

ROADWAY MANAGEMENT PLAN



D&A PAULICHUK
CONSULTING LTD.

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1. INTRODUCTION

This document is a Roadway Management Plan for the roadways within the Summer Village of Sunset Point (SVSP) in Alberta. The SVSP presently contains 4,375m of paved roadways and 1,545m of gravel surfaced roadways within the municipality that requires operational maintenance, rehabilitation and/or reconstruction within the next 30 – 50 years.

This ROADWAY MANAGEMENT PLAN will provide the following items in order to assist the Summer Village in planning and budgeting for maintaining these roadways:

- Review existing Land Use Areas within the summer Village
- Identify future areas of potential development and how this may affect the road use and suitability
- Determine road classifications and the transportation network
- Determine traffic volumes for roadways
- Determine growth potential of traffic and future projections
- Review existing road structures and suitability
- Determine regular and periodic maintenance of roadways for operations
- Determine future road improvements necessary to maintain operations
- Determine potential future upgrading of roads if desired
- Provide requirements of improvements with timing with costs

This document is based on information provided by the municipality, previous reports prepared for the municipality, site observations from Mr. Darcy Paulichuk, P. Eng., traffic volume data collected by D&A Paulichuk Consulting Ltd., intersectional analysis procedures and standards documented in Alberta Infrastructure and Transportation's "Highway Geometric Design Guide", 1999, and general municipal standards from various nearby municipalities.

Roadways with the Sunset Point Christian Camp, Village of Alberta Beach and Lac Ste. Anne County are not addressed in this PLAN. This Plan does not address pedestrian walkways, trails or multi-ways.

This report was prepared over the 2020 to 2021 in order to collect required data and to conduct observations of the performance and functions of the roadways within the Summer Village.

2. LAND USE DESIGNATIONS & PLANNING

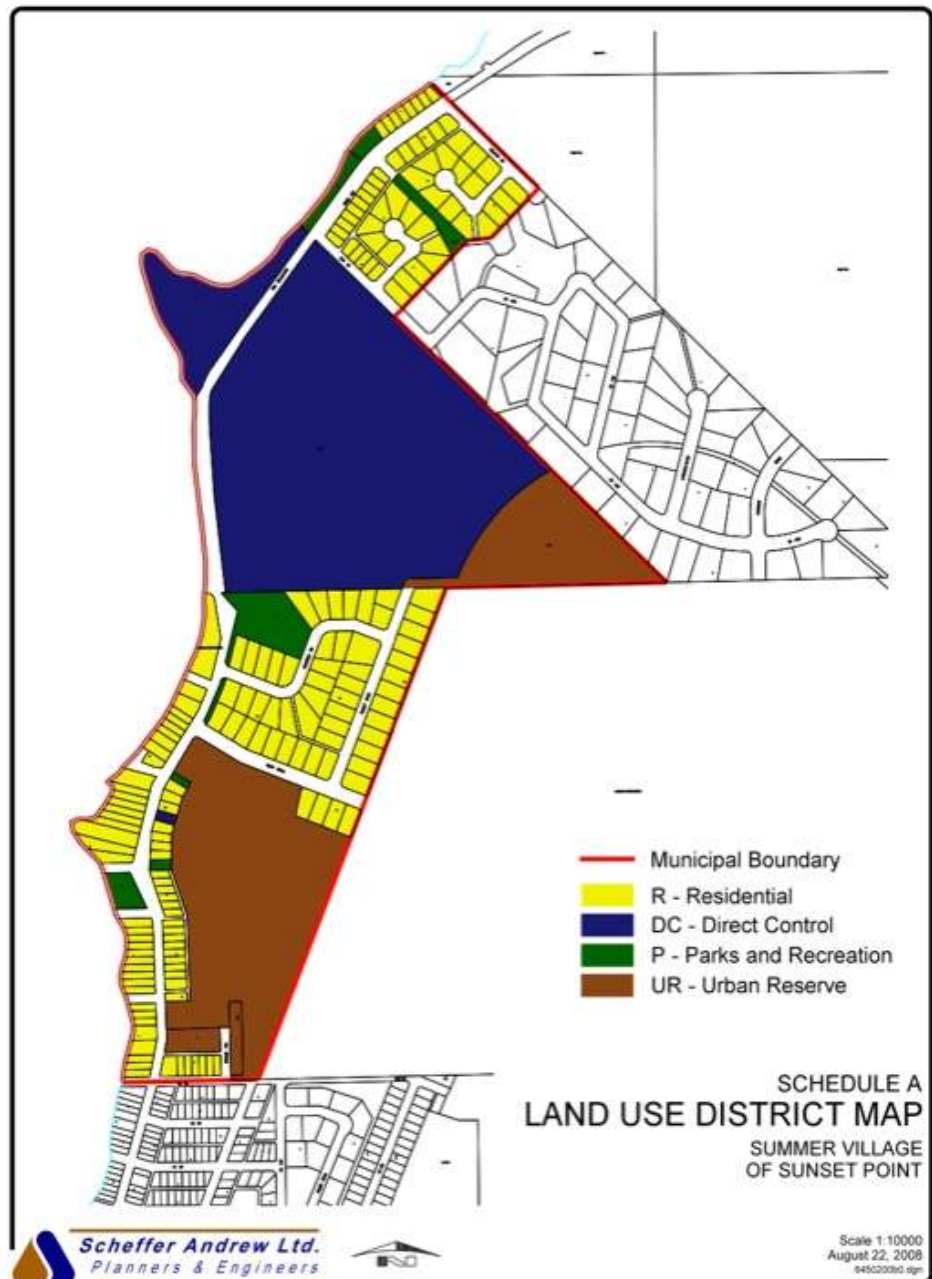
2.1 Land Use Bylaw

The Land Use Bylaw document was prepared by Scheffer Andrew Ltd. In December 2008 for the Summer Village. It provides present land use in place for the area.

Within the Bylaw, areas are identified as either Residential, Parks & Recreation, Urban Reserve or Direct Control within the municipal boundary as shown on the right.

The Residential, Parks and Recreation areas shown in this plan mainly represents existing/occupied development areas with little chance of change.

The large blue area identified as Direct Control and is occupied by the Sunset Point Christian Camp. No changes are anticipated for this area as it is partially developed with the remainder to be developed in future and maintained within its Camp boundaries.



The brown colored areas identified as Urban Reserve represent the areas of potential future development and likely land use change. These areas could contribute to notable traffic volume increases on the existing roadway network in the SV.

One item to note is that some residential parcels could change slightly in land use to include a home-based business, as identified in the Summer Village's 2010 Integrated Community Sustainability Plan.

2.2 Integrated Community Sustainability Plan

The Integrated Community Sustainability Plan document was prepared by Zap Municipal Consulting on August 27 2010 for the Summer Village. It provides Community based direction for working together with adjacent municipalities along with sustaining Summer Village visions.

In regards to roadways, this Plan discusses continuing to accommodate home based and other commercial businesses within the Summer Village.

The Plan also discusses Infrastructure Sustainability that included road improvements to Sunset Drive and 54th Avenue. Initiatives include road maintenance, such as grading, crack filling, snow removal, street lighting and street sweeping. present land use in place for the area.

SUMMER VILLAGE OF SUNSET POINT
INTEGRATED COMMUNITY SUSTAINABILITY PLAN 2010

10. Summary of Priority Initiatives

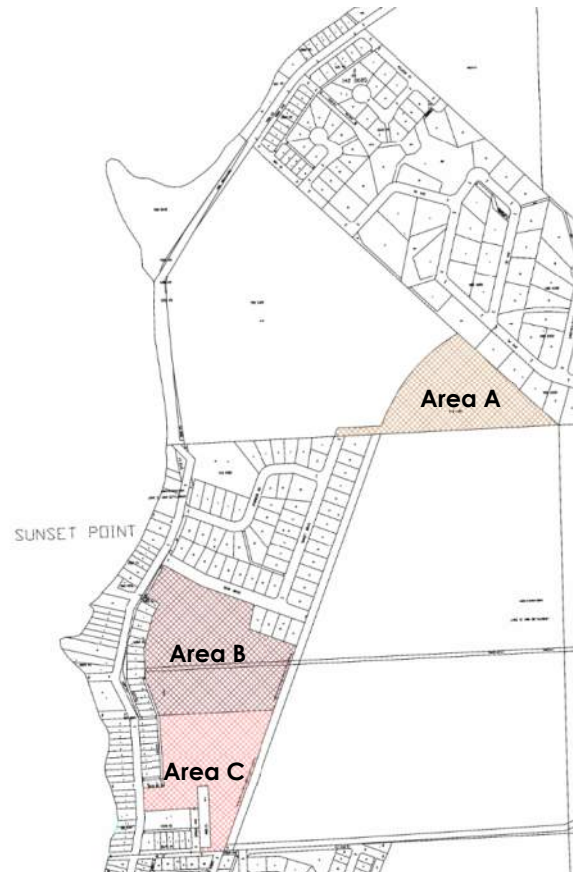


LOOKING FORWARD

2.3 Land Use Impact to Road Network

As mentioned in Section 2.1, the brown colored areas noted as Urban Reserve are likely candidates for significant development that will add traffic to the Summer Village's roadway network. When and if these areas will develop are unknown but the type of development can be predicted based on the adjacent area development. These areas are broken up into three development parcels as shown right.

Assuming that these development areas would mainly be comprised of recreational home residential land uses or even recreational campground land uses, trip generation volumes can be estimated using anticipated trip generation rates based on a land used and percentages of land used for lots as follows:



<u>Development Type</u>	<u>Trip Generation Rate</u>	<u>Traffic Volumes</u>
Area A (6.191 ha) Recreational Homes: (0.25 ha/lot = 25 lots)	3.47 trips/home	87 trips/day
Area B (9.490 ha) Recreational Campground: (0.25 ha/lot = 38 lots)	3.47 trips/home	132 trips/day
Area C (6.224 ha) Recreational Campground: (0.07 ha/stall = 90 stalls)	3.30 trips/lot	298 trips/day

These future traffic volumes would potentially spill into the existing roadway network once developed. For this reason, when considering a Sustainability Plan and Road

Maintenance Plan, these additional traffic volumes will contribute to the planning for rehabilitation and reconstruction measures.

