StoneGate Meadows

Area Structure Plan

July 15, 2021

Bylaw #: 1101-21

prepared for the developers:

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1. INTRODUCTION

1.1. Background

The StoneGate Meadows subdivision is located on the land directly east of the Hell's Creek Golf & Footgolf Course (located on all four quarters of 9-6-20-W4)[1]. It extends from the Golf Course east to Range Road 203, and from Highway 52 south to the irrigation canal[2]. The total subdivision is comprised of 74 hectares (183 acres). Phases 1 & 2 of the project have been completed under the previously approved Conceptual Design Scheme (DA2009-CDS01) as amended. Due to the scale of the development as a whole it has since been determined that an Area Structure Plan is now required for a development of this magnitude.

1.2. Purpose and Intent of the Plan

The purpose of the StoneGate Meadows Area Structure Plan is to provide a framework for the future residential subdivision and development of the subject property. In compliance with the Town of Raymond Municipal Development Plan, the area structure plan will address the following:

- Development phases
- Proposed land uses for the area in general
- Density of development in general
- Transportation planning, including the general location of major transportation routes and utilities
- Storm water management
- Municipal reserves and open space
- Compatibility with adjacent land uses
- Consistency with the Municipal Development Plan and other adopted plans within the Town of Raymond

[1] *See Appendix C for land title*

[2] *Refer to Drawing 1 for relative site location*

1.3. Developers' Vision for the Subdivision

We have carefully gone through the new Municipal Development Plan and the Transportation Master Plan and find them invaluable tools for our planning, and feel we comply with the guidelines they put forth. We believe this new subdivision, StoneGate Meadows, fits the Town's vision of our unique and beautiful community. We would like to highlight just a few of the many benefits this subdivision has to offer our community, both now and in the future.

Being located at the East entrance to our community along Highway 52, our beautiful lighted stone gate entrance leading into a well-planned, architecturally controlled neighborhood, will provide a very attractive welcome to our Town.

All services will be underground, including power, cable, and phone which will greatly enhance the beauty of the area.

All of the lots and their dwellings will have architectural controls in place with restrictive covenants to maintain the property values and to contribute to the 'retention and attraction' appeal of our community. The roads will be lined with Elms, making it truly a pleasurable driving or strolling experience for all the Town's citizens.

We firmly believe that in today's world, where so many cities are cramming their houses closer and closer together with their "extreme urban density," the lots we are providing will be in accordance with the 'unique and rare' community image our citizens hold dear. These lots will be highly sought after and will bring new affluence and beauty to the area, which in turn benefits the whole community.

Our Community needs a subdivision unique in scope and detail, which will attract the attention of a wide variety of people; we cannot compete with the larger cities on their playing field, so let us present an alternative. Large lots have been part of our unique heritage from Raymond's first pioneers, giving our citizens space to breathe and room to be self-sufficient.

Providing a specific area on the outer fringe of the Town with larger sized lots could encourage infill in other areas of the town because there would be an alternative for those who want more space. Because these larger lots appeal to different segments of the population, they will not be in direct competition with the infill lots.

StoneGate Meadows offers approximately 23 acres of municipal reserve for potential parks, green strips, trails, and a detention pond that could be used for all types of passive and active recreation.

These lots will be provided with raw irrigation water for domestic yard use which will greatly help the Town's goal of water reduction. It will lessen the strain on the Town's water treatment facilities and will allow the property owners to maintain their properties to this community's high expectation.

By providing diversified lots and combining it with a pleasant community atmosphere, the subdivision will help meet the Municipal Development Plan for community growth. Below are some of the areas where the StoneGate Meadows subdivision helps meet the goals of the Municipal Development Plan (referred to below as MDP):

- Both the north and south accesses onto CobbleStone Lane will feature a beautiful stone entryway. [MDP 1D (10)]
- The subdivision will provide all utilities through underground installation. [MDP 3B (8)]
- Architectural controls are in place to ensure that the subdivision keeps its appeal. [MDP 1D (9)]
- StoneGate Meadows will provide a variety of lot sizes and shapes as well as different styles of housing. The type and location of lots, as well as the architectural controls, will help attract middle to higher income families. [MDP 1D & 2A]
- The range of lots available in StoneGate Meadows will provide 'diversity in housing type, accessibility, tenure, and cost.' [MDP 2A (6)]
- More land is set aside for municipal reserve than is required. These lands are large enough and central enough to be developed into desirable community lots with excellent walking trail networks. [MDP 2A (11) & 2E (1&3)]
- The StoneGate Meadows subdivision is designed to be developed in phases. This meets the requirement that new subdivisions be developed in a"stable, balanced, and fiscally sound manner…" [MDP 1A (7)]

- By providing the lots with a separate raw water service there will be a reduced load on the Town's potable water service. [MDP 3D (13)]

2. PROPOSED SUBDIVISION DEVELOPMENT

2.1. Site Conditions

There was a geotechnical study performed in the northwest corner of the subdivision. This testing was performed to determine the feasibility of a condominium development. The study was to determine whether the soil around the site is sufficiently stable for construction of residences. Based on the results of the study it was determined that the condominiums could be constructed within the proposed proximity to the low spot without any issues.

2.2. Land Use

Prior to development of the first phase the entire subdivision area was annexed into the Town of Raymond boundaries. Prior to the first phases the entire parcel was zoned as agricultural and was rezoned to urban fringe then urban reserve. At the time of development, the first phase was rezoned as residential and the remaining subdivision site is still zoned as urban reserve. The urban fringe portion of the development may continue to be used for agricultural purposes until required for development for the subdivision. As the development proceeds the land will be rezoned on a per phase basis. Subdivision of the lots will also be done on a per phase basis.

2.3. Developmental Phases

In order to promote the most efficient development the subdivision is to be completed in phases. The layout of the subdivision is conducive to this method of development. Drawing 2 illustrates the proposed developmental phases with a potential development sequence. Where circumstances and demand allow this could be done with future phases so long as the phases being combined are adjacent and all necessary access and services may be provided.

2.3.1. Phase 1

The initial phase, or Phase 1 (referred to as Phases 1 and 2 in the Conceptual Design Scheme), has been registered under the previously approved Conceptual Design Scheme (DA2009-CDS01, as amended). It consists of 40 residential single-family lots, 1 institutional lot, and 4 public utility lots. It also included the construction of

CobbleStone Lane. As part of the initial development the infrastructure connections to the Town of Raymond systems were also installed. The potable water connects to the Town of Raymond water supply near corner lake and also at the intersection of East Park Street and 100 North. A sanitary sewer lift station was installed and empties through a force main into the Town of Raymond gravity sewer system. This force main and the potable water loop line were installed along the north end of the golf course. Alberta Transportation requires that any improvements within a 30m (98ft) buffer of a road allowance requires special authorization. Permission was received prior to the installation of these lines.

During the installation of the infrastructure within CobbleStone Lane, the mainlines were stubbed out to the east at intersections for future phases.

2.3.1.1. Re-Subdivision of Lots in Phase 1

Subdivision of the lots in Phase 1 shall not be permitted, except for the proposed condominium development in Phase 1-A.

2.3.2. Phase 1-A

As part of Phase 1-A, Lots 26-28 of Block 1 and Lot 1 PUL and Lots 2 and 3 of Block 2 of Plan 1012662 are to be converted from 5 residential single family lots and a public utility lot to bareland condominium developments. A potential layout for these developments is given on Drawing 5. These developments would require a home owners association to manage and maintain common space, including the road. The design and density identified in the potential layout is conceptual. The final design and density are subject to the approval of the Municipal Planning Commission and may require modification to address Land Use Bylaw requirements, review agency comments, site constraints, and any other applicable planning matters.

2.3.3. Phases 2 - 9

The remainder of the subdivision will be laid out as shown in Drawing 2. Future phases will be developed in the most logical and economical sequence. Depending on the circumstances when the time arrives, it would be possible to start multiple phases of development at the same time. For example, there would be no foreseeable reason why Phase 4 could not be done at the same time as Phase 3 if there were sufficient demand for lots. The same thing could be applied to Phase 6

and Phase 7. Combining of the phases would only be considered with phases that are sequential.

2.3.3.1. Re-Subdivision of Lots in Phases 2-9

Re-subdivision of the lots in Phases 2-9 may be considered by the Municipal Planning Commission to accommodate individual ownership for existing duplex development and proposed semi-detached development. Lots identified as Potential Multi-Unit Dwellings in Drawing 6 (Proposed Land Uses) may also be considered for re-subdivision to establish individual ownership.

Refer to Section 6.1.3 and Section 6.1.4 for subdivision policy addressing the potential condominium development and neighbourhood commercial development in Phase 4/5.

3. INFRASTRUCTURE

3.1. Required Underground Infrastructure

As part of Phase 1 services were installed along the full length of CobbleStone Lane. There are seven main services to be provided to each lot; electrical, ATCO natural gas, Telus, Shaw cable, potable water, raw water, and sanitary waste disposal. An overview of the proposed underground infrastructure is shown on Drawings 3 & 4. Telus, Shaw, electrical, and gas installation plans are provided by their respective parties prior to installation.

3.1.1. Shallow Underground Utilities

The shallow utilities (including Telus, Shaw, ATCO gas, and electrical) will be installed in a utility right-of-way located at the front of each lot.

Street lighting for the subdivision will be provided at intersections and road deflections with additional lighting to be provided as required by the Town of Raymond standards and as deemed suitable by the electrical engineer.

3.1.2. Potable Water

The subdivision will be supplied with potable water from the Town of Raymond water network. Connections to the Town's network were completed as part of the construction of Phase 1.

The United States Environmental Protection Agency's software (EPANET 2) was used to simulate what the available water pressure in the subdivision's water network would be. The simulation was run with 200mm (8") water lines throughout the network with a 250mm (10") line from the south tie-in point up to the intersection of CobbleStone Lane and PebbleCreek Cove South.

The piping network is sufficient to meet the Town of Raymond's Engineering Design Standards. There were two scenarios modelled and the results were reviewed[3]. The first scenario had each lot using a specified demand of 1.9 gallons per minute with a required minimum pressure of 350kPa (51psi) at all residences. According to the

[3] *See Appendix F for analysis network*

software the subdivision continued to provide a minimum of 391kPa (57psi). The second scenario required that two fire hydrants with a demand of 4000 liters per minute (1057 gallons per minute) be run along with a specified per residence demand of 3.0 liters per minute (0.8 gallons per minute) while maintaining a minimum pressure of 140kPa (20psi) at each hydrant. The software indicated that the water network was sufficient to provide a minimum pressure of 214kPa (31psi) at the hydrants.

3.1.3. Raw Water (Irrigation)

To prevent an excessive draw on the Town's treated water system a raw water main will be installed as each phase is constructed. This main line will connect to the raw water main supplied by the Town of Raymond. This is currently in operation. The raw water main was installed in the same trench as the sanitary sewer mains. The project engineer contacted Dorothy Lok of Alberta Environment regarding this same trench installation, and there is no concern as the raw water line will not be for potable use.

The raw water services were turned over to the Town of Raymond to maintain and regulate the service. The Town already has systems in place to collect fees and maintain service mains.

3.1.4. Sanitary Waste Disposal

Phase 1 implemented a typical gravity sewer for the north portion while the south portion required each residence to have a sewage lift pump. These systems discharge to a force main in CobbleStone Lane which empties into the southernmost gravity manhole.

The remainder of the subdivision will be serviced via gravity sewer mains. Should an unforeseen situation require it, a tank and grinder pump system may be used to connect to the nearest gravity sewer.

3.2. Transportation Planning

The Area Structure Plan intends to provide for an efficient road network that balances the access requirements of individual lots within the development area while maintaining the functional integrity and safety of the existing road system. The subdivision will have a road network as indicated in Drawing 5. This deviates from the traditional grid layout suggested in the Town of Raymond's Municipal Development

Plan. However the topography of the subdivision and the location of the existing drainage corridors make it more practical and efficient to use a non-grid subdivision layout.

A curvilinear patterned road network following the natural topography will be used as illustrated in Drawing 5. This improves the overall appeal and allows for more diversified and interesting Lots. The use of cul-de-sacs and coves are included to help increase density, while still maintaining larger than standards lots, in order to stay true to StoneGate's Country Residential feel.

3.2.1. Highway 52 Access

The subdivision accesses Highway 52 at the far north end of CobbleStone Lane. Prior to approval for the first phase of the subdivision Alberta Transportation required that a Traffic Impact Assessment (TIA)[4] be performed to consider the following:

- The potential impact of the proposed residential development on the existing transportation network, including an analysis of the potential impacts of the proposed departure from the Town of Raymond Transportation Master Plan, functional design of intersections, operational analysis, warrant analysis, et cetera;
- Speed limit reductions on highway 52; and
- Any expansion/improvement requirements to the existing road network that may be necessary to accommodate the proposed development .

The TIA took into account the proposed road network as well as the number of lots proposed in the Conceptual Design Scheme. The TIA found that no turning lanes would be required at the intersection of CobbleStone Lane and Highway 52 as long as the speed limit of Highway 52 is reduced to 50 kilometers per hour along the north boundary of the subdivision. Minister of Alberta Transportation signed Ministerial Order 31/20 on August 26, 2020 lowering the speed limit from 80kph to 50kph approximately 400m from the easterly corporate limits and from 100kph to 80kph at the easterly corporate limits (Range Road 203).

Alberta Transportation has also stipulated that there shall be no other accesses from any lot in the subdivision directly onto Highway 52. All lots will have access from the

[4] *See Appendix G for Traffic Impact Assessment Report*

internal subdivision road network. At the time that the intersection of CobbleStone Lane onto Highway 52 was constructed, the developers removed the two existing approaches as per Alberta Transportation's request.

It is understood that any upgrades that may be required to the existing provincial highway network are to be accomplished at no cost to the Alberta Transportation and any work within the highway right-of-way would require the benefit of a permit from the department as outlined in the said Highways Development and Protection Regulation.

3.2.2. Range Road 203 Access

The proposed accesses onto Range Road 203 will require the approval of the County of Warner as Range Road 203 falls under their jurisdiction. Permission for these accesses will be required before construction of the respective phases can begin. The Town is not responsible for any costs associated with upgrades, improvements or maintenance that may be necessary to Range Road 203. The TIA that the developers had completed at the request of Alberta Transportation included an analysis of these accesses as well. It was determined that the existing range road would be adequate to handle the expected increase in traffic without warranting additional lanes for turning. It was suggested in the TIA that the intersection of Range Road 203 and Highway 52 be a Type IIc intersection by the time that the subdivision reaches completion of all phases. These intersection types are shown as typical designs in the TIA.

3.2.3. Country Residential Style Roads

The design is similar to a 'Rural Industrial Collector' as illustrated in the Town of Raymond 2006 Engineering Standards, but is modified to create a country residential appearance throughout the subdivision. A typical design section for the subdivision road is shown on Drawing 7. The original road allowances for the development were 20.1m (66ft) wide. For Phases 2-9 the road allowance widths will be 24.0m (79ft) wide. This will allow for roadside ditches with flatter side slopes. The road surface is also going to be extended to a minimum of 10m (33ft) from edge to edge of driving surface for future phases to allow the smaller lots to have access to on-street parking.

For Phases 2-9, the minimum lot width when a culvert is required, will be designed to approximately 30m (100ft) to ensure the ditch ratio to culvert ratio along the frontage

is no less than 60/40 (ditch/culvert). Meaning that if a lot is 30m (100ft) wide, 60% of the frontage will be occupied by the ditch and 40% will be occupied by a culvert (assuming the maximum culvert length of 12.19m is utilized). For Phases 2-9 the minimum lot width when a culvert is not required will follow the Town of Raymond Land Use Bylaw requirement of 18.3m (60ft) minimum lot width and the 60/40 rule will not apply.

Although the country residential style of road is desirable, consideration may be given to using a standard road design with curb and gutter in future phases where it is deemed to be of greater benefit or where the proposed country residential style road

Similar road design in Sandstone Ridge south of Lethbridge

may be impractical. See Drawing 16.

3.2.4. Lot Accesses

Given the unique nature of the lots and layout of the StoneGate Meadows subdivision, the following provisions will be made to how the lots may be accessed:

- Lots with a primary frontage[5] of 40m (131ft) or greater shall be allowed to install a looped driveway, so long as no point of the driveway violates the setback and size restrictions provided below. Lots with a frontage of less than 40m may only have a single approach on the primary frontage. Approval of a looped driveway may only be granted where it has been demonstrated to the satisfaction of the Town that the additional driveway does not pose a traffic hazard or jeopardize the capacity or function of the road.

- Lots located on a corner (where two property lines front onto a road allowance) will be allowed a single access onto the secondary frontage provided that the house plan approved for development has a garage with doors facing the secondary frontage. Accesses on secondary frontages will not be allowed for any other purpose (i.e. rear/side yard access). Approval of a secondary driveway may only be granted where it has been demonstrated to the satisfaction of the Town that the additional driveway does not pose a traffic hazard or jeopardize the capacity of function of the road.

- Each lot approach will require a minimum 9m (29.5ft), up to a maximum of 12.19m (40ft), black high density polyethylene (HDPE) culvert. The ends are to have a 2:1 bevel and rip-rap placed to prevent erosion. The lot owner is responsible for supplying and arranging for the installation of all required culverts at their sole expense at the time of development and may be required to enter into a development agreement to do so in accordance with the Land Use Bylaw.

- Should an approach be located at a grade break in the ditch design a certified engineer may approve the construction of an approach without a culvert so long as doing so will not impede stormwater runoff.

- All approaches that require a culvert must be a minimum of 3m (10ft) from the edge of the driving surface to the nearest side of the property. Culvert inverts are to be a minimum of 6m (20ft) apart. See Drawing 14 for typical approach sizes and setbacks.

[5] The determination of the primary frontage is identified on Drawing 15 by the location of the front setback requirements.

- There will be no vehicular access to the lots from the rear property line.
- All other standards for driveways shall be as prescribed in the Land Use Bylaw and the Town Engineering Standards, as applicable.

Similar road design in Sandstone Ridge south of Lethbridge.

3.2.5. Proposed Arterial Road Relocation

The 2009 Town of Raymond Transportation Master Plan (TMP) proposed an arterial road that would run along the southern-most boundary of the StoneGate Meadows subdivision. Based on analysis performed prior to the Conceptual Design Scheme an alternative route was proposed. This route is shown on Drawing 12.

In the TMP it also proposed that a collector road run through the StoneGate Meadows subdivision along the east bounds of the golf course. The TMP defined a collector road as a street that will "Provide both land access and mobility within residential, commercial and industrial areas." Further criteria were given as follows:

- Traffic movement and land use access of equal importance
- Traffic volume of (vehicles per day)
    - <8000 (residential)
    - 1000 - 12000 (industrial/commercial)
- Interrupted flow
- Design speed of 50 - 80 kilometers per hour
- Average running speed of 30 - 70 kilometers per hour (off peak)
- Vehicle Types
    - Passenger and all service vehicles (residential)
    - All types (industrial/commercial)
- Desirable Connections
    - Local streets
    - Collector streets
    - Arterials
- Transit service is permitted
- No restrictions or special facilities are required for accommodation of cyclists
- Sidewalks provided on both sides for accommodation of pedestrians
- Few restrictions other than peak hour
- Minimum intersection spacing of 60 meters
- Right-of-way Width of 20 - 24 meters.

By these standards it would be reasonable to consider CobbleStone Lane as the collector road.

4. Municipal Reserve and Public Utility Lots

4.1. Municipal Reserves

There are three municipal reserve areas located in the subdivision. Municipal Reserve 1 is located in the center-north of the subdivision. It is located adjacent to Highway 52 and is 4.9 hectares (12.1 acres) in area. Given the size and shape of the lot it is ideally suited for both active and passive forms of recreation. There were two large holes dug in municipal reserve 1. These holes were used for the disposal of oversized solid wastes. At no point have hazardous materials been deposited into these holes. The precise contents of these holes is as follows:

- Cement from the old Town of Raymond swimming pool.
- Cement from two homes that burnt down in the summer of 2008.
- Tree branches, et cetera from the Town of Raymond cleanup days.

