MGB FILE NO.	**17/IMD-003**
IN THE MATTER OF	**AN INTERMUNICIPAL DISPUTE FILED PURSUANT TO SECTION 690 OF THE *MUNICIPAL GOVERNMENT ACT*, R.S.A. 2000 CHAPTER M-26 WITH RESPECT TO ROCKY VIEW COUNTY BYLAW NO. C-7700-2017, OMNI AREA STRUCTURE PLAN**
INITIATING MUNICIPALITY	**CITY OF CALGARY**
RESPONDENT MUNICIPALITY	**ROCKY VIEW COUNTY**
DOCUMENT	**EVIDENCE OF THE CITY OF CALGARY**
FILED BY	**THE CITY OF CALGARY** David Mercer/Hanna Oh 12th Floor, 800 Macleod Tr SE Calgary, AB T2G 2M3 david.mercer@calgary.ca hanna.oh@calgary.ca Phone: 403-268-2453 403-268-3662 Fax: 403-268-4634 File No. P8577

INDEX TO EVIDENCE OF THE CITY OF CALGARY

TAB A	**Transportation Expert Report Submissions**
1	Summary Report
2	Expert Report
3	Tom Hopkins Resume
4	Kari Fellows, P Eng, PTOE - Resume
TAB B	**Emergency Services Expert Report Submissions**
1	Expert Report
2	Ken Uzeloc - Resume
TAB C	**Planning Expert Report Submissions**
1	Expert Report
2	Andrew Palmiere – Resume
3	Neil Younger - Resume

TAB 1: CITY OF CALGARY TRANSPORTATION CONCERNS

Table of Contents

INTRODUCTION

1. Development in the OMNI ASP area will detrimentally affect The City of Calgary's Transportation Network. It is clear that development of the ASP lands will result in usage of City transportation systems beyond the capacity of the system without any mitigation commitments from Rocky View County. The detriment is reasonably likely to occur and to have a significant impact on the City. There are three main areas of Transportation-related detriment:

- **Failure to mitigate traffic impacts of the OMNI ASP on City of Calgary transportation systems**: ASP-generated traffic uses and strips the capacity of the City's transportation system without any commitment on the part of the County to mitigate OMNI ASP traffic issues.

- **Failure to mitigate significant City-funded capital costs of transportation infrastructure required to support the OMNI ASP**: the significant traffic generated by development contemplated in the ASP will compel the City of Calgary to fund significant capital costs of transportation infrastructure to support the OMNI ASP without any commitment on the part of the County to contribute to the funding or construction of the required infrastructure.

- **Failure to mitigate traffic safety issues**: traffic generated by development contemplated in the ASP has the potential to lead to a large increase in motor vehicle incidents, which will result in the reduction of traffic safety on City transportation systems without any commitment on the part of the County to mitigate ASP-related traffic safety issues.

1.1 FAILURE TO MITIGATE TRAFFIC IMPACTS OF OMNI ASP ON CITY OF CALGARY TRANSPORTATION SYSTEMS

2. As part of the City of Calgary's review of the OMNI ASP, traffic impacts were identified as a large concern, as it is likely that buildout of the ASP lands would lead to the usage of City transportation systems beyond their capacity, creating severe traffic congestion. This impact is exacerbated by traffic volumes associated with development within the Conrich ASP plan area that have not been mitigated by the County. County and City staff worked together in an attempt to address the likely severe traffic congestion within City limits associated with the OMNI ASP, but no specific policies or commitments have been made in the ASP to provide a solution. Without mitigation, severe congestion is likely to be experienced on the City transportation system as a result of buildout of the OMNI ASP lands.

3. As traffic impacts of the OMNI ASP are both likely and probable in the near future, The City of Calgary hired CIMA+, an expert transportation engineering consulting firm, to undertake an objective third party analysis to identify:

- traffic impacts on City transportation infrastructure resulting from buildout of the OMNI ASP;
- transportation infrastructure improvements necessary to mitigate traffic impacts;
- potential capital costs of City transportation infrastructure required to support development in the OMNI ASP plan area; and
- other transportation related impacts of development in the OMNI ASP Plan area on the City of Calgary.

4. CIMA+'s analysis resulted in the *City of Calgary: OMNI ASP Appeal, Transportation Network Study* (the "Traffic Study") The Traffic Study specifically identifies that the study was carried out by professional engineers within Alberta, employed by an engineering firm permitted to practice in Alberta.

Traffic Study at p. 2 **[TAB A-2]**

5. The City of Calgary reviewed the report, methodologies and conclusions and agrees with the findings of the Traffic Study. The City of Calgary further confirms that the Traffic Study was completed by qualified professional transportation engineers in Alberta, and that all methodology and analysis follow transportation industry standards to identify transportation impact of development.

Traffic Study at p. 3 **[TAB A-2]**

6. Genesis Lands, one of the major landowners in the OMNI ASP Plan area, is currently marketing their commercial lands, which accounts for approximately half of the ASP area. Genesis has indicated interest in development beginning in Summer 2018, so it is likely that site development will occur within 10 years. Genesis marketing materials identify that their development will be a commercial hub for Northeast Calgary and attract patrons from the rapidly developing Northeast residential communities of Calgary. It is accordingly clear that a large portion of the Plan area is being developed as a commercial area to specifically attract citizens of Calgary to shop within the County. The vehicular traffic to the Plan area will almost exclusively be from Calgary and this level of development, which is solely marketed towards Calgary

vehicular trips, will have a detrimental impact on Calgary traffic infrastructure, especially on east-west street connections connecting the ASP area and Northeast Calgary.

Genesis Materials **[TAB A-1(A)]**

7. The Traffic Study identifies a potential OMNI ASP trip-generating potential of an additional 15,339 vehicular trips per hour within the PM peak hour due to the build-out of the OMNI ASP lands. A local arterial street, such as 84th Street NE (which will serve the ASP area), has a carrying capacity of approximately 15,000 to 20,000 vehicular trips per day. Accordingly, the trip-generating potential for the OMNI ASP during the afternoon peak hour of the day exceeds the lower end of the traffic volume range expected in an entire day on that classification of City street. These traffic impacts are expected to cause significant detriment to the City in the form of physical demands on infrastructure and severe traffic congestion

Traffic Study at p. iv **[TAB A-2]**

Draft 84th Street NE Study, p. 15 **[TAB A-1(B)]**

City of Calgary Design Guidelines for Subdivision Servicing 2014, p. 39 **[TAB A-1(C)]**

8. The Traffic Study analyzed the detrimental impacts on City of Calgary infrastructure and transportation operations that would result from full development of the OMNI ASP given the previous approval of development in the adjacent Conrich ASP area in the County and the East Stoney ASP in the City. The report analyzed the cumulative traffic impacts of these developments on City infrastructure, including the local streets, intersections and interchanges identified in Map 1: Existing and Future Transportation Infrastructure.

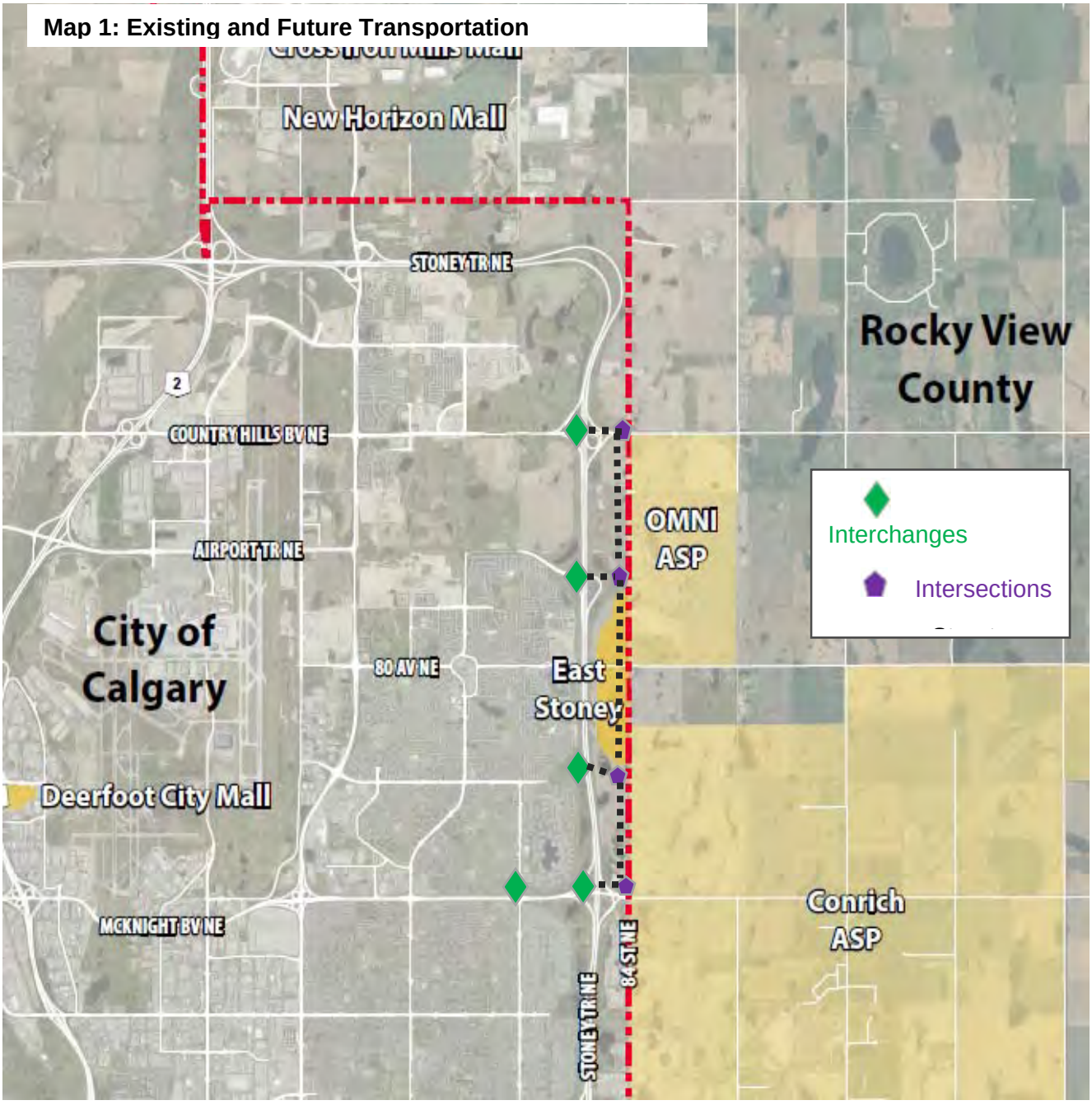
Map 1: Existing and Future Transportation Infrastructure

9. The analysis of full build out conditions identified severe traffic-related operational issues on City transportation infrastructure, including most area intersections, many interchange intersections and along City streets, as a result of buildout of the ASP lands. The majority of traffic operations in the area were shown to operate with severe delays and the majority of area intersections exhibiting volumes that exceed the capacity of the intersections to carry; in other words, the County traffic usage resulting from development in the ASP area exceeds the capacity of City transportation systems. This excess will require significant transportation improvements to mitigate these impacts.

Traffic Study at p. 50 **[TAB A-2]**

10. Specific transportation improvements that were identified in the Traffic Study that would be required to support buildout of the ASP include:

- Stoney Trail & Country Hills Bv NE interchange ultimate upgrade
- Stoney Trail & Airport Trail NE interchange upgrade and connection to 84 Street intersection
- Airport Trail NE street connection, west of 60 Street to Metis Trail NE
- Stoney Trail flyover with 64 Avenue NE and connection to 84 Street intersection
- Construction of 84 Street NE from Country Hills Boulevard to Mcknight Boulevard, as per draft 84 Street NE study
- Stoney Trail & McKnight Bv interchange ultimate upgrade



- McKnight Bv and 68 Street NE interchange
- Mcknight Bv and 84 Street grade separated intersection upgrades (still be designed)
- Many intersection laning and turn movement improvements to support OMNI ASP

Traffic Study at p. iv **[TAB A-2]**

11. There has been no commitment from Rocky View County to mitigate these excessive and severe traffic impacts that would be generated by the buildout of the OMNI ASP on the City of Calgary transportation system.

