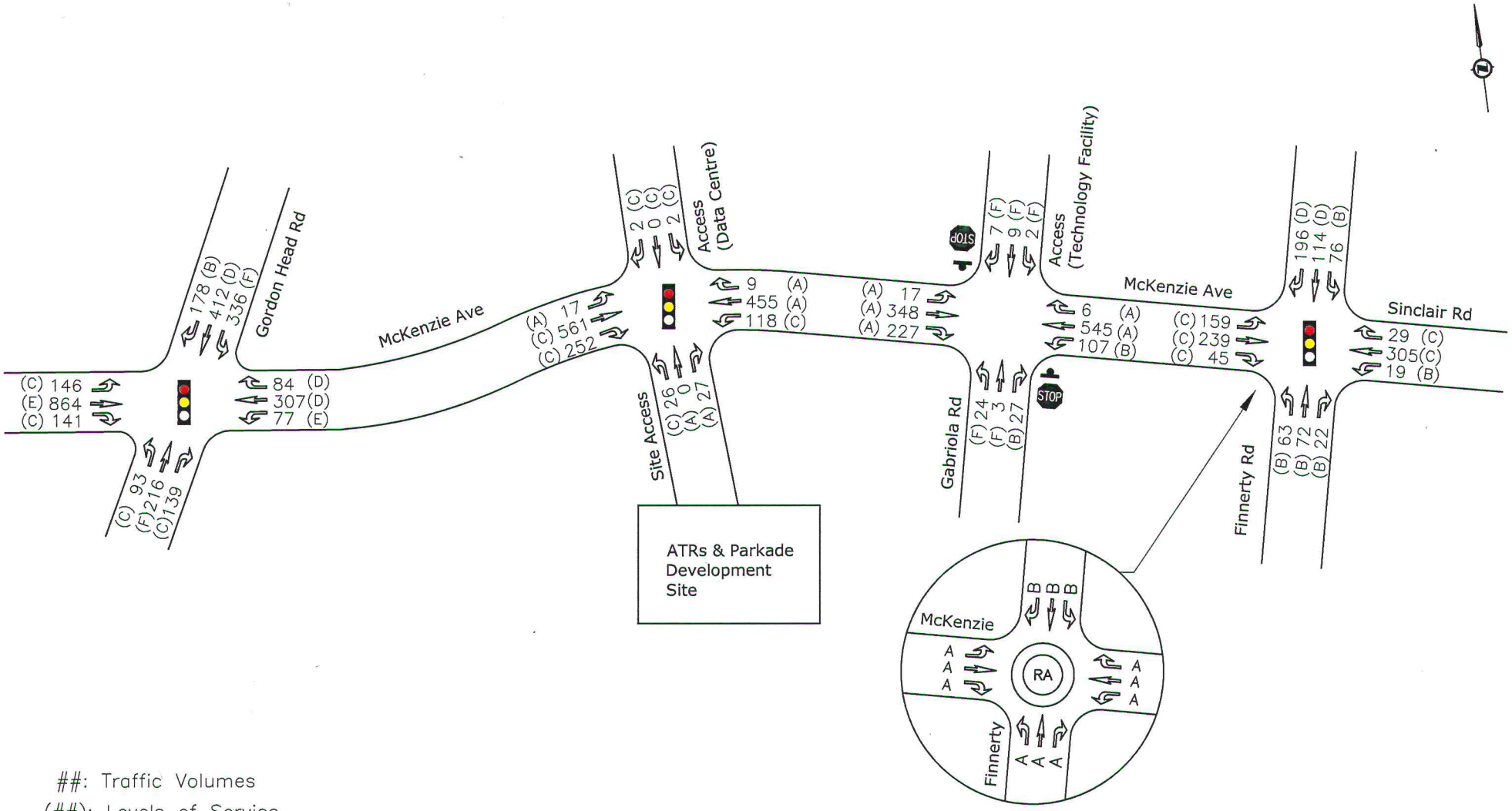
Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2013 PM POST DEVELOPMENT_OPTION 1
STOP CONTROL AT SITE ACCESS

DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12-10	DRAWING NO: 1159_FIG 8	REV.

FIGURE 8

PLOT DATE: 10/6/2010 3:30 PM PLOTTED BY: MJ Oh



Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard Transportation Group

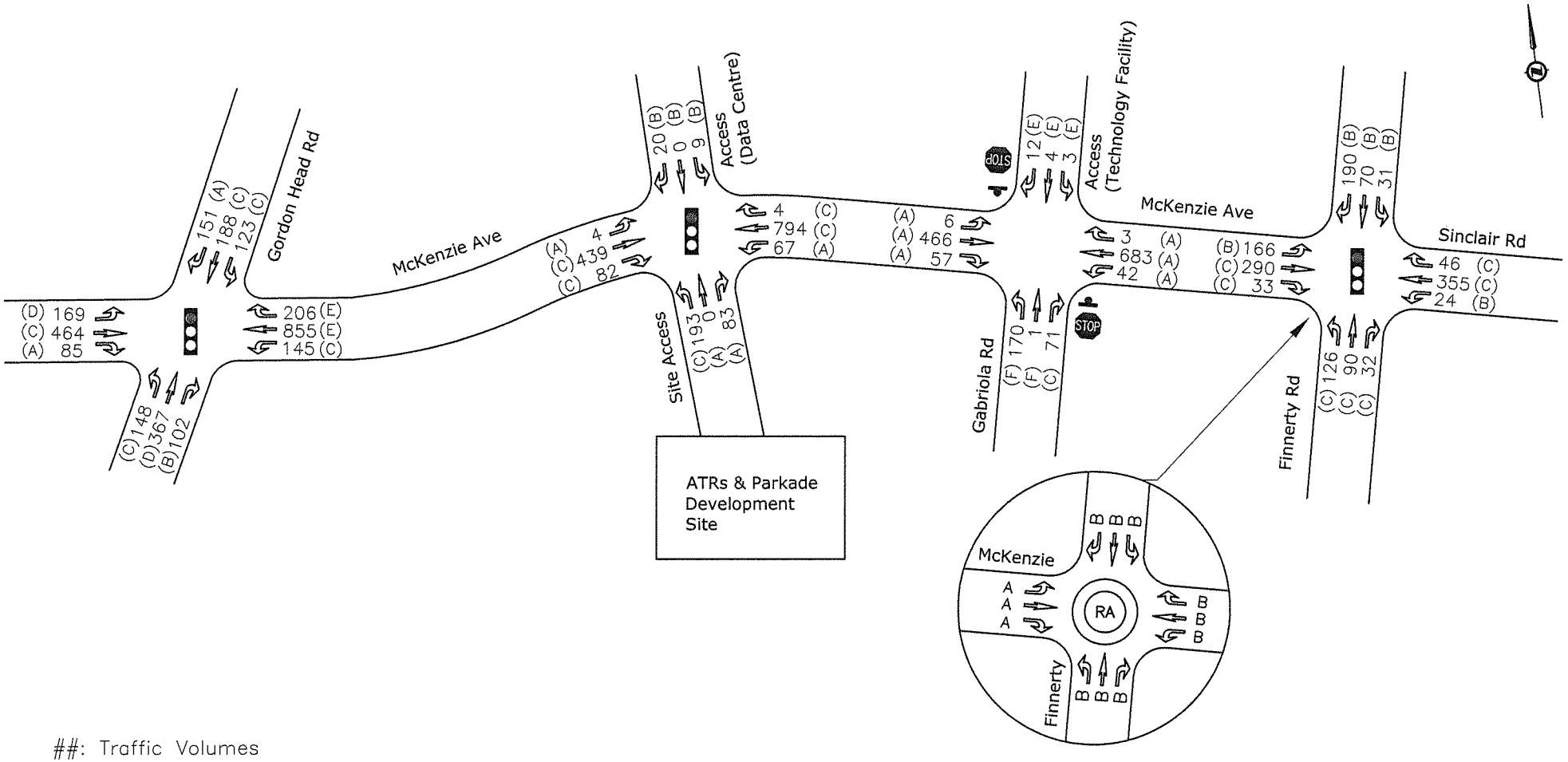
TITLE:

UVic Rec Centre TIA

2013 AM POST DEVELOPMENT_OPTION 2 SIGNAL CONTROL AT SITE ACCESS

DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: MAR 18–11	DRAWING NO: 1159_FIG 9	REV.

FIGURE 9



##: Traffic Volumes
(##): Levels of Service

Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard

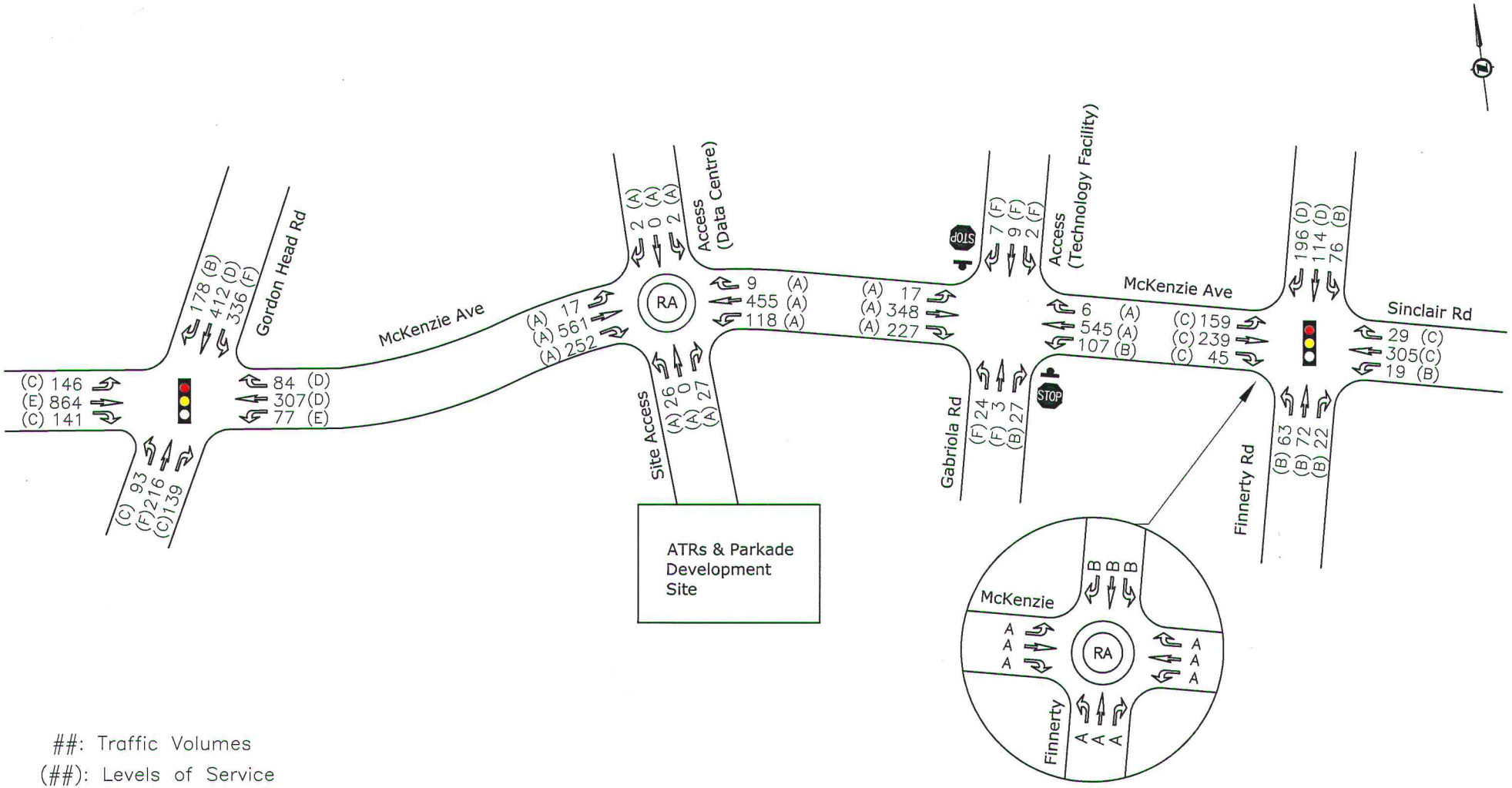
TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2013 PM POST DEVELOPMENT_OPTION 2
SIGNAL CONTROL AT SITE ACCESS

DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: MAR 18-11	DRAWING NO: 1159_FIG 10	REV.