These holes have since been covered. As the fill material that was used is solid, it would be reasonable to use these sites for various forms of passive recreation that does not include structures placed upon the fill sites.

Green strip with walking path similar to what Municipal Reserve 2 would look like.

Municipal Reserve 2 is 4.6 hectares (11.4 acres) and is a long narrow green strip that passes through the center of the subdivision. There is a wide and long drainage path that winds through this green space that makes it a scenic area that could be used for various forms of passive recreation. Since the side slopes along the narrow strip are between 2-5% and the slope along the length is <1%, a walking path could be installed that would wind from the south to north where it would cross the road and loop through Municipal Reserve 1. This trail

would be flush with the surrounding ground and would in no way interfere with the drainage through the green space. Municipal Reserve 2 also features a section at its north end that would be used as a large detention pond for the area. This area would only detain water during extreme storm events and could be used as a sport/ recreation field the majority of the time.

There are six access points into Municipal Reserve #2 for multiple purposes: to allow for pedestrian access from within the neighborhood and to allow for sufficient drainage corridors to minimize the distance drainage water needs to run along the frontages. They have been sized accordingly to meet both needs.

An example of a detention pond.

Municipal Reserve 3 is located south and west of Municipal Reserve 1. It is notably smaller than the other two with an area of 0.6 hectares (1.5 acres). This particular lot is fit nicely into a corner of residential lots and would be well suited for a playground area.

Amenities and improvements to be provided by the developer within the municipal reserve land will be determined at the time of subdivision through a developer agreement.

4.2. Public Utility Lots

Public utility lots within the subdivision are used to provide utility use, drainage corridors, access to the golf course, and municipal reserve access.

5. Stormwater Management

A Stormwater Management Plan was completed for Phases 1 and 2 prior to the finalization of the Conceptual Design Scheme and has been approved by Alberta Environment and is on record with the Town of Raymond. A preliminary analysis also determined the runoff flowrates and volumes for the remaining subdivision area.

5.1. Preliminary Catchment Areas

The existing subdivision site[6] has clearly defined drainage paths and an analysis revealed that there are four primary catchment areas (see Drawing 10). Preliminary calculations were done on each catchment area in order to determine the amount of post development storage that would be required to handle the increased volumes. These calculations were done using a 100 year 24 hour storm model. The results are shown below.

Catchment Area	Storage Volume Required
Catchment Area 1	2500 m^3 (3270 yd^3)
Catchment Area 2	800 m^3 (1046 yd^3)
Catchment Area 3	477 m^3 (624 yd^3)
Catchment Area 4	150 m^3 (196 yd^3)

It was determined that catchment area 1 will require a detention pond. Catchment areas 2-4 will be incorporated during phase 1. Catchment area 4 was deemed to not require a detention pond due to the small storage requirement. The final design of any detention pond will need to be approved by Alberta Environment.

5.2. Raymond Golf Course

As part of Phase 1 a storm water retention pond was created in cooperation with the Town of Raymond and the developers on the golf course. This pond is responsible for detaining the excess runoff from Catchment Area 2. The pond serves primarily as a water feature for the golf course but was also designed to facilitate the additional runoff from the development during heavy rainfall events. The capacity of the pond is sufficient to handle the projected excess runoff during a 1-in-100 year Modified Chicago Storm designed for the City of Lethbridge.

[6] *See Drawing 8 for natural drainage paths and Drawing 9 for existing topography*

In order to restrict the amount of excess runoff from Catchment Area 3 and prevent flooding over the golf course a smaller detention pond was constructed on Lot 12 of Block 1 and is protected by an easement.

Both the retention and the detention pond were included in the stormwater management plan and are already in use.

5.2.1. Alberta Transportation's Highway 52

As Catchment Area 1 is the largest and will see the greatest volume increase from post-development runoff, certain precautions will be necessary to assure that Highway 52's integrity and functionality is in no way compromised. In order to mitigate outflows, a detention pond will be constructed within Municipal Reserve 2 at the sole expense of the developers. The pond will have outfall controls to restrict post-development flow rates to pre-development rates. It shall also be constructed so as to allow recreational use (e.g. a soccer field) during dry weather.

There is currently a 900mm (3ft) culvert under Highway 52 that drains this catchment area to the north. Agreements with Alberta Transportation will need to be reached prior to development to continue to use this culvert as the outfall.

Catchment Area 1 will require further approval of an updated Storm Water Management Plan by Alberta Transportation and Alberta Environment & Parks.

5.2.2. Stormwater Management Plan Requirements

Prior to finalization of the subdivision, a Stormwater Management Plan will be prepared by a qualified engineer at the sole expense of the developers. The Stormwater Management Plan will require the endorsement of Alberta Transportation and Alberta Environment & Parks prior to registration of the plan of subdivision, and will require endorsement by both aforementioned departments prior to the final linen being approved by the approval authority.

The plan will detail:

- Details of operating water levels, inlet & outlet structures, system hydraulics, redundancy and emergency overflow provisions, and provisions for erosion & sediment control. All designs will include supporting analysis.

- Ownership and maintenance details of the various system components.
- Any other aspects that relate to non-highway matters as established by their respective parties (i.e. Town of Raymond, Raymond Irrigation District, utilities, et cetera).

6. PROPOSED LAND USE

6.1. Overview

In keeping with the vision of the subdivision and the Town of Raymond Municipal Development Plan (MDP) the subdivision lot layout has been improved from that of the Conceptual Design Scheme to promote a higher density and a wider variety of housing options. See Drawing 5 for the lot layout.

The total number of developable lots is 212. It is expected that the subdivision layout could house a population of approximately 921 at full build out. The number of lots and uses are shown in the following table:

	# Lots	Total Area (ha)	% of Developed ha.	Est. Population	Est. Density pop./ha
Low Density Residential	167	38.09	79.0%	668	17.54
Medium Density Residential	26	4.75	9.8%	208	43.82
Condo	18	1.35	2.8%	45	33.31
Commercial	1	4.05	8.4%	—	—
Open Space	18	11.34	—	—	—
Private Road	2	0.28	—	—	—
			Total	**921**	
				Average	**31.56**

When calculating densities the following occupancies were assumed:

Type	Avg. Occupancy
Low Density Residential*	4
Medium Density Residential	8
Condo	2.5
Commercial	0
Open Space	0
Private Road	0

***Average occupancy was based upon single-detached dwellings only.**

6.1.1. Low Density Residential

Low density residential development is considered to be single-detached dwellings, duplexes, and semi-detached dwellings, including the proposed condominium development. The vast majority of the proposed subdivision is comprised of single-detached dwellings situated on small town sized lots. The average lot size is 0.23 hectares (0.6 acres) providing an estimated population density of 17.3 people per hectare.

The developers recognize that in the MDP[7] the Town cites accessory dwelling units, such as garden suites and basement suites, as a way to diversify the housing stock and they have since included provisions for such uses in the Land Use Bylaw[8]. They are encouraged within the subdivision as long as they comply with the Town of Raymond Bylaws regarding accessory dwellings.

It is recognized that duplex and semi-detached dwellings provide an opportunity to increase the density within StoneGate Meadows. Allowances for these dwelling types are not restricted within StoneGate Meadows and may be considered in accordance with the provisions of the Land Use Bylaw.

6.1.2. Medium Density Residential

Medium density residential is considered to be multi-unit dwellings. A multi-unit dwelling is defined in the Land Use Bylaw as a building other than an apartment that contains three or more dwelling units. These are also suggested in the MDP as a method of improving the Town's housing diversity[9]. Although the original Conceptual Design Scheme did not contain any provisions specifically regarding this type of housing, the current proposal is that there be multi-unit dwellings within the subdivision to further diversify the types of housing available and to further increase residential density.

These lots would add to the variety of housing options available within the subdivision as well as providing lots of higher density. The developers are proposing that medium

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[7] *Town of Raymond Municipal Development Plan, 2009, section 2A (8).*

[8] *Town of Raymond Land Use Bylaw, No. 987-11, General Residential (R1) Land Use District, sections 2(4) and 19(1).*

[9] *Town of Raymond Municipal Development Plan, 2009, sections 2A (4-5).*

density residential lots be restricted to corner lots with no more than two per intersection.

6.1.3. Condominiums

As discussed in section 2.3.2 the north lots of Block 1 and the west lots of Block 2 were converted for use as a condominium development. These developments would fall under the classification of bareland condominiums as they would be sold as empty lots. As such they would fall under the regulations and rules of a bareland condominium.

Condominiums provide a unique type of housing and would provide smaller lots in higher density developments. This could help the Town meet their goal of providing affordable housing options through a small lot residential district and/or other measures[10].

The average size of the lots being proposed is 0.07 hectares (0.2 acres) providing an estimated population density of 33.7 people per hectare.

6.1.4. Commercial / Institutional

The commercial area for the subdivision is located on Lot 5 Block 2 of the proposed layout. This area will be zoned neighborhood commercial. The final subdivision of Lot 5 Block 2 will be adjusted as required to suit the needs of commercial development. This commercial development will comprise approximately 8% of all developable, non open space, area.

This neighborhood commercial area will be best suited to neighborhood commercial purposes such as restaurants, lodging, childcare, professional services and family recreation centers. It is adjacent to MR#1 and has immediate access to Range Road 203 and borders Highway 52. MR#1 and Travertine Road create a natural buffer between the neighborhood commercial and residential areas.

After the original Conceptual Design Scheme was accepted the Church of Jesus Christ of Latter-Day Saints desired to acquire eight lots for use in constructing a meeting house. This re-subdivision of lots and rezoning was accepted as an

[10] *Town of Raymond Municipal Development Plan, 2009, section 2A (10).*

amendment to the Conceptual Design Scheme. Block 4 Lots 1-4 as well as a portion of the developers' land has been amalgamated and is now Block 4 Lot 15.

6.1.5. Parks and Open Space

There are a number of areas that have been designated as open space for use as parks, walking trails, and recreational purposes and will be rezoned as such. As much as possible these areas are to be interconnected via walking trails to allow for ease of access and to promote use. The open space areas compose approximately 20% of all lot areas (entire subdivision without public road allowances).

7. DEVELOPMENT STANDARDS

7.1. Architectural Controls

In order to maintain the vision of the subdivision and to keep development consistent, development within the subdivision will be governed by architectural controls. The architectural controls will govern items such as:

- Construction timelines
- Building specifications
- Construction materials
- External appearance of primary structure and outbuildings
- Landscaping and lot grading

Architectural controls will be submitted at the time of application for subdivision.

7.2. Setbacks

The Town of Raymond Land Use Bylaw for General Residential provides for a minimum front setback of 7.6m (25ft) and a maximum front setback of 10.7m (35ft). However due to the roadside ditches and the size of the lots, the residential setbacks within the StoneGate Meadows subdivision may vary based on location and size as shown[11] on Drawing 15.

7.3. Fencing Adjacent to Raymond Irrigation District Canal

The developer shall be responsible for fencing the perimeter of the development adjacent to the Raymond Irrigation District Canal Right-of-Way (Plan 9610785) with a 4 foot high, slatted chain link fence or other fencing as approved by the Raymond Irrigation District.

A pathway along the RID right-of-way can be considered at this time, if constructed in accordance with the standards specified by the RID as attached in Appendix G. The

[11] *All other setbacks not identified in Drawing 15 will be established through the Town of Raymond Land Use Bylaw.*

RID will require final construction drawings to be approved by the RID prior to construction.

APPENDICES

Appendix A - Raw Water Agreement with the RID

RID Raymond Irrigation District
Box 538, Raymond, Alberta, Canada • T0K 2S0
Phone: (403) 752-3511 FAX (403) 752-3737

June 17, 2009

Dennis and Kelly Jensen
Box 1057
Raymond, Alberta
T0K 2S0

Dear Dennis and Kelly:

Re: your letter to the RID, undated, with regard to domestic raw water for StoneGate Meadows Subdivision.

The RID will make water available, for your noted project, under the household purposes provision of the Irrigation Districts Act, or the other purposes amendment to the RID water license. The district will not be responsible for your delivery turnout from the works of the district. You must install all of the delivery network to your development at your own cost. The agreements will be for conveyance of water only and not to cover any new works or maintenance or replacement costs to works that will be required. The RID board will decide what method of agreement they will allow, at a later date. Please keep the district informed as to when you would like to begin delivery of water into your development.

Sincerely

Gordon ZoBell
RID Manager

APPENDIX B - LAND TITLE CERTIFICATE

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0022 234 280	4;20;6;9;NE	071 282 579

LEGAL DESCRIPTION

MERIDIAN 4 RANGE 20 TOWNSHIP 6
SECTION 9
THAT PORTION OF THE NORTH EAST QUARTER
BEING THE NORTHERLY 135.00 METRES OF THE WESTERLY
330.00 METRES, WHICH LIES TO THE EAST OF THE WESTERLY
60.96 METRES THROUGHOUT THE SAID QUARTER SECTION
CONTAINING 4.455 HECTARES (11.00 ACRES) MORE OR LESS
EXCEPTING THEREOUT ROAD ON PLAN 5527HX
CONTAINING 0.232 OF A HECTARE (0.57 OF AN ACRE) MORE OR LESS
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

ESTATE: FEE SIMPLE

MUNICIPALITY: COUNTY OF WARNER NO. 5

REFERENCE NUMBER: 931 097 718 +1

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
071 282 579	07/06/2007	TRANSFER OF LAND		SEE INSTRUMENT

OWNERS

KD JEN LTD..
OF PO BOX 1057
RAYMOND
ALBERTA T0K 2S0

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

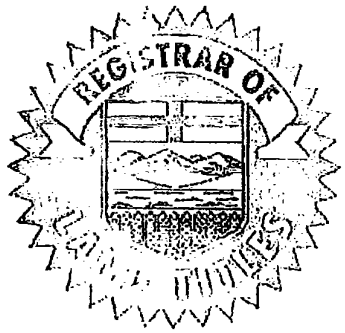
REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 032 013	14/04/1975	CAVEAT CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
781 111 013	13/07/1978	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
871 166 815	14/09/1987	UTILITY RIGHT OF WAY GRANTEE - STIRLING WEST WATER USERS ASSOCIATION.
071 282 580	07/06/2007	MORTGAGE MORTGAGEE - ALBERTA TREASURY BRANCHES. 601 MAYOR MAGRATH DRIVE SOUTH LETHBRIDGE ALBERTA T1J4M5 ORIGINAL PRINCIPAL AMOUNT: $1,000,000

TOTAL INSTRUMENTS: 004

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 10 DAY OF NOVEMBER, 2008 AT 04:17 P.M.

ORDER NUMBER:12721480

CUSTOMER FILE NUMBER: OFFICE



END OF CERTIFICATE

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0033 488 164	0814299;1;1	081 358 402

LEGAL DESCRIPTION
PLAN 0814299
BLOCK 1
LOT 1
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 70.681 HECTARES (174.66 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;20;6;9

MUNICIPALITY: COUNTY OF WARNER NO. 5

REFERENCE NUMBER: 081 358 309
071 282 579 +1

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
081 358 402	23/09/2008	SUBDIVISION PLAN		

OWNERS

KD JEN LTD..
OF PO BOX 1057
RAYMOND
ALBERTA T0K 2S0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
741 055 580	07/06/1974	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE RAYMOND IRRIGATION DISTRICT

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 032 013	14/04/1975	CAVEAT CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. " AFFECTS PART OF THIS TITLE "
781 111 013	13/07/1978	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "AFFECTED LAND: 4;20;6;9;NE" " AFFECTS PART OF THIS TITLE "
861 039 385	07/03/1986	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. " AFFECTS PART OF THIS TITLE "
871 180 924	01/10/1987	UTILITY RIGHT OF WAY GRANTEE - THE STIRLING WEST WATER USERS CO-OPERATIVE LIMITED. " AFFECTS PART OF THIS TITLE "
011 296 012	09/10/2001	CAVEAT RE : PIPELINE RIGHT OF WAY CAVEATOR - THE RAYMOND IRRIGATION DISTRICT. BOX 538 RAYMOND ALBERTA T0K0S0 AGENT - ALAN HEGGIE " AFFECTS PART OF THIS TITLE "
071 282 580	07/06/2007	MORTGAGE MORTGAGEE - ALBERTA TREASURY BRANCHES. 601 MAYOR MAGRATH DRIVE SOUTH LETHBRIDGE ALBERTA T1J4M5 ORIGINAL PRINCIPAL AMOUNT: $1,000,000 " AFFECTS PART OF THIS TITLE "

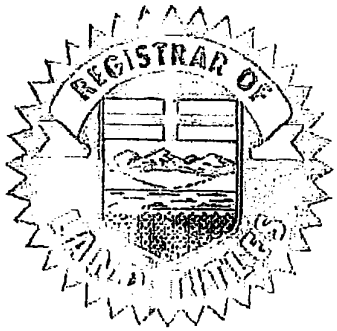
(CONTINUED)

TOTAL INSTRUMENTS: 007

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 10 DAY OF NOVEMBER, 2008 AT 04:17 P.M.

ORDER NUMBER:12721480

CUSTOMER FILE NUMBER: OFFICE



END OF CERTIFICATE

CERTIFIED COPY OF
Certificate of Title

S

LINC 0034 809 046 | SHORT LEGAL 0814299;1;1

TITLE NUMBER: 111 128 356 +9
SUBDIVISION PLAN
DATE: 25/05/2011

AT THE TIME OF THIS CERTIFICATION

KD JEN LTD..
OF PO BOX 1057
RAYMOND
ALBERTA T0K 2S0

IS THE OWNER OF AN ESTATE IN FEE SIMPLE
OF AND IN

PLAN 0814299
BLOCK 1
LOT 1
CONTAINING 70.681 HECTARES (174.66 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	ACRES	MORE OR LESS
SUBDIVISION	1010288	13.53	33.43	
SUBDIVISION	1012662	6.56	16.21	
SUBDIVISION	1111742	1.601	3.96	

EXCEPTING THEREOUT ALL MINES AND MINERALS

SUBJECT TO THE ENCUMBRANCES,LIENS AND INTERESTS NOTIFIED BY MEMORANDUM UNDER-WRITTEN OR ENDORSED HEREON,OR WHICH MAY HEREAFTER BE MADE IN THE REGISTER.

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
741 055 580	07/06/1974	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE RAYMOND IRRIGATION DISTRICT
751 032 013	14/04/1975	CAVEAT CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.. " AFFECTS PART OF THIS TITLE "
781 111 013	13/07/1978	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. "AFFECTED LAND: 4;20;6;9;NE" " AFFECTS PART OF THIS TITLE "
861 039 385	07/03/1986	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. " AFFECTS PART OF THIS TITLE "
871 180 924	01/10/1987	UTILITY RIGHT OF WAY GRANTEE - THE VILLAGE OF STIRLING.