12. The potential traffic impact of the OMNI ASP has also been made significantly worse by Rocky View County's lack of provision of transportation demand management to offset and reduce automobile trip usage within the ASP. There are two basic transportation demand management methods to address unacceptable levels of congestion at the planning stage:

- First, tie the planned land use to available and planned transportation systems and capacity;
- Second, encourage the use of alternative modes of transportation and through that means reduce the number of automobile trips generated.

Planning Evidence **[TAB C]**

13. The first management method identified above was not used by the County, as existing transportation systems and their capacity were clearly not taken into account. As stated in Part 3 of this submission, the intensity of land use proposed in the OMNI ASP was not anticipated through existing planning policy frameworks, and the intensity of those land uses creates significant detrimental impacts to The City of Calgary transportation network as a result of buildout of the OMNI ASP lands.

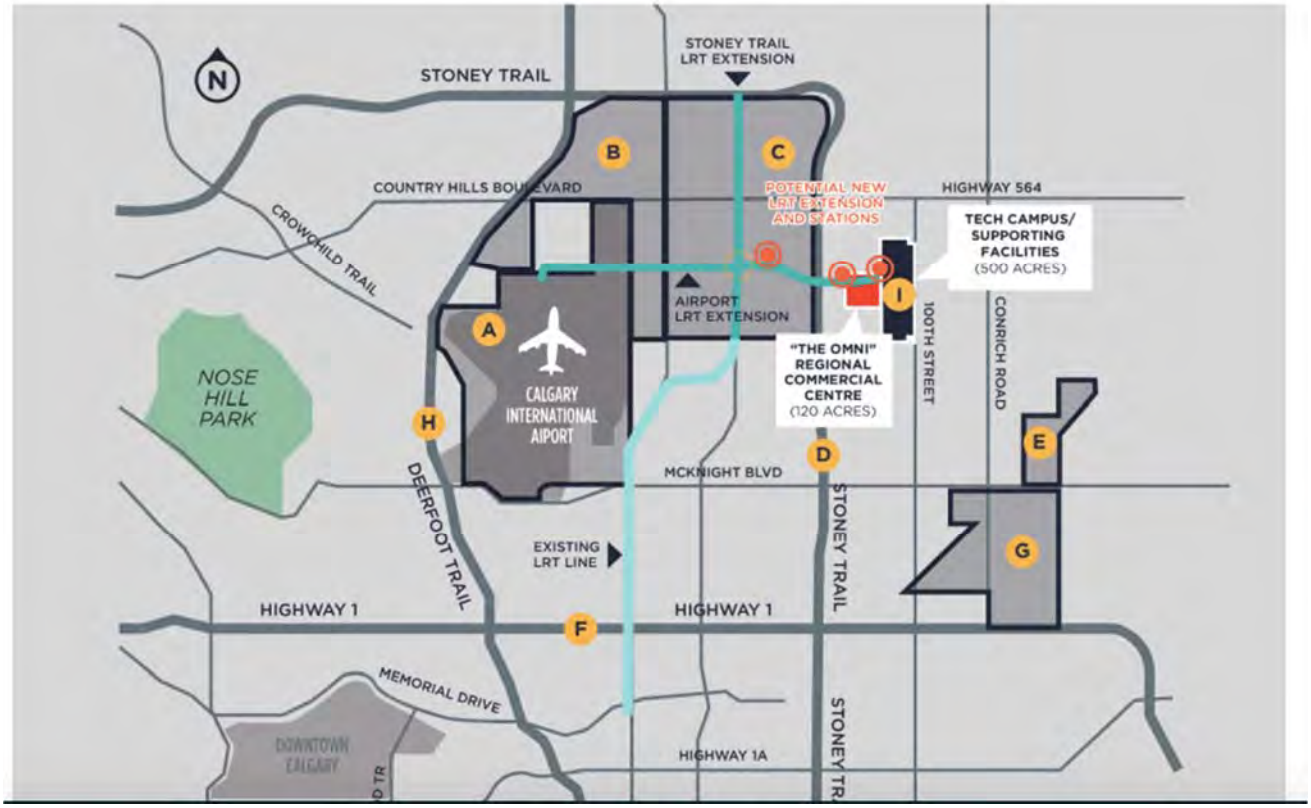
Traffic Study at p.50 **[TAB A-2]**

14. The second general method of reducing the impact to transportation networks is through the introduction of alternative modes of transportation such as through public transit. The OMNI ASP states in policy 16.9:

> "Opportunities to connect to regional public/private transit system should be supported. Development of such a system shall consider design standards, costs associated with upgrading the road network, and long-term operation and maintenance requirements"

Planning Evidence **[TAB C]**

15. Land owner aspirations indicate interest in extending Calgary's Light Rail Transit (LRT) to this development cell, as shown on the developer's website. While this material is significantly aspirational and not reflective of City of Calgary long range transit planning, it does illustrate private sector acknowledgment that the intensity of the uses proposed in the OMNI ASP should ideally be supported by a high level of transit service.



OMNI Website, Site Context Map, located at theomnicalgary.com/site-context

16. Since Rocky View County does not operate transit service and currently contracts service from The City of Airdrie's regional service line to provide a level of service to Cross Iron Mills commercial mall, there are currently limited options for the County itself to provide public transit service to this area, and no indication in the ASP of the County's plans to provide for such service. The landowner's promotional materials argue that the intensity of development support the most capital and operating intensive service that The City of Calgary provides its citizens: Light Rail Transit. It is important to note that all transit service provided to citizens of Calgary are subsidized by general tax revenue. The City of Calgary transit system requires subsidization through property tax dollars and is reliant upon sources of revenue that transcend user fees.

17. The only transit policy in the OMNI ASP speaks to general support for connections to a regional public/private transit system, but no indication that steps can and will be taken to ensure that transit services are delivered. The location of the development immediately adjacent to The City of Calgary will inevitably result in calls from the citizens of Calgary to explain why Calgary Transit is not providing service to this commercial and employment hub. Addressing citizen expectations for service will fall to both municipalities. Since the County has not made a commitment to provide transit services, the bulk of this responsibility will fall on the City and will result in a detriment to the City in requiring it to increase transit services or face lower citizen satisfaction and reputational harm.

1.2 FAILURE TO MITIGATE OMNI ASP CAPITAL COSTS OF TRANSPORTATION INFRASTRUCTURE ON CITY OF CALGARY

18. As identified in section 1.1, many transportation infrastructure improvements would be required to support the build out of OMNI ASP lands. There have been no commitments by the

County to construct or fund these improvements, and no specific policies in the ASP for either the County or ASP landowners to cover potential costs of such infrastructure. As such, it is very likely that the City of Calgary will suffer detriment in being compelled to fund the many improvements required to support the ASP, as outlined in the Traffic Study, and to advance future capital cost spending into current City of Calgary budget cycles, resulting in reallocating capital funds from current City transportation priorities to support the OMNI ASP.

19. The City of Calgary transportation infrastructure prioritization and budget planning cycles follow 4 year and 10 year planning cycles. The current 4 year transportation capital budget plan and service (operating) plan is contained within the Transportation Department section of *Action Plan 2015-2018* report, and the 10 year transportation capital budget and project prioritization plan is contained within the *Investing in Mobility: 2015-2024 Transportation Infrastructure Investment Plan* report.

City of Calgary Action Plan 2015-2018, Transportation section **[TAB A-1(D)]**

Investing in Mobility: 2015-2024 Transportation Infrastructure Investment Plan **[TAB A-1(E)]**

20. Both plans identify specific transportation infrastructure projects that have been prioritized for capital spending within the either the 4 or 10 year City Transportation budget cycles. Prioritization of projects in both plans did not include, nor could they anticipate, the need for many transportation improvements as a result of the OMNI ASP. The projects identified as being required to support the buildout of the OMNI ASP, as listed in section 1.1, have not been identified for City spending within current Transportation budget cycles. Funding this infrastructure would require reallocation of funds from existing City priorities to support the OMNI ASP and mitigate the severe traffic impacts from the ASP, as it is anticipated that the ASP will develop within 10 years. Budget for transit provision to OMNI ASP is also not identified or included within current budget cycles, and vague policy within the OMNI ASP, as discussed in s. 1.1 above, does not commit the County to fund or providing transit to ASP area.

21. One funding source that the City of Calgary uses to help fund larger pieces of transportation infrastructure as a part of its 4 and 10 year capital budgeting is the *Calgary Off-site Levies Bylaw*, where City landowners are required to contribute funds on a per hectare basis toward costs of City-wide infrastructure as they develop.

Calgary Off-site Levies Bylaw, 2M2016 (the "Levy Bylaw") **[TAB A-1(F)]**

22. The Levy bylaw contains a list of large transportation infrastructure projects that are envisioned to be required over 60 years to support the growth of the City of Calgary. The bylaw and infrastructure project lists did not envision nor anticipate development of the OMNI ASP lands in the near future and any listed projects that are identified in section 1.1, such as:

- McKnight Bv and 68 Street NE interchange
- Stoney Trail flyover bridge at 64 Avenue NE
- Stoney Trail & Airport Trail NE interchange ultimate upgrade
- Airport Trail NE street connection, west of 60 Street to Metis Trail NE

were envisioned to be needed well beyond current budget cycles and only as required to support overall growth and transportation needs of the City of Calgary.

Offsite Levy Bylaw Background report, p. 49 **[TAB A-1(G)]**

23. It should be noted that majority of any funds needed to construct these projects would not be significantly available in the Levy as the methodology collects the projected project cost amounts over a 60 year period and the funds collected to date would not cover even one of these projects. Accordingly, the City will be unable to access a large portion of its revenue in order to fund infrastructure improvements required as a result of development in the OMNI ASP area at the time the improvements would be required.

Offsite Levy Bylaw Background report" **[TAB A-1(G)**

24. Additional large transportation capital costs for the projects identified in section 1.1, were identified within the Traffic Study. Cost estimates for larger pieces of transportation infrastructure were provided in the Traffic Study. As table 4-1 illustrates, the potential City funded capital costs required to support the buildout of the OMNI ASP are in the range of $60 Million to $240 Million, plus yet to be determined costs related to the potential grade-separated intersection of McKnight Boulevard designs and localized intersection improvements identified in table 4-2.

Traffic Study, p. 61 **[TAB A-2]**

25. At a minimum, $60 Million of City-funded major transportation projects will be needed to support the OMNI ASP, and there is no City of Calgary funding source within current City budget timelines to finance these improvements. Even on the low end of the scale, this expense would result in significant detriment to the City of Calgary for infrastructure that is needed because of County development. The County has not specifically committed to fund these projects and has not included specific commitments for the County to construct or fund the infrastructure to support its own ASP buildout.

1.3 FAILURE TO MITIGATE TRAFFIC SAFETY ISSUES FROM ASP ON CITY OF CALGARY

26. As a result of the excessive use of and severe congestion that will be caused on the City transportation systems by the OMNI ASP, the City is also concerned with increased traffic safety issues that are likely to occur when the OMNI ASP are is built out. Potential traffic safety issues were also examined within the Traffic Study.