FIGURE 10

PLOT DATE: 3/18/2011 3:30 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

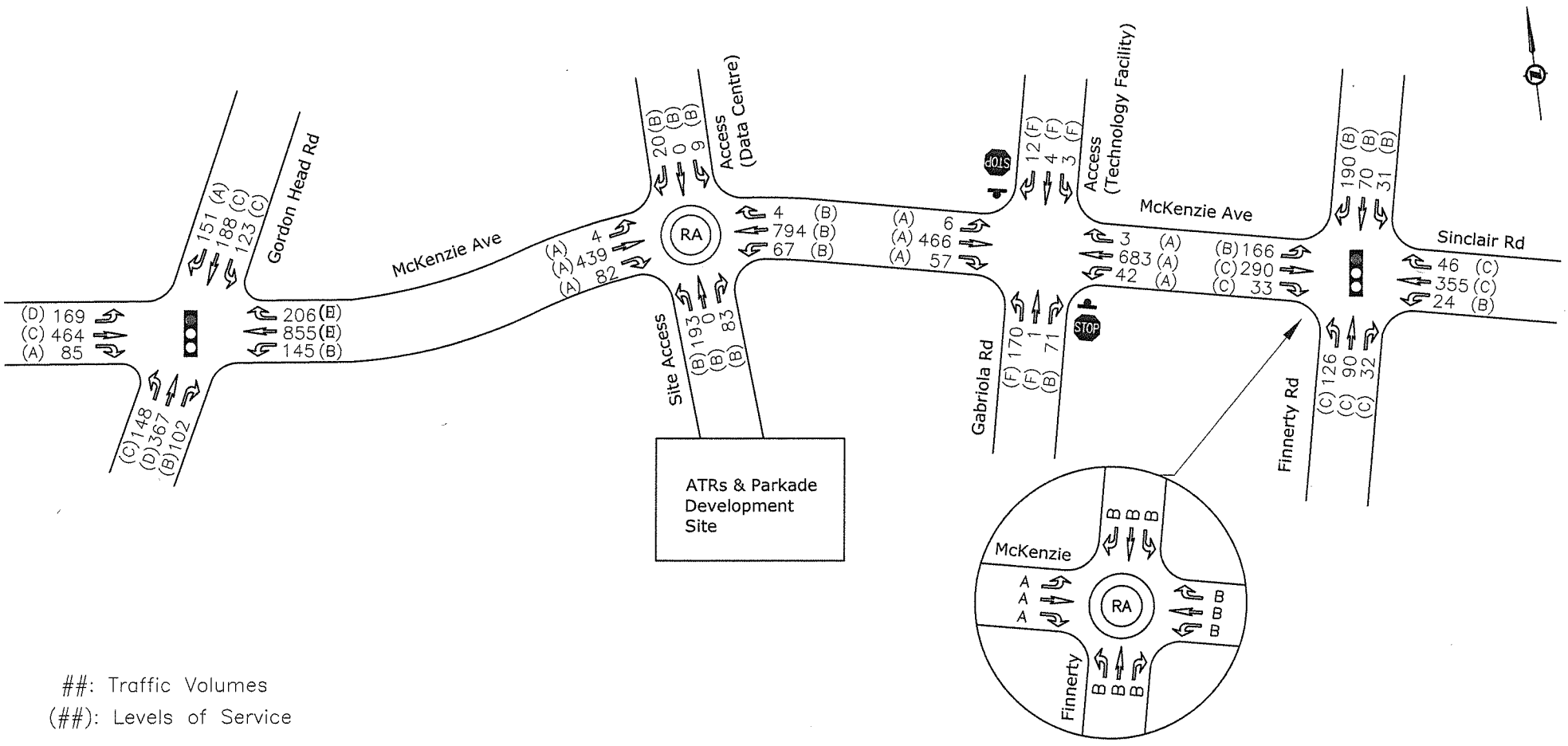
Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2013 AM POST DEVELOPMENT_OPTION 3
ROUNDABOUT AT SITE ACCESS

DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: MAR 18–11	DRAWING NO: 1159_FIG 11	REV.

FIGURE 11



##: Traffic Volumes
(##): Levels of Service

Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard

TRANSPORTATION GROUP

TITLE:

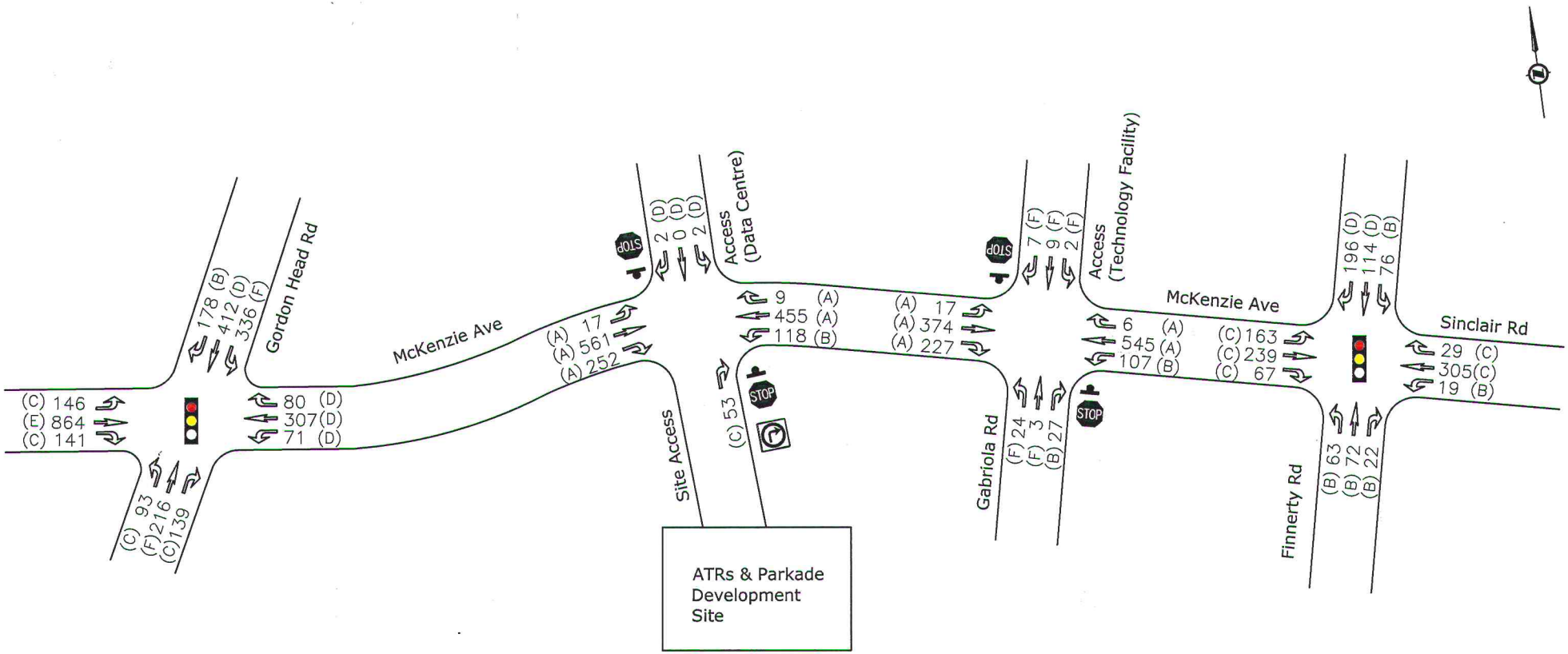
UVic Rec Centre TIA

2013 PM POST DEVELOPMENT_OPTION 3 ROUNDABOUT AT SITE ACCESS

DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: MAR 18-11	DRAWING NO: 1159_FIG 12	REV.

FIGURE 12

PLOT DATE: 3/18/2011 3:31 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

–It is assumed that the supposed westbound left & right traffic (exiting the site) at Godon Head Road/McKenzie Avenue would use the intersection of Finnerty Road/McKenzie Avenue to detour due to the right out only at the site access while the supposed westbound through traffic would use the Godon Head intersection via Ring Road and McGill Road.

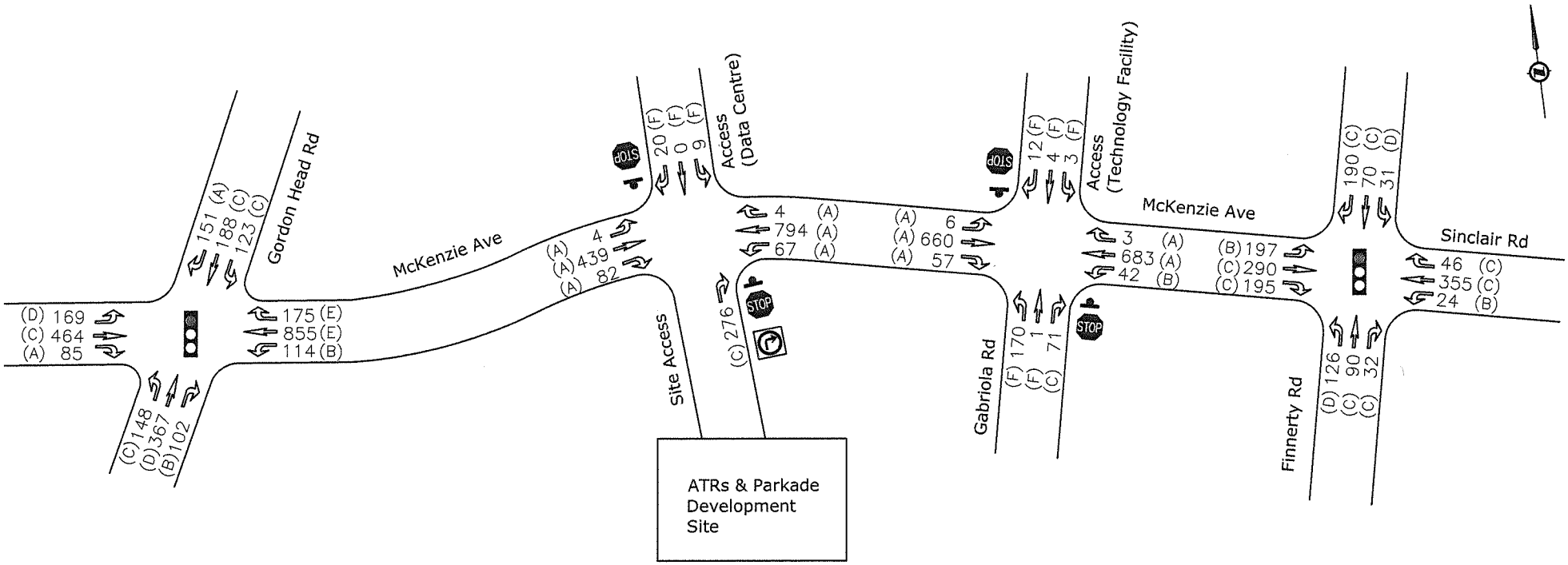
Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2013 AM POST DEVELOPMENT_OPTION 4a
RIGHT–OUT AT SITE ACCESS

DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 13	REV.

FIGURE 13

PLOT DATE: 10/8/2010 3:45 PM PLOTTED BY: MJ



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

–It is assumed that the supposed westbound left & right traffic (exiting the site) at Godon Head Road/McKenzie Avenue would use the intersection of Finnerty Road/McKenzie Avenue to detour due to the right out only at the site access while the supposed westbound through traffic would use the Godon Head intersection via Ring Road and McGill Road.