(CONTINUED)

CERTIFIED COPY OF
Certificate of Title

SHORT LEGAL 0814299;1;1
NAME KD JEN LTD.
NUMBER 111 128 356 +9

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
		" AFFECTS PART OF THIS TITLE " (DATA UPDATED BY: TRANSFER OF UTILITY RIGHT OF WAY 091374097)
011 296 012	09/10/2001	CAVEAT RE : PIPELINE RIGHT OF WAY CAVEATOR - THE RAYMOND IRRIGATION DISTRICT. BOX 538 RAYMOND ALBERTA T0K0S0 AGENT - ALAN HEGGIE " AFFECTS PART OF THIS TITLE "
101 017 481	18/01/2010	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - THE TOWN OF RAYMOND. BOX 629 15 BROADWAY SOUTH RAYMOND ALBERTA T0K2S0
101 198 120	05/07/2010	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - THE TOWN OF RAYMOND. BOX 629 15 BROADWAY SOUTH RAYMOND ALBERTA T0K2S0
101 198 777	06/07/2010	CAVEAT RE : DEFERRED RESERVE CAVEATOR - THE TOWN OF RAYMOND. 3105-16TH AVENUE NORTH LETHBRIDGE ALBERTA T1H5E8
111 128 355	25/05/2011	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - THE TOWN OF RAYMOND. BOX 629 15 BROADWAY SOUTH RAYMOND ALBERTA T0K2S0
111 128 359	25/05/2011	UTILITY RIGHT OF WAY GRANTEE - THE TOWN OF RAYMOND. AS TO PORTION OR PLAN:1111743
111 152 902	17/06/2011	MORTGAGE MORTGAGEE - 1ST CHOICE SAVINGS AND CREDIT UNION LTD.. BOX 1237 LETHBRIDGE ALBERTA T1J4A4 ORIGINAL PRINCIPAL AMOUNT: $1,500,000
111 152 903	17/06/2011	CAVEAT

(CONTINUED)

CERTIFIED COPY OF
Certificate of Title

SHORT LEGAL 0814299;1;1
NAME KD JEN LTD.
NUMBER 111 128 356 +9

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
		RE : ASSIGNMENT OF RENTS AND LEASES CAVEATOR - 1ST CHOICE SAVINGS AND CREDIT UNION LTD.. P.O. BOX 1237, 1320-3 AVENUE SOUTH LETHBRIDGE ALBERTA T1J4A4 AGENT - J BRUCE MILNE

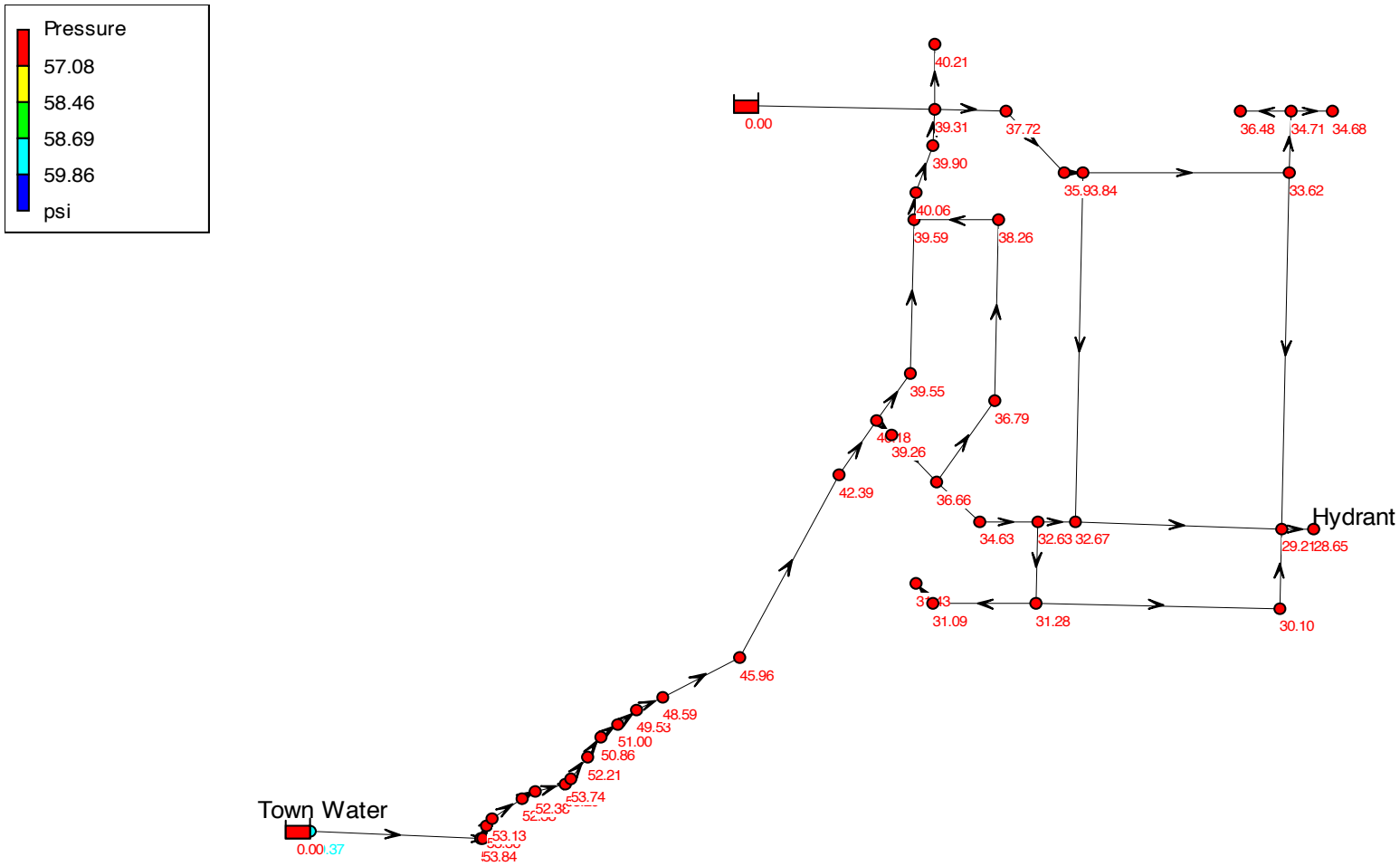
THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 12 DAY OF AUGUST ,2011

SUPPLEMENTARY INFORMATION

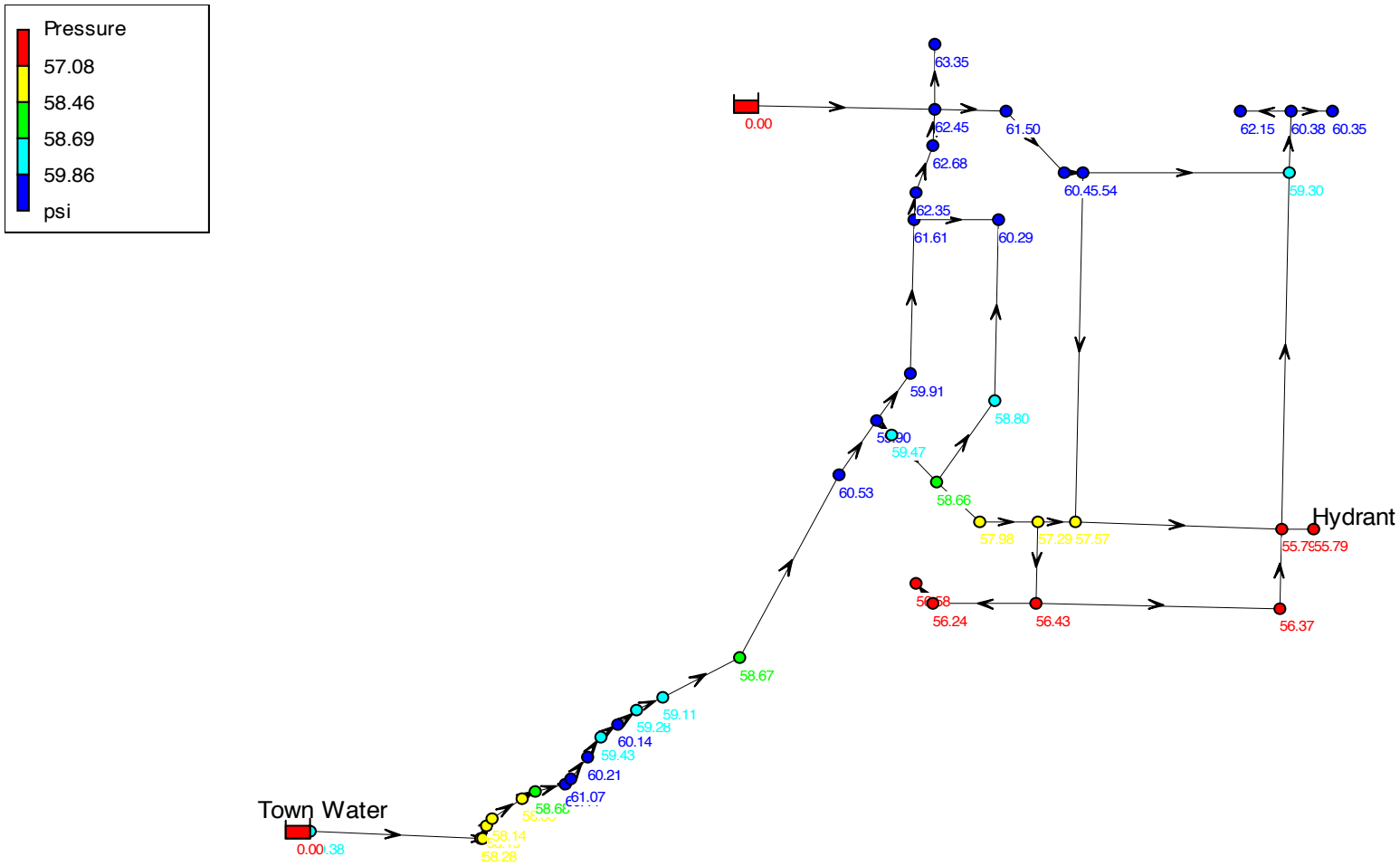
MUNICIPALITY: TOWN OF RAYMOND
REFERENCE NUMBER:
101 198 775 +48
ATS REFERENCE:
4;20;6;9
TOTAL INSTRUMENTS: 013

APPENDIX C - WATER NETWORK ANALYSIS

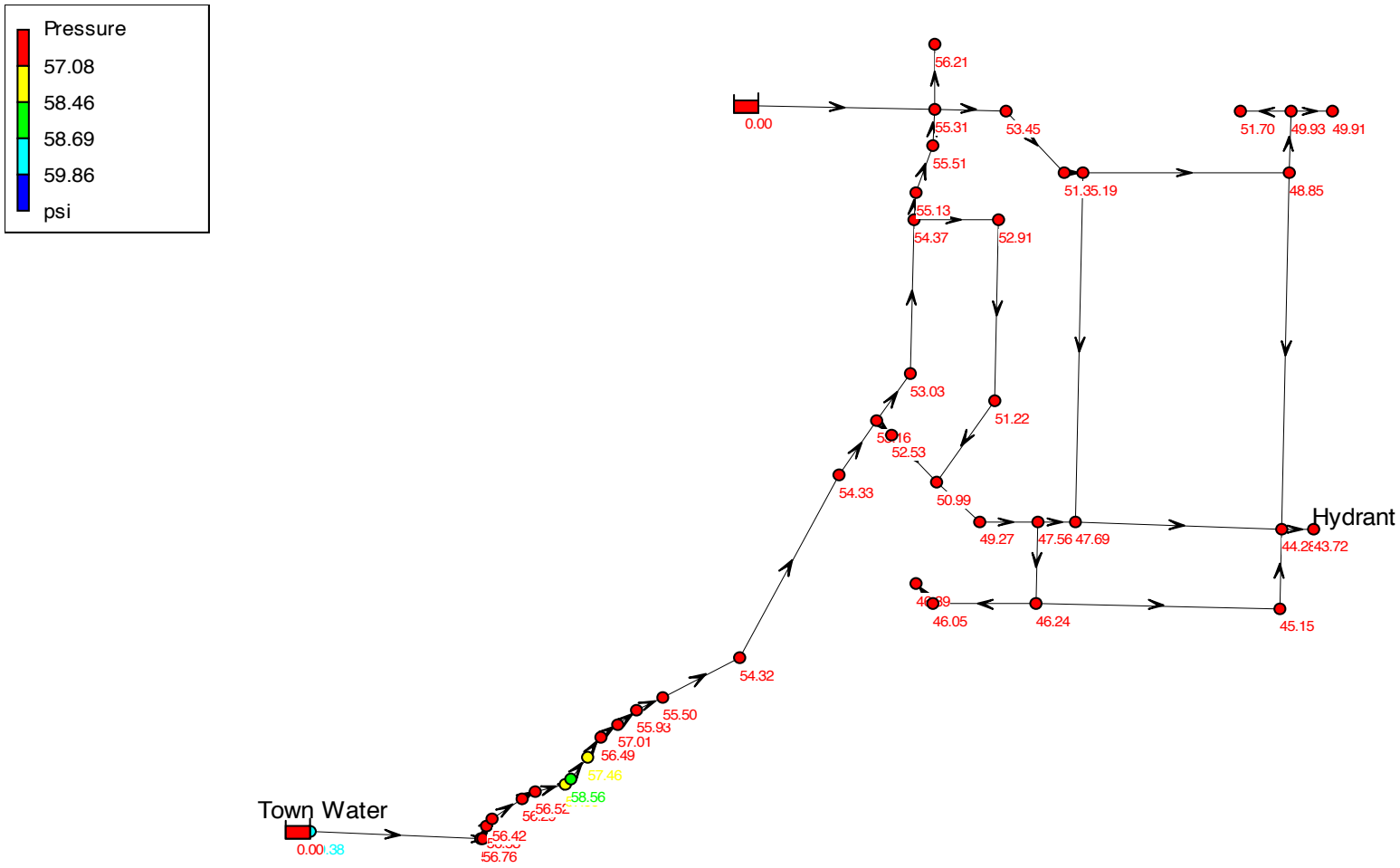
Jensen Water Mains (Load = 5 GPM per lot) - Not Looped at North - Hydrant On



Jensen Water Mains (Load = 5 GPM per lot) - Looped at North - Hydrant Off



Jensen Water Mains (Load = 5 GPM per lot) - Looped at North - Hydrant On



APPENDIX D - AECOM LETTER REGARDING LIGHTING

AECOM
17007 – 107th Avenue, Edmonton, AB, Canada T5S 1G3
T 780.486.7000 F 780.486.7070 www.aecom.com

September 16, 2009

To Kelly Jensen:
KD Jen Ltd.
Box 1057
Raymond, AB T0K 2S0

Re: Lighting Installation within Stonegate Meadows subdivision

AECOM Canada Ltd. is an engineering consulting firm with experience pertaining to the lighting of roadways and subdivisions within urban and rural developments.

There are four options pertaining to different methods of street light design. These methods are categorized as follows:

- All designed illumination levels comply with or exceed Illuminating Society of North America (IESNA) standards,
- All designed illumination levels comply with or exceed IESNA standards except as noted,
- Street lighting will not be installed within a subdivision (which also meets IESNA standards), and
- The designed illumination levels do not comply with the IESNA guidelines.

The second and fourth item would require a Lighting Waiver letter be signed by the municipality stating that the lighting installation does not meet IESNA guidelines and that any potential risks have been identified and accepted.

We have provided designs that fall under each of the above categories. In acreage developments we have proceeded with the design of a subdivision with periodic lighting at intersections or possible areas of conflict. We would not design these developments to IESNA standard and would be required to submit a lighting waiver letter to the municipality for acceptance. Most of these cases would be reserved to rural areas with some special areas with an urban development requiring illumination levels not meeting IESNA. (eg. Legend Estates Development within Parkland County – no street lighting, Rocky Mountain Estates, Raymond – partial street lighting.)

Although AECOM recommends following the IESNA standards, we understand that each development is unique and the intended usage could safely allow a deviation from the standards. Stonegate Meadows subdivision is a good example of a development that does not necessarily need to meet the IESNA standard. Since the road leading into the subdivision from the south and Highway 52 at the north boundary of the subdivision are not currently lit, and the majority of the traffic will be local traffic only, this subdivision could have lights at the intersections only and still be safe.

Sincerely,
AECOM Canada Ltd.

Jamie Rogoski ,CET
Electrical Designer/Project Manager
Jamie.rogoski@aecom.com

JR :jr

APPENDIX E - TRAFFIC IMPACT ASSESSMENT

Report

Wilde Brothers Engineering Ltd.

Traffic Impact Assessment
StoneGate Meadows Subdivision

March 2010

Certification Page

Traffic Impact Assessment
StoneGate Meadows Subdivision

Sorpea Tang, E.I.T.
Project Engineer

Rohit Vij, P.Eng.
Project Manager

ASSOCIATED ENGINEERING
QUALITY MANAGEMENT SIGN-OFF

Signature: _____

Date: _____

PERMIT TO PRACTICE: P 3979

Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 BACKGROUND

KD Jen Ltd. is planning to develop a residential subdivision, StoneGate Meadows, east of the Town of Raymond, Alberta. The proposed subdivision will be located south of Highway 52 and west of Range Road 203. Four access points are planned for the subdivision: one along Highway 52, two along Range Road 203, and one along 400 S within the Town of Raymond.

Wilde Brothers Engineering Ltd. was retained by KD Jen Ltd. to develop a conceptual design scheme for the proposed subdivision including development phasing, land use, stormwater management and transportation planning. The conceptual design scheme indicated that a traffic impact assessment (TIA) would be required by Alberta Transportation (AT) before construction of the subdivision. The TIA will address the following elements:

- The potential impact of the proposed residential development on the existing transportation network, including an analysis of the potential impacts of any departures from the Town of Raymond's Transportation Master Plan (TMP), functional design of intersections, operational analysis, warrant analysis, etc.
- Speed limit reductions on Highway 52.
- Any expansion/improvement requirements to the existing road network that may be necessary to accommodate the proposed development.

Associated Engineering was retained by Wilde Brothers Engineering Ltd. to complete the TIA for the proposed StoneGate Meadows subdivision. The TIA was completed in accordance with the official guidelines provided by AT. This report documents the assessment process.

1.2 SITE LOCATION

The proposed StoneGate Meadows subdivision will encompass a total area of 157 acres and will be located on all four quarters of 9-6-20-W4. The subdivision will be bounded by the east property line of Raymond and District Golf Club to the west, Highway 52 to the north, Range Road 203 to the east, and an irrigation canal to the south. Figure 1-1, at the end of this section, presents the proposed site location for the StoneGate Meadows subdivision.

Four access points are planned for StoneGate Meadows: a direct access along Highway 52 in the northwest corner of the subdivision (Highway 52/Collector Road Access); an access along 400 S in the southwest corner of the subdivision (400 S/Collector Road Access); and, two accesses along Range Road 203 (Range Road 203 north access and Range Road 203 south access), located in the northeast and southeast portions of the subdivisions. Traffic from the proposed accesses on Range Road 203 can access the Town of Raymond via the intersection at Highway 52 and Range Road 203.

1.3 OBJECTIVE

The objective for the TIA is to determine the anticipated traffic impacts and the required roadway improvements to ensure that the surrounding road network can safely accommodate traffic from the proposed subdivision.

1.4 STUDY METHODOLOGY

The TIA was completed using the following methodology:

- Collect and review traffic data
- Establish the existing (2010) and future (2030) background traffic conditions
- Estimate the vehicle trips generated to and from the subdivision
- Establish the trip distribution pattern and assign the site trips to the four access points and Highway 52/Range Road 203
- Complete a traffic analysis using Synchro 7.0 software for the study intersections
- Identify the traffic impacts of the subdivision and determine intersection improvement requirements for the 2010 and 2030 time frames
- Complete intersection treatment type analyses for the proposed Highway 52/Collector Road access and the Highway 52/Range Road 203 intersection
- Provide recommendations for roadway improvements required if necessary
- Prepare a report documenting process.

1.5 BOUNDARY ROAD NETWORK

Figure 1-1, at the end of this section, presents the existing roadway network in the vicinity of the proposed site. Highway 52/Range Road 203 is an existing intersection, with Highway 52 forming the eastbound and westbound approaches and Range Road 203 forming the northbound and southbound approaches.

A brief description of the existing roadways that are of interest is provided below:

- Highway 52 is a paved two-lane east-west highway. The posted speed limit varies within the study area from 50 km/h within the Town of Raymond, to 80 km/h east of the Town of Raymond to the proposed Collector Road access, to 100 km/h east of the proposed Collector Road access. Highway 52 starts at a T-intersection with Highway 5 northeast of the Town of Magrath and terminates at a T-intersection with Highway 4 southeast of the Town of Stirling. After the StoneGate Meadows subdivision is developed, the Town of Raymond plans to reduce the posted speed limit along Highway 52 to 50 km/h to east of Range Road 203. This was assumed for the TIA.

- Range Road 203 is two-lane gravel road oriented in the north-south direction. The posted speed limit was assumed to be 80 km/h. Range Road 203 starts at a T-intersection with Township Road 70 and terminates north of Township Road 54.