3. ROADWAY CLASSIFICATIONS

The existing roadway network within the Summer Village of Sunset Point mainly comprises of a **Minor Collector roadway** in **Sunset Drive** that follows along the shore of Lac Ste. Anne. Sunset Drive traverses around the east and part of the south shores of Lac Ste. Anne from Gunn at the north to Range Road 41 to the south west, as shown below. Sunset Drive is named differently through other municipalities however it is the same Minor Collector roadway.



The remainder of the roadways with the Summer Village can be classified as local roads, mainly due to their low traffic volumes and that they provide direct access to lots and parcels. The remaining road not highlighted are either front service roads and back lanes.



4. EXISTING ROADWAY CONDITIONS

The existing roadway network within the Summer Village of Sunset Point mainly comprises of the following roadway components:

Minor Collectors

Sunset Drive:	2,320m	paved
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Local Roads

48A Avenue:	370m	paved
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48 th Street:	425m	paved
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49A Avenue:	445m	paved
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54 th Avenue & 49 Street Cul-de-Sac:	420m	paved
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56 th Avenue & 49 Street Cul-de-Sac:	395m	paved
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Front Service Roads

Klinkhammer Park, E. Side of Sunset Drive:	110m	gravelled/asphalt bound
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54 th Ave. to 56 th Ave., E. Side of Sunset Drive:	400m
	gravelled/asphalt bound

Back Lane Roads

44th Avenue:	180m	gravelled
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45th to 47th Avenue:	345m	gravelled
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54 th Ave. to 56 th Ave.:	510m	gravelled
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The total amount of paved roadway is 4,375m and total amount of graveled roadways is 1,545m.

4.1 Sunset Drive (50th Street)

Sunset Drive was initially constructed many years ago, back when Alberta Beach was a Summer Village and CN was actively running its Edmonton – Vancouver rail line in the area. Sunset Drive was used only as a way to directly access cottage lots along the Lac Ste. Anne lakeshore and resembled more of a trail that was flat with no ditches, level with adjacent grounds. Over the years, as the more development occurred, Sunset Drive was extended to the north and was made more passible with road widening and gravel. Sunset Drive remained flat until just recently (within 10 – 15 years)

it was reconstructed with a higher embankment with a granular base course and hot mix

Sunset Drive is approximately 9.9m in width within the Summer Village of Sunset Point. From the Geotechnical Report performed in conjunction with this document preparation, the surfacing structure thicknesses are as follows:

Sunset Drive: 100 - 125mm ACP, 200 - 300mm GBC, Averaging 9.9m Width

Sunset Drive is classified as Minor Collector Roadway within the Summer Village as it is used to collect traffic directly from lots as well as from other local roads. Sunset Point has a painted centreline and shoulder lines. No passing is allowed, since the centerline is solid throughout the Summer Village. The posted speed limit is 40 kph.

For roadway geometric standards, Lac Ste. Anne County's General Municipal Servicing Standards can be used for comparison purposes as follows:

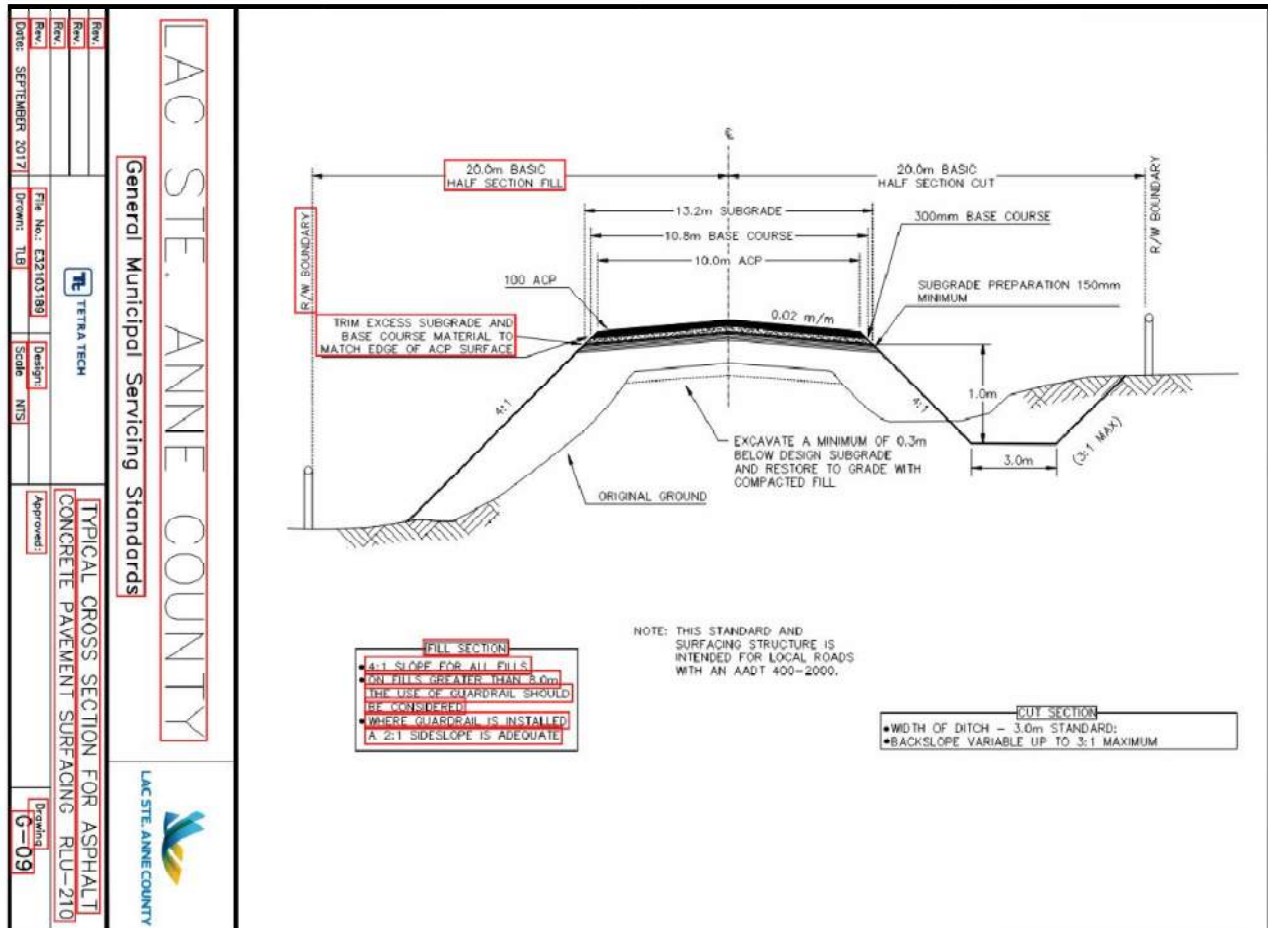
Note: The recommended design speeds are for internal roadway systems only.

* AADT = Average Annual Daily Traffic
** ROW = Right-of-Way
† SSD = Stopping Sight Distance

Designation	Surface	AADT*	Truck Traffic	Min. ROW** (m)	Preferred ROW** (m)	Design Speed (km/h)	Posted Speed (km/h)	SSD† (m)	Crest k (m)	Sag k (m)	Min. Horiz. Radius (m)
RLU-207G	Gravel	< 25	None	20	30	40	30	65	7	11	
RLU-208G(a)	Gravel	< 100	Minimal	20	30	60	50	85	15	20	90
RLU-208G(b)	Gravel	< 200	Minimal	20	30	60	50	85	15	20	90
RLU-209G	Gravel	> 200		20	40	60	50	85	15	20	90
RLU-210G	Gravel	> 200	Significant	20	40	70	60	140	35	30	190
RLU-208(a)	Cold Mix	< 200	Minimal	20	40	60	50	85	15	20	90
RLU-208(b)	ACP	< 200		20	40	60	50	85	15	20	90
RLU-209(a)	Cold Mix	< 500	Minimal	20	40	60	50	85	15	20	90
RLU-209(b)	ACP	< 500		40	40	60	50	85	15	20	90
RLU-210	ACP	< 2000		40	40	70	60	140	35	30	190
RLU-211	ACP	> 2000	Significant	40	40	70	60	140	35	30	190
ULU-209	ACP	< 2000		20	30	60	50	85	15	20	90
ULU-211.5	ACP	> 2000	Significant	30	30	70	60	140	35	30	190

Table 1 – Geometric Design Requirements

The nearest design standard for Sunset Drive is an RLU-210 standard with a design speed of 70 kph. The typical cross section for this standard is shown below:



Sunset Drive: Viewing north, at 45th Avenue



Sunset Drive: Viewing north, south of 46th Avenue.

ROADWAY MANAGEMENT PLAN

SUMMER VILLAGE OF SUNSET POINT



Sunset Drive: Viewing north, at 46th Avenue at Klinkhammer Park.



Sunset Drive: Viewing north at the Summer Village office, south of 48th Ave.



Sunset Drive: Viewing south, from the 48A Avenue intersection.



Sunset Drive: Viewing north, north of 49A Avenue.



Sunset Drive: Viewing north, north of 49A Avenue.



Sunset Drive: Viewing north, south of Christian Camp Main intersection.



In comparing Sunset Drive with the County RLU-210 design standard, Sunset Drive exhibits the following aspects to design parameters:

Parameter	Design Standard	Sunset Drive	Result
Posted Speed	60 kph	40 kph	Significantly less, hence some deficiencies in parameters can tolerated.
Width	10.0m	9.9m	Near Design Standard.
Surfacing Structure	100mm ACP 300mm GBC	100-125mm ACP 200-300mm GBC	Near equivalent but less truck traffic occurs on Sunset Drive.
Sideslopes	4:1	4:1	Same
Ditches	3.0m width	1 – 3m	Near equivalent; not a concern with low posted speed limit.
Backslopes	3:1	3:1	Same

The existing surfacing structure of Sunset Drive is sufficient for the existing traffic since existing truck traffic is approximately 2% with very little to no large tractor trailer traffic. Water truck deliveries and waste collection are only concern for heavy loading presently and could be reduced with more use of the West Inter Lake District (WILD) Regional Water Services Commission supply line. Potential future developments are not projected to add any large or heavy truck traffic, except for, construction and waste removal.