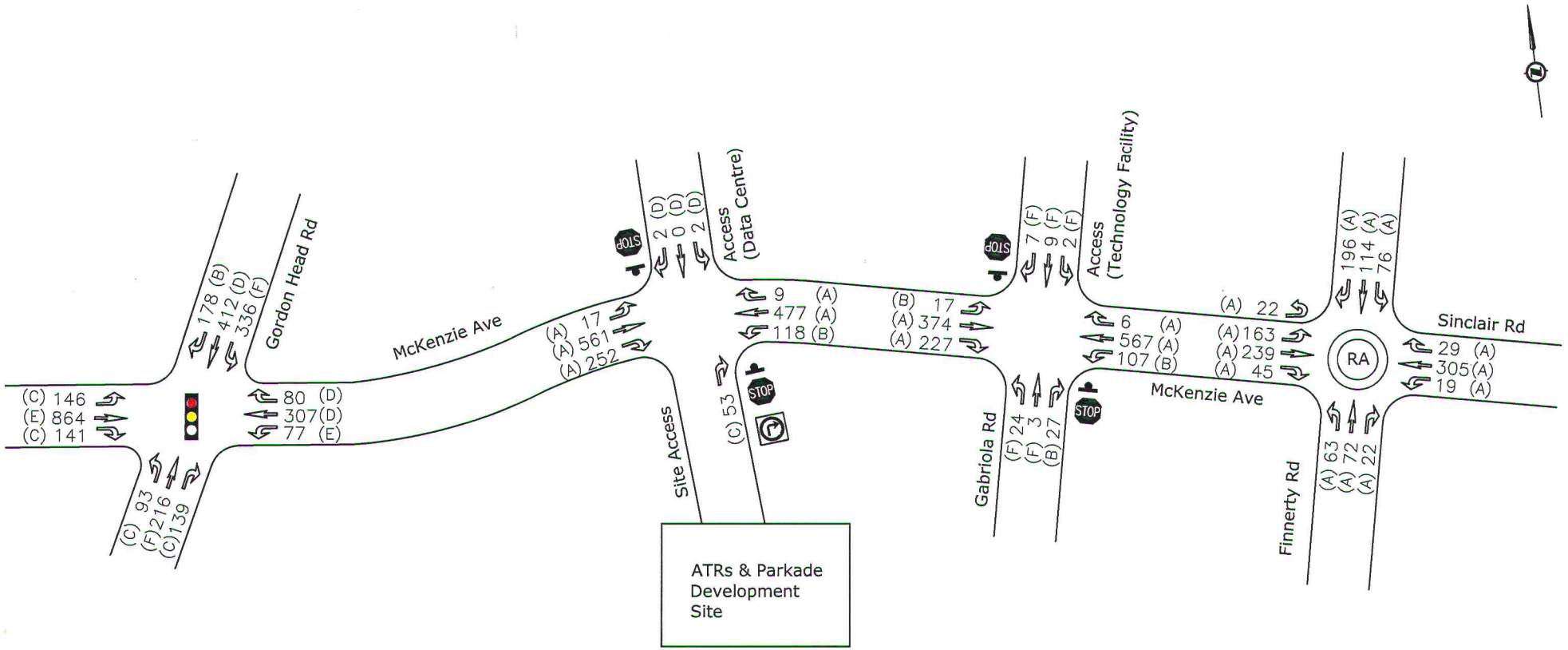
Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2013 PM POST DEVELOPMENT_OPTION 4a
RIGHT–OUT AT SITE ACCESS

DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 14	REV.

FIGURE 14

PLOT DATE: 10/6/2010 3:48 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

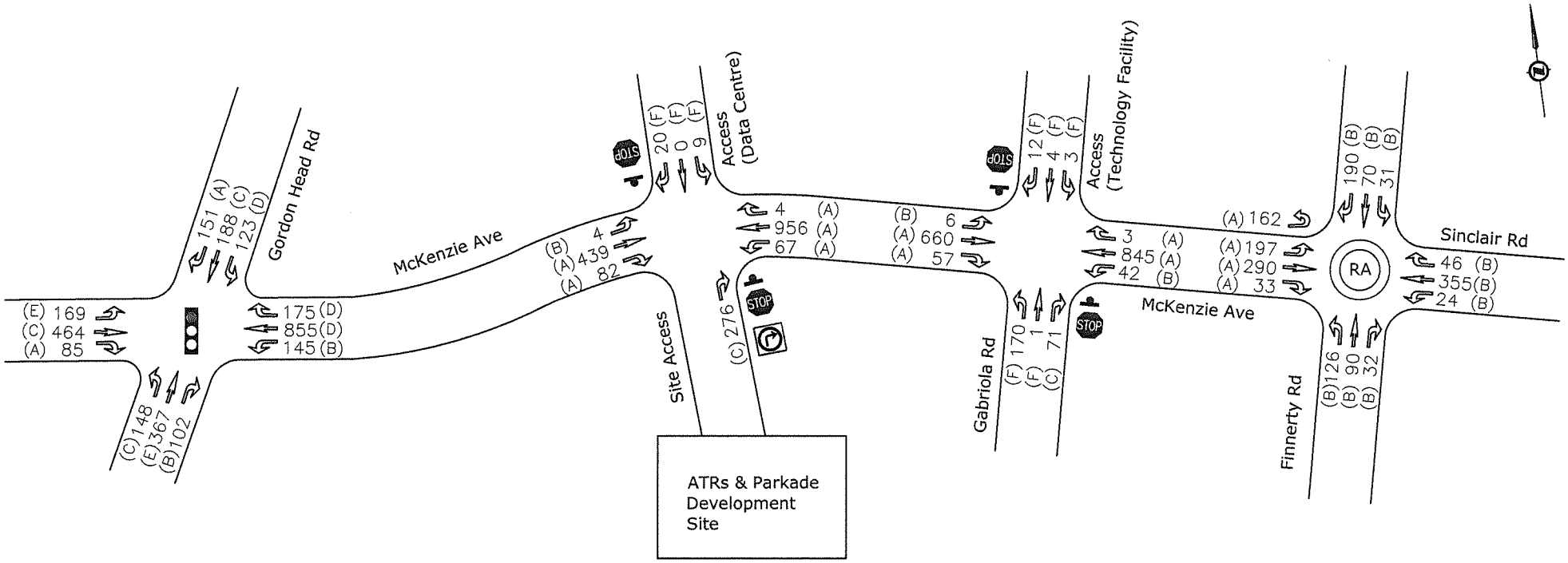
–It is assumed that the supposed westbound through & left traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection while the supposed westbound right traffic would turn left at the Finnerty roundabout.

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2013 AM POST DEVELOPMENT_OPTION 4b
ACCESS RIGHT–OUT & FINNERTY ROUNDABOUT

DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 15	REV.

FIGURE 15



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

–It is assumed that the supposed westbound through & left traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection while the supposed westbound right traffic would turn left at the Finnerty roundabout.

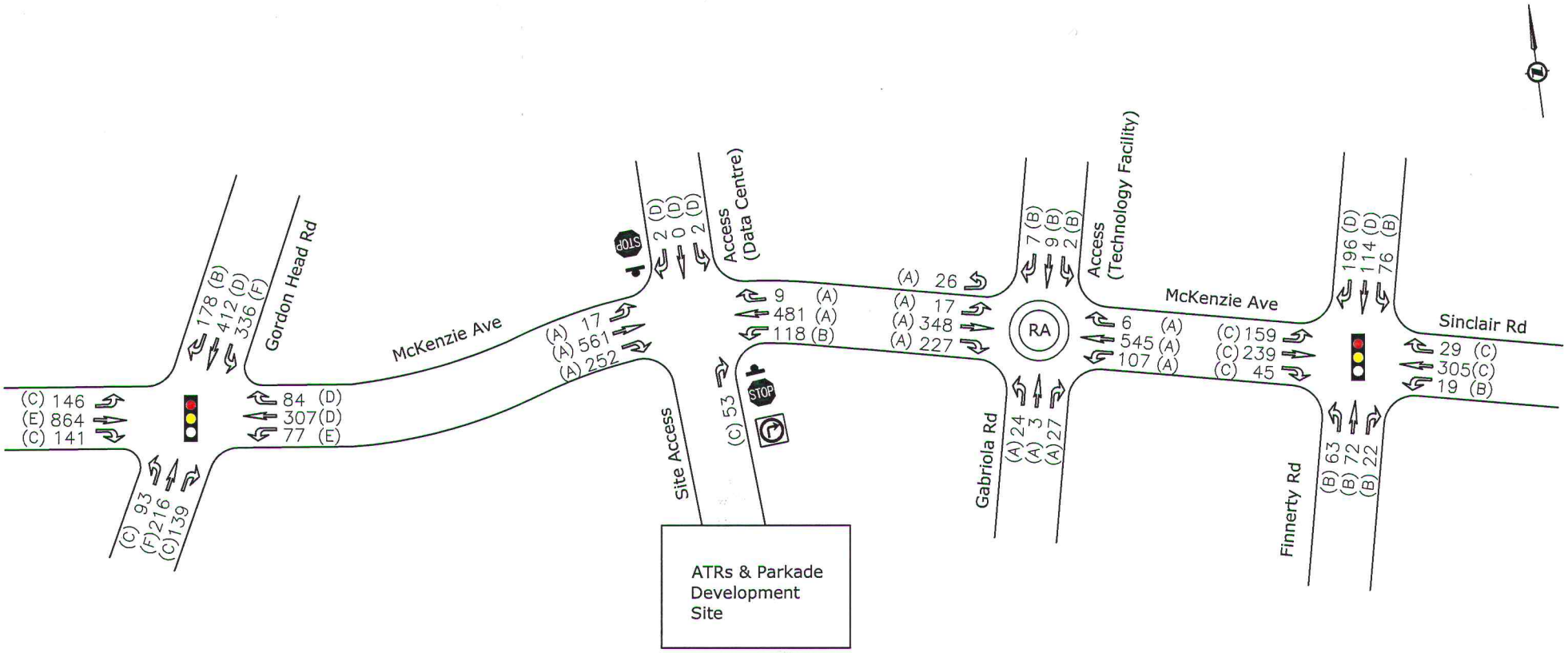
Boulevard Transportation Group

TITLE: UVic Rec Centre TIA
2013 PM POST DEVELOPMENT_OPTION 4b
ACCESS RIGHT–OUT & FINNERTY ROUNDABOUT

DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 16	REV.

FIGURE 16

PLOT DATE: 10/6/2010 3:51 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

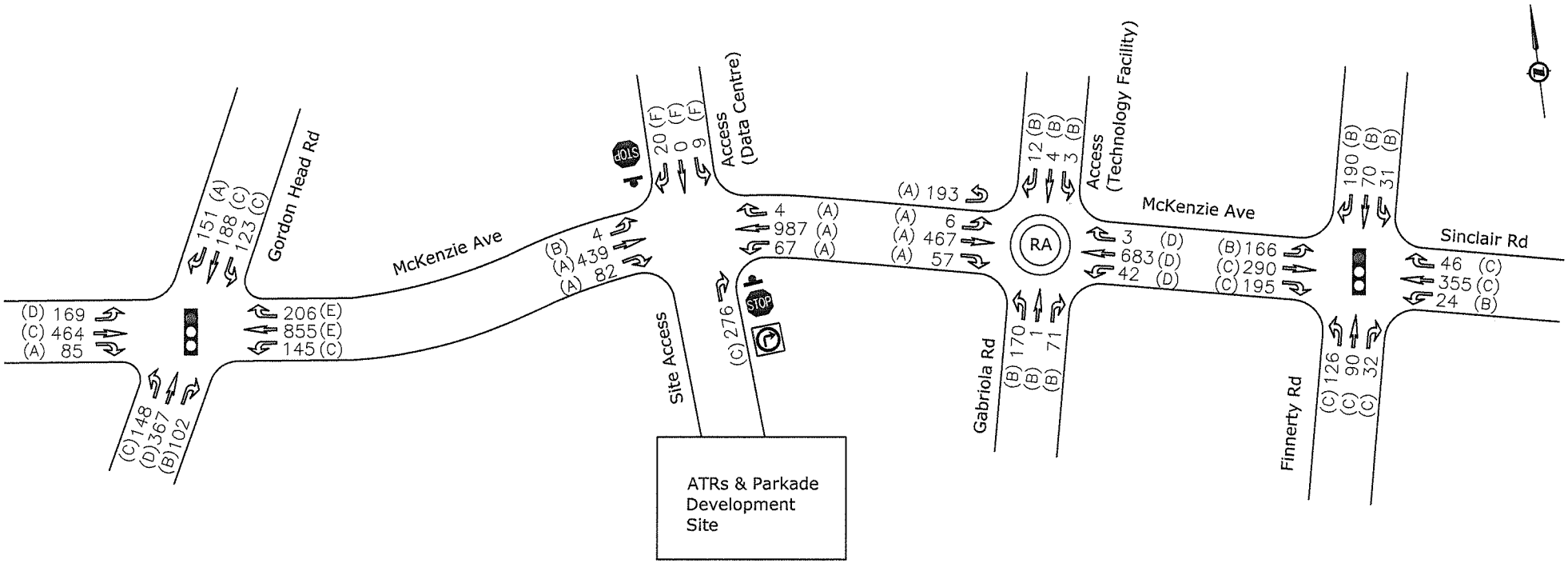
–It is assumed that the supposed westbound all traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection.

Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2013 AM POST DEVELOPMENT_OPTION 4c
ACCESS RIGHT–OUT & GABRIOLA ROUNDABOUT

DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 17	REV.

FIGURE 17



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

–It is assumed that the supposed westbound all traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection.