- 400 S is a two-lane paved roadway located in the southern portion of the Town of Raymond, with a posted speed limit of 50 km/h. 400 S was classified as an arterial roadway in the Town of Raymond's TMP and is expected to serve an important function as the Town of Raymond expands in the future.

The development of StoneGate Meadows has been planned in seven phases starting from the west end of the site. Multiple phases may be developed simultaneously as long as the phases are sequential and driven by demand. The development of StoneGate Meadows was assumed to commence after the existing (2010) time horizon and will be completed by the future (2030) time horizon. All the lots will be developed and all the internal roadways will be completed by the 2030 time horizon.

The internal roadways within the site will be constructed as paved two-lane roadways with a country residential appearance. This includes the roadways that will form the access points to the subdivision. The posted speed limit will be 50 km/h within the site.

1.6 LANE CONFIGURATION

The existing lane configuration at Highway 52/Range Road 203 was used for capacity analyses in both the existing (2010) and future (2030) time horizon. The existing lane configuration for Highway 52/ Range Road 203 is as follows:

- Eastbound Approach: Free-flow, single shared left turn, through and right turn lane
- Westbound Approach: Free-flow, single shared left turn, through and right turn lane
- Northbound Approach: Stop-control, single shared left turn, through and right turn lane
- Southbound Approach: Stop-control, single shared left turn, through and right turn lane.

At the proposed access locations, the following lane configurations were assumed for the 2030 time horizon.

Highway 52/Collector Road Access

- Eastbound Approach: Free-flow, single shared through and right turn lane
- Westbound Approach: Free-flow, single shared left turn and through lane
- Northbound Approach: Stop-control, single shared left turn and right turn lane.

Range Road 203/Range Road 203 North Access

- Eastbound Approach: Stop-control, single shared left turn and right turn lane
- Northbound Approach: Free-flow, single shared left turn and through lane
- Southbound Approach: Free-flow, single shared through and right turn lane.

Range Road 203/Range Road 203 South Access

- Eastbound Approach: Stop-control, single shared left turn and right turn lane
- Northbound Approach: Free-flow, single shared left turn and through lane
- Southbound Approach: Free-flow, single shared through and right turn lane.

400 S/Collector Road Access

- Westbound Approach: Stop-control, single shared left turn and right turn lane
- Northbound Approach: Free-flow, single shared through and right turn lane
- Southbound Approach: Free-flow, single shared left turn and through lane.

Figure 1-2, at the end of this section, presents the existing and assumed lane configurations at the study intersections.

For the purpose of this TIA, the 400 S/Collector Road access was assumed to connect to the existing T-intersection located on curve on 400 S.

1.7 ANALYSIS SCENARIOS

Capacity analyses were completed in both the a.m. and p.m. peak hours for the existing (2010) and future (2030) time horizons. The following intersections were analyzed for each time horizon.

Existing (2010) Time Horizon

- Highway 52/Range Road 203.

Future (2030) Time Horizon

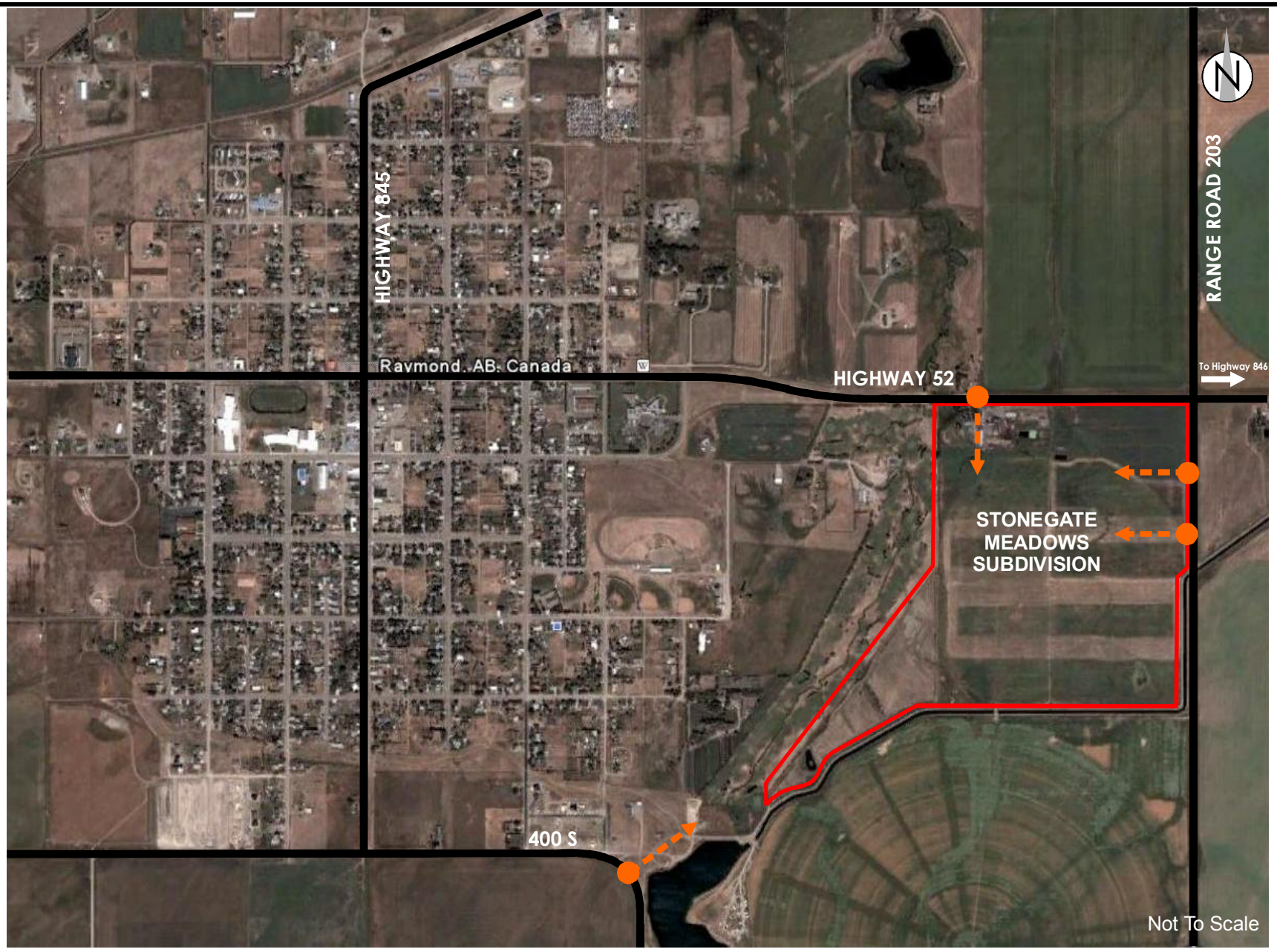
- Highway 52/Collector Road access
- Range Road 203/Range Road 203 north access
- Range Road 203/Range Road 203 south access
- 400 S/Collector Road access
- Highway 52/Range Road 203.

In the existing (2010) time horizon, only the background traffic volumes can be analyzed. In the future (2030) time horizon, both the background and total traffic volumes will be analyzed.

1.8 PROPOSED DEVELOPMENT

StoneGate Meadows will be a residential subdivision with approximately 200 lots dedicated for single-family residential housing and 2 lots (Lot 24 and Lot 25) dedicated for multi-family residential housing. A total of 48 units are planned for the multi-family residential housing, spanning both Lot 24 and Lot 25.

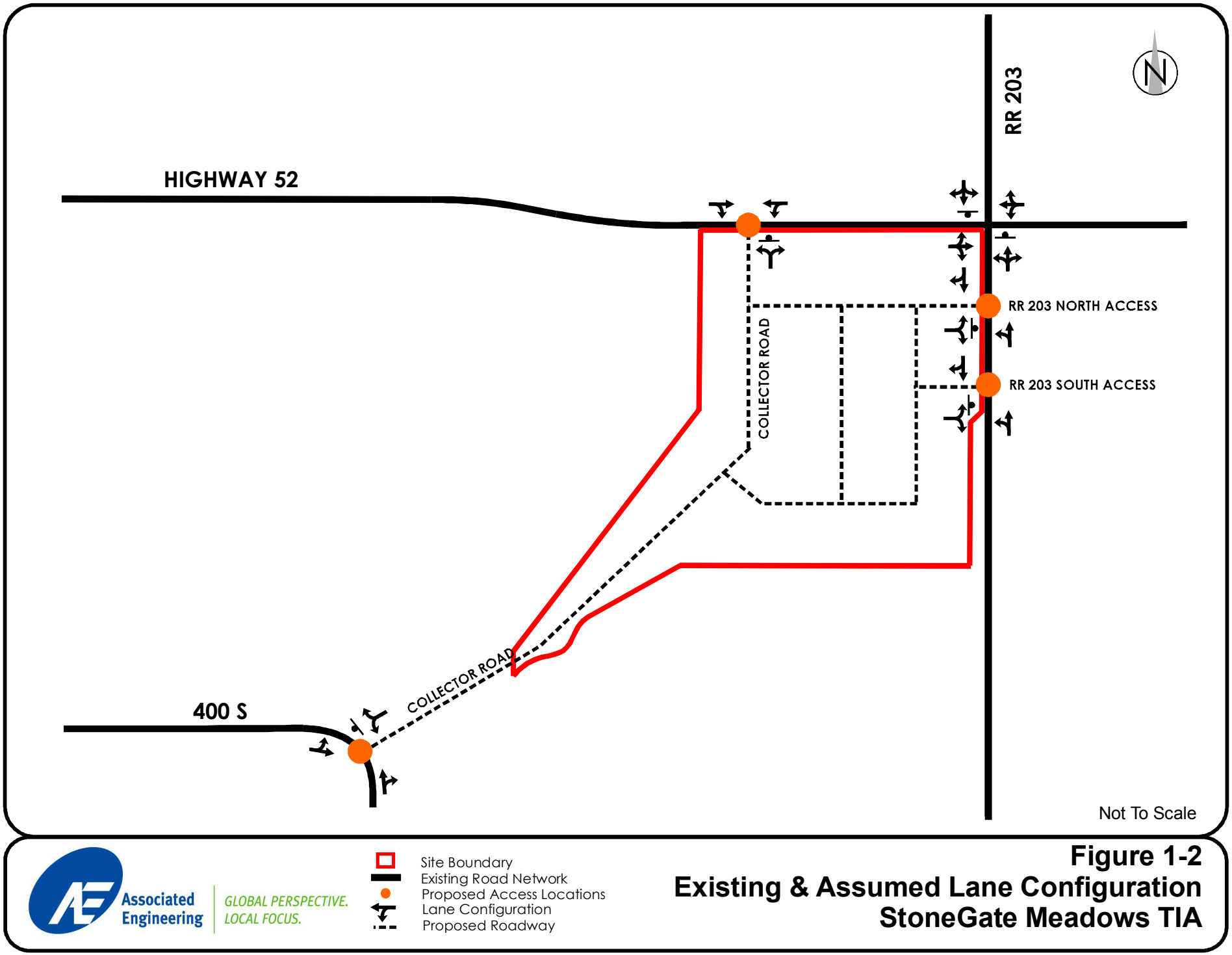
Figure 1-3, at the end of this section, presents the proposed lot and road layout plan for the StoneGate Meadows subdivision.



Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

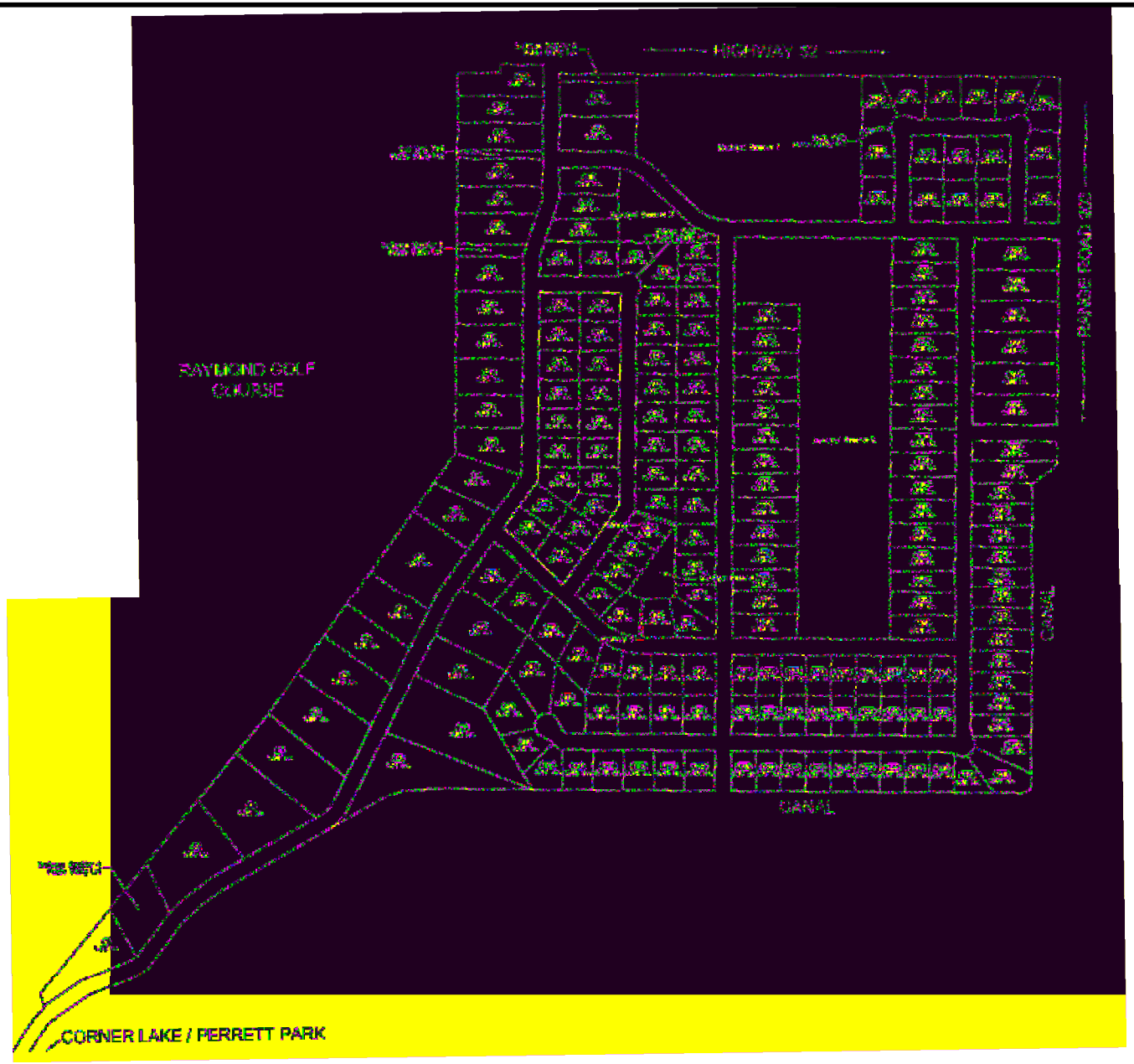
Site Boundary
Existing Road Network
Proposed Access Locations

Figure 1-1
Site Location
StoneGate Meadows TIA



Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Figure 1-2
Existing & Assumed Lane Configuration
StoneGate Meadows TIA



Not To Scale

Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Figure 1-3
Site Layout Plan
StoneGate Meadows TIA

2 Existing (2010) Traffic

2.1 2008 TRAFFIC

2008 traffic volumes at Highway 52/Range Road 203 were estimated using 2008 traffic information obtained from the AT website for Highway 52/Highway 845 and Highway 52/Highway 846. The data obtained (attached in Appendix A) included:

- 2008 turning movement diagrams for Highway 52/Highway 845 (in Raymond)
- 2008 turning movement diagrams for Highway 52/ Highway 846 (south of Stirling)
- Traffic volume history from 1999 to 2008 for Highway 52, east of Highway 845 in Raymond and west of Highway 846 south of Stirling.

Traffic decreases in the eastward direction between Highway 845 and Highway 846, and increases in the westward direction. This trend was observed in both the average annual daily traffic (AADT) and peak hour volumes. The increase/decrease in traffic volumes along Highway 52 was assumed to occur equally at points located between Highway 845 and Highway 846. These points included (from west to east):

- Local roads within the Town of Raymond (represented by one common point)
- Range Road 203
- Range Road 202
- Range Road 201
- Range Road 200
- Range Road 195.

Traffic volumes at Highway 52/Range Road 203 were estimated using the link volumes on Highway 52 and existing travel patterns at Highway 52/Highway 846. The existing traffic patterns for the northbound and southbound approaches were applied at Highway 52/Range Road 203 with some modifications.

The proposed accesses to StoneGate Meadows did not exist in the 2008 time horizon. Traffic volumes at these intersections on Highway 52 and Range Road 203 were restricted to through movements only. Figure 2-1, at the end of this section, presents the 2008 AADT and peak hour traffic volumes at the study intersections.

2.2 2010 TRAFFIC

Capacity analyses for this TIA will be completed in the existing (2010) and future (2030) time horizons. Construction of StoneGate Meadows is assumed to begin after the 2010 time horizon; therefore, the existing (2010) traffic will consist of only background traffic.

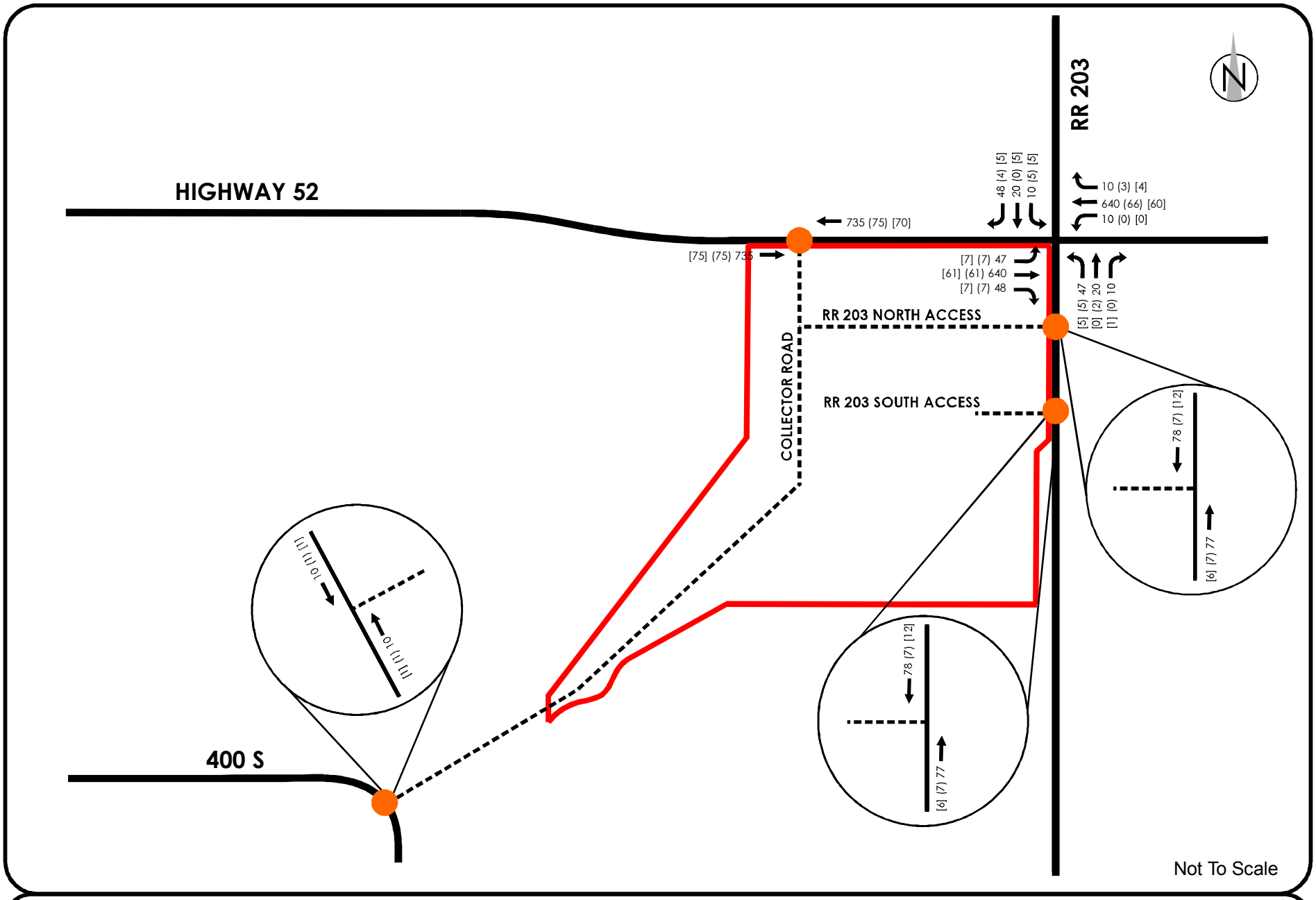
To obtain the existing (2010) background traffic volumes at the study intersections, a growth rate was applied to the 2008 traffic volumes presented in Figure 2-1. The traffic volume history along Highway 52 was analyzed to determine the annual growth rate in the study area. Table 2-1 presents the growth rate calculations performed on the data provided for Highway 52.