Geometric parameters of Sunset Point are mainly sufficient except for some locations of steep sideslopes that are less than 4:1. Since the ditches are deep, between 1 – 1.5m, sideslope improvements when possible or in conjunction with other projects

should be completed if right-of-way is available. There are also several locations with only v-ditches (see photos below), however this is mainly on the west of Sunset Drive where there is little drainage flow.



With the speed limit of 40km/hr., this is not a safety concern but just a desire to be more consistent with the design standard. Delineators could be used to help guide motorists in these locations as well if issues develop. Guardrail is not required.

The Geotechnical Report performed in conjunction with this document preparation, indicated that within Test Holes 01 to 03 the water table was approximately 1.5m below the surface of the road. This is concerning since this moisture will have a tendency to migrate up into the subgrade and hence weaken its foundation over time from the pumping action of the traffic loading. The more volume of heavier traffic, the more the weakened will occur. Therefore, Sunset Drive may be more prone to significant weakening during years of high moisture occurrences. Therefore, pavement overlays on Sunset Drive may be required more frequently (< every 20 years) to account for the weakening of the subgrade due to moisture. Consideration could also be given to lowering ditches around Sunset Drive to lower the level of moisture infiltration and water table. Especially on the uphill side of Sunset Point.

4.2 Local Roads

Local roads within the Summer Village include:

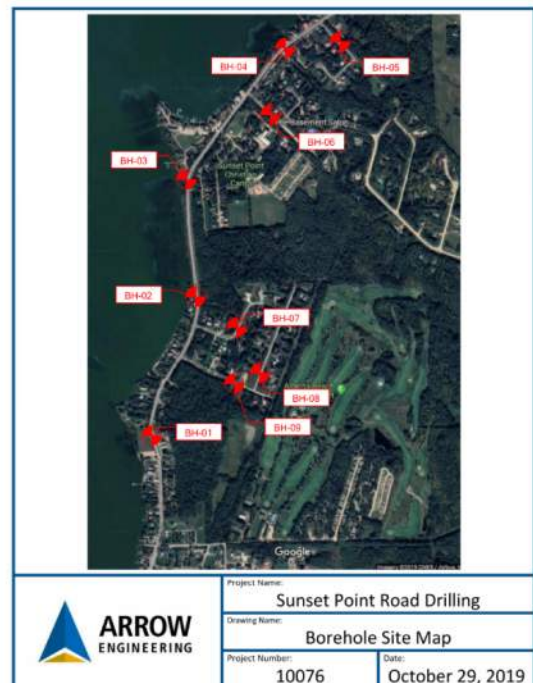
- 48A Avenue
- 48th Street
- 49A Avenue
- 54th Avenue & 49th Street Cul-de-Sac
- 56th Avenue & 49th Street Cul-de-Sac

The local roadways within the Summer Village were constructed originally for direct access to residential/cottage lots. These roadways are approximately 6.0 – 8.0m in road width and are paved. From the Geotechnical Report performed in conjunction with this document preparation, the surfacing structure thicknesses are as follows:

48A Avenue:	115mm ACP, 150mm GBC,	Averaging 6.5m Width
48 th Street:	125mm ACP, 175mm GBC,	Averaging 6.2m Width
49A Avenue:	150mm ACP, 150mm GBC,	Averaging 6.0m Width
54 th Avenue	125mm ACP, 150mm GBC,	Averaging 6.0m Width
56 th Avenue:	225mm ACP, 150mm GBC,	Averaging 6.0m Width

These roads are classified as Local Roadways within the Summer Village as they only collect traffic directly from lots and make no other connections to roadways. These roadways do not possess any painted line markings for centreline or shoulders. Although no posted signs are found on site, the posted speed limit of these internal local roads is assumed to be 40 kph, since Sunset Drive is posted at 40 kph.

For roadway geometric standards, Lac Ste. Anne County's General Municipal Servicing Standards can be used for comparison purposes as follows:



ROADWAY MANAGEMENT PLAN

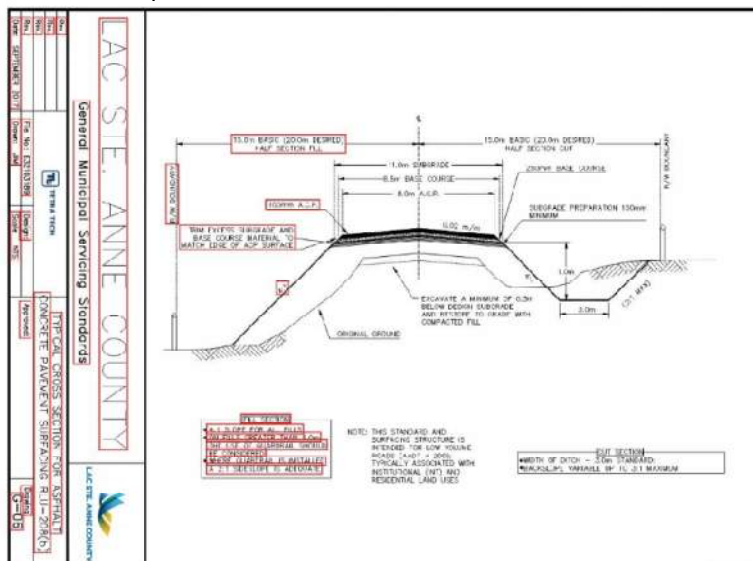
SUMMER VILLAGE OF SUNSET POINT

* AADT = Average Annual Daily Traffic
 ** ROW = Right-of-Way
 † SSD = Stopping Sight Distance
 Note: The recommended design speeds are for internal roadway systems only.

Designation	Surface	AADT*	Truck Traffic	Min. ROW** (m)	Preferred ROW** (m)	Design Speed (km/h)	Posted Speed (km/h)	SSD† (m)	Crest k (m)	Sag k (m)	Min. Horiz. Radius (m)
RLU-207G	Gravel	< 25	None	20	30	40	30	65	7	11	
RLU-208G(a)	Gravel	< 100	Minimal	20	30	60	50	85	15	20	90
RLU-208G(b)	Gravel	< 200	Minimal	20	30	60	50	85	15	20	90
RLU-209G	Gravel	> 200		20	40	60	50	85	15	20	90
RLU-210G	Gravel	> 200	Significant	20	40	70	60	140	35	30	190
RLU-208(a)	Cold Mix	< 200	Minimal	20	40	60	50	85	15	20	90
RLU-208(b)	ACP	< 200		20	40	60	50	85	15	20	90
RLU-209(a)	Cold Mix	< 500	Minimal	20	40	60	50	85	15	20	90
RLU-209(b)	ACP	< 500		40	40	60	50	85	15	20	90
RLU-210	ACP	< 2000		40	40	70	60	140	35	30	190
RLU-211	ACP	> 2000	Significant	40	40	70	60	140	35	30	190
ULU-209	ACP	< 2000		20	30	60	50	85	15	20	90
ULU-211.5	ACP	> 2000	Significant	30	30	70	60	140	35	30	190

Table 1 – Geometric Design Requirements

For these local roads, the posted speed of 40 kph (design speed = 50 kph) is lower than the RLU-208(b) road standard design speed of 60 kph in the County standards shown above. This indicates that design standard used for these local roads is less than the County RLU-208(b) local road standard. This is evident as the local roads are less than 8.0m in road top width. The typical design cross-section for an RLU-208(b) standard with a design speed of 60 kph is shown below.







56 Avenue: Viewing east just east of Sunset Drive.



49 Street Cul-de-Sac: Viewing west into the Cul-de-Sac.

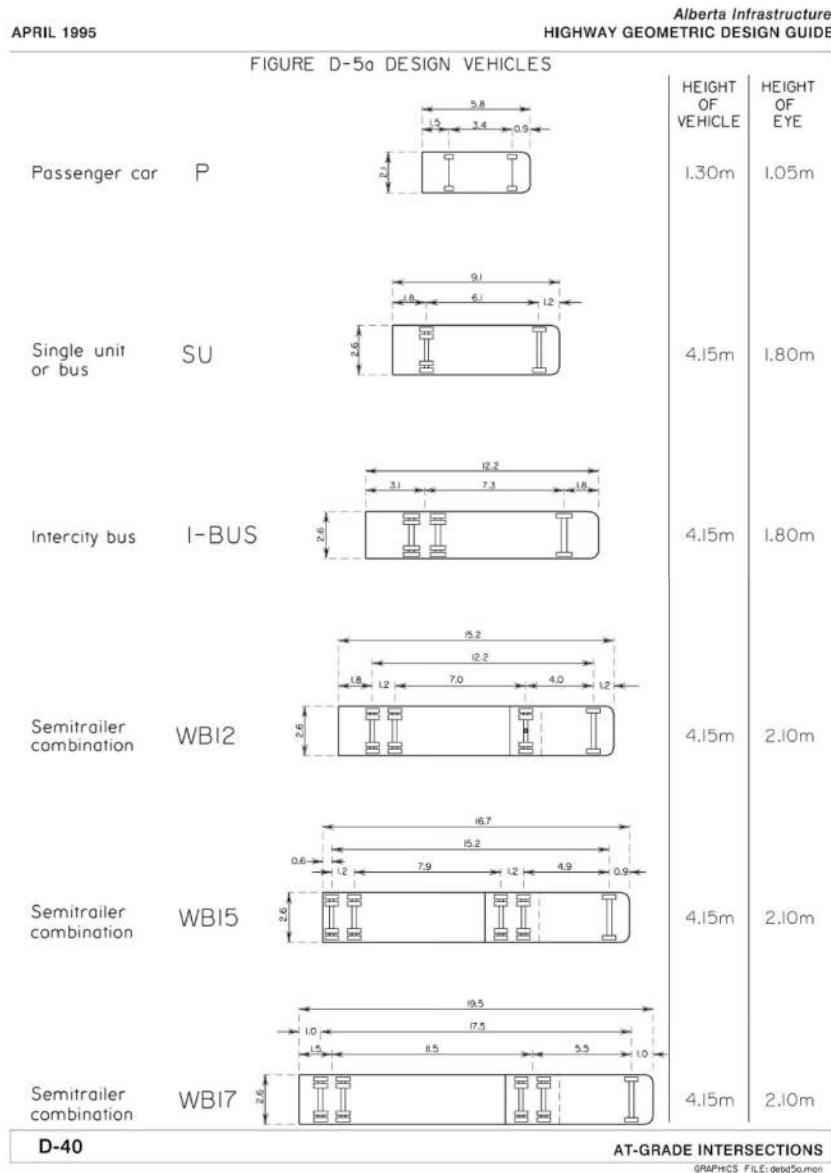
In comparing the existing local roads with the County RLU-208(b) design standard, the existing local roads exhibit the following aspects to design parameters:

Parameter	Design Standard	Local Roads	Result
Posted Speed	50 kph	40 kph	Appropriate to have lower design speed since width is less.
Width	8.0m	6.0 – 6.5m	Less than Design Standard.
Surfacing Structure	100mm ACP 250mm GBC	115-225mm ACP 150-175mm GBC	Near equivalent as the local roads have more ACP, but less trucks.
Sideslopes	4:1	4:1	Same
Ditches	3.0m width	2 – 3m	Near equivalent; not a concern with low posted speed limit.
Backslopes	3:1	3:1	Same

The existing surfacing structure of the local roads will be assessed in the next section using surfacing strength calculations. Sideslopes, ditch widths and backslopes are sufficient with the assumed posted speed of 40 kph.