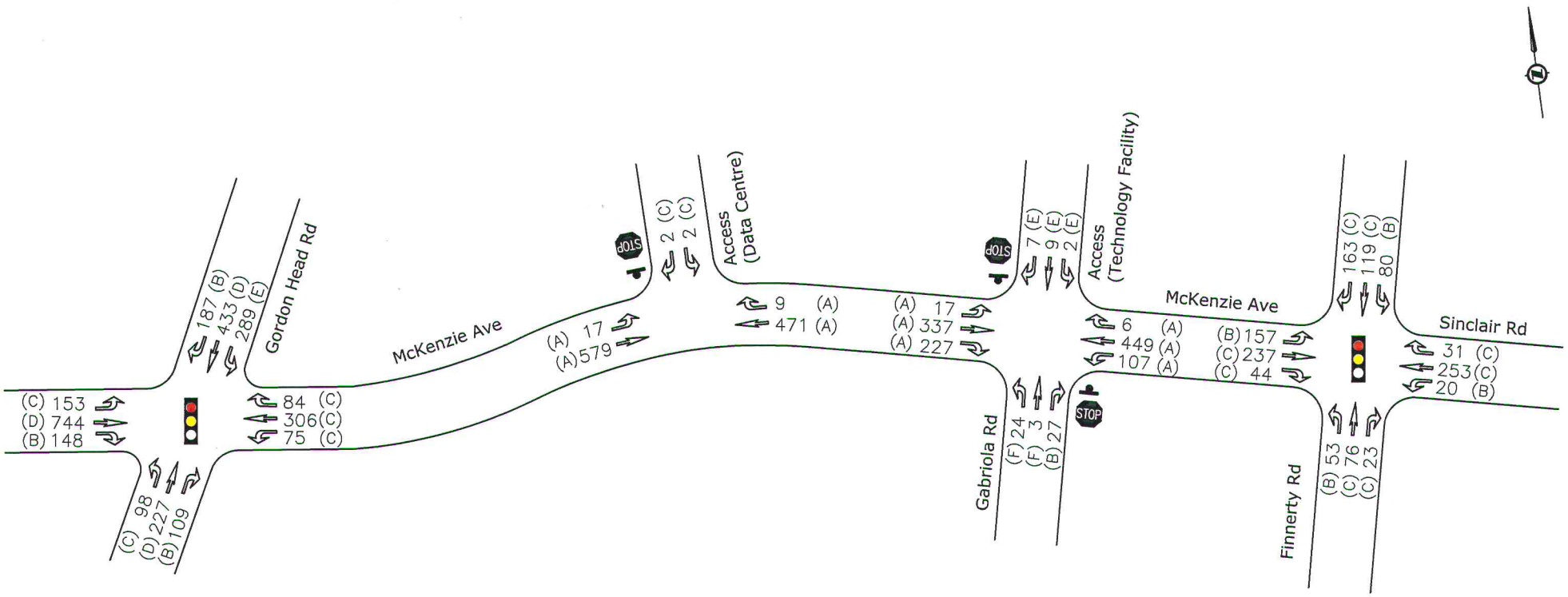
Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2013 PM POST DEVELOPMENT_OPTION 4c
ACCESS RIGHT–OUT & GABRIOLA ROUNDABOUT

DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 18	REV.

FIGURE 18

PLOT DATE: 10/8/2010 3:53 PM PLOTTED BY: MJ Gh



##: Traffic Volumes
(##): Levels of Service

Note:
–2023 background volumes are based on the 0.5% annual growth rate from the 2010 background volumes except for the Gabriola access (same as 2010).

–The laning is based on the proposed streetscape plan on McKenzie Avenue at Finnerty Road and the existing accesses (left turn lanes added in the model).

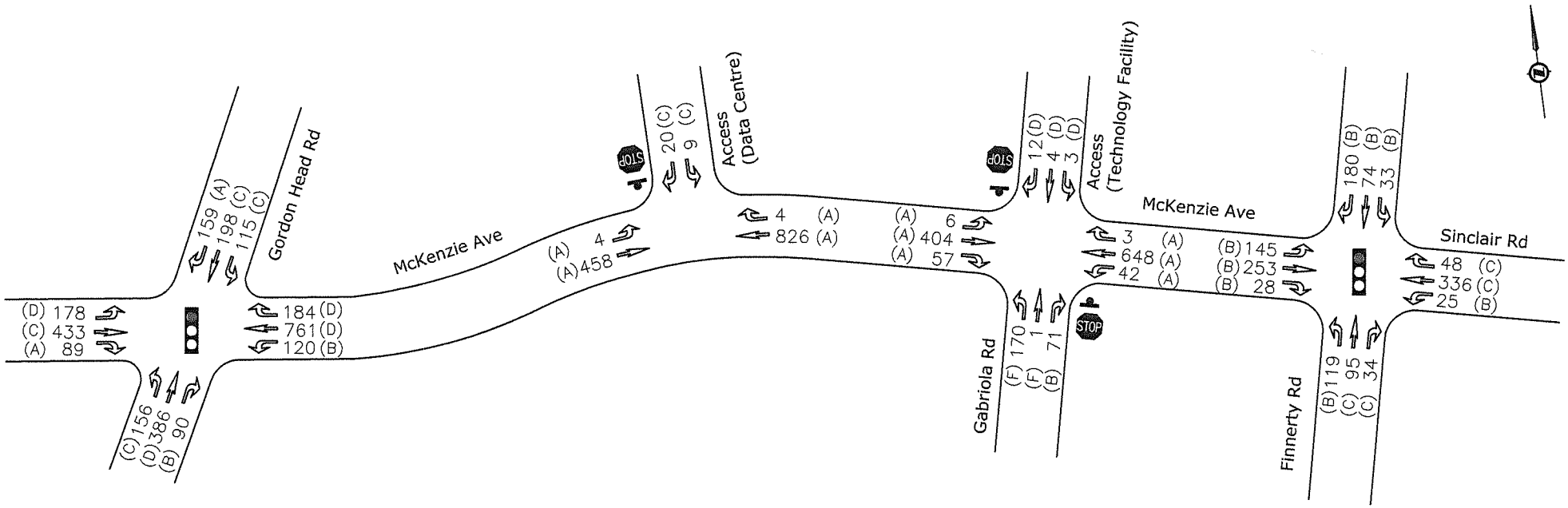
–At Finnerty Road/McKenzie Avenue, the LOS result is based on the protected/permitted turn type signal.

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2023 BACKGROUND CONDITION
AM Peak Hour – Volumes & LOS

DES'D:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 6–10	DRAWING NO: 1159_FIG 19	REV.

FIGURE 19



##: Traffic Volumes
(##): Levels of Service

Note:
–2023 background volumes are based on the 0.5% annual growth rate from the 2010 background volumes except for the Gabriola access (same as 2010).

–The laning is based on the proposed streetscape plan on McKenzie Avenue at Finnerty Road and the existing accesses (left turn lanes added in the model).

–At Finnerty Road/McKenzie Avenue, the LOS result is based on the protected/permitted turn type signal.

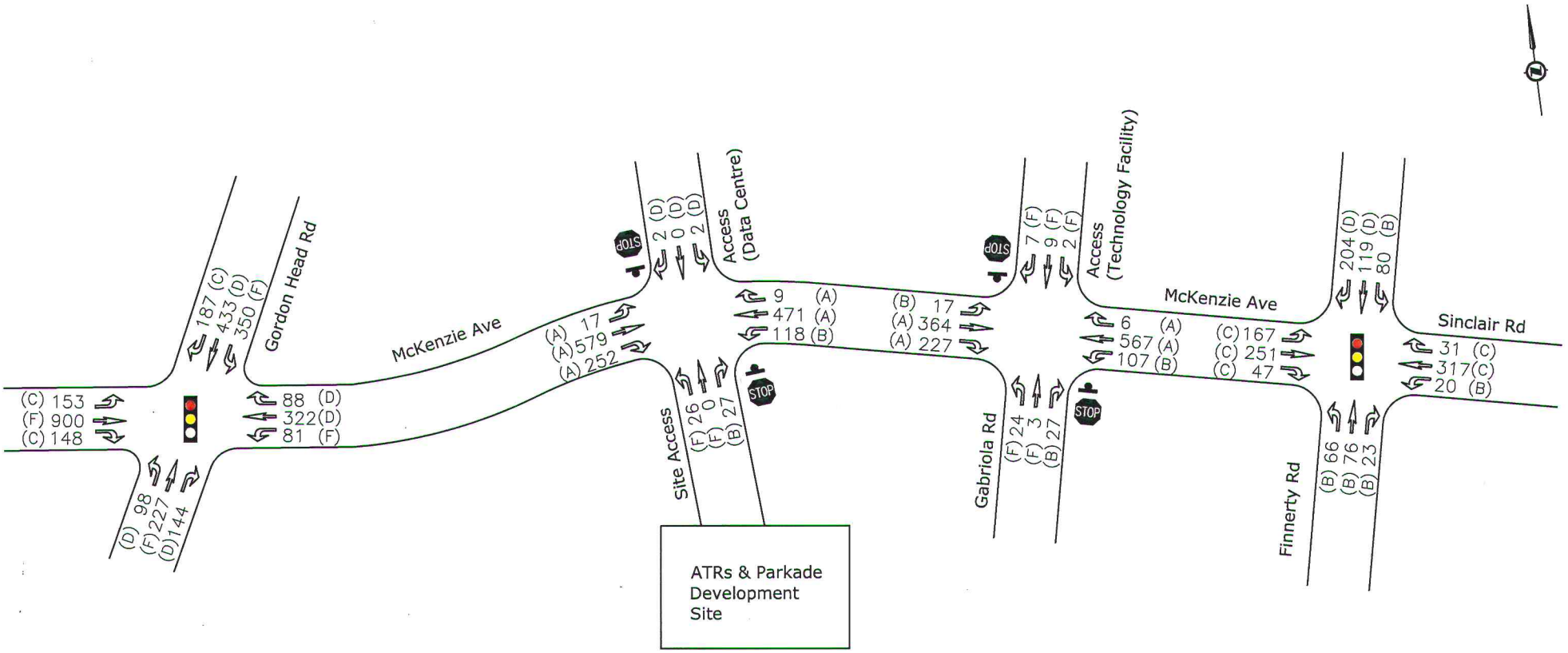
Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2023 BACKGROUND CONDITION
PM Peak Hour – Volumes & LOS

FIGURE 20

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 6–10	DRAWING NO: 1159_FIG 20	REV.

PLOT DATE: 10/8/2010 3:36 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

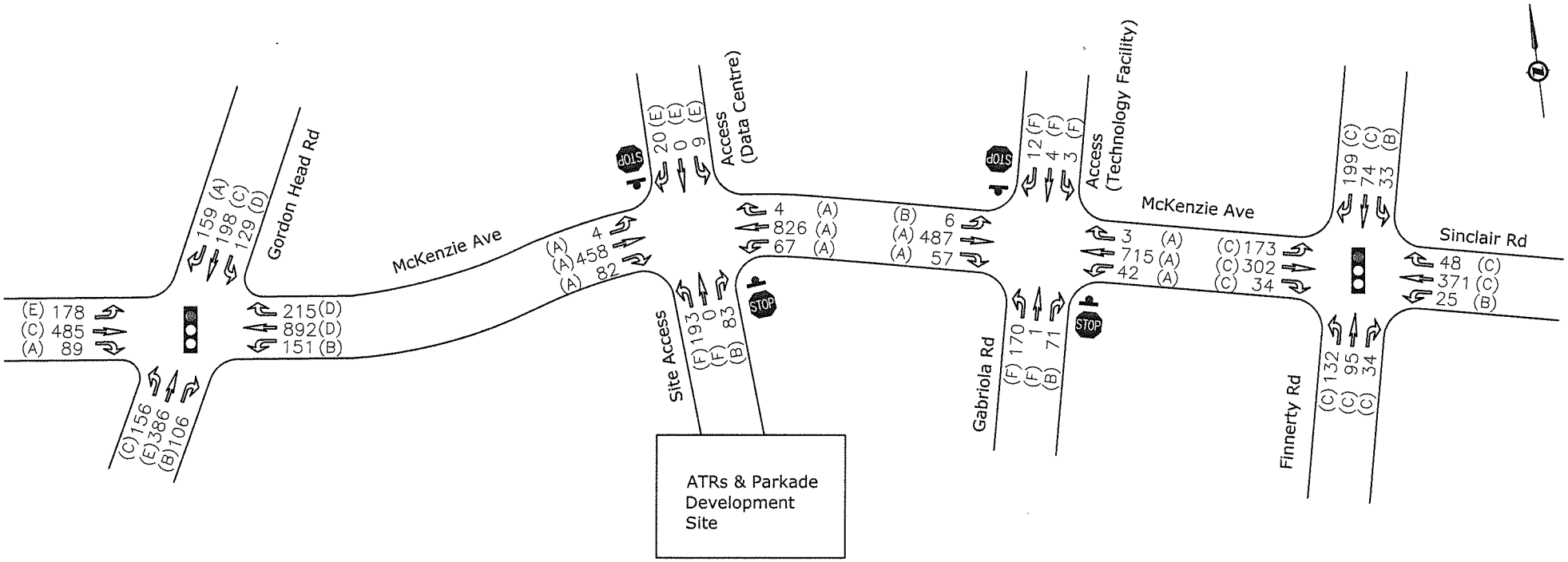
Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2023 AM POST DEVELOPMENT_OPTION 1
STOP CONTROL AT SITE ACCESS

DES'D:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12-10	DRAWING NO: 1159_FIG 21	REV.