27. The Traffic Study indicates that the routes between Northeast Calgary and the OMNI ASP area would have reserve capacity without development of the OMNI ASP , but would experience significant congestion during peak periods due to build out of the OMNI ASP area. Traffic demand would exceed road network capacity to the extent that left and right turn storage lanes would not provide sufficient space for vehicles to queue safely out of through lanes and collisions would likely increase.

Traffic Study pg 30 & 50 **[TAB A-2]**

28. The City of Calgary has recently conducted spatial analysis to analyze the frequency of motor vehicle collisions (MVC) in proximity to Shopping Centres. This work is summarized in the memo *"Analysis of MVC's in Proximity to Shopping Centres",* included in Appendix G of the Traffic Study and is also included within Part 2 of City arguments.

Emergency Services Evidence **[TAB B]**

29. This work showed a clear correlation between shopping centre boundaries and high density locations for MVC's. It found that there is an increase in motor vehicle collisions in areas of the City following build out of a shopping area similar in size to the OMNI commercial lands.

Emergency Services Evidence **[TAB B]**

30. Currently, the area of the City near the OMNI ASP area accounts for approximately 100 motor vehicle incidents per year. Translating findings from the spatial analysis work, it may be expected with build out of OMNI commercial lands that motor vehicle incidents within a one kilometre radius of OMNI commercial lands will increase by as much as 146% in MVC's from the existing conditions. This is a very large increase in the potential incidents involving City drivers and reduction in overall traffic safety for all drivers on the City transportation systems and would be correlated directly to build out of OMNI ASP lands. This would be detrimental to the City in requiring the City to provide additional, unfunded emergency response to such incidents and also in requiring the City to incur additional capital costs to make improvements to transportation infrastructure that would mitigate these safety concerns.

Emergency Services Evidence **[TAB B]**

31. There has been no commitment by Rocky View County to mitigate the potential large increase in incidents and reduction of traffic safety for Calgary drivers associated with the build out of the OMNI commercial lands, nor are there any specific policies within the ASP to address potential increased traffic safety issues caused by the OMNI ASP buildout.

32. Given that these issues have not been addressed by the County, any mitigation measures or traffic safety related infrastructure improvements, and any emergency services response to increased motor vehicle incidents, would likely fall to the City in addition to the probable capital costs identified in section 1.2. By enacting the ASP as is, development in the County has the very real potential to reduce the traffic safety on City streets and inflict extra capital and operating costs on the City to mitigate and or respond to these serious traffic safety issues.

SUMMARY OF TRANSPORTATION DETRIMENT TO CITY OF CALGARY

33. The City of Calgary has demonstrated that the development proposed through the OMNI ASP creates significant impact and detriment to the City of Calgary's transportation systems. These detriments to the City are both likely and probable as a part of the OMNI ASP approval.

34. To summarize, Rocky View County, through the OMNI ASP, inflicts transportation detriment on The City of Calgary by its:

- **Failure to mitigate traffic impacts of the OMNI ASP on City of Calgary transportation systems**: ASP-generated traffic uses and strips the capacity of the City's transportation system without any commitment on the part of the County to mitigate OMNI ASP traffic issues.

- **Failure to mitigate significant City-funded capital costs of transportation infrastructure required to support the OMNI ASP**: the significant traffic generated by development contemplated in the ASP will compel the City of Calgary to fund significant capital costs of transportation infrastructure to support the OMNI ASP without any commitment on the part of the County to contribute to the funding or construction of the required infrastructure.

- **Failure to mitigate traffic safety issues**: traffic generated by development contemplated in the ASP has the potential to lead to a large increase in motor vehicle incidents, which will result in the reduction of traffic safety on City transportation systems without any commitment on the part of the County to mitigate ASP-related traffic safety issues.

TAB A-1(A)

OMNI – COMMERCIAL

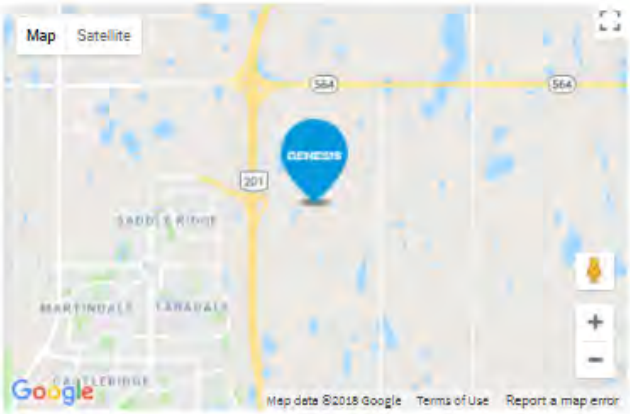
A master-planned commercial development of a minimum of 180 acres, located immediately east of 84 St NE with direct access to Stoney Trail via Airport Trail.

OMNI will be the commercial hub for Northeast Calgary, drawing patronage from both the rapidly developing Northeast Calgary residential. The development will create a range of merchandise zones, with a vision to provide an outlet centre, a home design and furnishing precinct (Designopolis), general retail (convenience/services), entertainment opportunities integrated with hospitality services and office space over approximately 740,000 square feet in close proximity to residential development.

THE OMNI BY GENESIS

FOR MORE INFORMATION

http://theomnicalgary.com/



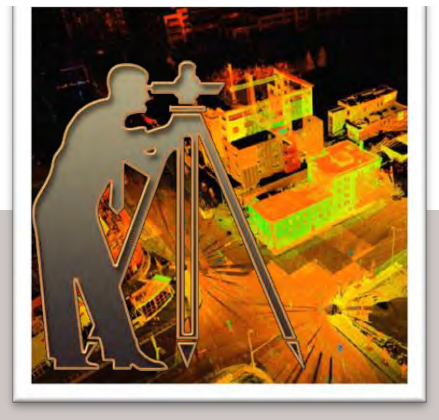
TAB A-1(B)

WATT Consulting Group
Since 1983

84 Street NE

Study of Alignment, Right-of-Way, Classifications and Access Management (Draft Report)

February 7, 2018


#310, 3016 – 5th Avenue NE
Calgary, AB T2A 6K4
Phone: 403.273.9001
Fax: 403.273.3440
wattconsultinggroup.com

84 Street NE

Study of Alignment, Right-of-Way, Classification and Access Management (Draft Report)

Prepared for: **City of Calgary and Rocky View County**

Prepared by: **Watt Consulting Group**

Our File: **3480.T01**

Date: **February 7, 2018**

TABLE OF CONTENTS

APPENDICES

Appendix A: Background Volumes and Synchro Analysis
Appendix B: Technical Memorandums
Appendix C: Functional Design Drawings
Appendix D: 84 St / McKnight Blvd Options and Synchro Analysis
Appendix E: Wetland Information

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

The purpose of this study was to develop a functional plan for the ultimate condition of 84 Street NE (84 St) corridor from just north of 16 Avenue NE (16 Ave) to Country Hills Boulevard NE (Country Hills Blvd). Shown here, in **Figure 1**, is an overall map of the project area.

The ultimate recommendations include:

- Cross sections and roadway classifications which can be staged as the area develops eliminated or minimizing throw away.
- Ultimate intersection configurations of 84 St with:
  - 32 Avenue NE (32 Ave)
  - McKnight Boulevard NE (McKnight Blvd)
  - 64 Avenue NE (64 Ave)
  - Township Road 252 (Twp 252)
  - Airport Trail NE (Airport Tr)
  - Country Hills Blvd.
- Identify the Right-of-Way required corresponding to the roadway classification
- Outline an access management plan

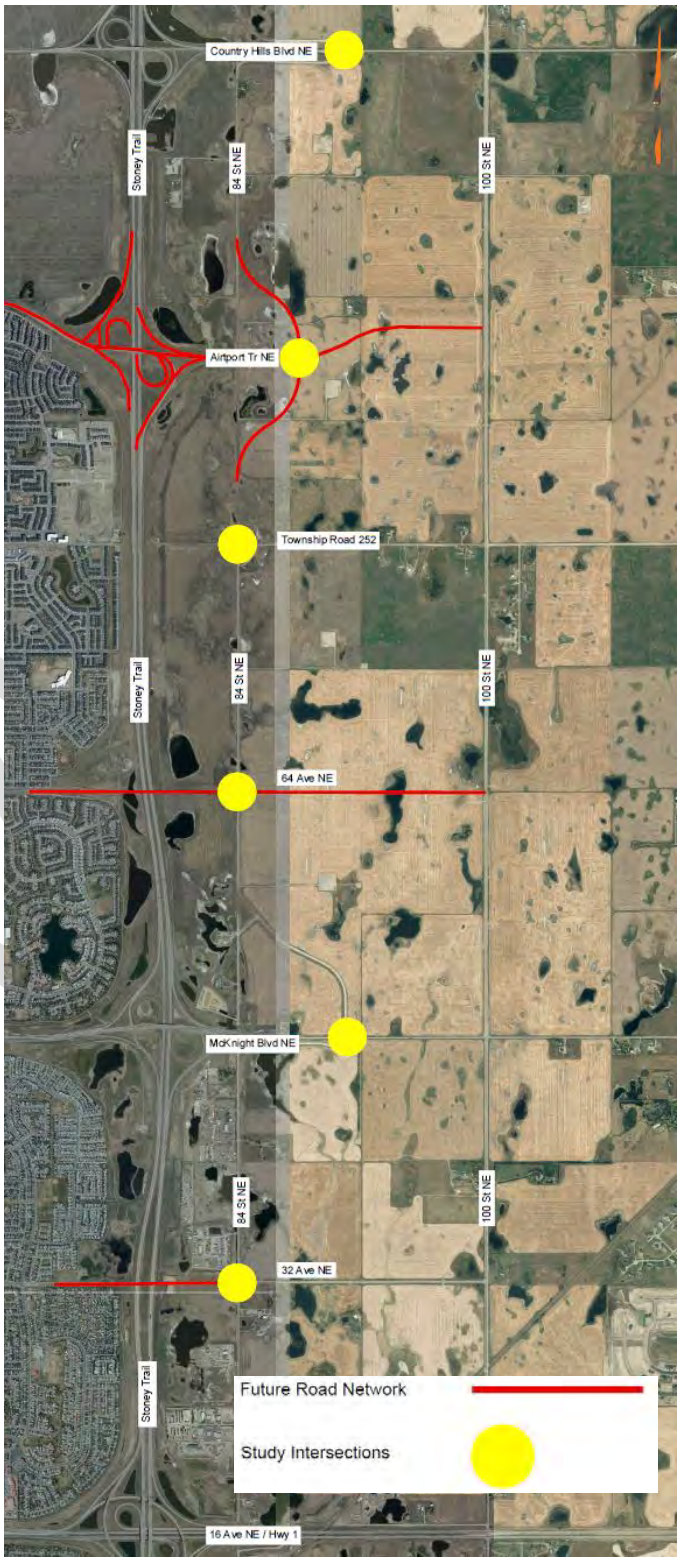


Figure 1 – Project Area Map

2.0 STUDY BACKGROUND

2.1 PREVIOUS AREA STUDIES

2.1.1 OMNI ASP

Prior to the commencement of this study, a network analysis was completed in support of the Area Structure Plan (ASP) for Omni, a 1280 acres proposed commercial and industrial development in the Rocky View County. The project included a comprehensive analysis of the primary road network and determined short and long term impacts of the proposed development on the existing network as well as interchanges along Stoney Trail.

In order to identify ultimate network requirements, a two stage analysis was carried out:

Stage 1: Assumed maximum development intensity and was used to identify the ultimate right-of-way requirements.

Stage 2: Assumed most probable development progression, as identified by the Rocky View County staff, based on available information and long term economic and development patterns.