Table 2-1
Growth Rate along Highway 52

Year	East of Highway 845, in Raymond		West of Highway 846, South of Stirling	
	Average Annual Daily Traffic (Two-Way)	Growth Rate (%)	Average Annual Daily Traffic (Two-Way)	Growth Rate (%)
1999	1550		660	
2000	1760	13.5%	700	6.1%
2001	1490	-15.3%	650	-7.1%
2002	1560	4.7%	630	-3.1%
2003	1600	2.6%	640	1.6%
2004	1600	0.0%	640	0.0%
2005	1540	-3.8%	640	0.0%
2006	1660	7.8%	680	6.3%
2007	1710	3.0%	700	2.9%
2008	1620	-5.3%	720	2.9%
Average		**0.8%**		**1.1%**
Average along Highway 52				**0.9%**

The average annual growth rate along Highway 52 between Highway 845 and Highway 846 is 0.9%. The provincial average growth rate is 2.5%, as stipulated by AT. To be conservative, the 2.5% growth rate was adopted and applied to the 2008 traffic volumes over a two year period, assuming non-compounded growth.

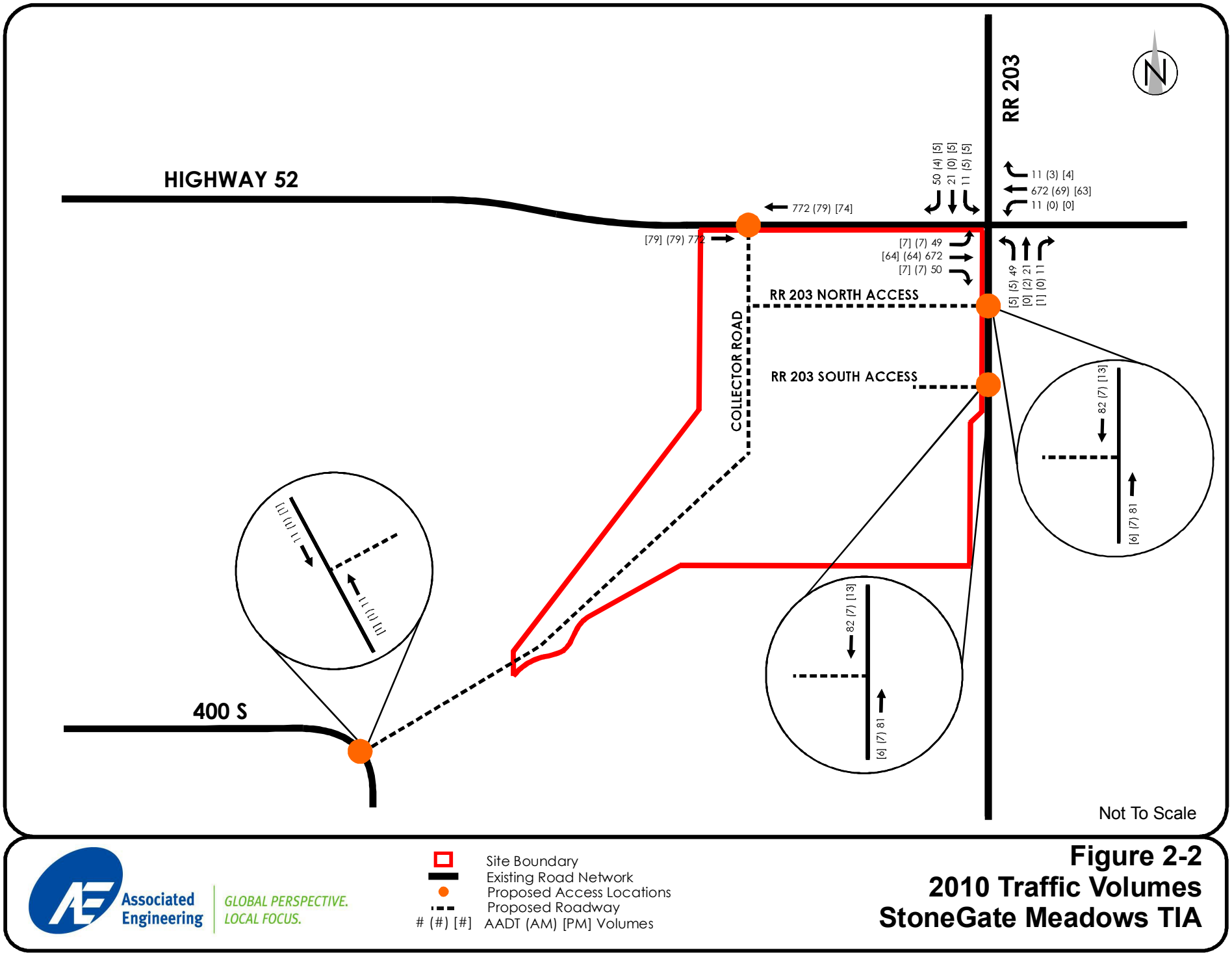
Figure 2-2, at the end of this section presents the 2010 AADT and peak hour traffic volumes at the study intersections.



Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Site Boundary
Existing Road Network
Proposed Access Locations
Proposed Roadway
(#) [#] AADT (AM) [PM] Volumes

Figure 2-1
2008 Traffic Volumes
StoneGate Meadows TIA



Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Site Boundary
Existing Road Network
Proposed Access Locations
Proposed Roadway
(#) [#] AADT (AM) [PM] Volumes

Figure 2-2
2010 Traffic Volumes
StoneGate Meadows TIA

3 Future (2030) Traffic

The development of StoneGate Meadows is assumed to be complete by the future (2030) time horizon. Traffic volumes in the 2030 time horizon will consist of background traffic volumes, expanded to the future horizon, and site generated traffic volumes from the StoneGate Meadows subdivision. The two traffic components are discussed in detail below.

3.1 2030 BACKGROUND TRAFFIC

2030 background traffic volumes were obtained by expanding the existing (2010) traffic volumes for 20 years using the 2.5% non-compounded growth rate. Figure 3-1, at the end of this section, presents the 2030 background AADT and peak hour traffic volumes at the study intersections.

3.2 2030 SITE-GENERATED TRAFFIC

A three-step process was undertaken to determine the site traffic generated by the proposed StoneGate Meadows subdivision. The steps included:

- Trip Generation: Estimate the number of trips generated from and attracted to the subdivision during the a.m. and p.m. peak hours.
- Trip Distribution: Estimate the origin/destination of trips to/from the subdivision.
- Trip Assignment: Selecting the routes used by trips to/from the subdivision and the assignment of the traffic volumes to the study intersections.

3.2.1 Trip Generation

The proposed subdivision layout plan, presented in Figure 1-3, was used to estimate trips generated by the subdivision. The subdivision will contain a total of 202 lots; 200 lots are dedicated to single family residential and two lots are dedicated to multi-family residential. The multi-family residential lots will likely contain 48 low-rise apartments.

The ITE Trip Generation (7th Edition) handbook was referenced to determine the appropriate trip rates to apply to estimate the trips generated from and attracted to the proposed developments. Table 3-1 summarizes the trip generation procedure undertaken to estimate the site trips generated by the subdivision.

During the a.m. peak hour, a total of 241 trips will be generated by the subdivision and during the p.m. peak hour, a total of 280 trips will be generated from the subdivision for the built-out condition.

3.2.2 Trip Distribution

Trips generated by the subdivision will predominately travel to the west, towards the Town of Raymond, in both the a.m. and p.m. peak hour. To reflect this travel pattern, a 90/10 west/east split was assumed on Highway 52 at both the proposed Collector Road access location and the Range Road 203 intersection. At the other proposed access locations on Range Road 203 and 400 S, a 90/10 north/south split was also assumed to reflect the travel pattern.

3.2.3 Assignment

Site trips were distributed across the four access locations based on proximity. Each phase of development was assessed independently and assigned to the nearest access location. If multiple access locations were available, the trips were assigned equally. The percentage split for the four access locations for the full built-out condition was:

- Highway 52 and Collector Road: 25%
- Range Road 203 and Range Road 203 North Access: 20%
- Range Road 203 and Range Road 203 South Access: 20%
- 400 S and Collector Road: 35%.

Figure 3-2, at the end of this section, presents the final trip distribution percentages at the study intersections based on the assumptions discussed above.

Figure 3-3, at the end of this section, presents the 2030 site-generated AADT and peak hour traffic volumes at the study intersections. The AADT for the 2030 site-generated traffic was estimated by assuming a typical p.m. peak traffic volume to AADT ratio of 0.10.

3.2.4 Town of Raymond Transportation Master Plan Comparison

It should be noted that the proposed StoneGate Meadows subdivision was considered in the Town of Raymond's TMP. When the TMP was completed, the information available for the subdivision was limited to the following details:

- Residential land use with 265 single family housing lots
- Two access points into the subdivision, one in the north coinciding with the north Collector Road access, and one in the south coinciding with the south Collector Road access.

Stonegate Meadows Subdivision TIA
Project: 2010-3991
Date: January 26, 2010

Trip Generation - AM/PM Peak

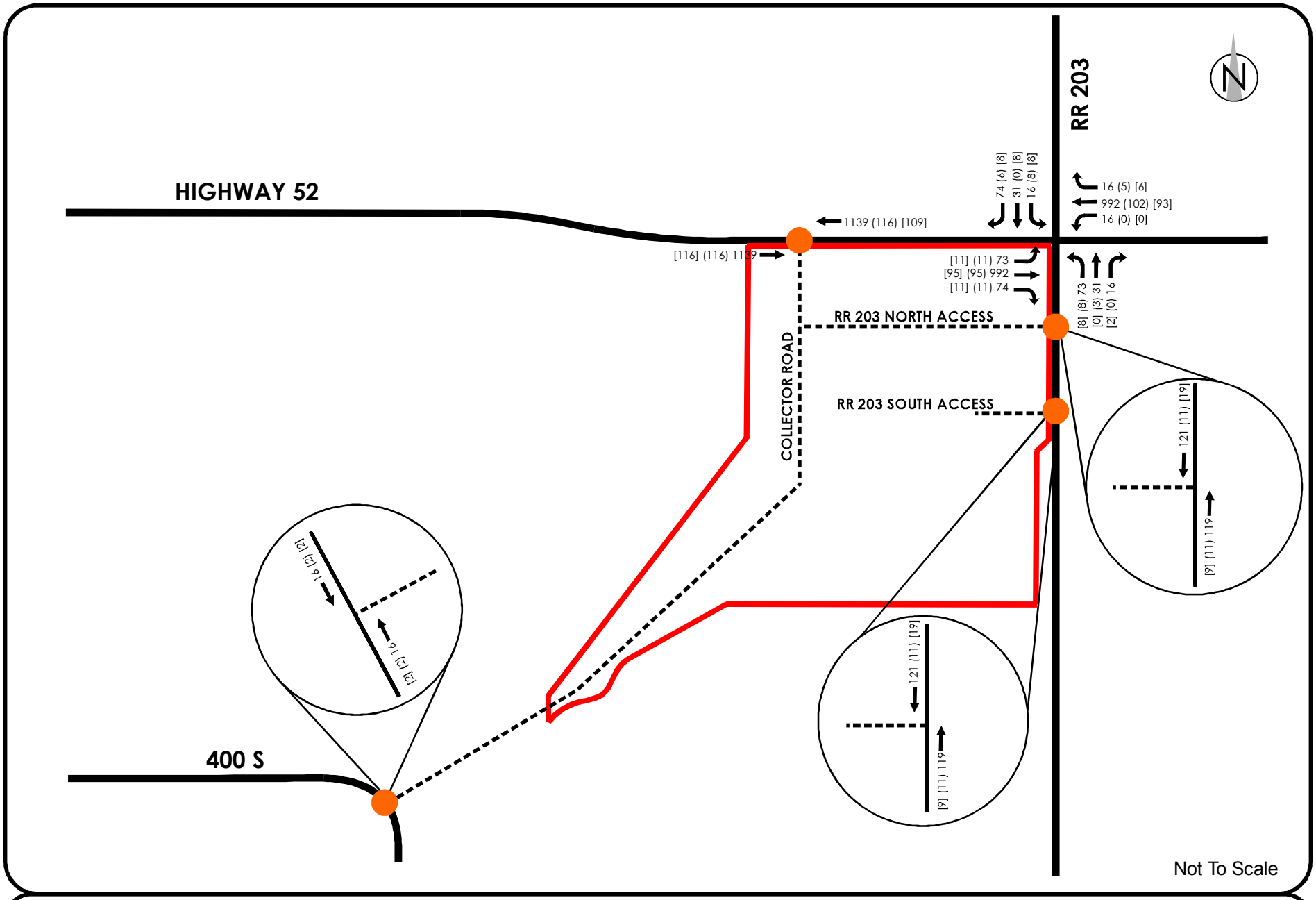
			Independent Variable		ITE Data						Trips (T)					
					AM Peak Hour (One Hour Between 7 - 9 am)			PM Peak Hour (One Hour Between 4 - 6 pm)			AM Peak Hour (One Hour Between 7 - 9 am)			PM Peak Hour (One Hour Between 4 - 6 pm)		
Description	Units	Land Use Description	Description	Units (X)	Equation or Average Rate	% Inbound	% Outbound	Equation or Average Rate	% Inbound	% Outbound	Total	In	Out	Total	In	Out
Phase I	23	**210**: Single-family detached housing	Dwelling Unit	23	T = 0.70X+9.43	25%	75%	Ln(T) = 0.90Ln(X)+0.53	63%	37%	26	7	20	29	18	11
Phase 2	48	**221**: Low-rise apartment	Dwelling Unit	48	Ln(T) = 0.82Ln(X)+0.23	21%	79%	Ln(T) = 0.88Ln(X)+0.16	65%	35%	31	7	24	36	23	13
Phase 2 - Lot 24 & 25	18	**210**: Single-family detached housing	Dwelling Unit	18	T = 0.70X+9.43	25%	75%	Ln(T) = 0.90Ln(X)+0.53	63%	37%	23	6	17	23	14	9
Phase 3	55	**210**: Single-family detached housing	Dwelling Unit	55	T = 0.70X+9.43	25%	75%	Ln(T) = 0.90Ln(X)+0.53	63%	37%	48	12	36	63	40	23
Phase 4	27	**210**: Single-family detached housing	Dwelling Unit	27	T = 0.70X+9.43	25%	75%	Ln(T) = 0.90Ln(X)+0.53	63%	37%	29	7	22	33	21	12
Phase 5	28	**210**: Single-family detached housing	Dwelling Unit	28	T = 0.70X+9.43	25%	75%	Ln(T) = 0.90Ln(X)+0.53	63%	37%	30	8	23	35	22	13
Phase 6	33	**210**: Single-family detached housing	Dwelling Unit	33	T = 0.70X+9.43	25%	75%	Ln(T) = 0.90Ln(X)+0.53	63%	37%	33	8	25	40	25	15
Phase 7	16	**210**: Single-family detached housing	Dwelling Unit	16	T = 0.70X+9.43	25%	75%	Ln(T) = 0.90Ln(X)+0.53	63%	37%	21	5	16	21	13	8
TOTAL				**248**							**241**	**59**	**182**	**280**	**177**	**103**

1. Residential units counted off 'Stonegate Meadows Subdivision Proposed Lot and Road Layout'
2. Dwelling units for Phase 2 - Lot 24 & 25 from developer

The TMP estimated that a total of 258 trips would be generated by the subdivision in the p.m. peak hour for the 2028 time horizon. The difference in the expected site trips, from the trips generated in this TIA, is small and can be attributed to the difference in the number of lots and the intended land use. Site traffic at the two common access locations will also differ between the two documents, as the number of access points have changed and different trip distributions were assumed. In the TMP, a 100/0 west/east split was assumed at the Highway 52/Collector Road access and a 100/0 north/south split was assumed at the 400 S/Collector Road access. For the TIA a 90/10 split was assumed at both locations.

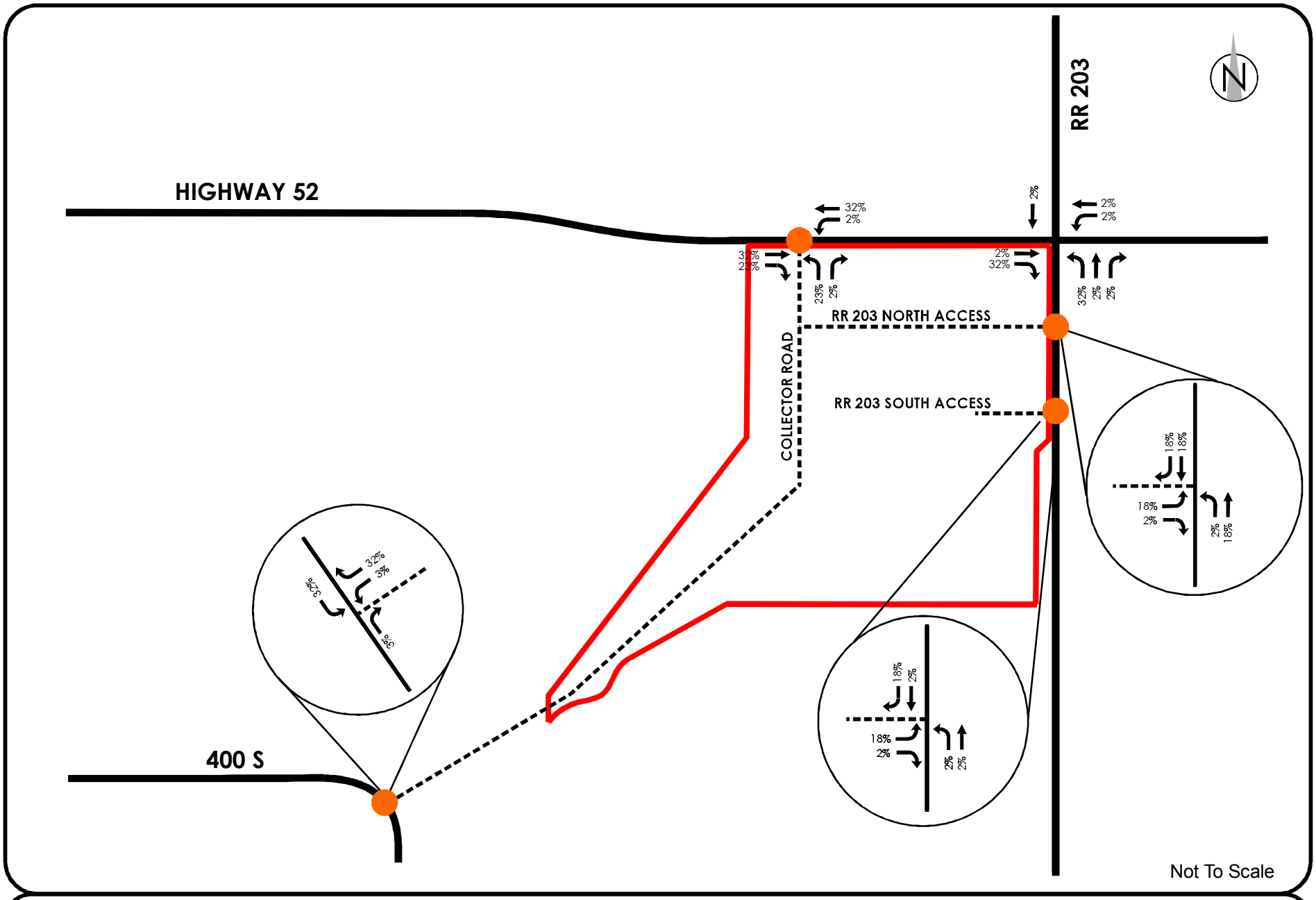
3.3 2030 TOTAL TRAFFIC

The 2030 background traffic volumes were combined with the 2030 site-generated traffic volumes to obtain the 2030 total traffic volumes. Figure 3-4 presents the 2030 total traffic AADT and peak hour traffic volumes for the study intersections.



Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Figure 3-1
2030 Background Traffic Volumes
StoneGate Meadows TIA



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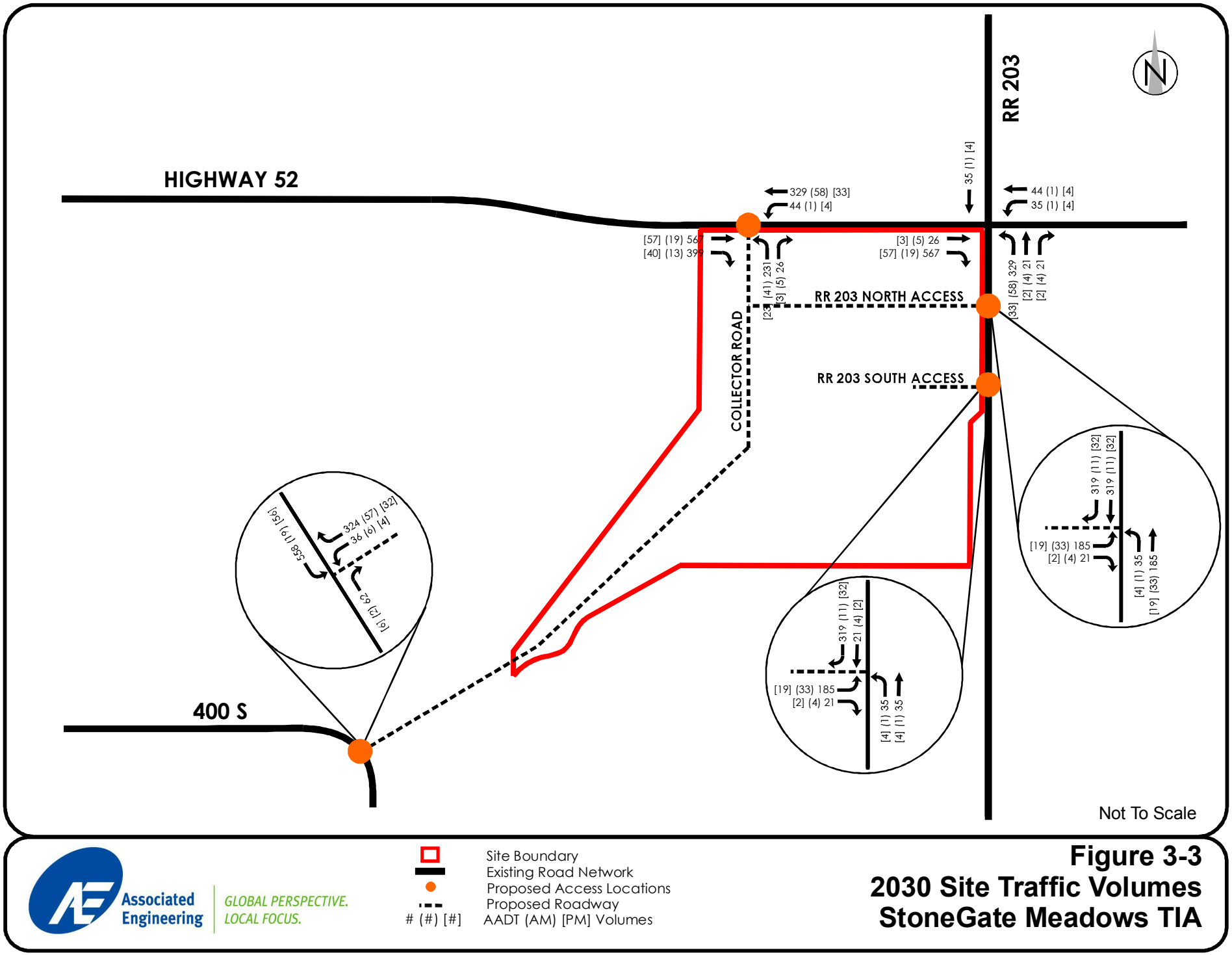
Site Boundary
Existing Road Network
Proposed Access Locations
Proposed Roadway
#% Site Trip Distribution Percentage

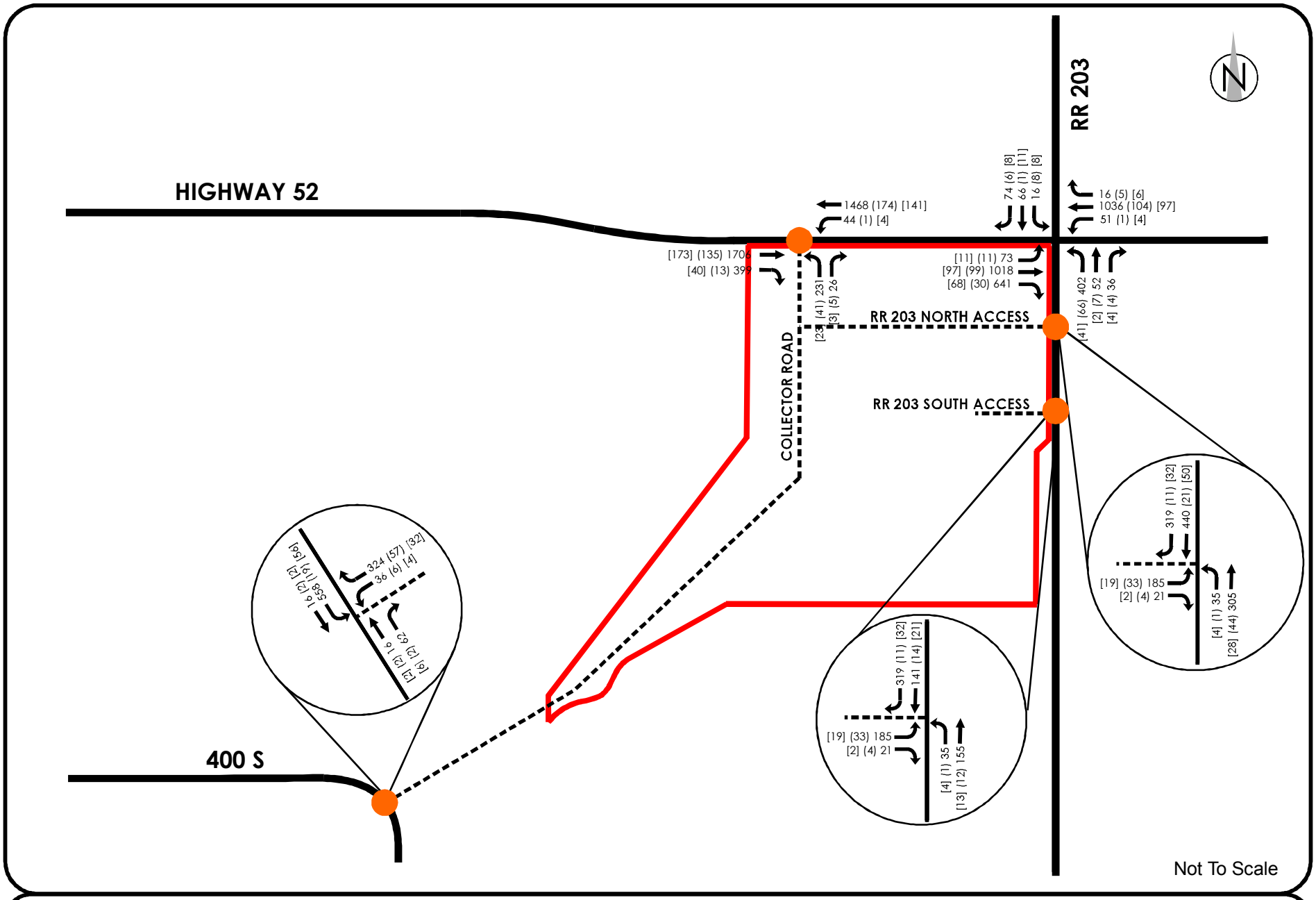
Figure 3-2
Site Distribution Assumption
StoneGate Meadows TIA



Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Site Boundary
Existing Road Network
Proposed Access Locations
Proposed Roadway
(#) [#] AADT (AM) [PM] Volumes

Figure 3-3
2030 Site Traffic Volumes
StoneGate Meadows TIA



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Site Boundary
Existing Road Network
Proposed Access Locations
Proposed Roadway
(#) [#] AADT (AM) [PM] Volumes

Figure 3-4
2030 Total Traffic Volumes
StoneGate Meadows TIA

4 Traffic Assessment

The Synchro 7.0 traffic analysis program based on the Highway Capacity Manual (HCM) was used to complete the capacity analysis of the study intersections. Synchro 7.0 applies the methodology established by the HCM to output a level of service (LOS) for study intersections, given the lane configuration, vehicular volumes, heavy vehicle percentages, etc. For the capacity analyses the following assumptions were made:

- Heavy Vehicle Percentage: 3% along Highway 52 and Range Road 203, 2% on 400 S and the subdivision roads
- Lane Width: 3.7 m along Highway 52 and Range Road 203, 4.8 m along 400 S, and 4.0 m along the subdivision roads.
- Default values from Synchro were used for the remaining parameters.

The assumed lane configurations presented in Figure 1-2 were used to complete the capacity analyses.

The operational capability of the study intersections were assessed using capacity, which is a measure of the sustainable flow rate at which vehicles can be expected to transverse a point. The critical measures used in the assessment were:

- Volume to capacity (v/c) ratio provides the amount of congestion for each turning movement and for each lane group for signalized intersections. A v/c value over 1 indicates that the movement or lane group is over capacity.
- Control delay is the amount of delay a vehicle experiences in seconds.
- LOS is a qualitative measure describing operational conditions within a traffic stream and is based on service measures such as delay and congestion.

For the purpose of the traffic assessment a LOS C was required for the intersection approach to be operating above an acceptable level. AT requires a minimum LOS D for each movement at an intersection and minimum overall intersection LOS C.

The LOS definitions for an unsignalized intersection is included in Appendix B. A detailed review of the assessment is included in the following sections and the outputs from Synchro have been summarized in Appendix C.

4.1 EXISTING (2010) TIME HORIZON

An assessment of the study intersections with the existing (2010) traffic was completed to ensure that the study intersections are currently operating at an acceptable level. The detailed capacity analyses are included in Appendix C.

Table 4-1 presents the overall intersection LOS for the study intersections in the existing (2010) horizon.

Table 4-1
Capacity Analysis Results (2010 - Existing Traffic)

Peak Hour	Intersection	Maximum v/c Ratio	Intersection Delay (Seconds)	Overall LOS
A.M.	Highway 52 and Range Road 203	0.01	1.2	A
P.M.	Highway 52 and Range Road 203	0.02	1.5	A

The intersection of Highway 52 and Range Road 203 operates well in the existing (2010) horizon for both the a.m. and p.m. peak hour conditions, with overall intersection LOS A, maximum v/c ratios below 0.02, and intersection delays below 1.5 seconds. The individual movements also all operate at LOS A and with delays below 9.7 seconds. The assumed lane configurations are sufficient to accommodate the existing (2010) traffic volumes.

4.2 FUTURE (2030) BACKGROUND TRAFFIC

An assessment of the study intersections with only the future (2030) background traffic was completed to ensure that the study intersections would operate at acceptable levels in the 2030 time horizon, prior to consideration for the proposed StoneGate Meadows subdivision.

Table 4-2 presents the overall intersection LOS for the study intersections in the future (2030) time horizon, using only background traffic.

Table 4-2
Capacity Analysis Results (2030 - Background Traffic Only)

Peak Hour	Intersection	Maximum v/c Ratio	Intersection Delay (Seconds)	Overall LOS
A.M.	Highway 52 and Collector Road Access	0.07	0.0	A
	Range Road 203 and Range Road 203 North Access	0.01	0.0	A
	Range Road 203 and Range Road 203 South Access	0.01	0.0	A
	400 S and Collector Road Access	0.00	0.0	A
	Highway 52 and Range Road 203	0.02	1.4	A
P.M.	Highway 52 and Collector Road Access	0.07	0.0	A
	Range Road 203 and Range Road 203 North Access	0.01	0.0	A
	Range Road 203 and Range Road 203 South Access	0.01	0.0	A
	400 S and Collector Road Access	0.00	0.0	A
	Highway 52 and Range Road 203	0.03	1.7	A

All the intersections will continue to operate well in the future (2030) horizon for both the a.m. and p.m. peak hour conditions, with overall intersection LOS A, maximum v/c ratios below 0.07 and intersection delays below 1.7 seconds. The individual movements also continue to operate well at LOS B or better, and with delays below 10.4 seconds. The assumed lane configurations are expected to accommodate the future (2030) background traffic volumes.

4.3 FUTURE (2030) TOTAL TRAFFIC

An assessment of the study intersections with the future (2030) total traffic was completed to determine potential improvements required at the study intersections following the development of StoneGate Meadows.

Table 4-3 presents the overall intersection LOS for the study intersections in the future (2030) time horizon, using the total traffic.

Table 4-3
Capacity Analysis Results (2030 - Total Traffic)

Peak Hour	Intersection	Maximum v/c Ratio	Intersection Delay (Seconds)	Overall LOS
A.M.	Highway 52 and Collector Road Access	0.09	1.4	A
	Range Road 203 and Range Road 203 North Access	0.04	3.0	A
	Range Road 203 and Range Road 203 South Access	0.04	4.4	A
	400 S and Collector Road Access	0.06	7.7	A
	Highway 52 and Range Road 203	0.12	3.2	A
P.M.	Highway 52 and Collector Road Access	0.14	0.8	A
	Range Road 203 and Range Road 203 North Access	0.05	1.6	A
	Range Road 203 and Range Road 203 South Access	0.03	2.4	A
	400 S and Collector Road Access	0.04	7.1	A
	Highway 52 and Range Road 203	0.08	2.6	A

All the intersections are expected continue to operate well in the future (2030) horizon for both the a.m. and p.m. peak hour condition, with overall intersection LOS A, maximum v/c ratios below 0.14 and intersection delays below 7.7 seconds. The individual movements are also expected to operate well at LOS B or better, and with delays below 11.1 seconds. The assumed lane configurations are expected to accommodate the future (2030) total traffic volumes.

5 Intersection Design

5.1 INTERSECTION TREATMENT TYPE

Intersection treatment type analyses were completed at Highway 52/Collector Road access and Highway 52/Range Road 203, to determine the intersection types warranted after StoneGate Meadows is developed in the 2030 time horizon. The analyses involved the following:

- Preliminary assessment based on traffic volumes and Figure D-7.4 in the Alberta Highway Geometric Design Guide
- Warrant for exclusive left-turn lane and right-turn lane if the preliminary assessment indicates that a detailed analysis is required.

The traffic volumes presented in Figure 3-4 were used for the preliminary assessment.

At both intersections, the preliminary assessment based on Figure D-7.4 indicated that a Type II, III, IV or V intersection would be required, to be determined by completing a detailed analysis. The worksheets for the preliminary assessment and detailed analysis have been included in Appendix D. Table 5-1 presents the results of the intersection treatment type analysis (preliminary and detailed).

Table 5-1
Intersection Treatment Type Analysis (Preliminary and Detailed)

Intersection	Preliminary Intersection Type (Figure D-7.4)	Peak Period	Left Turn		Right Turn		Detailed Intersection Type
			Westbound	Eastbound	Westbound	Eastbound	
Hwy 52 and Collector Road Access	Type II, III, IV or IV	A.M.	Not Warranted			Not Warranted	Type II A
		P.M.	Not Warranted			Not Warranted	
Hwy 52 and Range Road 203	Type II, III, IV or IV	A.M.	Not Warranted	Not Warranted	Not Warranted	Not Warranted	Type II C

6 Conclusion

This report documents the results of a TIA completed for the proposed StoneGate Meadows subdivision to be located east of the Town of Raymond, Alberta. This assessment evaluated how the following intersections would operate before and after the development of the proposed subdivision in the 2030 time horizon:

- Highway 52/Collector Road access
- Range Road 203/Range Road 203 north access
- Range Road 203/Range Road 203 south access
- 400 S/Collector Road access
- Highway 52/Range Road 203.

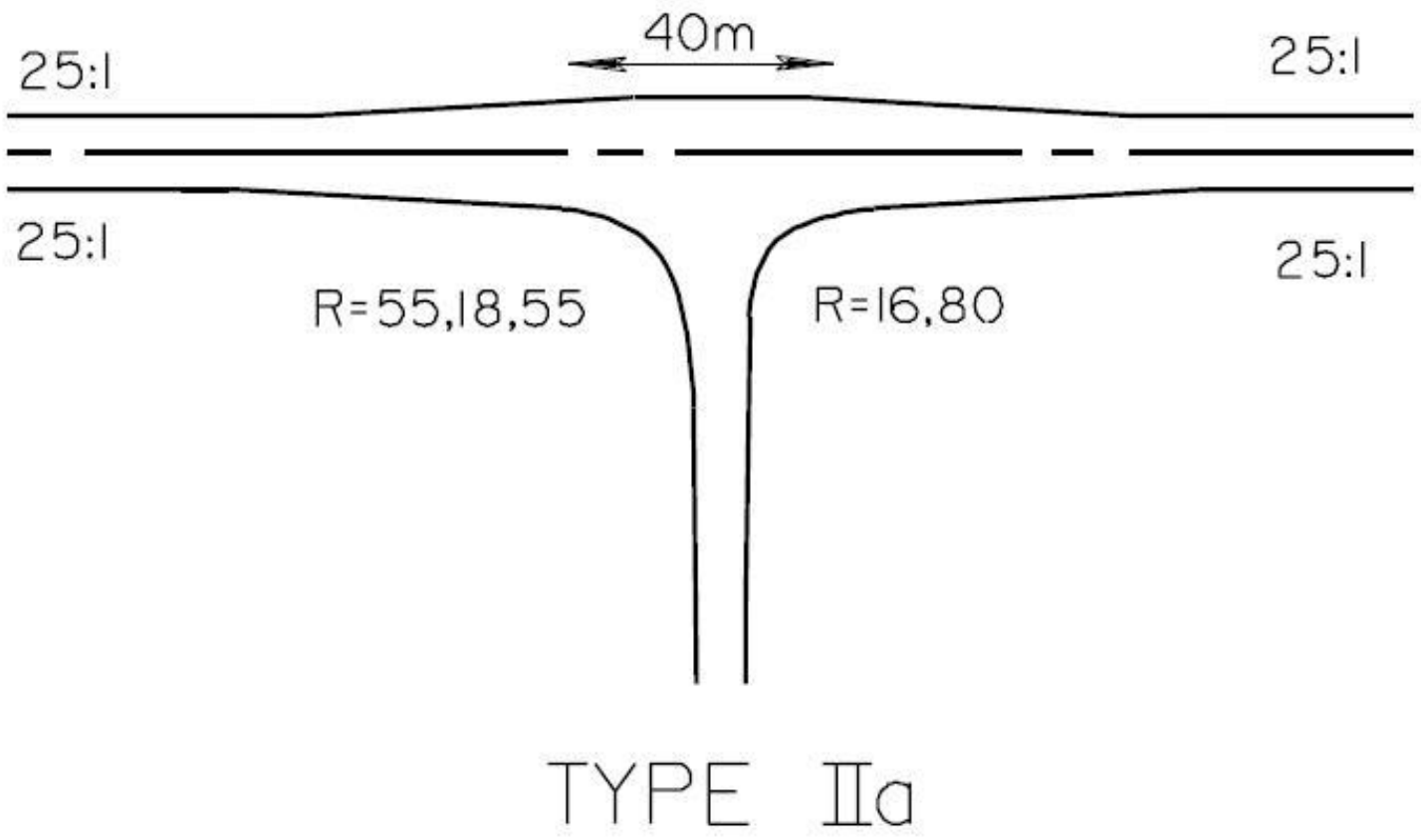
The objective of the assessment was to determine the anticipated traffic impacts and required roadway improvements to ensure that the surrounding road network can safely accommodate the proposed subdivision.