FIGURE 21



##: Traffic Volumes
(##): Levels of Service

Note: Based on the proposed streetscape plan on McKenzie Avenue

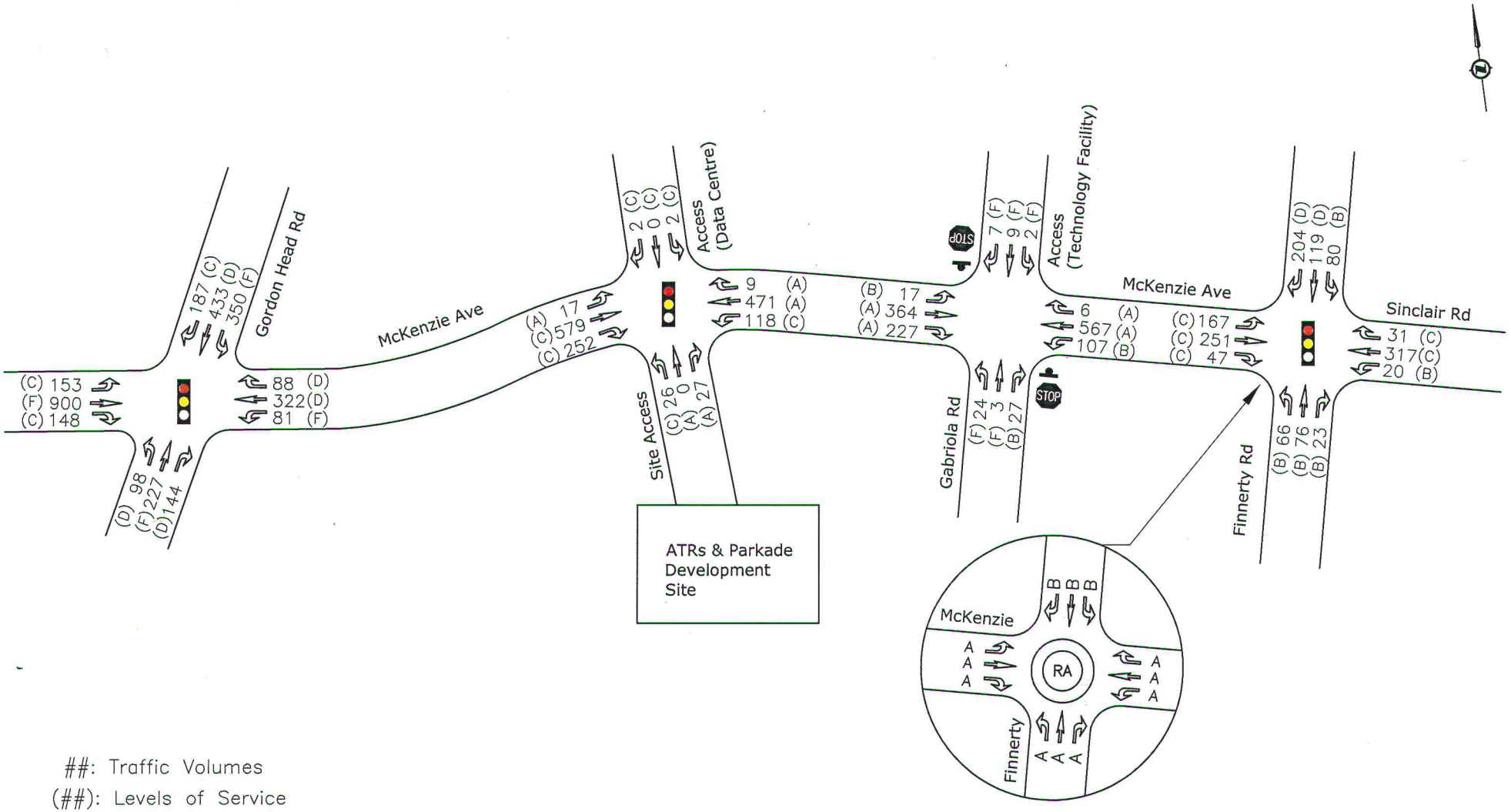
Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2023 PM POST DEVELOPMENT_OPTION 1 STOP CONTROL AT SITE ACCESS

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12-10	DRAWING NO: 1159_FIG 22	REV.

FIGURE 22

PLOT DATE: 10/8/2010 3:59 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

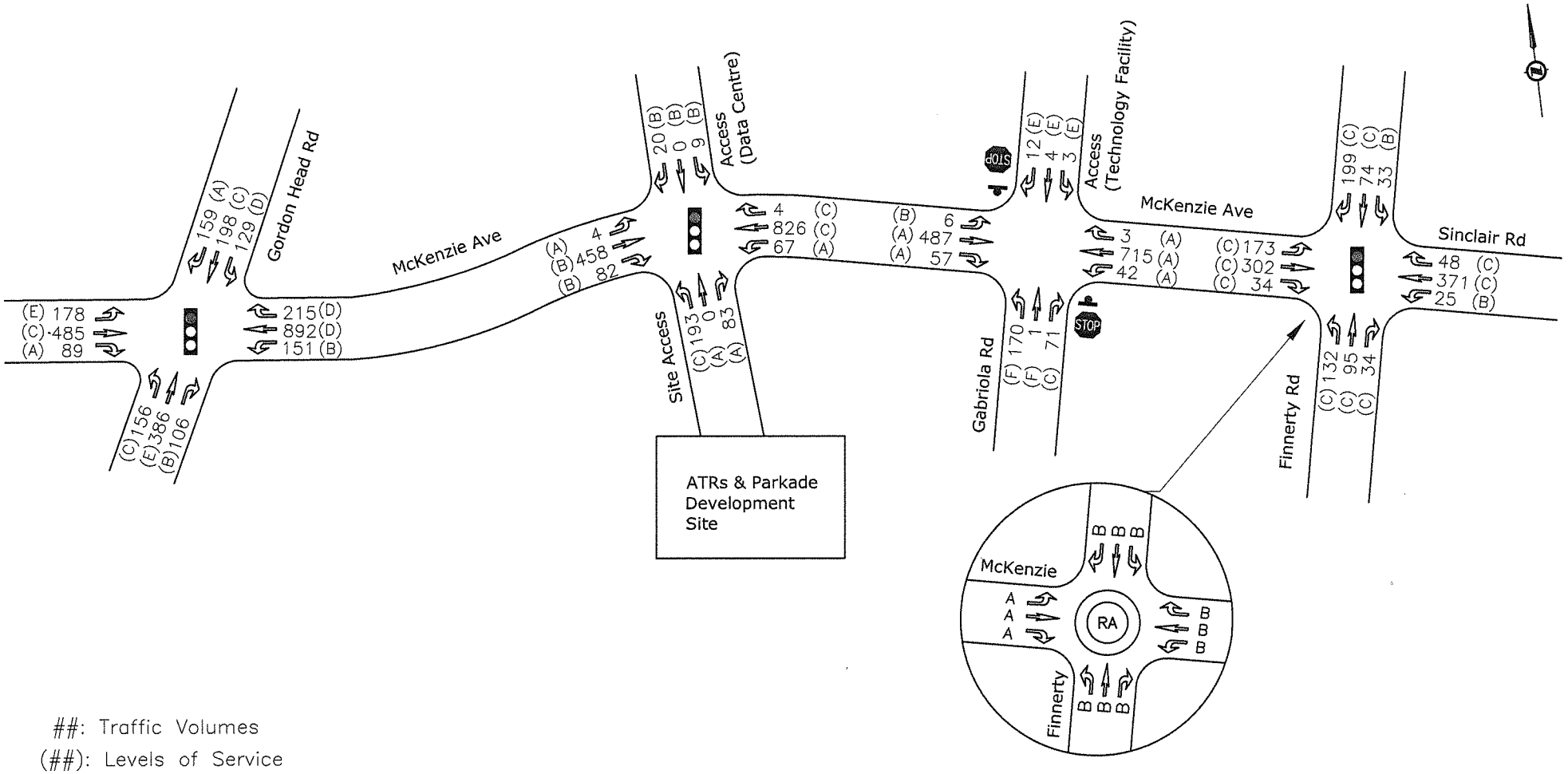
Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2023 AM POST DEVELOPMENT_OPTION 2
SIGNAL CONTROL AT SITE ACCESS

DES'D:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: MAR 18–11	DRAWING NO: 1159_FIG 23	REV.

FIGURE 23



##: Traffic Volumes
(##): Levels of Service

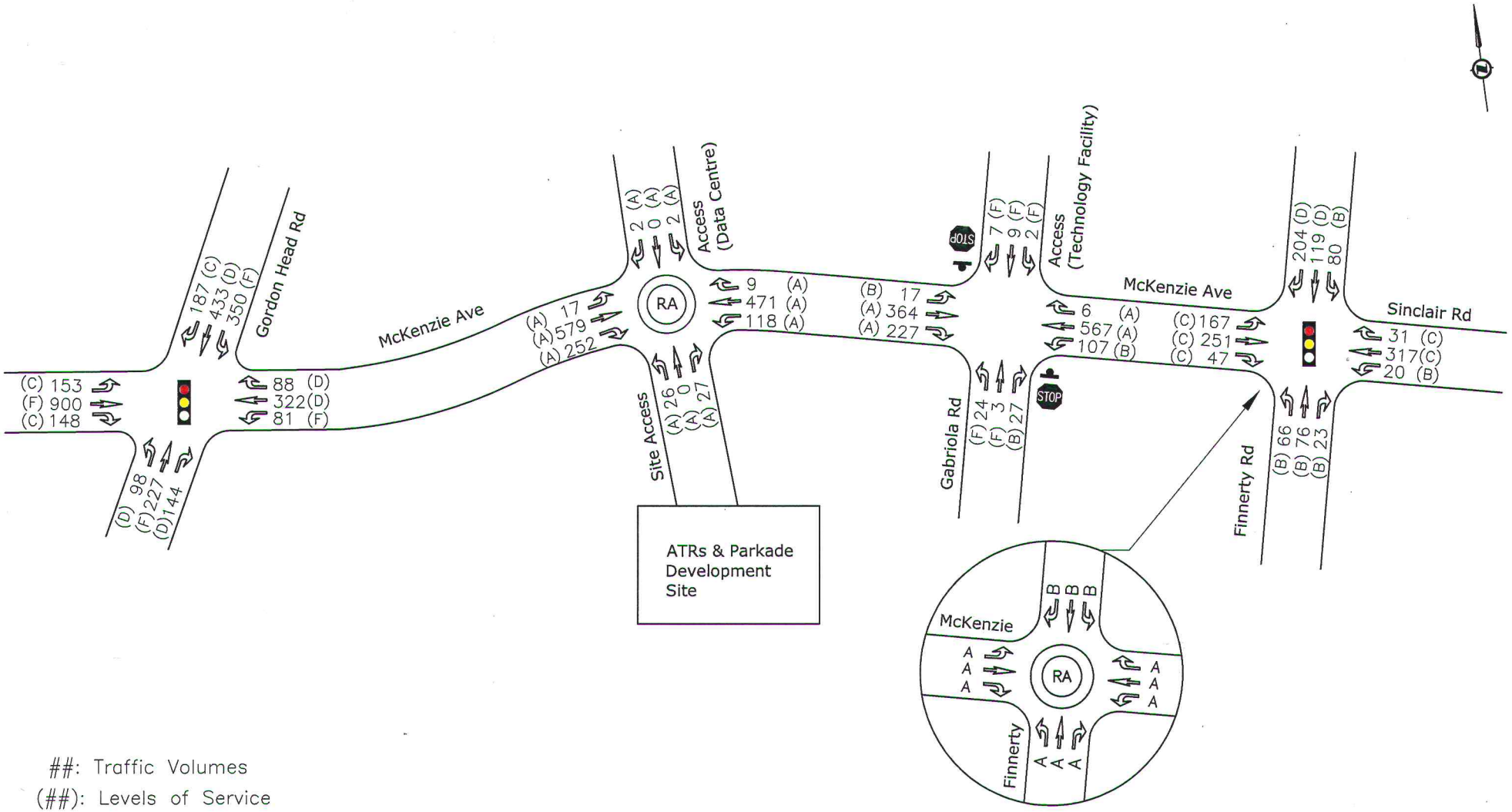
Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard

TRANSPORTATION GROUP

TITLE: UVic Rec Centre TIA 2023 PM POST DEVELOPMENT_OPTION 2 SIGNAL CONTROL AT SITE ACCESS			FIGURE 24
DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE	
DATE: MAR 18–11	DRAWING NO: 1159_FIG 24	REV.	