In review of the **roadway widths**, various roadway widths were measured on the roads inspected. Local roads in Alberta can vary in widths from 5 to 10m. It is important to determine when roadway widths are sufficient to support the proposed traffic and when there may be concerns. The County Road Standards, shown below, tend to relate to new roads that are to be constructed by do not address the numerous existing roads that were built many years ago with lesser levels of service.

Vehicle widths are approximately 2.6m in width as shown below in the Alberta Transportation Design Guide. Therefore, any width less than 5.5m is deemed impassable.



When referring to the Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads, Section 2.2.2, shown below provide some direction on acceptable road widths:



2.2.2 LANE WIDTHS

increase in safety for lane widths beyond the 3.7 m range.³

2.2.2.1 Through Lane Widths

Design Domain: Quantitative Aids

Technical Foundation

Lane width and condition of the roadway surface have a significant influence on the safety and comfort of the travelling public. The capacity of a roadway is markedly affected by lane width, with wider lanes having the ability to carry a larger volume of traffic than a narrower lane. In general, safety increases with wider lanes up to a width of about 3.7 m. There is no further

Lane widths are dependent upon design speed and the volume of traffic the roadway is intended to carry, and the number and types of trucks on the roadway. Design domain widths for rural two-lane roadways are provided in Table 2.2.2.1 while lane widths for multilane rural roadways are given in Table 2.2.2.2. Lane widths for through lanes on urban roadways are provided in Table 2.2.2.3.

Table 2.2.2.1 Lane Widths for Two-Lane Rural Roadways

Design Speed (km/h)	Classification and Design Hour Volume					
	Local	Collector Design Hour Volume			Arterial Design Hour Volume	
		<250	250-450	>450	<450	>450
30, 40	3.0 - 3.7					
50	3.0 - 3.7	3.3 - 3.7	3.3 - 3.7	3.5 - 3.7		
60	3.0 - 3.7	3.3 - 3.7	3.3 - 3.7	3.5 - 3.7		
70	3.0 - 3.7	3.5 - 3.7	3.5 - 3.7	3.7		
80	3.0 - 3.7	3.5 - 3.7	3.5 - 3.7	3.7	3.5 - 3.7	3.7
90	3.3 - 3.7	3.5 - 3.7	3.5 - 3.7	3.7	3.5 - 3.7	3.7
100	3.3 - 3.7	3.5 - 3.7	3.5 - 3.7	3.7	3.5 - 3.7	3.7
110					3.7	3.7
120					3.7	3.7
130					3.7	3.7

Table 2.2.2.2 Lane Widths for Multilane Rural Roadways

Design Speed	Lane Width (m)
less than 100 km/h	3.5 - 3.7
100 km/h and greater	3.7

As per Table 2.2.2.1, road widths for Collector Roads are required to be 7.0m minimum for Design Hour Volumes of 450 or less. Road widths for Local Roads are required to be 6.0m minimum. Therefore, a 6.0m minimum road width for a posted speed of 40 kph is acceptable and hence the existing width on the Local Roads is sufficient. Also, the existing traffic volumes and projected traffic volumes from the new development will be very low in comparison to the roadways requiring more width. All local roadways measured during this assessment meet or exceed this criterion.

It is important to note that Design Standards are mainly for new development and do not differentiate between development of a new road versus upgrading/rehabilitating an existing road. Most of the local roads in Alberta were built many years ago and likely followed a lower set of standards than is used today. Therefore, there must be some engineering judgement used in regards to which parameters of the standards can be allowed some flexibility when applying them to these existing roads. Other jurisdictions such as Alberta Transportation provide allowances for rehabilitation of existing roadways with some flexibility towards the roadway standards. These standards are known as the 3R/4R Geometric Design Guidelines. The purpose of these guidelines is "to extend the service life of existing paved highways and enhance highway safety on a network basis. To accomplish this objective, the standards focus on the most safety-cost effective improvements and also encourage the use of low-cost opportunities to improve safety where major reconstruction is not cost-effective".

It is also important to note that narrow roads often act as a traffic calming mechanism in which motorists have a tendency to speed above the posted speed when the roadway is wider.

The existing surfacing structures of the Local Roads are sufficient for the existing traffic since existing truck traffic is very low with no large tractor trailer traffic. Water truck deliveries and waste collection are only concern for heavy loading presently and could be reduced with more use of the West Inter Lake District (WILD) Regional Water Services Commission supply line. Potential future developments are not projected to add any large or heavy truck traffic, except for, construction and waste removal, however should be reviewed. Geometric parameters of Sunset Point are sufficient for a local road standard with a posted speed of 40 kph.

The Geotechnical Report performed in conjunction with this document preparation, indicated that within Test Holes 01 to 03 the water table was approximately 1.5m below the surface of the Sunset Drive. Since most of the Local Roads are higher in elevation than Sunset Drive, this is not too concerning except locations of major drainage paths along the local roadway such as 48A Avenue. In order to help alleviate this, the

ditches along 48A Avenue where heavy flow occurs could be lowered to help keep the road structure drained and minimize moisture infiltration into the subgrade.

In summary, the Local Roads appear to be in an acceptable condition, however should be monitored for future breaks/failures and heavy loadings that could substantially damage isolated areas.



4.3 Front Service Roads

There are two locations of Front Service roads in the Summer Village as follows:

- Klinkhammer Park, E. Side of Sunset Drive: 110m gravelled/asphalt bound
- 54th Ave. to 56th Ave., E. Side of Sunset Drive: 400m gravelled/asphalt bound

These roads can be assumed to be a form of Local Road and likely should follow a similar standard.



In comparing the existing front service roads with the County RLU-208(b) design standard, the existing local roads exhibit the following aspects to design parameters:

Parameter	Design Standard	Local Roads	Result
Posted Speed	50 kph	40 kph	Significantly less, hence some deficiencies in parameters can be allowed.
Width	10.0m	5.0 – 6.0m	Widths may be narrow but more width available on flat sideslopes
Surfacing Structure	100mm ACP 300mm GBC	Gravel with thin asphalt bound layer for dust control	Near equivalent but less truck traffic occurs on Sunset Drive.
Sideslopes	4:1	4:1	Same
Ditches	3.0m width	Shallow to None	This is an issue and a likely cause of poor surface conditions.
Backslopes	3:1	3:1	Same

The Front Service roads are exhibiting significant surface failures in the forms of pot holing and breakages which hold water and expand the deterioration of the roadway. The road surfaces are also out of shape, with little to no crown to allow for runoff. Drainage is limited to shallow ditching and runoff comes often from the lots directly onto the road in places of no ditches. Widths should also be review and should be at least 6.5m or 7.5m if re-construction were to occur.

It is recommended that the Front Service roads be scheduled for re-construction with a widening component, with grade raising and ditch creation. Approaches into lots will require an approach with new culverts that convey drainage through new centerline culverts under the roads. Surfacing of the Front Service roads should be considering and include a minimum structure of 100mm of ACP over 250 - 300mm of GBC.

4.4 Back Lane Roads

There are three locations of Back Lane roads in the Summer Village as follows:

44th Avenue:	180m	gravelled/asphalt bound
45 th to 47 th Avenue:	345m	gravelled/asphalt bound
54 th Ave. to 56 th Ave.:	510m	gravelled/asphalt bound

ROADWAY MANAGEMENT PLAN

SUMMER VILLAGE OF SUNSET POINT

There is no precise roadway standard for back lanes and can vary in form and application in municipalities. Photos of the Summer Village's Back Lanes are shown below.



44th Avenue Back Lanes



45th – 47th Avenue Back Lanes



54th – 56th Avenue Back Lanes



The Back Lane roads are exhibiting significant surface roughness and softening in the forms of pot holing and breakages which hold water and expand the deterioration of the roadway. The road surfaces are also out of shape, with poor crowning to allow for runoff. Drainage is limited to shallow ditching and runoff comes often from the lots directly onto the lanes in places of no ditches. Widths are very narrow and often less than 5.0m. Some of the surfaces are graveled only or have some form of asphaltic surfacing of poorer quality, likely more for dust abatement.

Due to the variance in existing lane construction, it is recommended that a strategy be prepared for the Back Lanes in the form of a Lane standard that specifies width, crown type, drainage control and structural surface.

5. TRAFFIC COUNTS

In order to better understand the existing roadway network in the Summer Village, traffic volumes are needed. Two traffic counts were recently taken within the area at key interface locations between Minor Collectors and Local Roads. Previous Traffic Impact Assessments will be utilized to help project traffic volumes in the future with projected development.