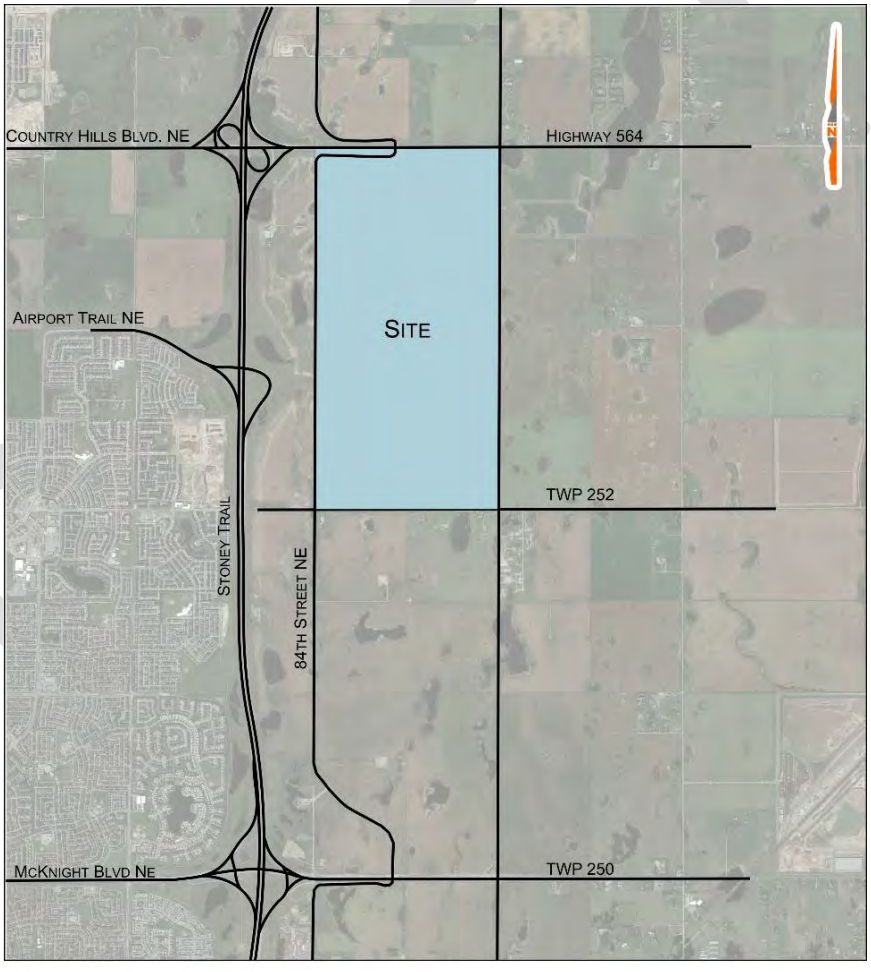


Figure 2 – OMNI Area Map

2.1.2 EAST STONEY ASP

The East Stoney land area is bounded by 84 St to the east, 64 Ave to the south, Stoney Tr to the west, and the future Airport Trail to the north.

As a part of the development, 705 units of single family housing will be completed by 2019 and an additional 704 units (single family), 447 units (multi family), 29,063 sq ft (commercial), and a 900 student capacity school will be finished by the year 2029.

It was found that most study area intersections will continue to operate at acceptable Levels of Service. Access to Airport Tr will be required for accommodation of additional future volumes.

Figure 3 – East Stoney Area Map

2.1.4 CONRICH ASP

The Conrich ASP included a long term network concept for the Conrich area and carried out analysis of the long term network capacity and right of way requirements to ensure that the current plans for the nodal development could be fully accommodated. The area was located east of Stoney Trail, west of RGE Rd 281, south of TWP Rd 254 and north of Highway 1. Several upgrades were suggested as a part of the project, mostly related to McKnight Blvd.

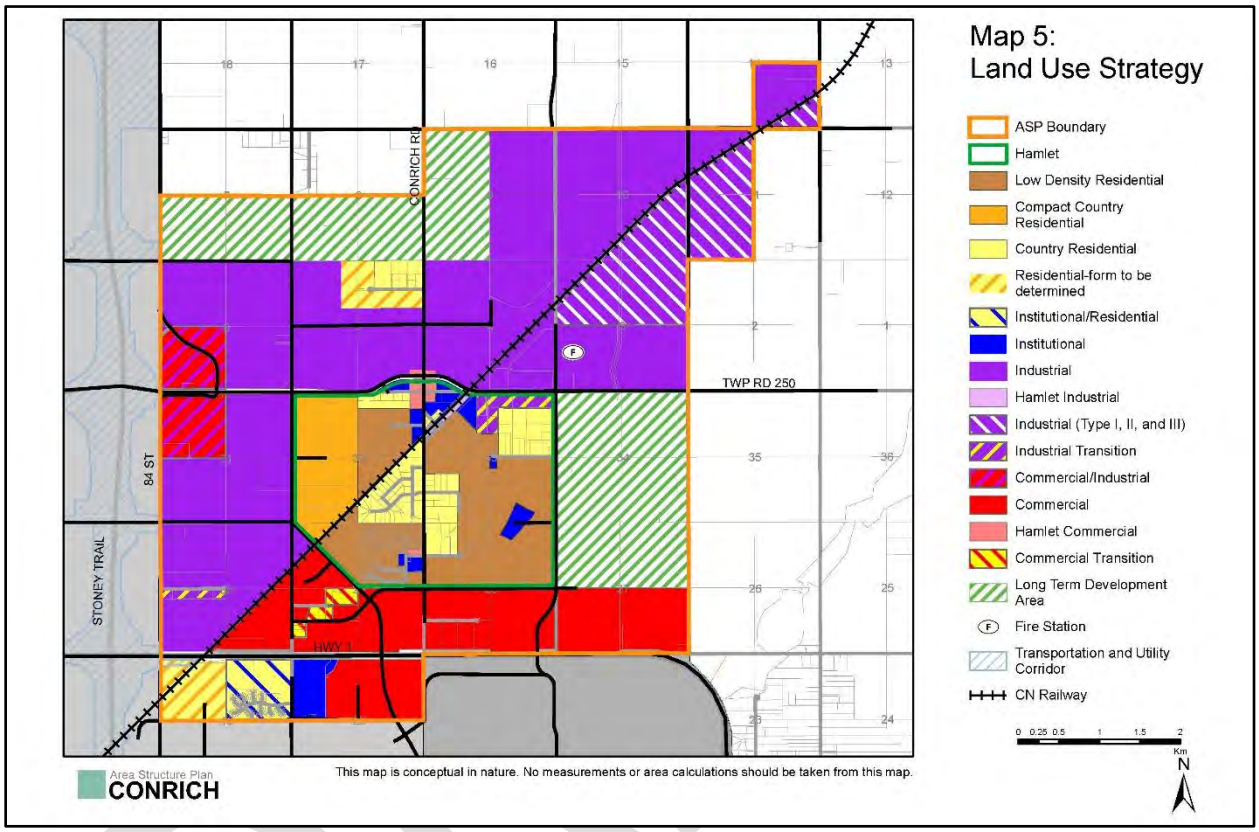


Figure 4 – Conrich Area ASP map

2.2 WETLANDS AND WATERBODIES

Through our initial investigation of the project area, numerous wetlands and water bodies were identified. Due to the site conditions and the potential environmental risks, a desktop wetland assessment for performed for the project area. This assessment has been summarized below and attached in **Appendix E**.

Overall 91 wetlands were identified within the initially defined project area and are illustrated in Figure 5 on the next page. These wetlands were identified as:

- 2 ephemeral waterbodies
- 15 temporary marsh wetlands
- 24 seasonal marsh wetlands
- 2 seasonal shallow open water wetlands
- 19 semi-permanent marsh wetlands
- 22 semi-permanent shallow open water wetlands
- 4 man-made wetlands
- 3 temporary or seasonal marsh wetlands

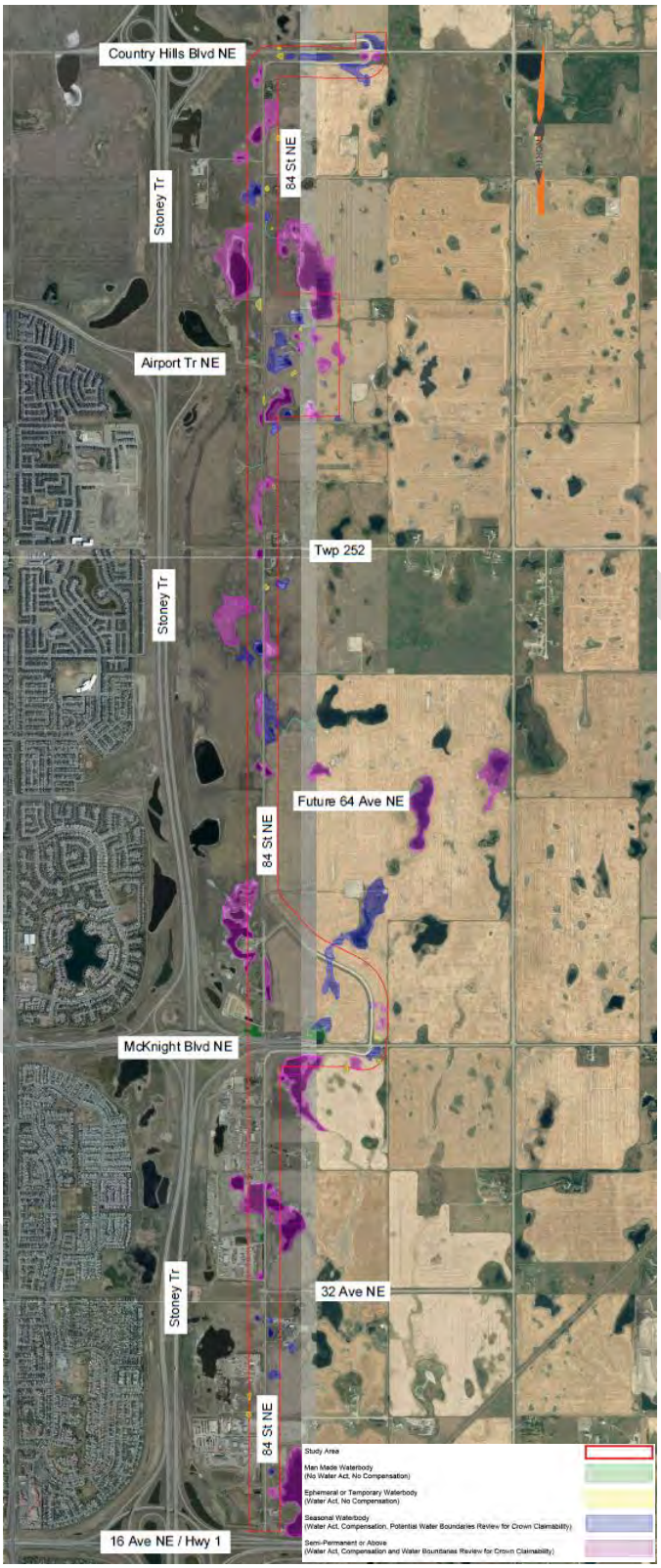


Figure 5 – Wetlands and Waterbodies

2.3 PROJECT ASSUMPTIONS

This study was to identify the ultimate needs of the corridor and intersections. The following assumptions were made:

- volumes generated by Rocky View County development as approved by County staff and volumes generated by City of Calgary development as approved by City staff
- All road network connections are fully built out including all Stoney Tr interchanges and flyovers
- Similar land use assumptions were placed on the land area on both the north and south sides of the East Stoney Area
- traffic forecast assumes that future 64th Avenue NE flyover of Stoney Trail is for general traffic; the City of Calgary may choose to designate the 64th Avenue flyover for Transit and active modes only, therefore passenger vehicles assumed to use this route may be rerouted to other streets

3.0 TRAFFIC ANALYSIS

Analysis was carried out for the six different intersections along 84 St, starting from just north of 16 Ave in the south to Country Hills Boulevard in the north.