PLOT DATE: 3/18/2011 3:32 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

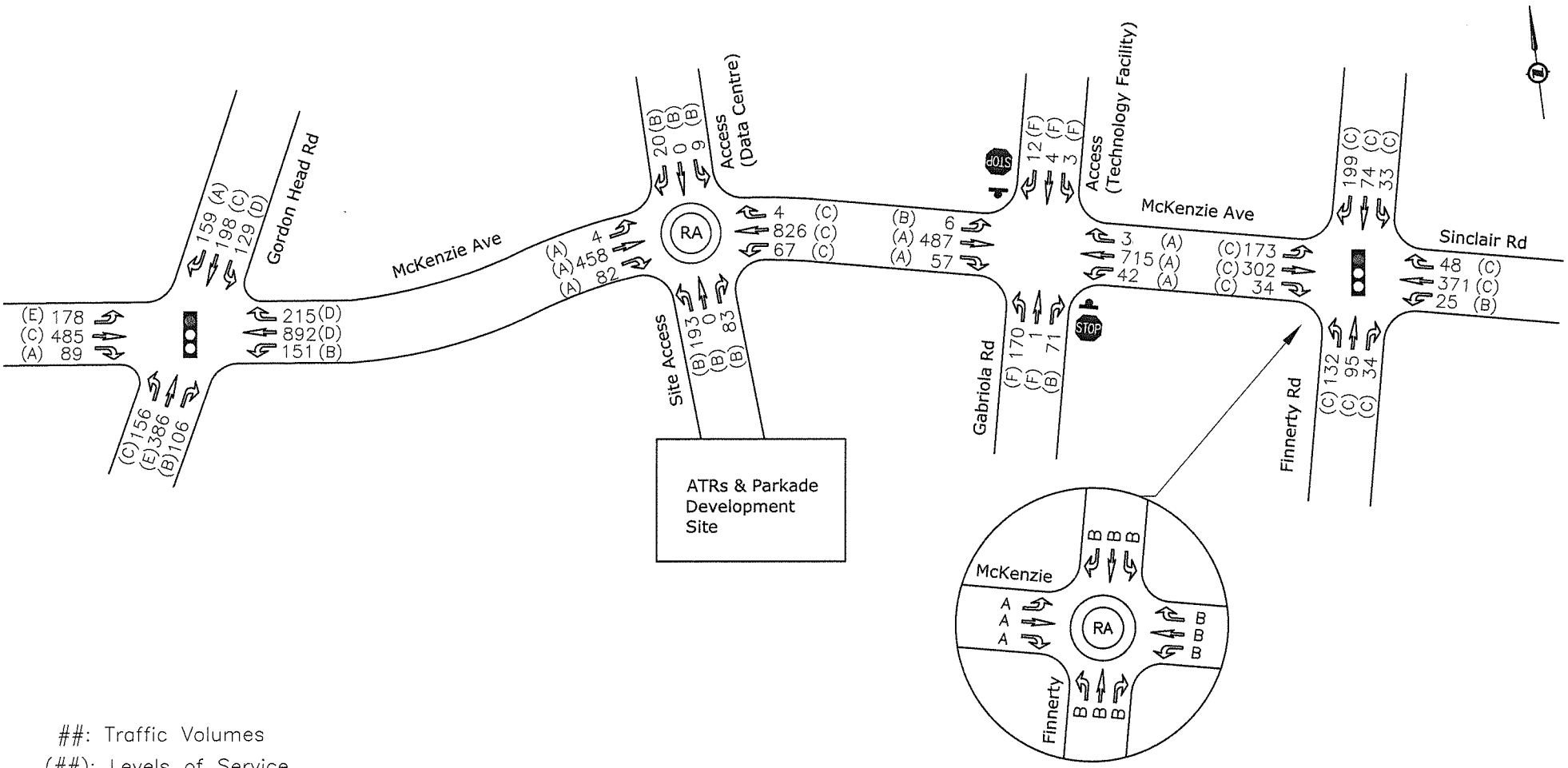
Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2023 AM POST DEVELOPMENT_OPTION 3
ROUNDABOUT AT SITE ACCESS

DES'D:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: MAR 18–11	DRAWING NO: 1159_FIG 25	REV.

FIGURE 25



##: Traffic Volumes
(##): Levels of Service

Note: Based on the proposed streetscape plan on McKenzie Avenue

Boulevard

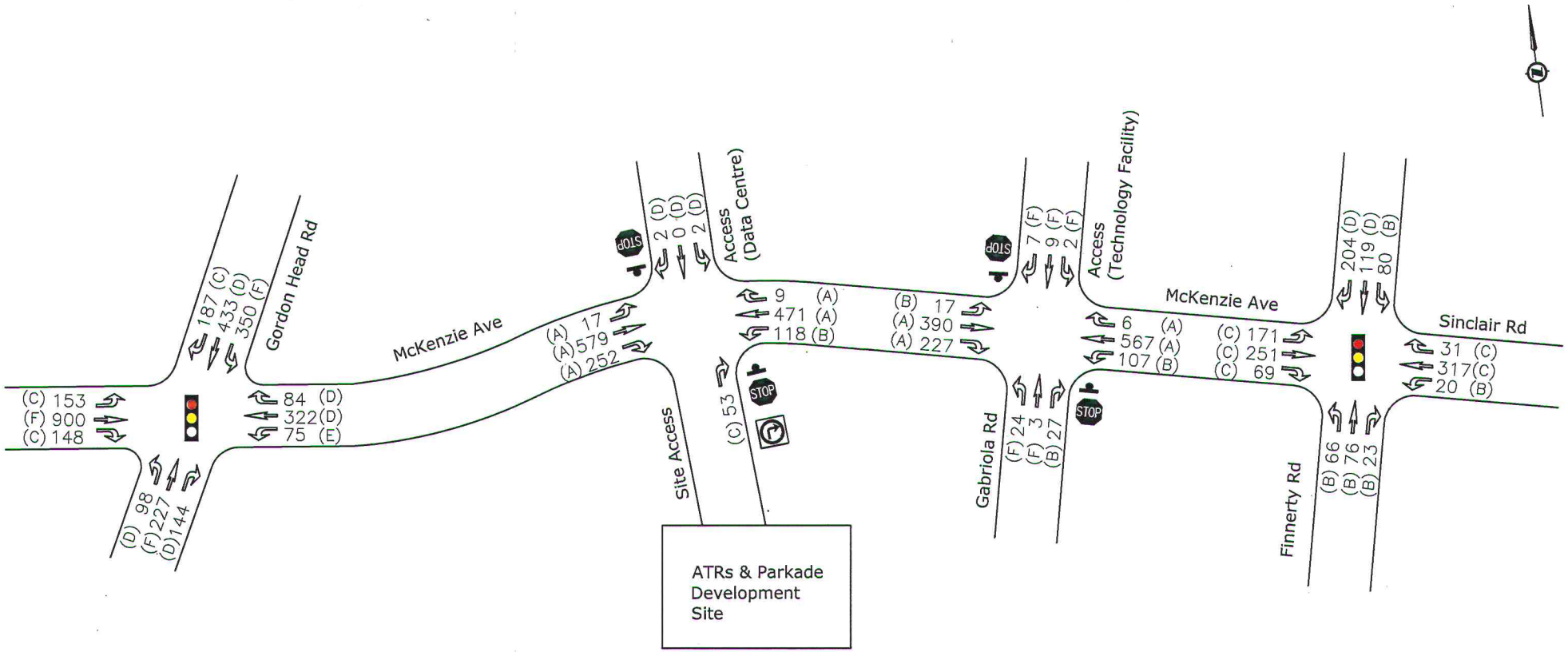
TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2023 PM POST DEVELOPMENT_OPTION 3
ROUNDABOUT AT SITE ACCESS

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: MAR 18–11	DRAWING NO: 1159_FIG 26	REV.

FIGURE 26

PLOT DATE: 3/18/2011 3:33 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

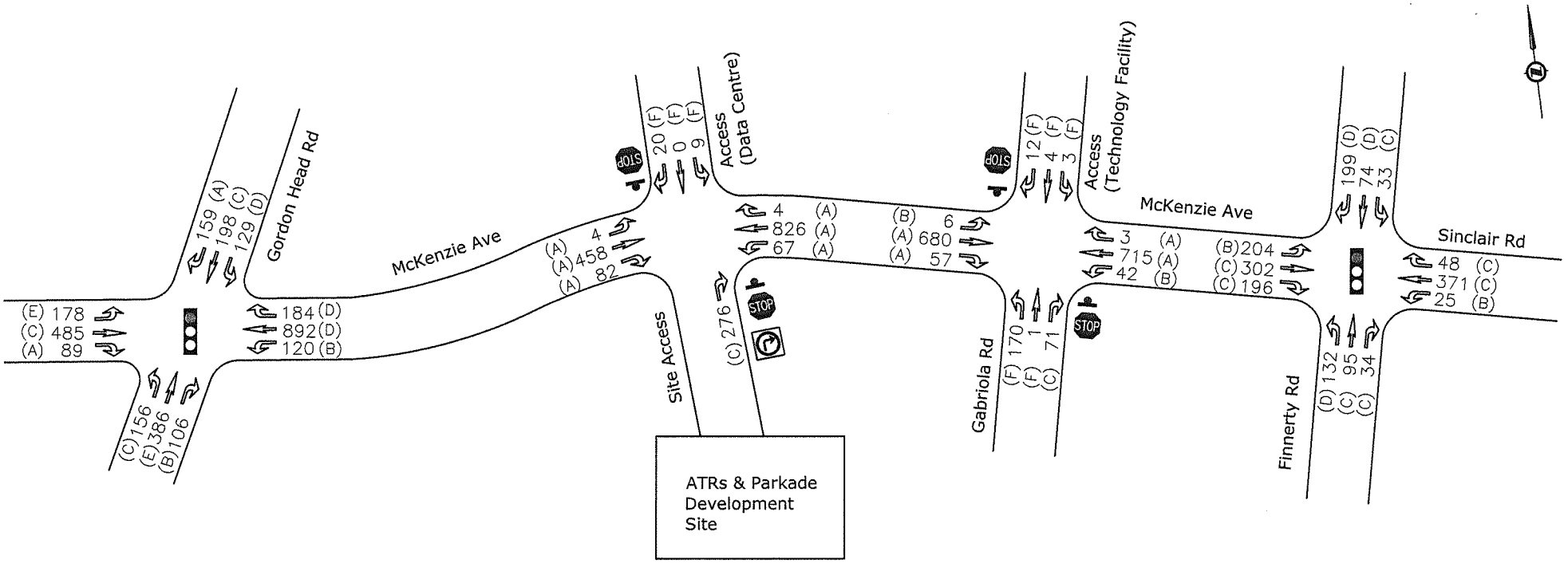
–It is assumed that the supposed westbound left & right traffic (exiting the site) at Godon Head Road/McKenzie Avenue would use the intersection of Finnerty Road/McKenzie Avenue to detour due to the right out only at the site access while the supposed westbound through traffic would use the Godon Head intersection via Ring Road and McGill Road.

Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2023 AM POST DEVELOPMENT_OPTION 4a
RIGHT–OUT AT SITE ACCESS

DES'D:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 27	REV.

FIGURE 27



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

–It is assumed that the supposed westbound left & right traffic (exiting the site) at Godon Head Road/McKenzie Avenue would use the intersection of Finnerty Road/McKenzie Avenue to detour due to the right out only at the site access while the supposed westbound through traffic would use the Godon Head intersection via Ring Road and McGill Road.