6.1 CAPACITY ANALYSIS

The proposed subdivision will not negatively impact the study intersections in the existing (2010) or future (2030) time horizons. Highway 52/Range Road 203 currently operates at an overall intersection LOS A and will continue to operate at LOS A in the 2030 horizon, with or without consideration for site traffic from the proposed subdivision. Additionally, in the 2030 horizon, the proposed access locations are expected to operate at overall intersection LOS A. The assumed lane configurations and traffic controls presented in Figure 1-2 is sufficient to accommodate the expected 2030 traffic at the study intersections.

6.2 INTERSECTION TYPE

Intersection treatment type analyses were completed for Highway 52/Collector Road access and Highway 52/Range Road 203. The analysis included a preliminary assessment based on Table D-7.6 of the Alberta Highway Geometric Design Guide and a detailed analysis involving warrants for exclusive left-turn and right-turn lanes. A Type II a intersection should be provided at Highway 52/Collector Road access and a Type II c intersection should be provided at Highway 52/Range Road 203. Figure 6-1 and Figure 6-2 present a Type II a and Type II c Intersection, respectively.

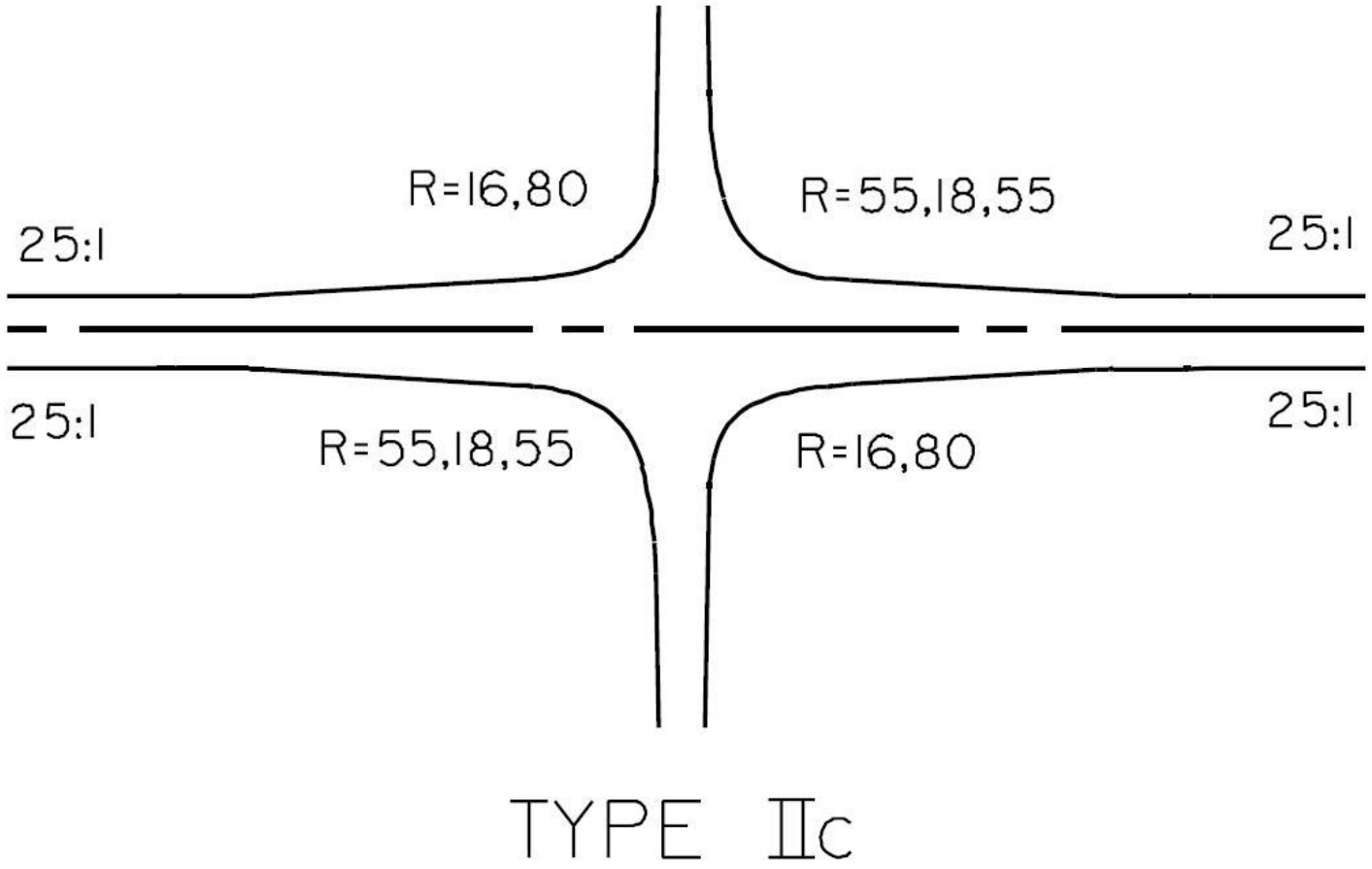


From Figure D-7.5 in the AT Highway Geometric Design Guide

Not To Scale

Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Figure 6-1
Type II a Intersection Type
StoneGate Meadows TIA



From Figure D-7.5 in the AT Highway Geometric Design Guide

Not To Scale

Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

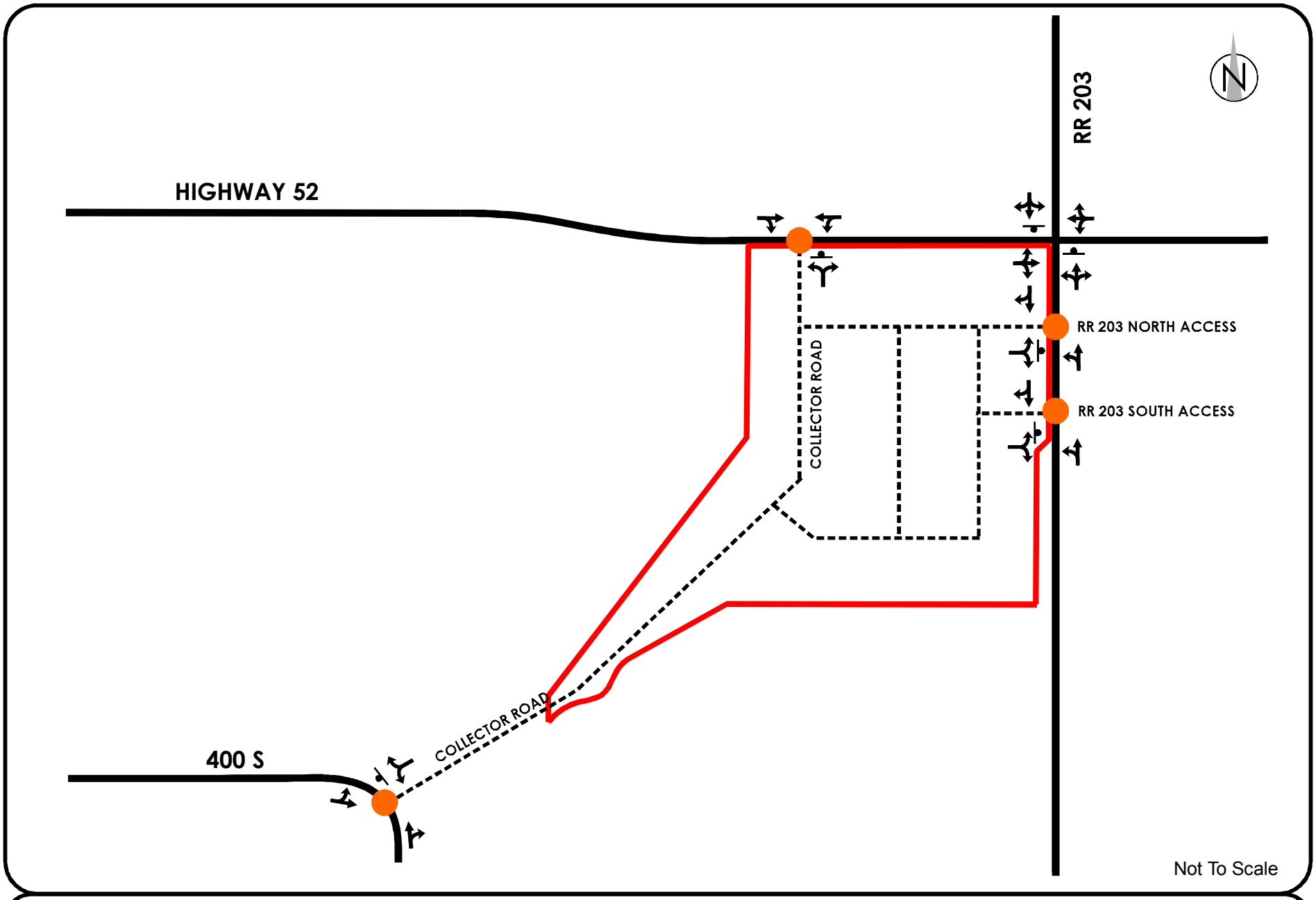
Figure 6-2
Type II c Intersection Type
StoneGate Meadows TIA

7 Recommendations

StoneGate Meadows should be developed with the four access points proposed in the site layout plan and with the lane configurations presented in Figure 7-1, at the end of this section. The location for the site access along 400 S should be reviewed in detail as part of the preliminary design. Consideration should be given to the horizontal curve along 400 S, and for safety reasons, the access point should be located off the curve.

As StoneGate Meadows is developed, the Highway 52/Collector Road access will need to be built to a Type II a intersection standard. For the full built-out condition, Highway 52/Range Road 203 intersection will need to be a Type II c intersection standard,.

It is recommended that the reduced posted speed of 50 km/h be implemented on Highway 52, to east of Range Road 203. This will ensure safe operating conditions for traffic along Highway 52 between the Town of Raymond and the StoneGate Meadows.



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Site Boundary
Existing Road Network
Proposed Access Locations
Lane Configuration
Proposed Roadway

Figure 7-1
Recommended Lane Configuration
StoneGate Meadows TIA

A Appendix A - 2008 Traffic Data

Turning Movement Summary Diagram

Reference No.: 997119

Intersection of:
52 & 845 IN RAYMOND

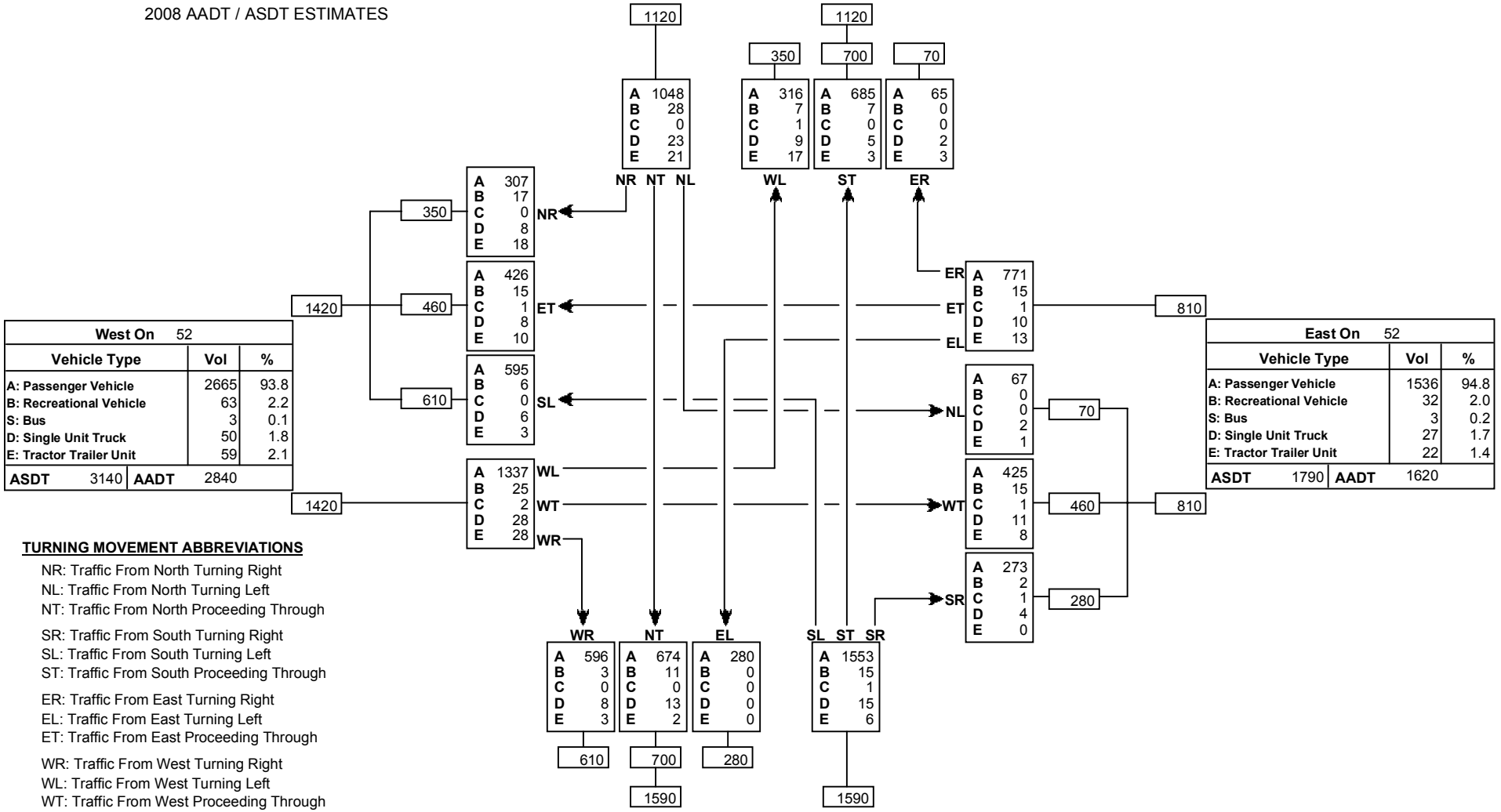
2008 AADT / ASDT ESTIMATES

North On 845		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2114	94.4
B: Recreational Vehicle	42	1.9
S: Bus	1	0.0
D: Single Unit Truck	39	1.7
E: Tractor Trailer Unit	44	2.0
ASDT 2480	**AADT** 2240	

West On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2665	93.8
B: Recreational Vehicle	63	2.2
S: Bus	3	0.1
D: Single Unit Truck	50	1.8
E: Tractor Trailer Unit	59	2.1
ASDT 3140	**AADT** 2840	

East On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1536	94.8
B: Recreational Vehicle	32	2.0
S: Bus	3	0.2
D: Single Unit Truck	27	1.7
E: Tractor Trailer Unit	22	1.4
ASDT 1790	**AADT** 1620	

South On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	3103	97.6
B: Recreational Vehicle	29	0.9
S: Bus	1	0.0
D: Single Unit Truck	36	1.1
E: Tractor Trailer Unit	11	0.3
ASDT 3520	**AADT** 3180	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

TURNING MOVEMENT ABBREVIATIONS

AADT: Average Annual Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of January 1 to December 31 (365 days)

ASDT: Average Summer Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 997119

Intersection of:
52 & 845 IN RAYMOND

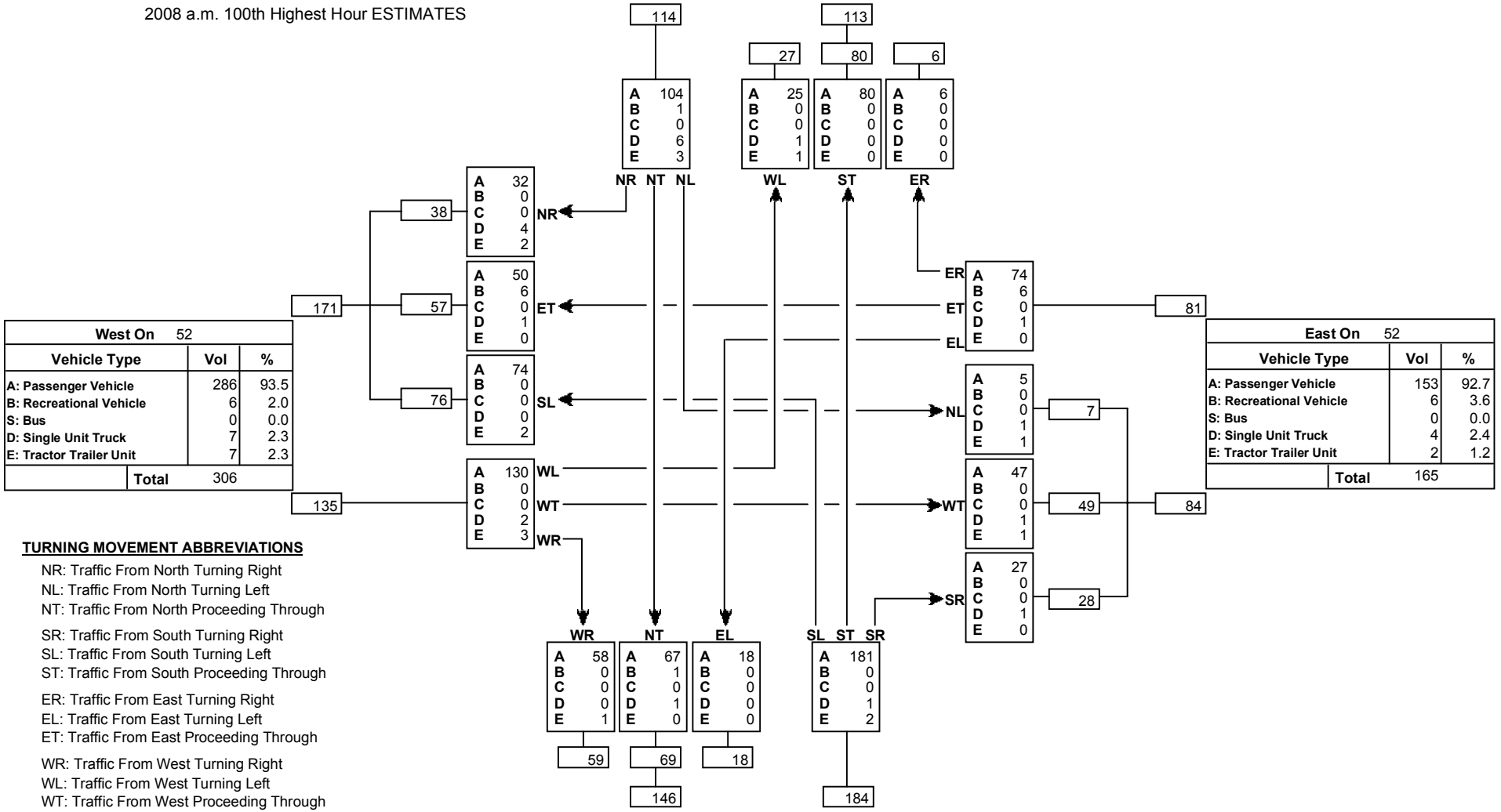
2008 a.m. 100th Highest Hour ESTIMATES

North On 845		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	215	94.7
B: Recreational Vehicle	1	0.4
S: Bus	0	0.0
D: Single Unit Truck	7	3.1
E: Tractor Trailer Unit	4	1.8
Total	227	