The operating conditions during the peak hours at the studied intersections were evaluated using the Synchro/SimTraffic 9.0. This software calculates the average delay for each movement as well as the overall delay for each intersection. The following table summarizes how Level of Service (LOS) is defined by delay time for a signalized intersection.

TABLE 1 – LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS)	Average Delay (per vehicle)
A	0 – 10 seconds
B	>10 – 20 seconds
C	>20 – 35 seconds
D	>35 – 55 seconds
E	>55 – 80 seconds
F	>80 seconds

LOS of A represents the best case scenario, minimal to no delay in the movement or overall intersection. LOS of F represents a significant delays and can cover a broad range as anything above 80 seconds is considered F. Typically an acceptable overall LOS for an intersection if A to D, however, some movements within the intersection may experience better or worse delays.

3.1 BACKGROUND VOLUMES

Based on the previous studies of the Omni, Conrich, East Stoney ASP's as well as the additional assumptions listed in Section 2.3, background traffic volumes were obtained for the Ultimate Scenario. Shown below, in **Figure 6**, are the ultimate volumes used for this study. Attached in **Appendix A** is the full size background map illustrating these volumes and their corresponding intersection LOS.

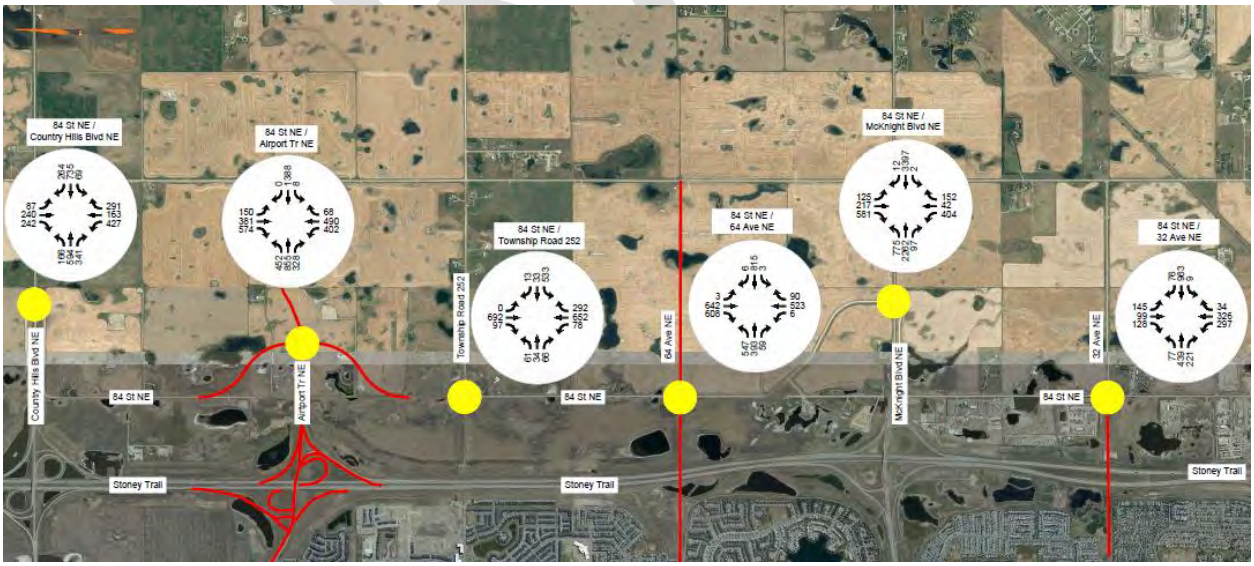


Figure 6 – Background Volumes

3.3 INTERSECTION ANALYSIS

3.3.1 84 ST / 32 AVE

This intersection was analyzed with 84 St being a 4-lane undivided road with no left turn bays and 32 Ave being a 4-lane divided roadway with left turn bays.

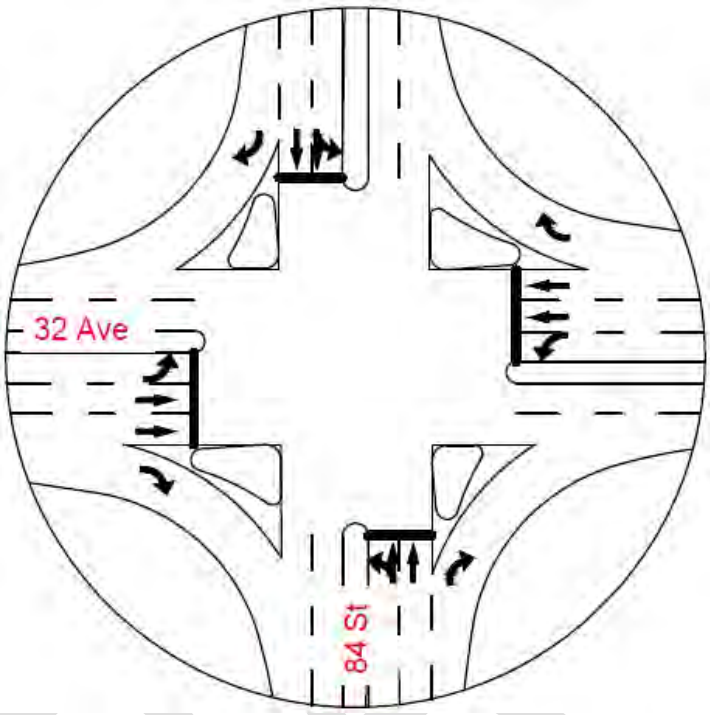


Figure 6 – 84 St / 32 Ave – Intersection Lane Configuration for Analysis

Summarized in the table below are the results of the Synchro analysis. Overall, the intersection performs at a **LOS of B** with an average delay of **14.2 seconds**.

TABLE 2 – 84 ST / 32 AVE – SYNCHRO ANALYSIS SUMMARY

Movement		PM Peak Hour			
		v/c Ratio	LOS	Delay (s)	Queue (m)
Eastbound	Left	0.52	C	25.8	20.2
	Through	0.34	A	9.8	21.1
	Right	0.31	A	2.9	8.8
Westbound	Left	0.03	A	8.3	2.3
	Through	0.74	B	15.2	53.4
	Right	0.12	A	3.1	5.3
Northbound	Left/Through	0.86	C	21.8	49.7
	Right	0.07	A	4.1	3.7
Southbound	Left/Through	0.36	B	13.0	15.8
	Right	0.24	A	9.0	14.1
Intersection Summary		-	**B**	**14.2**	-

3.3.3 84 ST / MCKNIGHT BLVD

This intersection was analyzed several times through several iterations which included increasing both through lanes and left turn lanes, adjusting signal timing and testing dual right turn movements. The best performing intersection analyzed 84 St as a 4-lane divided roadway with dual left turns in both directions and McKnight Blvd as a 6-lane divided roadway with dual left turn lanes in each direction. All right turns were channelized with the southbound right turn movement modelled as free flow.

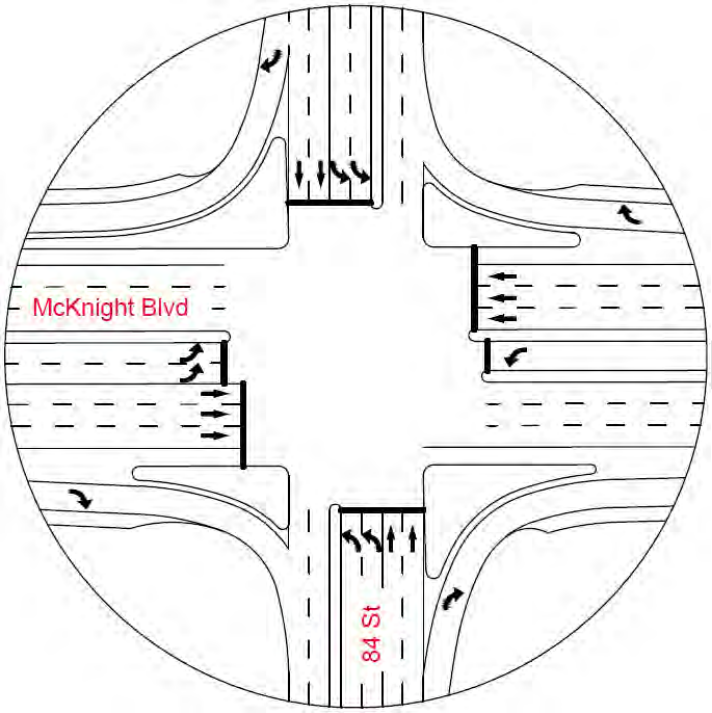


Figure 7 – 84 St / McKnight Blvd – Intersection Lane Configuration for Analysis

Summarized in the table below are the results of the Synchro analysis. Overall, the intersection performs poorly at a **LOS of F** with an average delay of **142.0 seconds**.

TABLE 3 – 84 ST / MCKNIGHT BLVD – SYNCHRO ANALYSIS SUMMARY

Movement		PM Peak Hour			
		v/c Ratio	LOS	Delay (s)	Queue (m)
Eastbound	Left	1.43	F	244.6	208.6
	Through	0.71	B	16.2	206.5
	Right	0.09	A	2.0	7.2
Westbound	Left	0.02	E	66.0	3.4
	Through	1.44	F	232.1	546.6
	Right	0.02	A	0.0	0.0
Northbound	Left	1.38	F	237.7	120.4
	Through	0.13	E	60.9	12.6
	Right	0.11	A	0.1	0.0
Southbound	Left	0.41	E	70.8	30.0
	Through	0.73	F	81.1	47.8
	Right	0.38	A	0.7	0.0
Intersection Summary		**-**	**F**	**142.0**	**-**

3.3.4 84 St / 64 Ave

This intersection was analyzed with 84 St being a 4-lane divided road with no left turn bays and 64 Ave being a 4-lane divided roadway with dual left turn lanes in the eastbound direction sand a single left turn lane in the westbound direction.

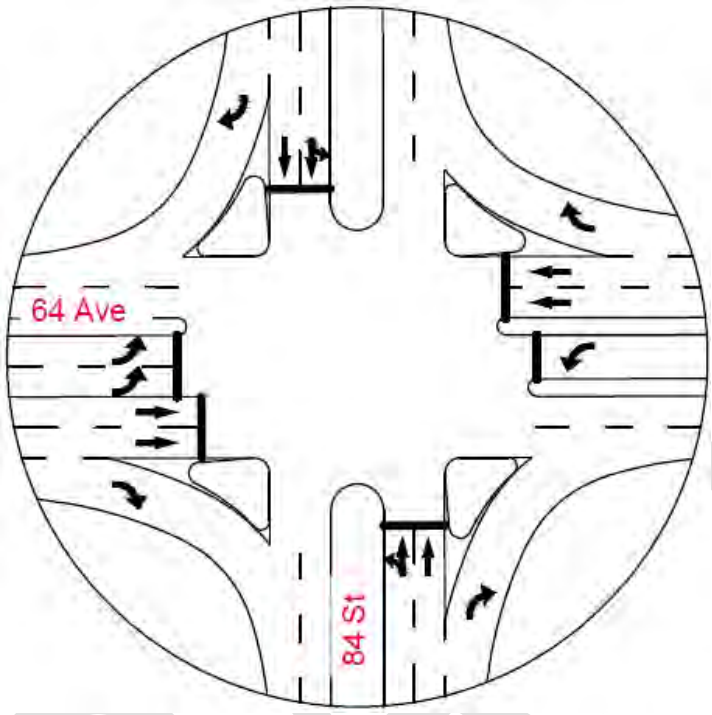


Figure 8 – 84 St / 64 Ave – Intersection Lane Configuration for Analysis

Summarized in the table below are the results of the Synchro analysis. Overall, the intersection performs at a **LOS of C** with an average delay of **29.0 seconds**.