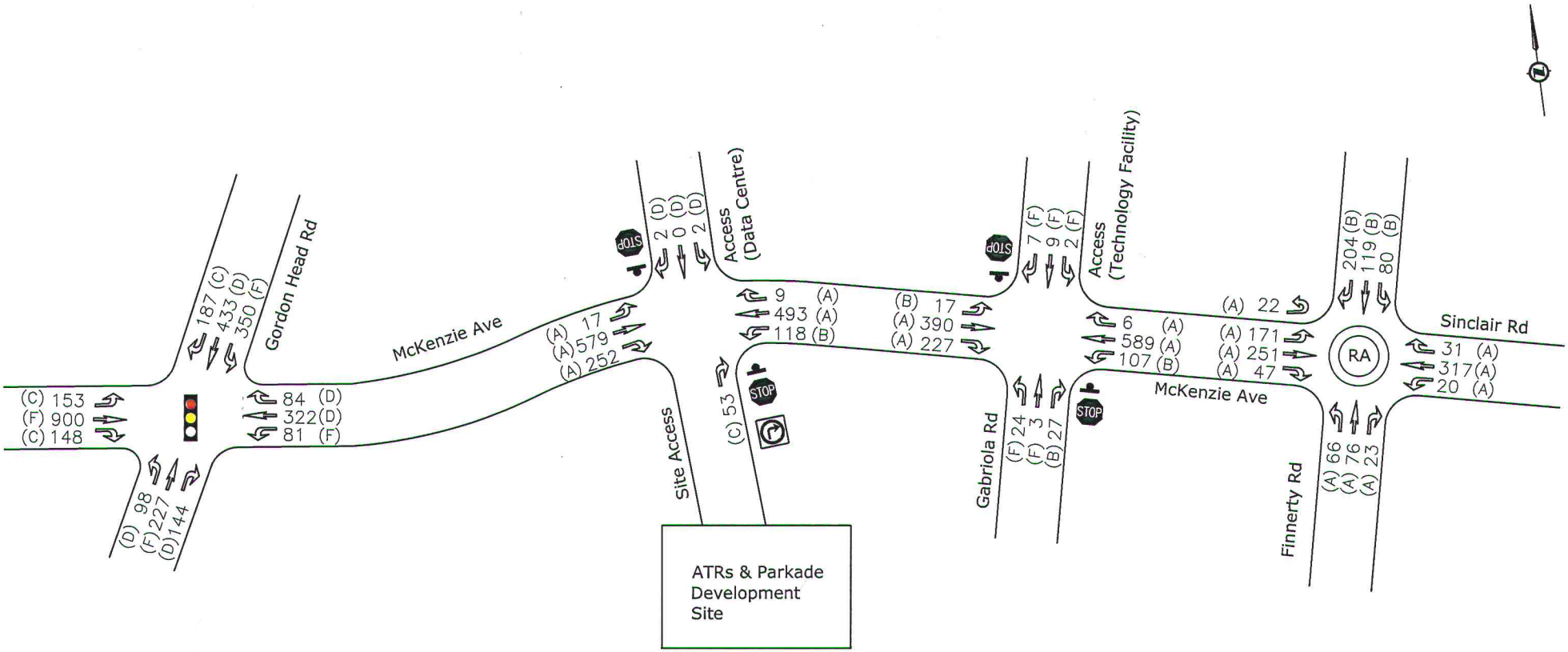
Boulevard TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2023 PM POST DEVELOPMENT_OPTION 4a
RIGHT–OUT AT SITE ACCESS

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 28	REV.

FIGURE 28

PLOT DATE: 10/8/2010 4:08 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

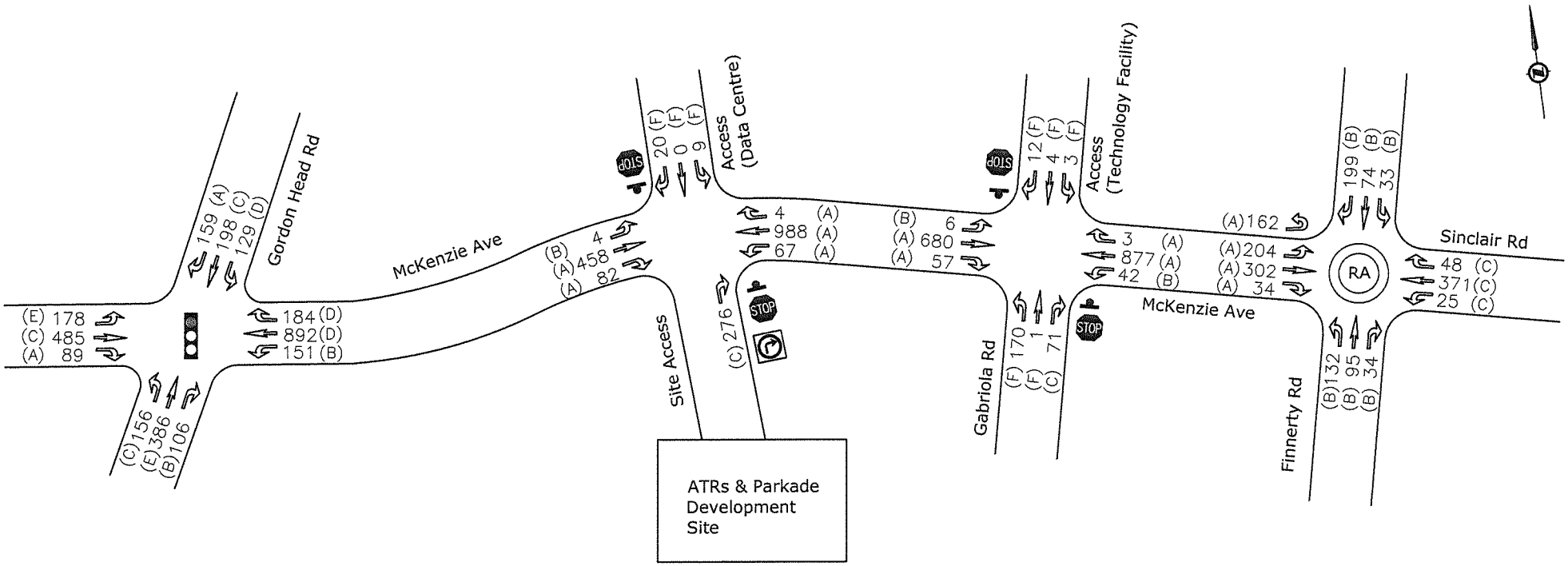
–It is assumed that the supposed westbound through & left traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection while the supposed westbound right traffic would turn left at the Finnerty roundabout.

Boulevard Transportation Group

TITLE:
UVic Rec Centre TIA
2023 AM POST DEVELOPMENT_OPTION 4b
ACCESS RIGHT–OUT & FINNERTY ROUNDABOUT

DES'D:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 29	REV.

FIGURE 29



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

–It is assumed that the supposed westbound through & left traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection while the supposed westbound right traffic would turn left at the Finnerty roundabout.

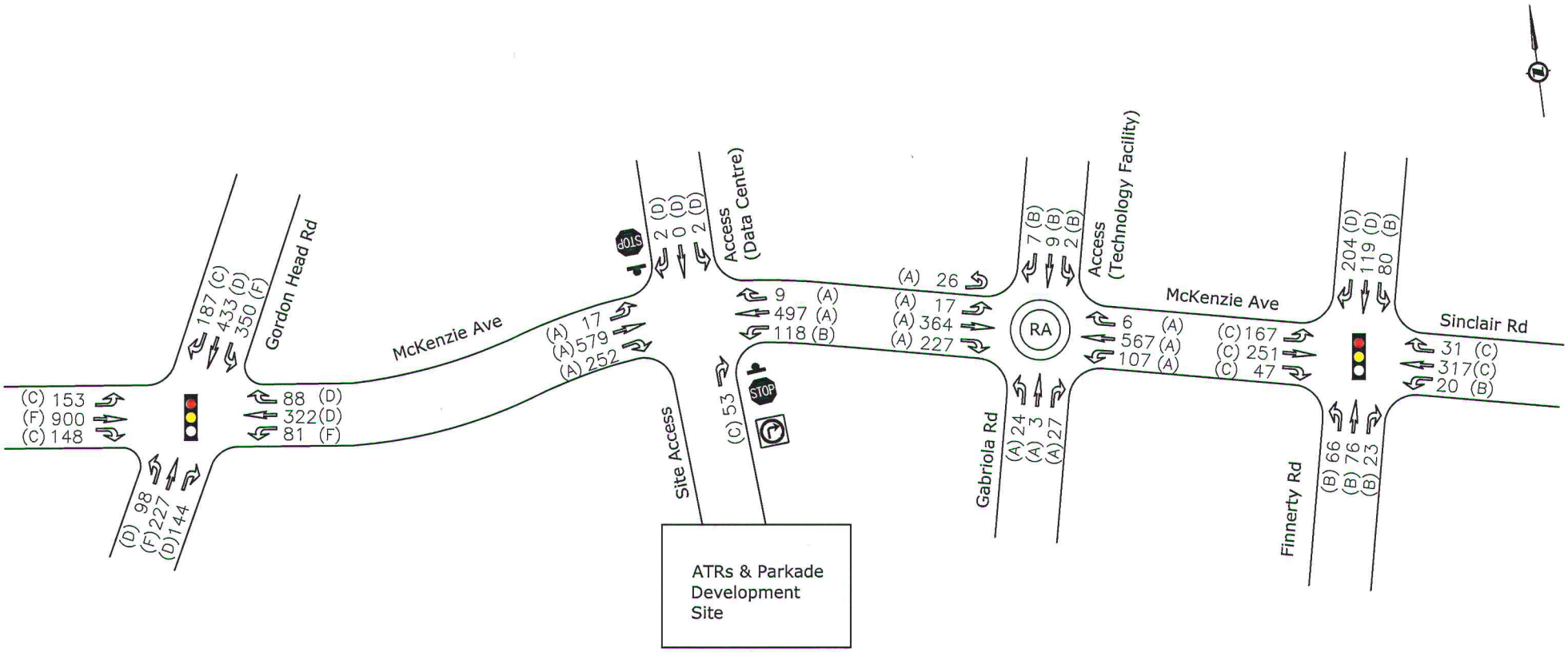
Boulevard TRANSPORTATION GROUP

TITLE: UVic Rec Centre TIA
2023 PM POST DEVELOPMENT_OPTION 4b
ACCESS RIGHT–OUT & FINNERTY ROUNDABOUT

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12–10	DRAWING NO: 1159_FIG 30	REV.

FIGURE 30

PLOT DATE: 10/6/2010 4:09 PM PLOTTED BY: MJ Oh



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

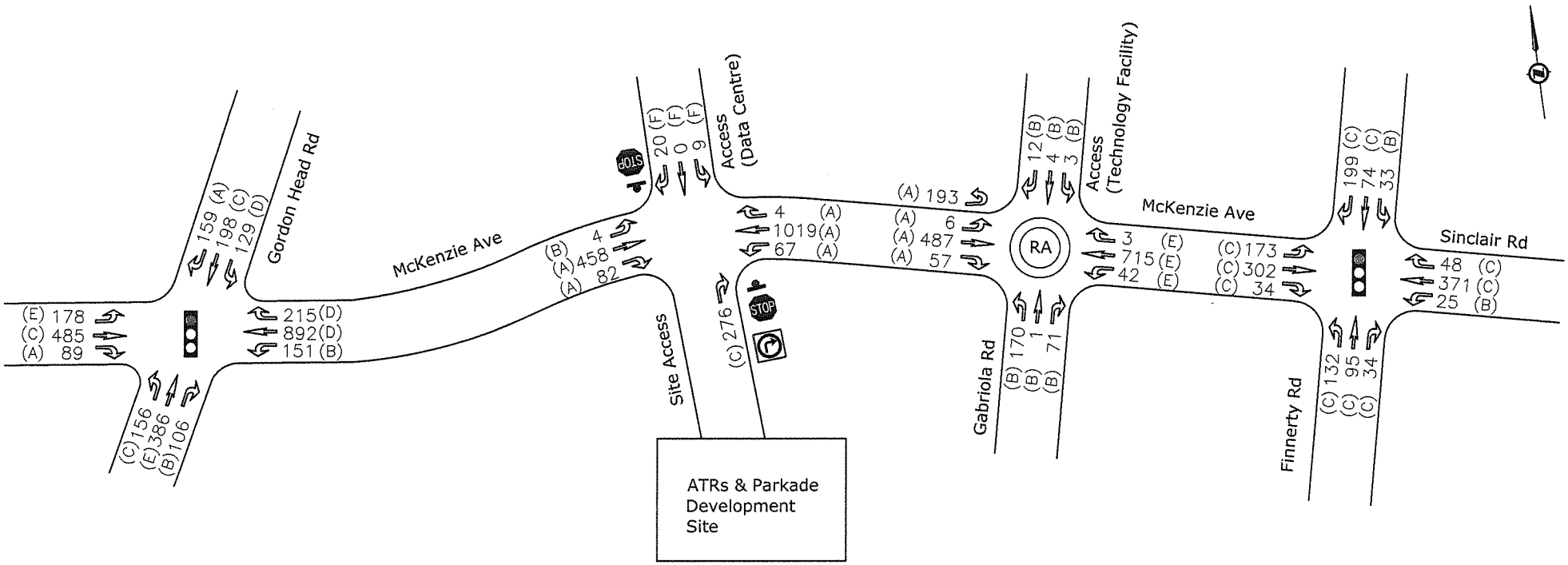
–It is assumed that the supposed westbound all traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection.