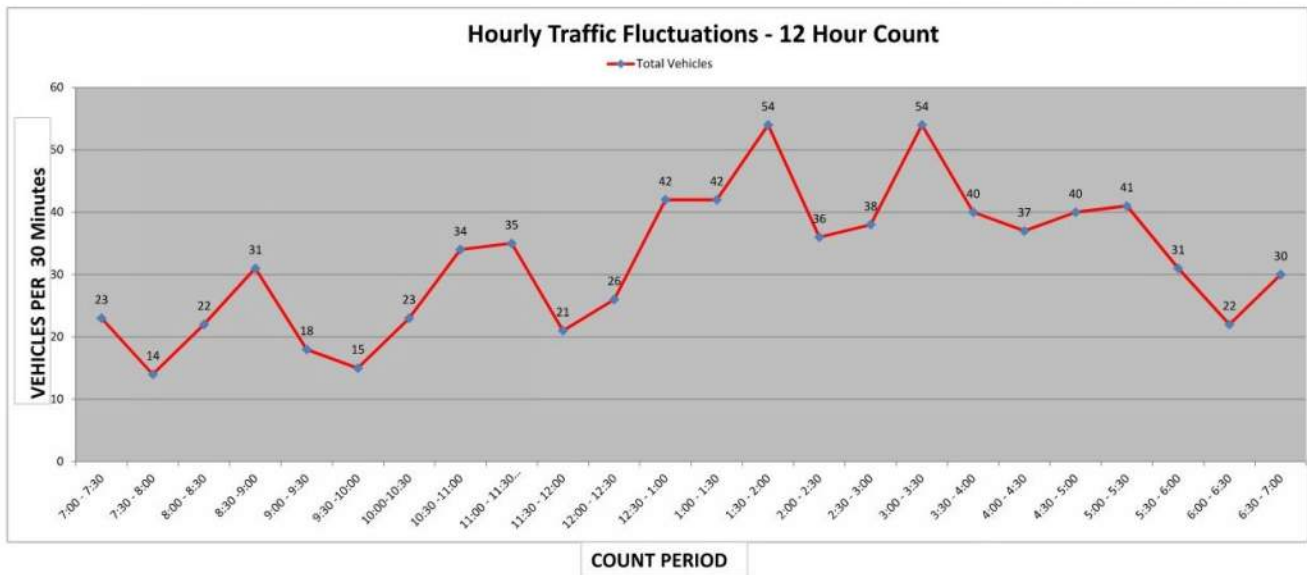
In order to better understand the existing traffic volumes in the area the development will be accessing, a traffic count was conducted on Mar. 5, 2021, and Apr. 19, 2021, as shown below.



The raw data collected, the 12-Hour Turning Movement Diagrams and the 12-Hour count graph are shown in Appendix A. The converted Turning Movement Diagrams for each traffic count is shown below and in Appendix A. The conversion from the 12-Hour counts were made from nearby permanent traffic counters located on Highway 43. The conversion process used the same procedure and consultant that Alberta Transportation uses for all of their traffic count conversions.



Sunset Drive & 48A Avenue, Mar. 5, 2021



ROADWAY MANAGEMENT PLAN

SUMMER VILLAGE OF SUNSET POINT



DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: Sunset Drive INTERSECTION OF: Sunset Dr. & 48A Avenue
 REFERENCE NO.: H5340-TC1 LEGAL DESCRIPTION: SV of Sunset Point
 DAY & DATE OF COUNT: Mar 5, 2021 COUNT DURATION: 12 Hours

INTERVAL	APPROACHING INTERSECTION															TOTALS											
	FROM THE EAST ON					48A Avenue					FROM THE WEST ON																
	LEFT					THROUGH					RIGHT																
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E		
7:00 - 7:30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
7:30 - 8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 - 8:30	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:30 - 9:00	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	5	
9:00 - 9:30	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
9:30 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:00-10:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
10:30 - 11:00	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
11:00 - 11:30 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 - 12:00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
12:00 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 - 1:00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
1:00 - 1:30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
1:30 - 2:00	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
2:00 - 2:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
2:30 - 3:00	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
3:00 - 3:30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
3:30 - 4:00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
4:00 - 4:30	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
4:30 - 5:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
5:00 - 5:30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
5:30 - 6:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
6:00 - 6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30 - 7:00	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E		
TOTALS	36	0	0	3	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	43

LOCATION DIAGRAM ENCLOSED (Y/N):
 WEATHER CONDITIONS:
 RECORDER(S):
 COMMENTS:

VEHICLE CLASSES				
A: PASSENGER VEHICLES	B: RECREATION VEHICLES	C: BUSES		
D: SINGLE UNIT TRUCKS	E: TRACTOR TRAILER COMBINATIONS			

INTERVAL	APPROACHING INTERSECTION															TOTALS	GRAND TOTALS																		
	FROM THE NORTH ON					Sunset Drive					FROM THE SOUTH ON							Sunset Drive																	
	LEFT					THROUGH					RIGHT							LEFT					THROUGH					RIGHT							
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
7:00 - 7:30	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	23		
7:30 - 8:00	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14			
8:00 - 8:30	0	0	0	0	0	8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	22			
8:30 - 9:00	0	0	0	0	0	12	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	31			
9:00 - 9:30	0	0	0	0	0	8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	18			
9:30 - 10:00	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15			
10:00-10:30	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	23			
10:30 - 11:00	0	0	0	0	0	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	34			
11:00 - 11:30 pm	0	0	0	0	0	13	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	35			
11:30 - 12:00	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	21			
12:00 - 12:30	0	0	0	0	0	10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	26			
12:30 - 1:00	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	42			
1:00 - 1:30	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	42			
1:30 - 2:00	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	54			
2:00 - 2:30	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	36			
2:30 - 3:00	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	38			
3:00 - 3:30	0	0	0	0	0	23	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	54			
3:30 - 4:00	0	0	0	0	0	13	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	40			
4:00 - 4:30	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	37			
4:30 - 5:00	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	40			
5:00 - 5:30	2	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	41			
5:30 - 6:00	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	31			
6:00 - 6:30	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	22			
6:30 - 7:00	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	30			
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E					
TOTALS	2	0	0	0	0	310	3	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	726	769		

LOCATION DIAGRAM ENCLOSED (Y/N):
 WEATHER CONDITIONS:
 RECORDER(S): MoVision Camera
 COMMENTS:

VEHICLE CLASSES				
A: PASSENGER VEHICLES	B: RECREATION VEHICLES	C: BUSES		
D: SINGLE UNIT TRUCKS	E: TRACTOR TRAILER COMBINATIONS			

ROADWAY MANAGEMENT PLAN

SUMMER VILLAGE OF SUNSET POINT

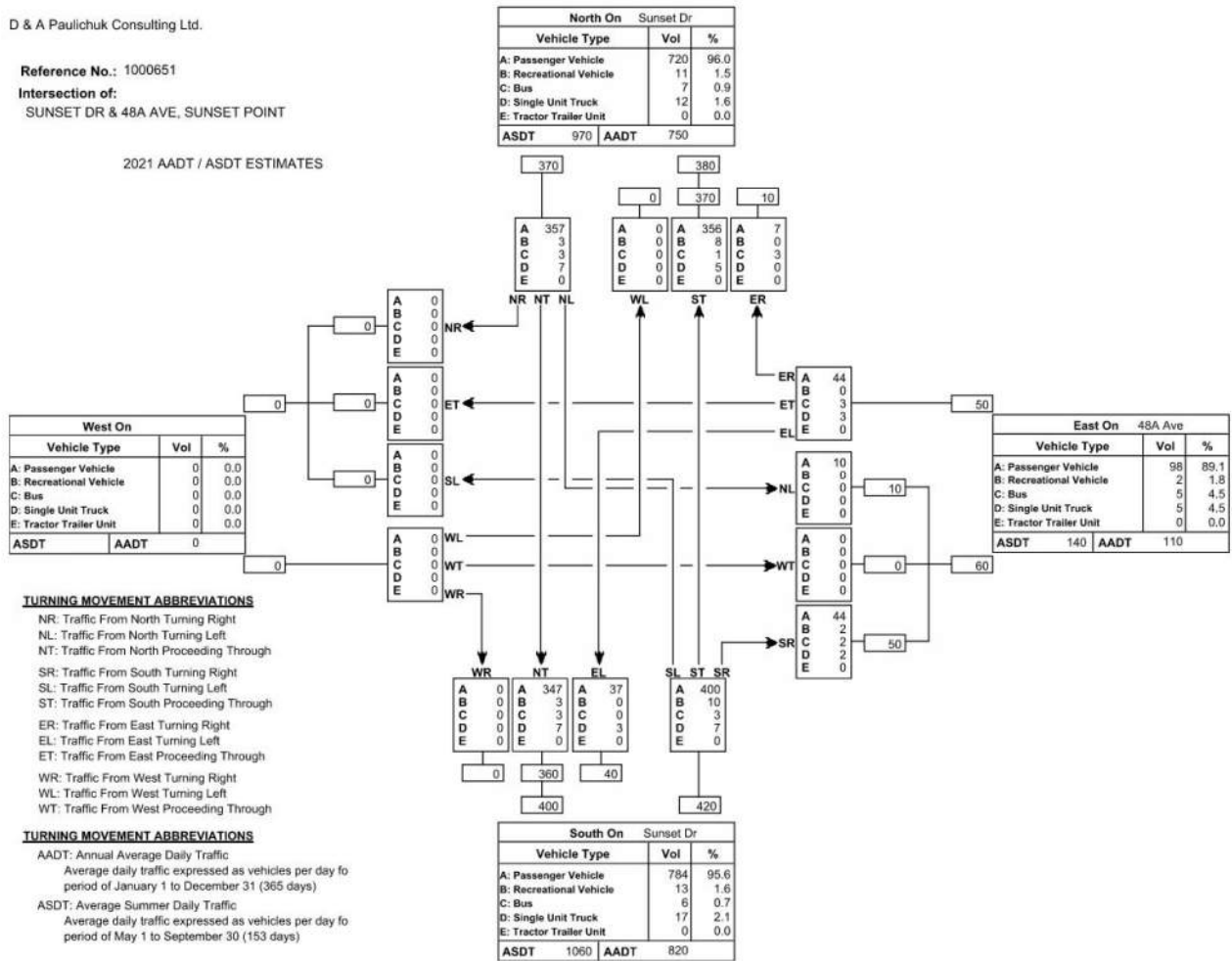
D & A Paulichuk Consulting Ltd.