TABLE 4 – 84 ST / 64 AVE – SYNCHRO ANALYSIS SUMMARY

Movement		PM Peak Hour			
		v/c Ratio	LOS	Delay (s)	Queue (m)
Eastbound	Left	0.85	D	45.7	82.6
	Through	0.23	B	13.1	39.0
	Right	0.08	A	4.1	6.5
Westbound	Left	0.02	D	36.7	3.1
	Through	0.87	D	40.4	117.6
	Right	0.01	A	0.0	0.0
Northbound	Left/Through	0.56	C	24.2	50.2
	Right	0.17	A	2.8	5.8
Southbound	Left/Through	0.68	C	26.8	62.7
	Right	0.86	C	21.8	82.1
Intersection Summary		-	**C**	**29.0**	-

3.3.6 84 St / Twp 252

This intersection was analyzed with 84 St being a 4-lane divided road with no left turn bays and Twp 252 4-lane divided roadway with a shared through-left and through-right lanes in each direction.

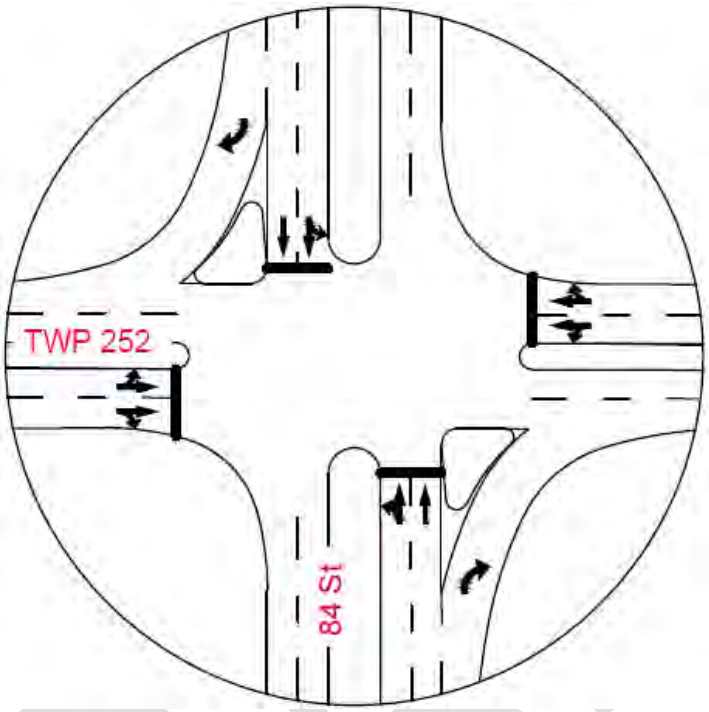


Figure 9 – 84 St / Twp 252 – Intersection Lane Configuration for Analysis

Summarized in the table below are the results of the Synchro analysis. Overall, the intersection performs at a **LOS of C** with an average delay of **28.3 seconds**.

TABLE 5 – 84 ST / TWP 252 – SYNCHRO ANALYSIS SUMMARY

Movement		PM Peak Hour			
		v/c Ratio	LOS	Delay (s)	Queue (m)
Eastbound	Left	0.24	C	23.9	14.1
	Right/Through	0.50	C	32.6	28.4
Westbound	Left	0.85	D	35.6	128.6
	Right/Through	0.07	B	17.3	12.5
Northbound	Left/Through	0.80	D	37.3	135.0
	Right	0.39	A	4.4	18.4
Southbound	Left/Through	0.53	C	27.1	98.0
	Right	0.15	A	4.0	9.0
Intersection Summary		**-**	**C**	**28.3**	**-**

3.3.8 84 St / Airport Tr

This intersection was analyzed several times through several iterations which included increasing both through lanes and left turn lanes, adjusting signal timing and testing dual right turn movements. The best performing intersection analyzed 84 St as a 4-lane divided roadway with dual left turn lanes in both directions and Airport Tr as a 6-lane divided roadway with dual left turn lanes in the eastbound direction and a single left turn lane in the east bound direction. All right turns were channelized with the southbound and northbound right turn movements modelled as free flow and the eastbound and westbound right turns modelled as yield.

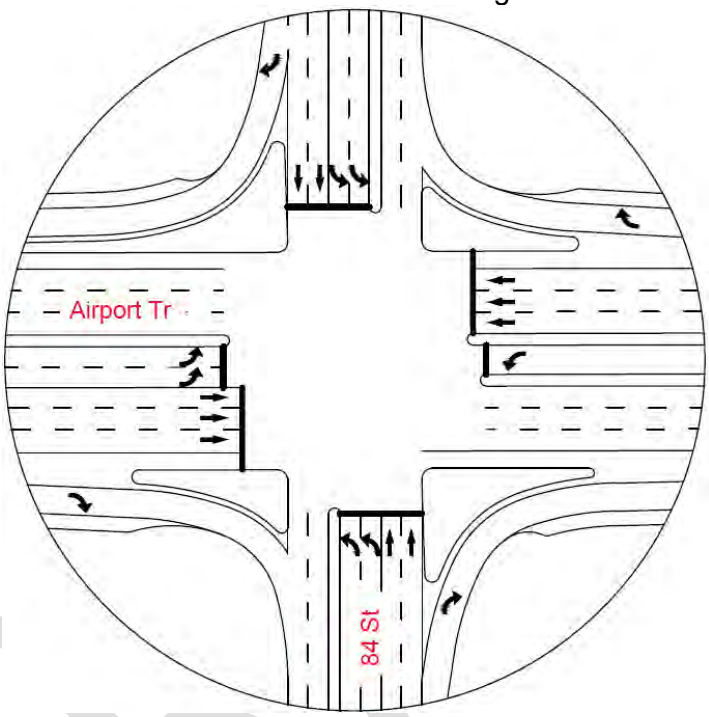


Figure 10 – 84 St / Airport Tr – Intersection Lane Configuration for Analysis

Summarized in the table below are the results of the Synchro analysis. Overall, the intersection performs poorly at a **LOS of D** with an average delay of **55.0 seconds**.

TABLE 6 – 84 ST / AIRPORT TR – SYNCHRO ANALYSIS SUMMARY

Movement		PM Peak Hour			
		v/c Ratio	LOS	Delay (s)	Queue (m)
Eastbound	Left	0.89	E	73.3	90.2
	Through	0.41	C	23.9	76.6
	Right	0.40	A	3.9	18.6
Westbound	Left	0.06	E	57.0	7.1
	Through	1.05	F	83.9	179.7
	Right	-	-	-	-
Northbound	Left	0.79	E	63.2	70.2
	Through	0.97	F	85.9	105.3
	Right	0.05	A	0.1	0.0
Southbound	Left	1.07	F	144.2	221.7
	Through	0.56	D	49.4	67.4
	Right	0.41	A	0.8	0.0
Intersection Summary		**-**	**D**	**55.0**	**-**

3.3.9 84 St / Country Hills Blvd

The best performing intersection analyzed 84 St as a 4-lane divided roadway with dual left turn lanes in the northbound direction and a single left turn lane in the southbound direction and Country Hills Blvd as a 4-lane divided roadway with single left turn lanes in each direction. All right turns were channelized and modelled as yield conditions.

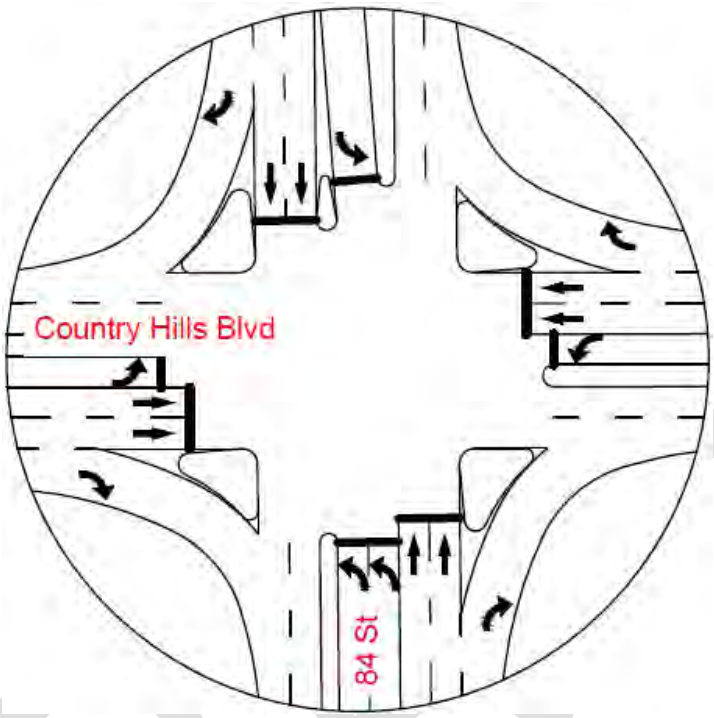


Figure 11 – 84 St / Country Hills Blvd – Intersection Lane Configuration for Analysis

Summarized in the table below are the results of the Synchro analysis. Overall, the intersection performs poorly at a **LOS of C** with an average delay of **25.0 seconds**.

TABLE 7 – 84 ST / COUNTRY HILLS BLVD – SYNCHRO ANALYSIS SUMMARY

Movement		PM Peak Hour			
		v/c Ratio	LOS	Delay (s)	Queue (m)
Eastbound	Left	0.57	C	21.4	29.7
	Through	0.59	C	26.3	61.0
	Right	0.50	A	5.4	18.3
Westbound	Left	0.19	B	13.1	12.6
	Through	0.85	D	37.3	87.9
	Right	0.46	A	5.9	16.7
Northbound	Left	0.81	D	44.5	55.5
	Through	0.39	C	29.2	41.1
	Right	0.21	A	0.3	0.0
Southbound	Left	0.41	D	37.4	26.1
	Through	0.81	D	52.4	71.8
	Right	0.17	A	0.3	0.0
Intersection Summary		-	**C**	**25.0**	-

4.0 CROSS SECTION DEVELOPMENT

A detailed roadway classification and cross section analysis was undertaken to determine the recommendations for 84 St. Through this analysis, it was identified that two different roadway classification and cross section be used for this road. Forecast volumes illustrate a drastic difference in volume son either side of McKnight Blvd (approximately 50%). This drastic change warrants a change in the roadway classification and cross section.

Summarizes in this section are the recommended roadway classifications and cross sections. For additional details see the Roadway Classification and Typical Cross Sections Memorandum in **Appendix B**.

4.1 SOUTH PROJECT LIMITS TO MCKNIGHT BLVD

This segment of McKnight Blvd presented daily volumes in the 8000 to 10,000 range. It was recommended to use the Primary Collector roadway classification for the following reasons:

- Daily volumes are in the appropriate range
- Simplified and streamlined water act approval process for impacted wetlands
- 30 m Right-of-Way provides the most flexibility providing opportunity to alter classification in the future to the higher classification of Industrial Arterial or the lower classification of Industrial Street.

Shown below, in **Figure 12**, is the representative cross section from the DGSS.