Boulevard Transportation Group

TITLE: UVic Rec Centre TIA
2023 AM POST DEVELOPMENT_OPTION 4c
ACCESS RIGHT–OUT & GABRIOLA ROUNDABOUT

DES'D:	DRAWN: mjo	SCALE: NOT TO SCALE	
DATE: AUG 12–10	DRAWING NO: 1159_FIG 31	REV.	

FIGURE 31



##: Traffic Volumes
(##): Levels of Service

Note:
–Based on the proposed streetscape plan on McKenzie Avenue

–It is assumed that the supposed westbound all traffic (exiting the site) at Godon Head Road/McKenzie Avenue would turn around at the roundabout of Finnerty Road/McKenzie Avenue to access the Gordon Head intersection.

Boulevard

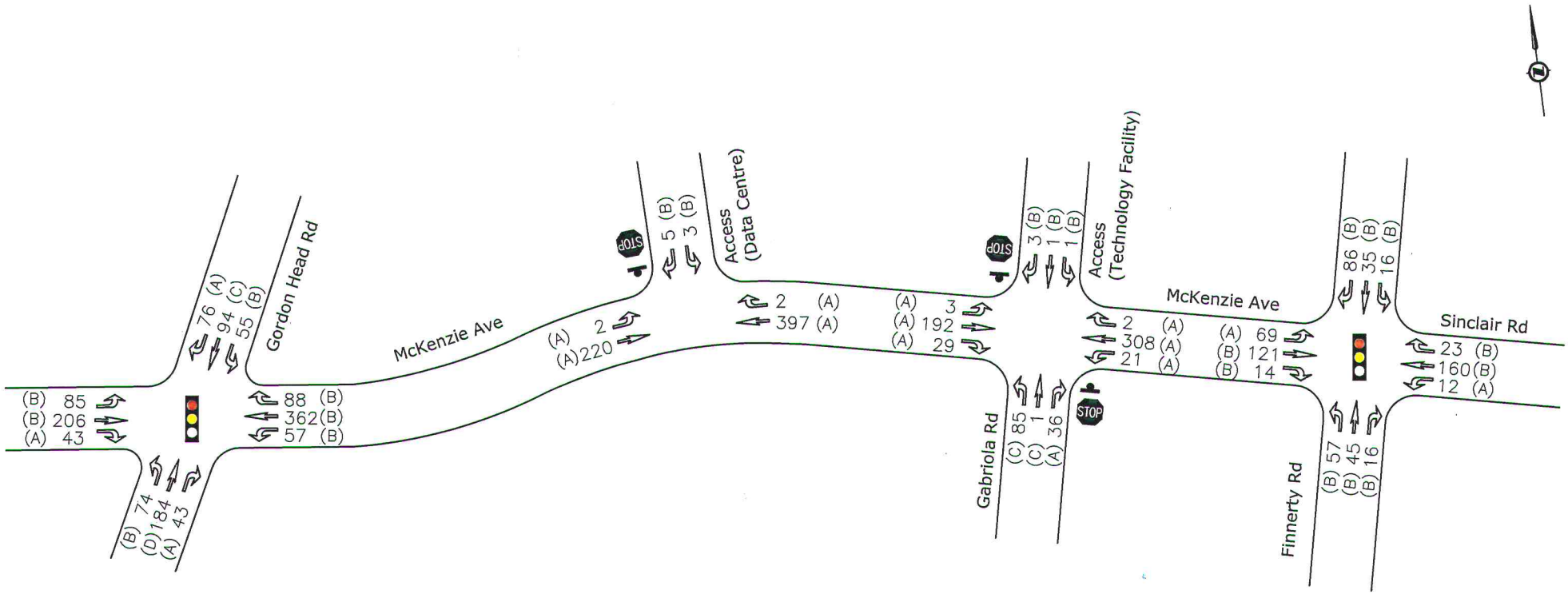
TRANSPORTATION GROUP

TITLE:
UVic Rec Centre TIA
2023 PM POST DEVELOPMENT_OPTION 4c
ACCESS RIGHT-OUT & GABRIOLA ROUNDABOUT

DESIGNED:	DRAWN: mjo	SCALE: NOT TO SCALE
DATE: AUG 12-10	DRAWING NO: 1159_FIG 32	REV.

FIGURE 32

PLOT DATE: 10/8/2010 4:11 PM PLOTTED BY: MJ Oh

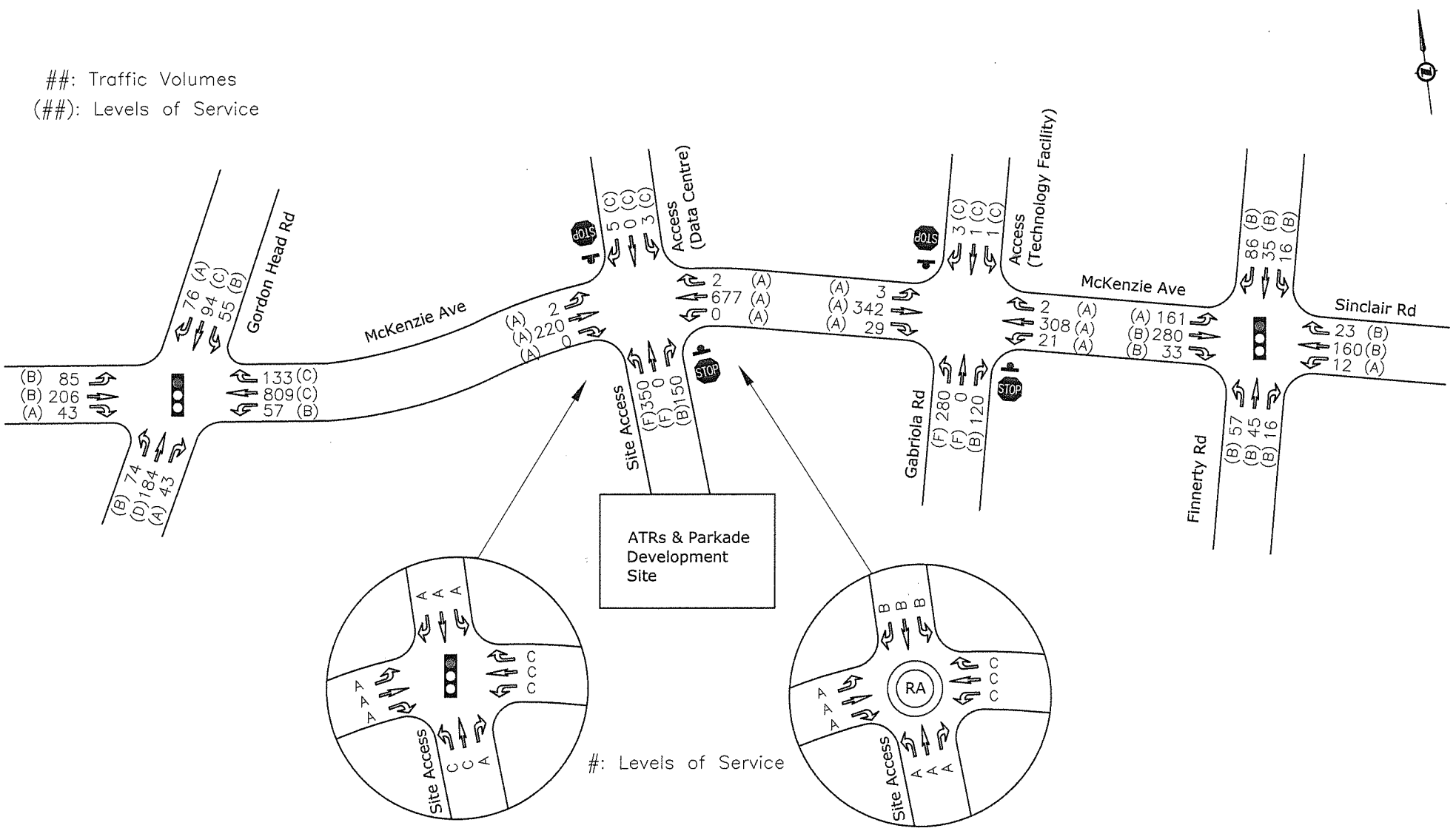


##: Traffic Volumes
(##): Levels of Service

Note: Based on the proposed streetscape plan for McKenzie Avenue

Boulevard Transportation Group

TITLE: UVic Rec Centre TIA 2013 Event Base Conditions Peak Hour Volumes & LOS			FIGURE 33
DES'D: MJ	DRAWN: mjo	SCALE: NOT TO SCALE	
DATE: SEP 9–10	DRAWING NO: 1159_FIG 33	REV.	



Boulevard Transportation Group

TITLE: UVic Rec Centre TIA 2013 Event Post Development Peak Hour Volumes & LOS			FIGURE 34
DESIGNED: MJ	DRAWN: mjo	SCALE: NOT TO SCALE	
DATE: SEP 9-10	DRAWING NO: 1159_FIG 34	REV.	

PLOT DATE: 10/6/2010 4:14 PM PLOTTED BY: MJ Oh

APPENDIX A

Synchro Background Information

MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed by using a software program called Synchro and SimTraffic, and the results were measured in delay, Level of Service (LOS) and 95th percentile queue length. Synchro is based on the Highway Capacity Manual (HCM) methodology. SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly "seeding" or positioning vehicles travelling throughout the network. The simulation, is run five times (five different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

Levels of Service

Traffic operations are typically described in terms of Levels of Service (LOS) which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable/disruptive operations). LOS E/F are generally undesirable operations for every day conditions.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The two tables below indicate the ranges of delay for LOS for signalized and unsignalized intersections.

Table A1: LOS Criteria

	Average Control Delay (seconds/vehicle)	
Level of Service	Unsignalized Intersection	Signalized Intersection
A	Less than 10	Less than 10
B	11 to 15	11 to 20
C	16 to 25	21 to 35
D	26 to 35	36 to 55
E	36 to 50	56 to 80
F	More than 51	More than 81

APPENDIX B

ITE Expected Parking Demand for the Athletics Centre

Table used to calculate ITE expected demand.

Use	GFA (m^2)	Parking Demand Rate	Total Parking Demand
Entrance, Lobby, and Membership	455	3.05 / 100 m^2	14
Change / Team Rooms	1,300	No additional	0
Fitness / Weight, Injury Clinic	3,805	3.82 / 100 m^2	145
Aquatics	3,165	3.82 / 100 m^2	121
Gym / Racquet / Dance	4,305	3.82 / 100 m^2	164
Field House	3,146	3.82 / 100 m^2	120
ATRS Offices	622	3.05 / 100 m^2	19
CanAssist	1,164	4.77 / 100 m^2	56
EPHE School	n/a	n/a	0

APPENDIX C

UVic TDM Study Recommendations

Parking:

- Combine Synergies of Parking and TDM Goals
- Increase Parking Fees
- Reform Parking Policy – Integrate TDM Objectives
- Streamline Parking Data Collection and Enforcement Strategies
- Prioritize Convenient Parking Spaces
- Control Use of Complimentary Parking Passes
- Negotiate with Saanich to Implement a Parking Spillover "Hotline"
- Improve Parking and Transportation Information
- Peak Period Transportation and Parking Management
- Introduce "High Tech" Payment System
- Introduce Fees for Night Parking

Transit:

- Increase Service
- UPass for Staff and Faculty
- Improve Passenger Amenities
- Improve Information
- Special Event Buses
- Integrate Transit Route Information with Housing Services

Bicycle:

- Install Covered Parking
- Provide Secure Parking
- Increase After-trip Facilities – Showers and Lockers
- Laundry and Dry Cleaning Service
- Bike Routes to Campus
- Re-Introduce the "Public Bike" System,
- Support a Student-Run "Bike Kitchen"

Ridesharing:

- Ridematching Service
- Preferential Parking
- Reduced Parking Prices for Carpools and Vanpools
- Reduce Barriers to Qualification

Pedestrian:

- Safer Crossings on Ring Road
- Traffic Calming on Ring Road
- Pedestrian Routes to Campus

Promotion and Education of TDM

Supporting Options:

- Guaranteed Ride Home Service
- Maximize Fleet Vehicle Utilization
- Establish /Support a Car- Cooperative
- Integrate Merchants Discounts into Green Commuting
- Stagger Class Start Times
- Reconfigure Ring Road and Parking Accesses
- Trip Reduction Strategies
- Increase Housing Opportunities In Surrounding Neighbourhoods