Reference No.: 1000651

Intersection of:
SUNSET DR & 48A AVE, SUNSET POINT

2021 AADT / ASDT ESTIMATES

Turning Movement Summary Diagram

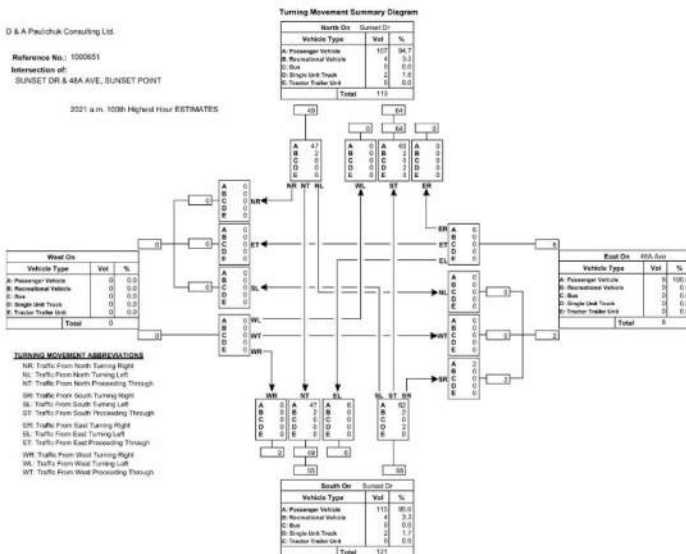


D & A Paulichuk Consulting Ltd.

Reference No.: 1000651

Intersection of:
SUNSET DR & 48A AVE, SUNSET POINT

2021 a.m. 100th Highest Hour ESTIMATES

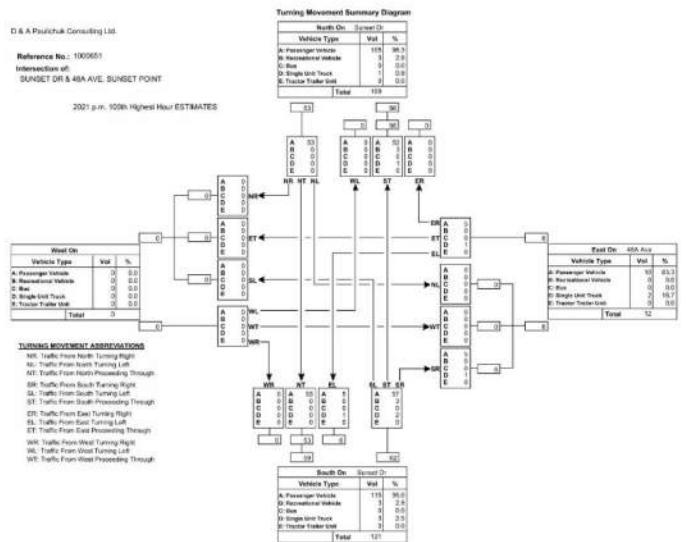


D & A Paulichuk Consulting Ltd.

Reference No.: 1000651

Intersection of:
SUNSET DR & 48A AVE, SUNSET POINT

2021 p.m. 100th Highest Hour ESTIMATES



The AADT is calculated using ATR data that was available from January 1, 2021 up to and including the actual date of the manual count. The effects of COVID-19 are taken into account during the calculations. ATR's are chosen based on proximity and in some cases based on similar traffic characteristics.

The Methodology used for determining 100th highest Peak Hour Turning Movements: The AM / PM peaks are determined by applying the assigned ATR 100th highest hour factor (ATR AADT / ADT 100th highest observed hour) to the highest leg AADT of desired manual count, which provides the 100th highest hour factor for that particular count. The factor is then applied to the AM or PM observed manual peak hour (highest total volumes observed in an hour) turning movement volumes.

Estimated AADT traffic volumes for key roads within the Summer Village are shown below. It should be noted that summer traffic volumes could increase dramatically (50 – 100%) since the area is mainly comprised of summer cottages.



6. TRAFFIC GROWTH & FUTURE PROJECTIONS

The following historical traffic data for Highway 633:02 is available from the Alberta Transportation's website, which indicates a growth rate of approximately 1.31% for the east leg of Hwy. 633:02 at RR 32, from 1997 to 2019 (22 years).

Historical Traffic Volumes – Hwy. 633:02 & Rge. Rd. 32

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AADT	2570	2570	2530	2530	2530	2650	2650	2650	2650	2620	2600	2340

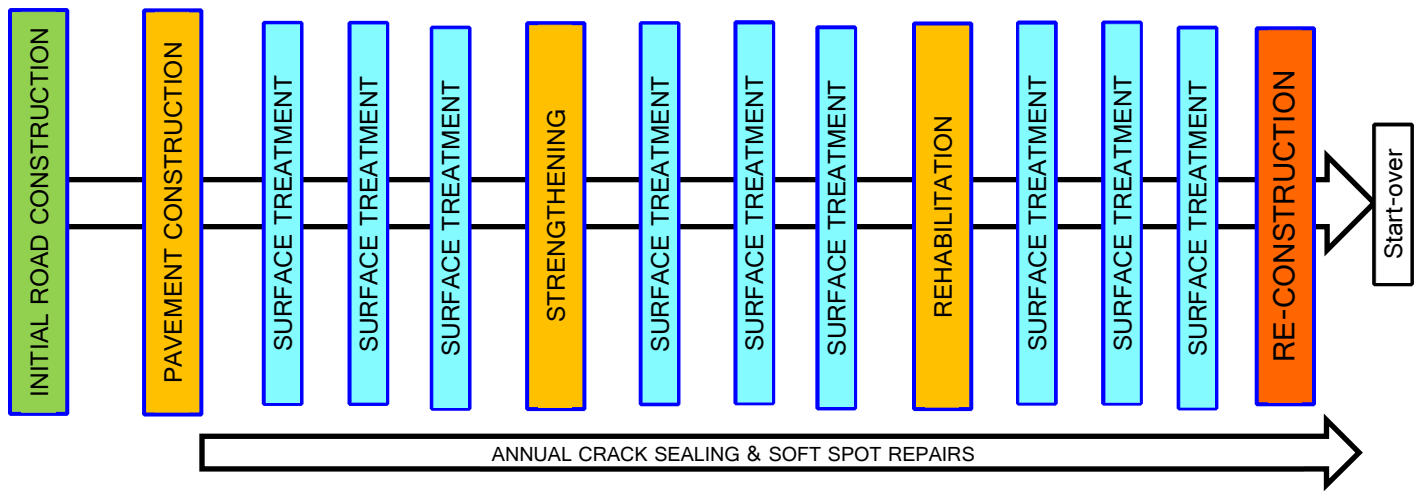
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
AADT	2020	2120	2200	2240	2340	2340	2370	2430	2450	2460	2540	2570

A growth rate of 2.0% will be used for projecting traffic on Sunset Drive for the next 20 years. A growth rate of 0.00% will be used on Local Roads, since no other development is planned for the area. Projected AADT values are shown below:



7. ROADWAY SUSTAINABILITY CYCLES & PLANS

In order to develop a Plan to sustain the operation of roadway to acceptable levels of standards, maintenance functions can be viewed as a life cycle from initial construction to when major re-construction or replacement is required. A typical life cycle for roadways is illustrated as follows:



In this case above, the roadway life never ends but just continues on with annual crack sealing & soft spot repairs, intermittent surface treatments, pavement overlays for strengthening and cold mill pavement inlays for rehabilitation. Using a cyclic plan of maintaining the road will extend the life of the road that ultimately avoids full re-construction. Letting a road get to stage of dis-repair will inevitably result in reconstruction as the only remedy. Reconstruction is obviously undesirable since it can be even more costly than the initial road construction.

Using the above strategy, each of the road types within the Summer Village can be programmed for cyclic actions in order to maintain its operational quality.

7.1 Road Maintenance Methods

Crack Sealing

The Summer Village engages in regular annual crack sealing of all its paved roads in the Summer Village. This one single exercise can be viewed as the most important method of maintaining the quality of roads and extension of the road life span. If moisture is allowed to penetrate the road surface and entering the pavement and base, a larger crack is formed which lets more moisture in and evolves into a pot hole.

This the start or more expensive repairs and if left unattended can destroy an entire road surfacing structure. It is highly recommended that this continue and continue annually. Below are some photos from some of the recent crack sealing in the Summer Village.



Soft Spot Repair

Soft spots can occur for various reasons or from various sources. As noted above, one source is surface penetration of water. Another maybe isolated moisture pockets that are trapped below the surface in the subgrade and/or base course. These types of failures need to be treated with the same regularity and urgency as crack sealing every year. Each year, the roads should be inspected for soft spot failures and marked out for repair. These are often identifiable by “alligator-type” cracking which indicates a deep structural weakness that will need to be dug out and corrected. Other soft spot failures include pavement breakups, block cracking and settlements.

Soft spots should be budgeted for periodically, just like crack sealing if necessary. The repair should include excavation of the road, approximately 0.3 to 1.0m below the surface, depending on the type of failure. If the soft spot is a trapped moisture failure, the excavation should be daylighted out to one side of the road so that the area can drain into the ditch. Backfill can include woven geotextile, geogrid, granular base course and pavement.

Strengthening – Pavement Overlays

As road subgrades (clay portion) age over time, moisture continues to migrate up into the road embankment thus weaken the overall structural strength. A road is strongest at its initial construction and then slowly gets weaker and weaker as it ages. For this reason, eventually the road will need to be strengthen to make up for the loss of strength in the subgrade. This can be best accomplished by providing periodic pavement overlays to the roadway. Usually this is in the form of a one lift overlay on

municipal roadways and multiple lifts on heavier used roadways such as provincial highways. Pavement overlays have the advantage of providing more strength, filling in rutting and sealing the old pavement surface. One disadvantage is that new pavements are fairly smooth and can be slippery with heavy rain, ice or snow. Pavement overlays are designed to last over 10 – 25 years normally.

Micro-Surfacing

Sunset Drive is presently in a surface treatment stage that includes a Micro-Surfacing treatment that was applied several years ago.

Micro-Surfacing is best explained as a “porridge-like” material that comprises of a polymer modified asphalt emulsion mixed with sand and small aggregates that is approximately 7 – 10mm in thickness. It is applied using a slurry box, similar to a paver screed. Its primary attributes are to seal the pavement surface and fill in rutting in the wheel paths. It also increases skid resistance and is more environmentally friendly.



Existing Micro-Surfacing on Sunset Drive



The existing Micro-Surfacing on Sunset Point has been monitored over the last 3 years and is performing very well on Sunset Drive. Micro-Surfacing has proven not to perform well where there are high traffic volumes and there is 10 – 20% of heavy truck traffic such as provincial highways. However, for Sunset Drive it has proven to last and

maintain the seal over the pavement. For this reason, Micro-Surfacing will be proposed for more future surface treatments for all roads in the Summer Village.