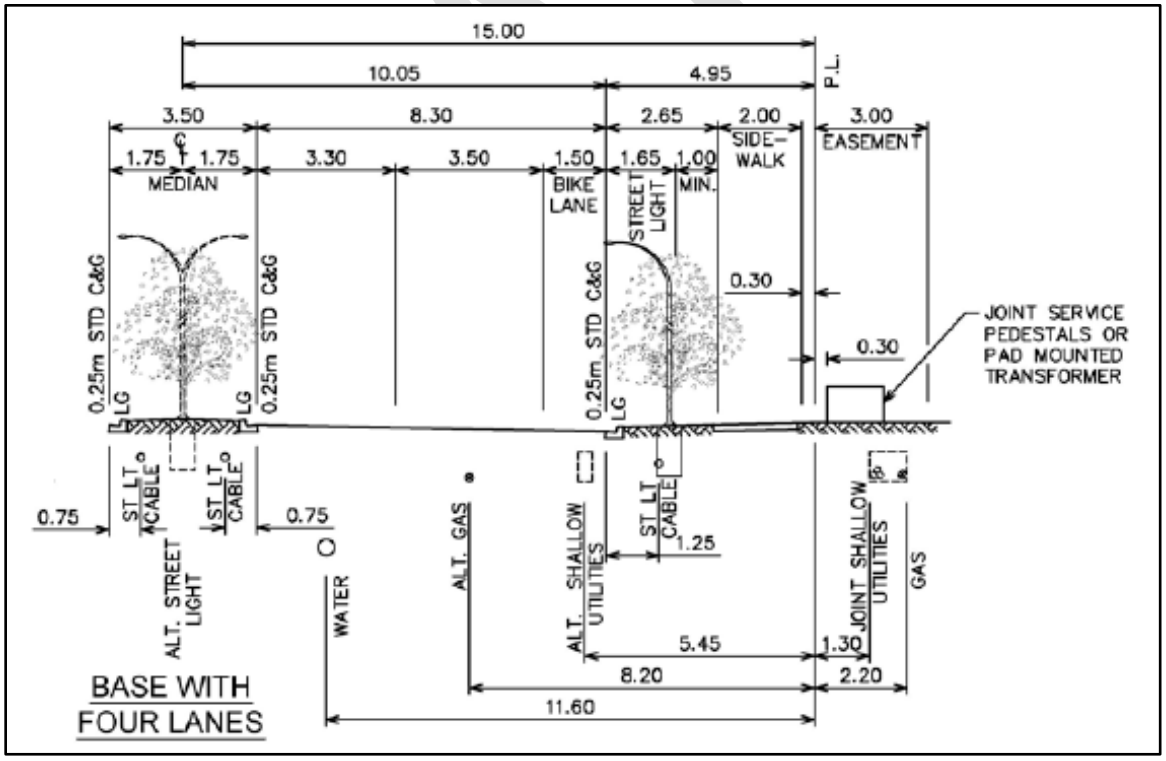


Figure 12 – 84 St Typical Cross Section – South Project Limits to McKnight Blvd

4.2 MCKNIGHT BLVD TO COUNTRY HILLS BLVD

Based on the anticipated daily volumes, the potential classifications vary between Arterial Street, Local Arterial Street and Industrial Arterial Street. In review of the criteria studied in this analysis, a Modified Local Arterial Street Classification is recommended for this road for the following reasons:

- Daily volumes are in the appropriate range
- While there is no immediate need for left turn bays between the major intersections along this corridor, providing the median allows for flexibility in the future if land use and/or densities change.
- Inclusion of a median restricts future developments to right-in right-out driveway access instead of full turns. Full turns movements to be accommodated at intersections locations.
- The roadway acts as a buffer between residential and industrial land uses.
- The median acts as an additional buffer between residential areas and potentially heavy truck movement in the northbound direction.
- Cycling requirements can be accommodated off-street on a multi-use pathway on one or both sides of the road.
    - The East Stoney ASP requires a regional pathway on the west side of 84 St.
- The median allows for the future potential requirements for left turn lanes if they do become warranted and allows for the most flexibility
- Providing a 30 m roadway Right-of-Way allows for use of the streamlined (WAIF) for the Water Act approval process.

For this segment of 84 St NE it is recommended to use the typical cross section shown below, in **Figure 2** and in more detail in **Appendix D**.

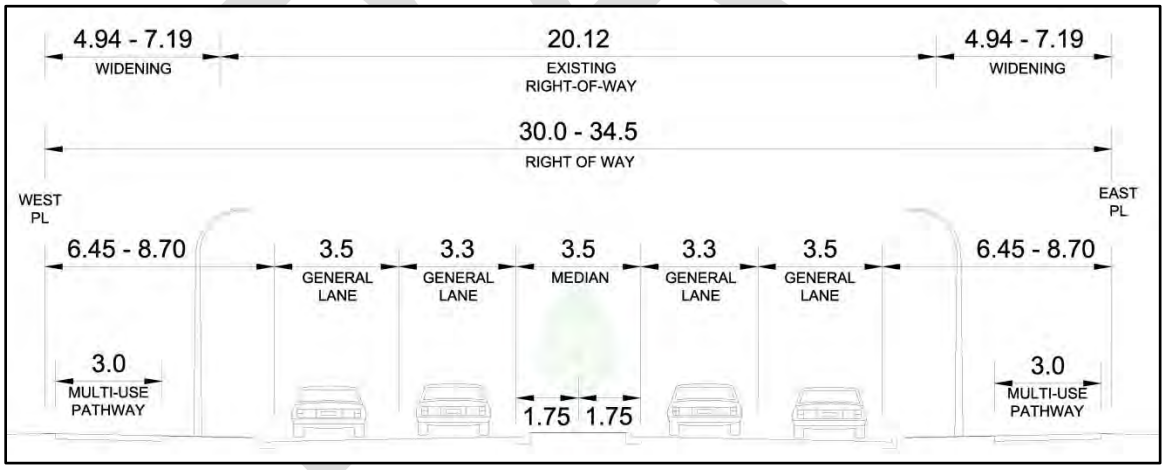


Figure 13 – 84 St Typical Cross Section – McKnight Blvd to Country Hills Blvd

5.0 FUNCTIONAL INTERSECTION DESIGN

For each of the major intersections a functional design of the recommendation intersection configuration was developed. These drawings have been included in Appendix C for reference.

5.1 84 ST / 32 AVE (DRAWING RD01)

32 Ave has been identified as an Arterial Street in the CTP. Ultimately, 32 Ave will be connected on either side of Stoney Tr via a flyover bridge only (no ramp connections). This segment of 84 St has been classified as a Primary Collector in **Section 4.1.**

The intersection of 84 St and 32 Ave has been designed as a typical Arterial Street to Collector Street in accordance with the City of Calgary Design Guidelines for Subdivision Servicing, 2014 (DGSS). The intersection features are summarized as follows:

- Sidewalks & Pathways
  - 84 St – It has been shown as 2.0 m wide separated sidewalk on either side. A 1.5 m wide bike lane has been included parallel to the travel lanes.
  - 32 Ave – It has been assumed to use the off-street biking option with a 3.0 m multi-use pathway on either side of the road.
- Right turns
  - From 84 St to 32 Ave – Right turns from Twp 252 to 84 St to not require channelized right turns.
  - From 32 Ave to 84 St – Channelized right turn ramps are required for right turning movements from 84 St to Twp 252.
- Left Turns
  - Eastbound/Westbound - Left turn lanes required in both directions with a minimum storage length of 60 m.
  - Northbound/Southbound – No Left turn lanes warranted

*Note: this intersection may be required to be modified as the surrounding lands are developed. Alternatively 84 St NE could be classified as an Industrial Arterial or even an Arterial Street as identified in **Section 4.1**.*

5.2 84 ST / MCKNIGHT BLVD (DRAWING RD02)

The intersection of 84 St / McKnight Blvd was identified as problematic in terms of traffic operations in **Section 3.3.3**. The conflicting heavy volumes in the westbound through direction and eastbound left direction result in poor operations under any at grade configurations

Interchange configuration and alternative intersection designs have been developed within this study and screened for adequate operations. Additional study is recommended for this location to properly analyze and evaluate each option to develop a preferred solution. See **Section 7.0** for initial option development ad screening.

5.2.1 DEVELOPMENT OF OPTIONS

Through our initial analysis of the standard at-grade intersections it was evident that the volumes forecast for this intersection could not be accommodated by a standards at-grade intersection (regardless of how many lanes were given). Unique solutions for this intersection location were investigated.

The existing roadway alignment of 84 St swings off of centerline and to the east by about 683 m. This offset provides opportunity to develop some unique solutions for the intersection in additional to traditional options. The following outlines the six options developed:

5.2.1.1 STANDARD INTERSECTION

This option is the base case scenario which is the traditional at grade intersection. This option includes the proposed realignment of 84 St on the south side of McKnight Blvd to provide adequate intersection geometry for the intersection and avoid wetlands within the vicinity.

Figure 14 – McKnight Blvd Option 1 – Standard Intersection

5.2.1.2 SINGLE POINT URBAN INTERCHANGE

This option removes the through movements from the intersection by elevating the eastbound and westbound lanes of McKnight Blvd on an overpass over the crossroad of 84 St. A standard intersection lies beneath the overpass providing all movements except eastbound through and westbound through.

Figure 15 – McKnight Blvd Option 2 – Single Point Urban Interchange

5.2.1.3 84 ST FLYOVER

This option maintains the existing intersection location and closes the south leg. Access from 84 St south of McKnight Blvd is provided through and 84 St Flyover and connection to 84 St on the north side of McKnight Blvd. By removing the south leg, no property will be required south of McKnight for the roadway realignment of 84 St.

Figure 16 – McKnight Blvd Option 3 – 84 St Flyover

5.2.1.4 *RESTRICTED LEFT TURNS*

This option is a typical at grade intersection with the additional restriction of some left turn movements. Vehicles coming from northbound Stoney Trail whom exit to eastbound McKnight Blvd are restricted from making the left turn movement. These vehicles are forced to go eastbound to the next intersection at 100 St NE to make their left turn movement.

Figure 17 – McKnight Blvd Option 4 – Restricted Left Turns

5.2.1.5 *84 ST FLYOVER WITH SEPARATED RAMPS*

This option is a modification to the 84 St Flyover option. This option removes all signals along McKnight Blvd and provides all movements through the 84 St Flyover, right-in right-out ramps, and the realigned 84 St connection on the south side.

Figure 18 – McKnight Blvd Option 5 – 84 St Flyover with Separate Ramps

5.2.1.6 *84 St Flyover with Left Turn Flyover*

This option is another modification to the 84 St Flyover option. This option removes the problematic left turn movements from the intersection of 84 St and McKnight Blvd and places them on a separated loop ramp with an additional single lane flyover. For the remaining movements there is an at grade "T" intersection at 84 St and McKnight Blvd.

Figure 19 – McKnight Blvd Option 6 – 84 St Flyover with Left Turn Flyover

5.2.2 Initial Screening – Level of Service Operations

Each of these options was tested to determine if traffic operations could be improved to an acceptable level. The base case option for this analysis was Option 1 – Standard Intersection. These traffic volumes were redistributed for each of the remaining options based on the proposed configurations. Each option was analyzed in Synchro to determine the LOS of each intersection. Synchro reports and summary drawings for each option have been included in Appendix D.

The following table summarizes the options, the corresponding LOS and the options to be shortlisted for further analysis.