Micro-Surfacing will need to be performed in conjunction with other jurisdictions in order to obtain a reasonable construction price. The Summer Village alone does not possess enough roads to form a desire for the few contractors in the province to mobilize for. Therefore, planning for this work will not just include obtaining funding, but timing with others.

Rehabilitation – Cold Mill and Pavement Inlays

The cycle of pavement overlays cannot go on forever due to the narrowing effect that occurs with applying a slope on the side of the pavement so motorists do not abruptly fall off on. For a 50mm pavement overlay, approximately 0.4m of overall road width can be lost. For a roadway that is only 6.0 – 6.5m wide, this can be substantial and very undesirable. For this reason, at some point in the cycle of maintaining the roadway, the road will be needed to be cold milled down and then replaced with new pavement. This does not have the same strengthening effect as a standalone pavement overlay, however if deep enough can provide enough strength for a shorter period of time.

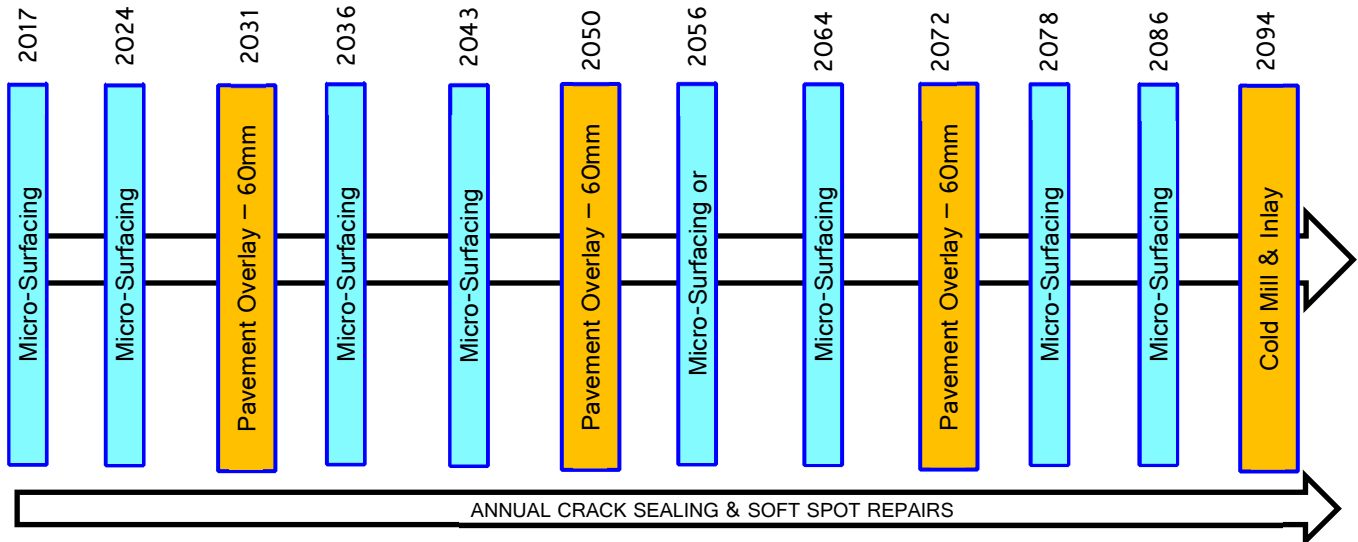
Due to the narrow road widths within several roads in the Summer Village will need to be used at some point.

Re-Construction

Re-construction of the roadways is not necessarily ripping up the entire roadway and re-building it from the beginning again. In most cases, the subgrade is usually maintained and the surfacing structure is recycled by grinding up its full thickness and laid down as a sub-base. This grinding of the old pavement and base course is called full depth recycling and is usually completed in conjunction with grade widening of the subgrade so that the final road width is increased. The grinding can either be removed and used elsewhere or placed down as a sub base. New base course and pavement is then placed on top of the sub base. Full depth recycling is the more inexpensive method of re-construction; however, it does still represent a substantial cost in the life cycle of the roadway and is avoided for as long as possible.

7.2 Sunset Drive (50th Street)

Sunset Drive is presently in a surface treatment stage that includes a Micro-Surfacing surface treatment placed on the pavement several years ago. The following cycle is estimated for Sunset Drive as a whole.



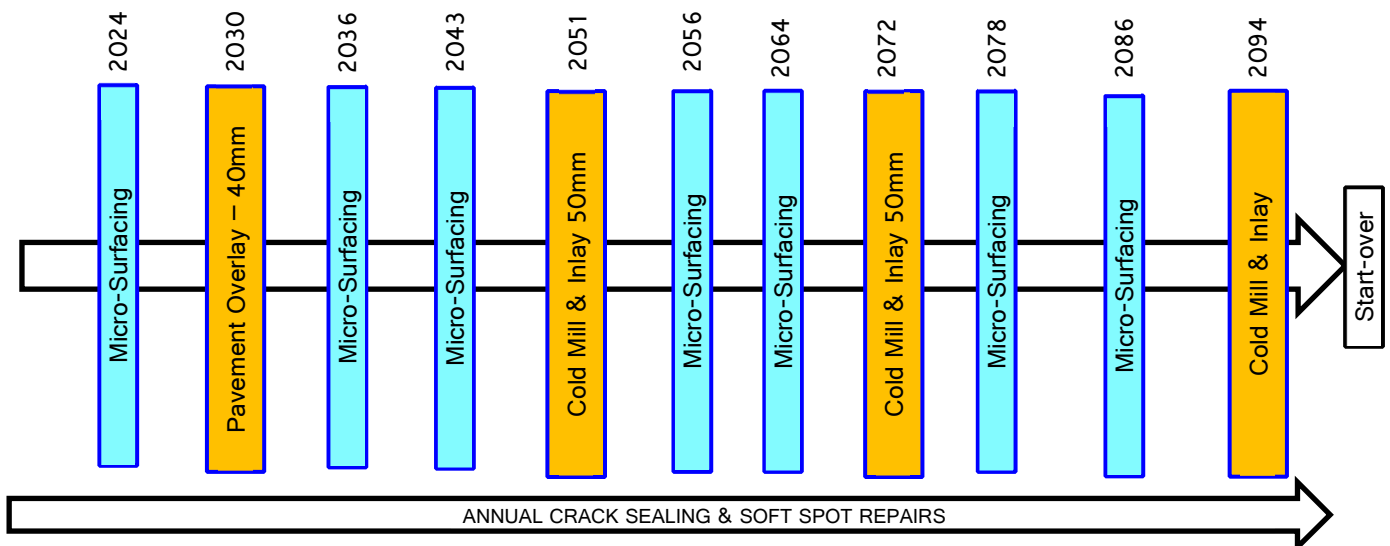
Pavement overlays are anticipated to last 19 – 22 years with a good maintenance program. Micro-Surfacing can last for 7 – 8 years. Presently Sunset Drive is in good condition and only requires regular periodic maintenance. The above schedule is using 5 – 8 years as a basis of required actions, however this is dependant on traffic growth, precipitation in the area and overall performance of the pavement and micro-surfacing. Micro-surfacing will need to coincide with Local Road micro-surfacing, so the timing may be affected by this as well.

Cost estimates for this work and timing schedule spreadsheet is provided in Appendix D.

7.3 Local Paved Roadways

It is assumed that all paved local roads are in the same condition and age. This includes the following local roads:

- 48A Avenue
- 48th Street
- 49A Avenue
- 54th Avenue & 49th Street Cul-de-Sac
- 56th Avenue & 49th Street Cul-de-Sac



Pavement overlays are anticipated to last 20 – 22 years. Presently the Local Roads are in fair to good condition and mainly requires regular periodic maintenance. A pavement overlay will likely be required on the Local Roads prior to Sunset Drive needing paving; however, this may change. The above schedule is using 6 – 8 years as a basis of action required, however dependant on traffic growth, precipitation in the area and overall performance of the pavement and micro-surfacing. Micro-surfacing will need to coincide with Sunset Drive micro-surfacing, so the timing may be affected by this as well.

Cost estimates for this work and timing schedule spreadsheet is provided in Appendix D.

8. ROADWAY IMPROVEMENT PLANS

Not all of the roadways within the Summer Village are ready to follow a regular maintenance cycle plan. These roadways can either be maintained as there are or improved into a better condition. This section explores the improvements and costs of these roads, and then their required regular maintenance cycle plan.

8.1 Front Service Roadways

The front service roadways are as follows and are in similar existing conditions:

Klinkhammer Park, E. Side of Sunset Drive:	110m gravelled/asphalt bound
54 th Ave. to 56 th Ave., E. Side of Sunset Drive:	400m gravelled/asphalt bound

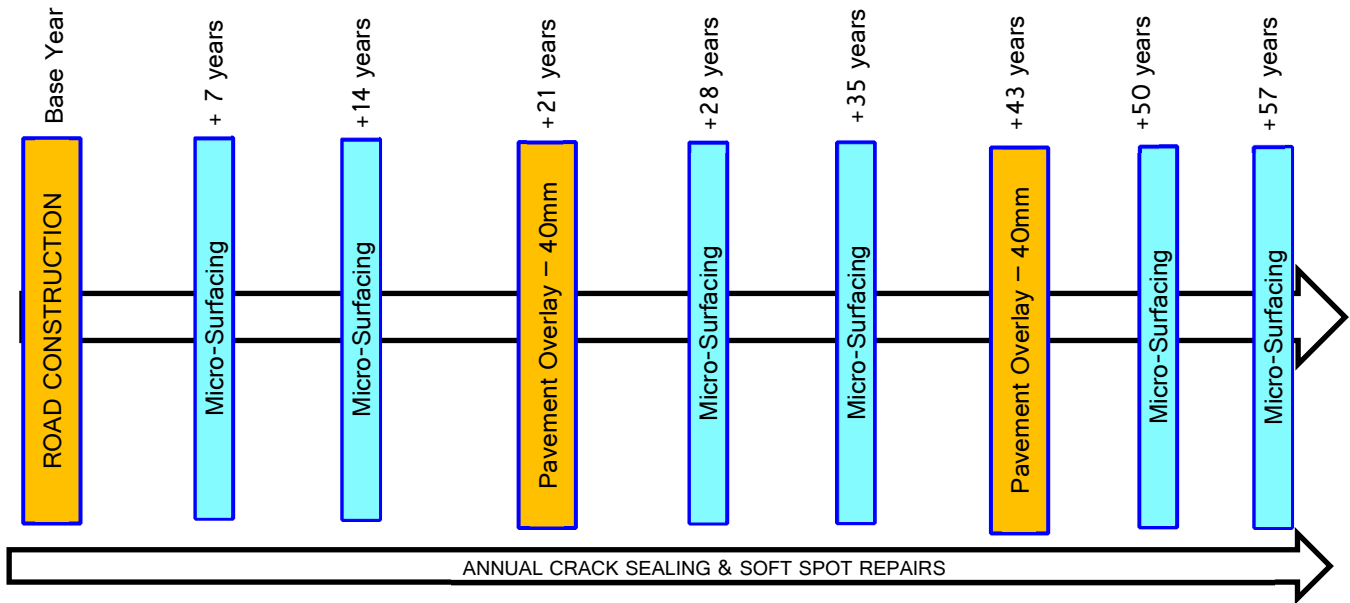
Presently these service roads are in poor condition due to the elevation of the roadway being with shallow or no ditches. These surfaces contain regular pot holing, wash boarding and soft spots that are difficult to fix since the road has no crown to drain off water. Every time it rains, moisture is contained on the roadway surface and thus continues to cause issues.

In order to improve this, the drainage on these roadways needs to be corrected. The road elevations are low, basically flush along the lot side of road. The existing road base should be undercut by 0.3m and re-compacted. A shallow 0.5m ditch should be dug on the east side to collect runoff from the lots. The road should be built up using 300mm of Granular Base Course and 100mm of Asphalt Concrete Pavement. Road width should be 7.0 – 7.5m minimum. Accesses to each lot will require some transitional approach construction comprising of Granular Base Course into the lot. Small 400mm culverts should be installed in the ditch at each approach location. The approaches are assumed to not be paved and would be the lot owner's cost.



Cost estimates for this work and timing schedule spreadsheet is provided in Appendix D and E which include \$175,000 for the Klinkhammer Park front service roads and

\$550,000 for the 54th – 56th Avenue front service roads. Upon completion of the road improvements, a regular schedule of maintenance should be followed:



8.2 Back Lane Roadways

The back lane roadways are as follows and must be addresses separately since their existing conditions vary:

44th Avenue:	180m	gravelled/asphalt bound
45 th to 47 th Avenue:	345m	gravelled/asphalt bound
54 th Ave. to 56 th Ave.:	510m	gravelled/asphalt bound

A back lane standard is first required to address the need for improvements. At the time of this document preparation, this standard was not available.



9. COSTING COMPONENTS

For each of the components of maintenance, repair and construction noted in this PLAN have been cost estimated in detail in order to use in the future for planning, budgeting and programming. Cost Estimate details are shown in Appendix E. Each item is summarized below:

Annual Maintenance Activity

Crack Sealing:	\$ 3,000/year
Line Painting:	\$ 5,000/year
Snow Clearing:	\$ 12,000/year

Periodic

Soft Spot Repairs (5 soft spots):	\$ 20,000/year
Front Service Pot Hole Repairs & Graveling:	\$ 25,000/year
Back Lane Pot Hole Repairs & Graveling:	\$ 22,000/year
Permanent Sign Replacements:	\$ 5,000/year

As Per Schedule

Micro Surfacing (based on combining work with other municipalities):

Sunset Drive:	\$ 210,000
Local Roads:	\$ 85,000
Front Service Roads:	\$ 28,000

Pavement Overlay

Sunset Drive – 50mm 1 st Overlay:	\$ 750,000
Sunset Drive – 50mm 2 nd Overlay:	\$ 730,000
Local Roads – 40mm:	\$ 360,000
Front Service Roads – 40mm:	\$ 110,000

Cold Mill & Inlay

Sunset Drive – 60mm @ 8m width:	\$ 855,000
Local Roads – 50mm @ 6m width:	\$ 510,000

ROADWAY MANAGEMENT PLAN

SUMMER VILLAGE OF SUNSET POINT

Cost estimates above are based on 2021 unit prices for roadway maintenance and construction work and do not include an allowance for inflation or deflation in the market. It is recommended that all work be periodically put out to competitive tenders or quotations to ensure price control.

10. BUDGETING

Using each of the roadway improvement plans for each of the costing components for each year, a budget can be estimated and predicted. The following graph illustrates the budgeting for the Summer Village's roadways for the next 30 years:

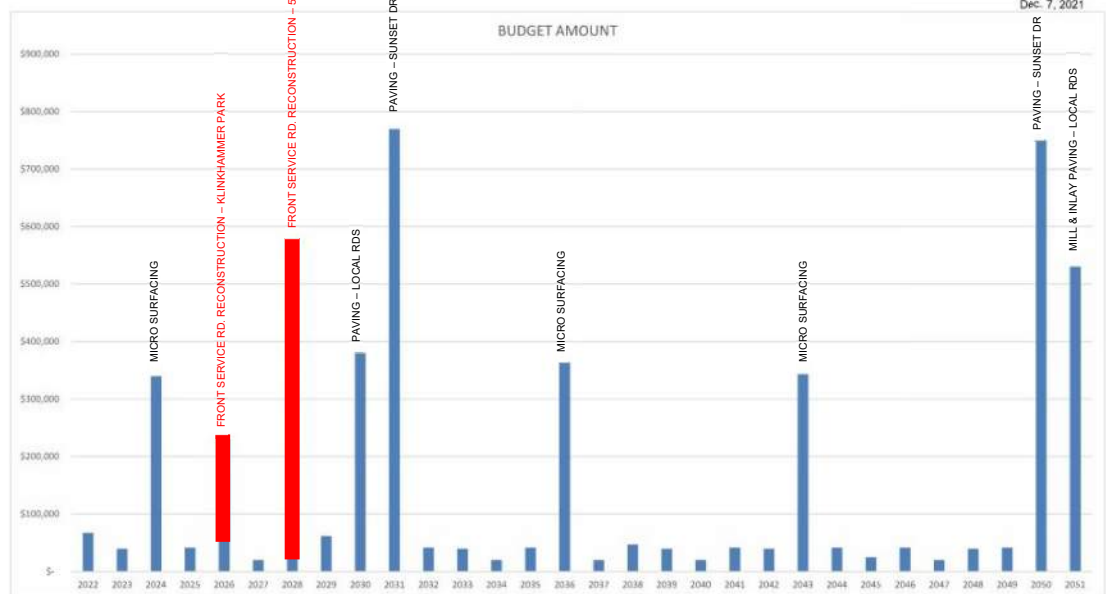


ROADWAY MANAGEMENT PLAN



Dec. 7, 2021

YEAR	BUDGET AMOUNT
2022	\$ 67,000
2023	\$ 40,000
2024	\$ 340,000
2025	\$ 42,000
2026	\$ 230,000
2027	\$ 20,000
2028	\$ 575,000
2029	\$ 82,000
2030	\$ 390,000
2031	\$ 770,000
2032	\$ 42,000
2033	\$ 40,000
2034	\$ 20,000
2035	\$ 42,000
2036	\$ 363,000
2037	\$ 20,000
2038	\$ 47,000
2039	\$ 40,000
2040	\$ 20,000
2041	\$ 42,000
2042	\$ 40,000
2043	\$ 343,000
2044	\$ 42,000
2045	\$ 25,000
2046	\$ 42,000
2047	\$ 20,000
2048	\$ 40,000
2049	\$ 42,000
2050	\$ 750,000
2051	\$ 530,000



Note: Red bars indicate that these costs are optional

The above graph illustrates the financial needs for roadway operation, maintenance and rehabilitation. The operational costs will always be required every year such as snow clearing. Line painting and crack sealing are recommended every year, however upon inspection by a professional engineer, these functions could be extended to every 2 years if not required. Soft Spot repairs are allowed for approximately every 3 years and can fluctuate in timing by +/- 2 years. Micro Surfacing

is necessary to preserve the pavement surface quality and is estimated to be required every 5 – 8 years and can fluctuate on when it is required. Pavement overlays and milling with pavement inlays are planned for 19 – 23 years of life span, however with an aggressive schedule of crack sealing, soft spot repairs and micro surfacing, pavement overlays could be extended to potentially 25 years of life.

The items shown in red are option improvement items that are placed strategically to minimize large budget years. The need is dependant on the wear and maintain of these existing roads and the desire to improve them in order to minimize maintenance costs. Without improvements, an allowance for maintenance of these roads such as annual gravelling and pot hole repair will be necessary. These costs are included up to the time of major improvements in the above costs.

Back lane maintenance is assumed to be required every 3 – 4 years. An improvement strategy has not been provided in this Plan since there is no present standard for back lanes in the Summer Village and would need to be established. For now, periodic maintenance is assumed.

It is important to note that the above scheduling is only an estimate and is subject to change due to the conditions of the road and surroundings, particularly moisture and traffic loading. It is highly recommended that this Plan and its budget scheduling be reviewed annually or at least every two years

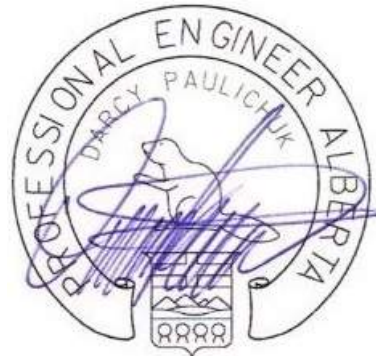
Overall, scheduling of rehabilitation improvements may be limited by funding availability and will need to be prioritized accordingly. This report represents a recommended improvement schedules and frequencies. Changes to this may be necessary due to funds as well as the details of treatment.

11. CLOSURE

The contents of this document have been prepared using existing available information, site observations and engineering judgement and experience. It is important to note that scheduling, cost estimates and plans are subject to change or require modification over time. Cost estimates are based on only preliminary assessment of site conditions and should be followed with more detailed design by a professional engineer. Roadway conditions should be monitored annually along with regular updates to this Roadway Management Plan.



Darcy O. Paulichuk, P. Eng.



Dec. 9, 2021

APEGA Permit to Practice Number: P12132

APPENDIX A

Summer Village Address Map

APPENDIX B

Geotechnical Report

APPENDIX C

Traffic Count Data

APPENDIX D

Detailed Cost Estimates

APPENDIX E

Budget Programing/Budgeting Spreadsheet