TABLE 8 – 84 ST / MCKNIGHT BLVD OPTION SCREENING SUMMARY

84 St / McKnight Blvd Proposed Solution	North Intersection (LOS/Delay)	South Intersection (LOS/Delay)	Shortlisted for Further Analysis
Option 1 – Standard Intersection	F / 129.6 s		No
Option 2 – Single Point Urban Interchange	B / 15.8 s		Yes
Option 3 – 84 St Flyover	B / 17.9 s	F / 119.3 s	No
Option 4 – Restricted Left Turn Lanes	F / 84.1 s		No
Option 5 – 84 St Flyover with Separated Ramps	C / 22.5 s	A / 5.8 s	Yes
Option 6 – 84 St Flyover with Left Turn Loop Ramp	A / 4.8 s	C / 29.1 s	Yes

5.2.3 McKnight Blvd / 84 St Intersection Recommendations

It is recommended that Option 2, Option 5 and Option 6 be analyzed further and in more detail. It is anticipated that this detailed analysis and evaluation should include but not be limited to:

- Traffic Operations
  - Intersection level of service
  - Equivalent travel time analysis and time savings
  - Weaving
- Construction costs
  - Earthworks and asphalt costs
  - Stormwater management systems
  - Utility impacts
- Environmental Impacts
  - Environmental site assessments
  - Wetland impacts and potential compensation
- Geotechnical recommendations
  - Desktop geotechnical study
- Right of Way Requirements
  - Optimization and streamlining of ROW

5.3 84 St / 64 Ave (Drawing RD03)

64 Ave has been identified as an Arterial Street in the CTP. Ultimately, 64 Ave will be connected on either side of Stoney Tr via a flyover bridge only (no ramp connections). This segment of 84 St has been classified as an Arterial Street in **Section 4.2**.

The intersection of 84 St and 64 Ave has been designed as a typical Arterial Street to Arterial Street in accordance with the DGSS. The intersection features are summarized as follows:

- Sidewalks & Pathways
  - All – It has been assumed to use the off-street biking option with a 3.0 m multi-use pathway on either side of each road.
- Right turns
  - All – Channelized right turn ramps are required for all right turn movements.

- Left Turns
    - Eastbound – Dual left turn lanes in the eastbound direction are required with a 90 m storage length. The intersection design also includes transitioning the median from 6 m to 9 m which is completed using reversing 1750 m radius curves.
    - Westbound – A single left turn bay (5 m wide) was designed with a small median separation from the through lanes. This median can be removed in the future to implement dual left turn lanes if warranted by changes in the development assumptions and traffic patterns. The design accommodates a 60 m storage length with a median transition from 6 m to 9 m using reversing 1750 m radius curves.
    - Northbound/Southbound – based on the traffic analysis in this study, left turn lanes are not warranted, however, left turn bays with a typical 60 m (minimum) storage length have been shown on an as required basis.

Note: City of Calgary is maintaining the option of Transit and Active Modes travel only on the future 64 Ave flyover (of Stoney Tr). Future study will determine which option will be constructed.

5.4 84 ST / TWP 252 (DRAWING RD04)

Twp 252 has not been included in the CTP. On the west side of 84 St (within the City of Calgary) this roadway will likely take on the name “80 Avenue NE”, however on the east side (within Rocky View County) the existing road name of Twp 252 has been retained for this study. Based on the volumes anticipated for this roadway and the typical roadway hierarchy, Twp 252 has been assumed as a Collector Street with parking on both sides. This segment of 84 St has been classified as an Arterial Street in **Section 4.2**.

The intersection of 84 St and Twp 252 has been designed as a typical Arterial Street to Collector Street in accordance with the DGSS. The intersection features are summarized as follows:

- Sidewalks & Pathways
    - 84 St – It has been assumed to use the off-street biking option with a 3.0 m multi-use pathway on either side of the road.
    - Twp 252 – In accordance with the DGSS, a typical 2.0 m monolithic walk has been shown, with the transition to a 2.0 separated walk at the roadway widening for the intersection approaches. The monolithic walk is required in segments of the road where on-street parking is available.
- Right Turns
    - From 84 St to Twp 252 – Channelized right turn ramps are required for right turning movements from 84 St to Twp 252.
    - From Twp 252 to 84 St – Right turns from Twp 252 to 84 St to not require channelized right turns.
- Left Turns
    - Eastbound/Westbound – based on the configuration of the typical intersection, the laning along Twp 252 on each approach is a shared through and left turn lane and a shared through and right turn lane
    - Northbound/Southbound – based on the traffic analysis in this study, left turn lanes are not warranted, however, left turn bays with a typical 60 m (minimum) storage length have been shown on an as required basis.

Note: Within the City of Calgary boundaries, this road does not and is not planned to cross Stoney Trail.

5.5 84 ST / AIRPORT TR (DRAWING RD05)

The intersection of Airport Trail and 84 ST was analyzed in detail in the Airport Trail Intersection Location Memorandum attached in **Appendix B**. This analysis is summarized below.

Airport Tr has been identified as Skeletal Road within the City in the CTP. However, outside the City limits, within Rocky View County this road has been identified as a 4-Lane Major. It was agreed that the section of Airport Tr between Stoney Trail and 84 St can be identified as a transition zone.

Ultimate plans show a full movements interchange at Stoney Tr with large merging and diverging ramps on the east side of the interchange. A Weaving analysis was conducted to verify if the intersection spacing could follow the typical Alberta Transportation Access Management Standard of 150 m from the beginning of the ramp taper. The weaving analysis and microsimulation showed no problematic areas.

The intersection of 84 St and Airport Tr has been designed as a typical Arterial Street to Arterial Street as per the DGSS. The intersection features are summarized as follows:

- Sidewalks & Pathways
  - 84 St – It has been assumed to use the off-street biking option with a 3.0 m multi-use pathway on either side of the road.
  - Airport Tr – Sidewalks and multi-use pathways are typically not permitted so no east-west connection for pedestrians and cyclists is provided.
- Right Turns
  - All – All right turns are channelized. All right turns have been deigned in accordance with DGSS with the 440 m radius taper exiting and the yield condition entering.
- Left Turns
  - Eastbound – to maintain the consistent median width proposed from the current interchange plans at Stoney Tr, parallel left turn lanes were used. In this direction, dual left turn lanes with 120 m of storage length was required.
  - Westbound – In this direction, a typical 60 m (minimum) storage length was required. A single left turn bay (5 m wide) was designed with a small median separation from the through lanes. This median can be removed in the future to implement dual left turn lanes if warranted by changes in the development assumptions and traffic patterns.
  - Northbound – Dual left turn lanes with 125 m of storage length are required in this direction. The intersection design also includes transitioning the median from 6 m to 9 m along the first curve to the south.
  - Southbound – Dual left turn lanes with 100 m of storage length are required in this direction. The intersection design also includes transitioning the median from 6 m to 9 m along the first curve to the north.

5.6 84 ST / COUNTRY HILLS BLVD (DRAWING RD06)

Country Hills Blvd has not been classified in the CTP. However, it has been identified that this roadway classification is to be determined through local areas plans. For the purposes of this study and based on the anticipated volumes, it is assumed that Country Hills Blvd will be an Arterial Street through the intersection of 84 St. This segment of 84 St has been classified as an Arterial Street in **Section 4.2**.

The intersection of 84 St and Country Hills Blvd has been designed as a typical Arterial Street to Arterial Street in accordance with the DGSS. The intersection features are summarized as follows:

- Sidewalks & Pathways
  - 84 St – It has been assumed to use the off-street biking option with a 3.0 m multi-use pathway on either side of the road.
  - Country Hills Blvd – It has been assumed to use the off-street biking option with a 3.0 m multi-use pathway on either side of the road.
- Right turns
  - All – Channelized right turn ramps are required for all right turn movements.
- Left Turns
  - Eastbound – In this direction a single left turn lane with a storage length of 100 m is required.
  - Westbound – In this direction, a typical 60 m (minimum) storage length was required.
  - Northbound – Dual left turn lanes with 60 m of storage length are required in this direction. The intersection design also includes transitioning the median from 6 m to 9 m along the first curve to the south.
  - Southbound – Due to the wide median, a slotted left turn with a 30 m storage length was included in the design. This movement can be easily modified to a longed storage length or accommodate a parallel dual left turn lanes with 60 m (minimum) storage length in the future as required.
- Alignment of 84 St north of Country Hills Blvd
  - This segment of 84 St was outside the study limits and the alignment through this area was not developed in detail. The intersection design includes a short stub on the north side of the intersection to illustrate lane continuity only.

Note: Although not yet updated in the CTP, the Cornerstone ASP has established Country Hills Blvd as an Arterial Street within the City of Calgary boundaries.

6.0 84 ST ALIGNMENT AND ACCESS MANAGEMENT

The 84 St road alignment will mainly follow the existing 84 St alignment with some realignment required at the Airport Tr and Country Hills Blvd Intersection approaches.

6.1 AIRPORT TR INTERSECTION LOCATION (DRAWINGS A04 AND 05)

The proposed location of the Airport Tr intersection was analyzed in detail in the Airport Trail Intersection Location Memorandum, attached in **Appendix B**. the recommendation is summarized below.

The intersection location involves a shift in the 84 St alignment, to the east, by 358 m providing the 150 m spacing between the end of the ramp taper and the intersection.

Short tangent sections were provided on the north and south side of Airport Tr followed by reversing 400 m radius curves (with spirals) to shift 84 St back to the current alignment. The 400 M radius curves were used to allow for development of left turn bays along the curves, per the DGSS.

6.2 COUNTRY HILLS BLVD (DRAWING A05)

The existing intersection location at Country Hills Blvd was retained. However, the existing alignment of 84 St approaching the Country Hills Blvd intersection does not provide appropriate

geometry to allow for the development of the left turn bays required in the northbound or southbound directions.

On the south approach to Country Hills Blvd a tangent section was added to 84 St for the development of the required 60 m long dual left turn lanes. Immediately to the south of the left turn bay taper, the alignment makes a 90 degree curve to using a 130 m radius to move to an east-west direction as quickly as possible, which enhances the grid network and allows for a direct north-south intersection/access point.

Following this alignment further south a 400 m radius curve has been included to curve the alignment 90 degrees again back to the north-south direction. This radius was used to accommodate potential intersection along the curve to provide access to the lands along the existing 84 St alignment in this area.

6.3 ADDITIONAL INTERSECTION / ACCESS MANAGEMENT

For the general access management along the 84 St corridor, the major intersections of 32 Ave, McKnight Blvd, 64 Ave, Twp 252, Airport Tr and Country Hills Blvd were set as “unmovable” intersection locations. Intersection spacing and accesses allowed will be based on the DGSS and classification for 84 St (south of McKnight Blvd) will be either Primary Collector, Industrial Arterial or Industrial Street, depending on the future plans of the adjacent land areas.

On the portion of 84 St south of McKnight Blvd, additional accesses with minor road crossings are anticipated at approximately 60-120 m spacing. The minimum spacing for intersection along this segment is 120 m from an Arterial (32 Ave) and 60 m between other minor roadways.

On the portion of 84 St north of McKnight Blvd, additional accesses with minor road crossings are anticipated between these intersections at approximately 300-400 m spacing. Although Local Arterials Streets are allowed minimum intersection spacing of 150m, the 300 m spacing is recommended as this is a Modified Local Arterial as this spacing will sufficiently allow for turning lane development and storage, as well as improve traffic signal operation of the corridor. Since there is significant uncertainty regarding the future land use planning and development of the surrounding areas, the minimum distance of 300 m or greater between intersections is recommended.

Additional detail on proposed intersection/access locations can be found on drawings A01 – A05 in **Appendix C**.

7.0 RECOMMENDATIONS

We recommend following the alignment, Right-of-Way, Roadway Classification, Access Management and functional intersection designs presented within this study. Through more detailed functional planning, preliminary design and detailed design as development progressed within the areas we recommend the following additional work:

- Confirm and finalize the classification and cross section of 84 St south of McKnight Blvd as the areas develops and future plans are established.
- Detailed traffic analysis for future development plans to identify if and where left turn lanes would be warranted along the corridor, and associated Right-Of Way widening at intersections to accommodate.
- Profile and earthwork grading to determine where backsloping easements or additional Right-of-Way is required

- Stormwater modelling and analysis to determine stormwater management plan and potential pond locations required and/or any runoff outlets locations
- Design work to determine utility provision and placement requirements
- More detailed wetland evaluation to establish mitigations, impacts, costs
- More detailed functional planning analysis, design and comparison of McKnight Blvd and 84 St Interchange options.