West On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	286	93.5
B: Recreational Vehicle	6	2.0
S: Bus	0	0.0
D: Single Unit Truck	7	2.3
E: Tractor Trailer Unit	7	2.3
Total	306	

East On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	153	92.7
B: Recreational Vehicle	6	3.6
S: Bus	0	0.0
D: Single Unit Truck	4	2.4
E: Tractor Trailer Unit	2	1.2
Total	165	

South On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	324	98.2
B: Recreational Vehicle	1	0.3
S: Bus	0	0.0
D: Single Unit Truck	2	0.6
E: Tractor Trailer Unit	3	0.9
Total	330	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 997119

Intersection of:
52 & 845 IN RAYMOND

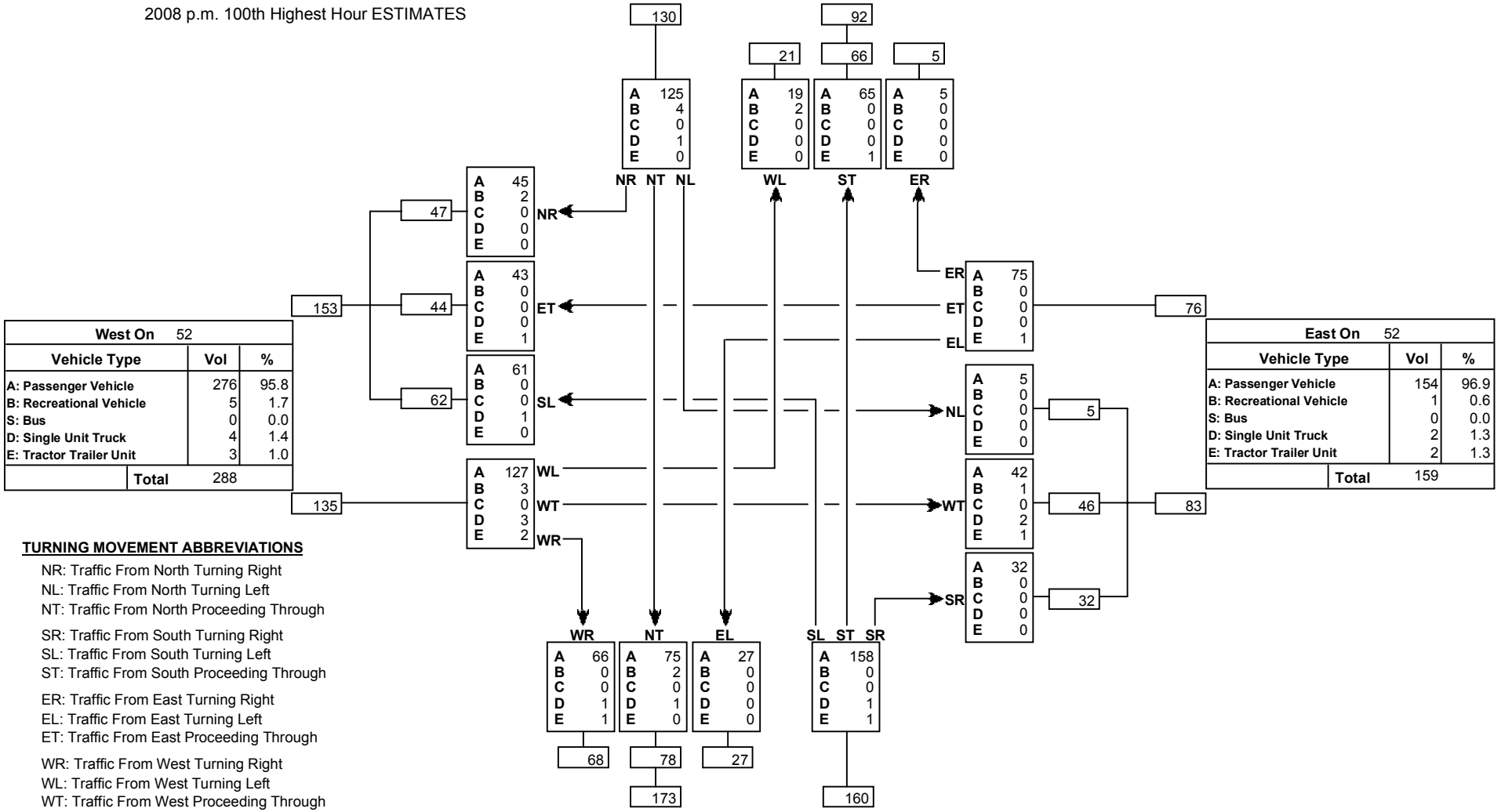
2008 p.m. 100th Highest Hour ESTIMATES

North On 845		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	214	96.4
B: Recreational Vehicle	6	2.7
S: Bus	0	0.0
D: Single Unit Truck	1	0.5
E: Tractor Trailer Unit	1	0.5
Total	222	

West On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	276	95.8
B: Recreational Vehicle	5	1.7
S: Bus	0	0.0
D: Single Unit Truck	4	1.4
E: Tractor Trailer Unit	3	1.0
Total	288	

East On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	154	96.9
B: Recreational Vehicle	1	0.6
S: Bus	0	0.0
D: Single Unit Truck	2	1.3
E: Tractor Trailer Unit	2	1.3
Total	159	

South On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	326	97.9
B: Recreational Vehicle	2	0.6
S: Bus	0	0.0
D: Single Unit Truck	3	0.9
E: Tractor Trailer Unit	2	0.6
Total	333	



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SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

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EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 109030

Intersection of:
52 & 846 S OF STIRLING

2008 AADT / ASDT ESTIMATES

North On 846		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	458	88.1
B: Recreational Vehicle	8	1.5
S: Bus	0	0.0
D: Single Unit Truck	10	1.9
E: Tractor Trailer Unit	44	8.5
ASDT 560	**AADT** 520	

West On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	626	86.9
B: Recreational Vehicle	16	2.2
S: Bus	0	0.0
D: Single Unit Truck	19	2.6
E: Tractor Trailer Unit	59	8.2
ASDT 800	**AADT** 720	

East On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	344	90.5
B: Recreational Vehicle	8	2.1
S: Bus	0	0.0
D: Single Unit Truck	11	2.9
E: Tractor Trailer Unit	17	4.5
ASDT 420	**AADT** 380	

South On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	94	94.0
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	4	4.0
E: Tractor Trailer Unit	2	2.0
ASDT 110	**AADT** 100	

TURNING MOVEMENT ABBREVIATIONS

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WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

TURNING MOVEMENT ABBREVIATIONS

AADT: Average Annual Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of January 1 to December 31 (365 days)

ASDT: Average Summer Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 109030

Intersection of:
52 & 846 S OF STIRLING

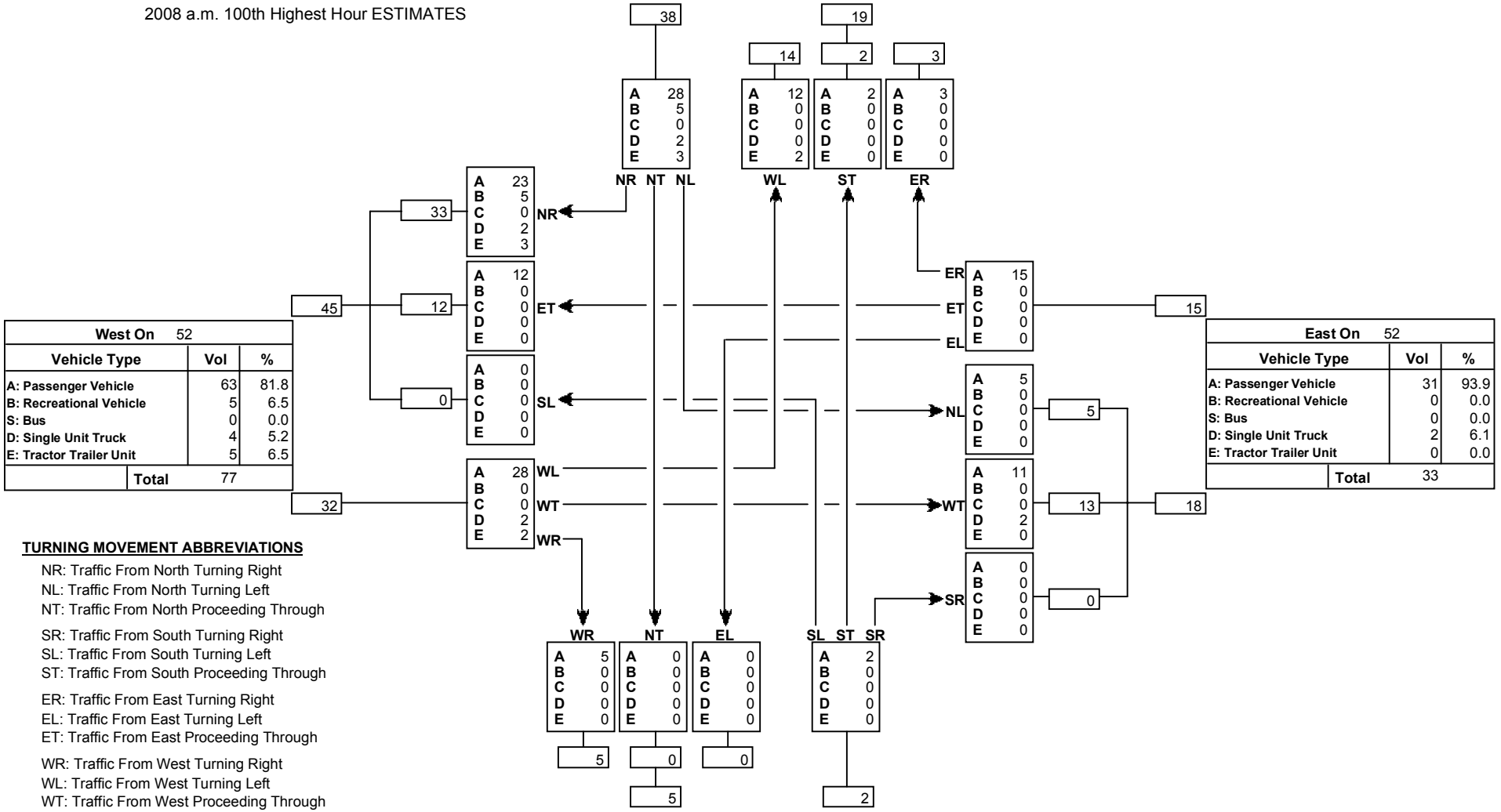
2008 a.m. 100th Highest Hour ESTIMATES

North On 846		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	45	78.9
B: Recreational Vehicle	5	8.8
S: Bus	0	0.0
D: Single Unit Truck	2	3.5
E: Tractor Trailer Unit	5	8.8
Total	57	

West On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	63	81.8
B: Recreational Vehicle	5	6.5
S: Bus	0	0.0
D: Single Unit Truck	4	5.2
E: Tractor Trailer Unit	5	6.5
Total	77	

East On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	31	93.9
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	2	6.1
E: Tractor Trailer Unit	0	0.0
Total	33	

South On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	7	100.0
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	7	



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WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 109030

Intersection of:
52 & 846 S OF STIRLING

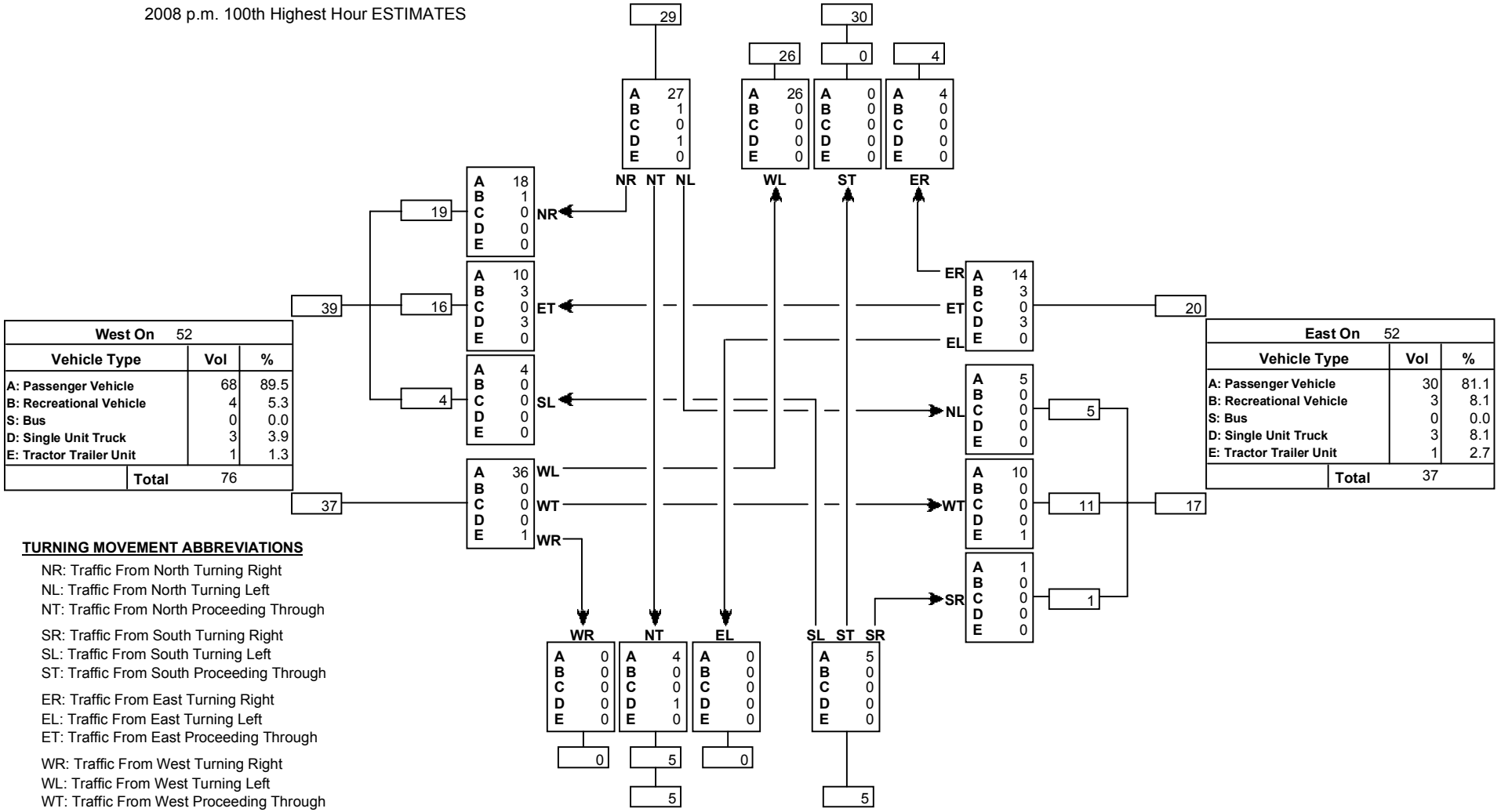
2008 p.m. 100th Highest Hour ESTIMATES

North On 846		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	57	96.6
B: Recreational Vehicle	1	1.7
S: Bus	0	0.0
D: Single Unit Truck	1	1.7
E: Tractor Trailer Unit	0	0.0
Total	59	

West On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	68	89.5
B: Recreational Vehicle	4	5.3
S: Bus	0	0.0
D: Single Unit Truck	3	3.9
E: Tractor Trailer Unit	1	1.3
Total	76	

East On 52		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	30	81.1
B: Recreational Vehicle	3	8.1
S: Bus	0	0.0
D: Single Unit Truck	3	8.1
E: Tractor Trailer Unit	1	2.7
Total	37	

South On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	9	90.0
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	1	10.0
E: Tractor Trailer Unit	0	0.0
Total	10	



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ALBERTA HIGHWAYS 1 TO 986
TRAFFIC VOLUME HISTORY 1999 - 2008

Alberta Transportation
Program Management Branch
Network Planning and Performance

Produced: 18-Feb-2009 By CornerStone Solutions Inc.

Hwy	CS	TCS	Muni	From	1999 AADT	2000 AADT	2001 AADT	2002 AADT	2003 AADT	2004 AADT	2005 AADT	2006 AADT	2007 AADT	2008 AADT	2008 ASDT
52	2	4	Card	E OF 5 S OF WELLING	1590	1810	1520	1530	1580	1560	1490	1600	1720	1780	1970
52	2	4	Card	1.3 KM E OF 5 & 52 RAYMOND	1640	1870	1570	1540	1560	1530	1490	1650	1720	1780	1970
52	2	4	Warn	W OF 844 W OF RAYMOND	1440	1650	1390	1350	1390	1660	1600	1710	1840	1900	2100
52	2	8	Warn	E OF 844 W OF RAYMOND	1490	1710	1440	1400	1440	1690	1630	1740	1870	1930	2140
52	2	8	Warn	W OF 845 IN RAYMOND	2160	2470	2080	2590	2670	2670	2560	2740	2880	2840	3140
52	2	12	Warn	E OF 845 IN RAYMOND	1550	1760	1490	1560	1600	1600	1540	1660	1710	1620	1790
52	2	12	Warn	W OF 846 S OF STIRLING	660	700	650	630	640	640	640	680	700	720	800
52	2	16	Warn	E OF 846 S OF STIRLING	380	400	340	330	330	330	330	360	360	380	420
52	2	16	Warn	W OF 4 SE OF STIRLING	370	390	330	320	330	330	330	350	350	370	410
53	4	4	Clrw	E OF 22 N OF ROCKY MTN HOUSE	370	370	370	380	380	390	420	420	420	400	480
53	4	4	Pnka	W OF 761 N OF CARLOS WJ	250	270	270	280	280	330	350	350	350	440	530
53	4	8	Pnka	E OF 761 N OF CARLOS WJ	250	300	300	310	310	370	390	390	390	480	580
53	4	8	Pnka	W OF 761 W OF RIMBEY EJ	440	440	440	480	480	500	540	540	540	630	760
53	4	12	Pnka	E OF 761 W OF RIMBEY EJ	560	560	560	580	580	600	650	650	650	780	940
53	4	12	Pnka	W OF 766 W OF RIMBEY	870	800	820	830	830	830	920	920	920	920	1100
53	4	16	Pnka	E OF 766 W OF RIMBEY	1500	1360	1400	1410	1410	1410	1520	1520	1520	1520	1820
53	4	16	Pnka	W OF 52 ST IN RIMBEY 20-42-2-501700000		2430	2490	2490	2460	2450	2950	3010	3080	3000	3170
53	4	16	Pnka	E OF 52 ST IN RIMBEY 20-42-2-501700000		2910	2990	2990	2960	2950	3370	3460	3540	3440	3640
53	4	16	Pnka	W OF 20A IN RIMBEY		3290	3370	3360	3340	3330	3390	3480	3560	3460	3660
53	4	16	Pnka	E OF 20A IN RIMBEY		4930	5040	5030	4970	4940	5240	5380	5480	5330	5640
53	4	16	Pnka	0.4 KM E OF 20A & 53 IN RIMBEY	5220	5150	5270	5290	5120	5230	5430	5580	5690	5500	5860
53	4	16	Pnka	W OF 20 S OF RIMBEY SJ	2600	2560	2750	2740	2700	2680	2820	2900	2980	2720	2880
53	6	4	Pnka	E OF 20 N OF RIMBEY NJ	1360	1370	1450	1390	1470	1520	1590	1640	1580	1540	1690
53	6	4	Pnka	0.5 KM E OF 20 & 53 RIMBEY NJ	1470	1440	1450	1380	1490	1550	1590	1590	1590	1530	1680
53	6	4	Pnka	W OF FORSHEE RD 36-42-2-500000000	1550	1370	1430	1370	1450	1500	1570	1620	1560	1520	1670
53	6	4	Pnka	E OF FORSHEE RD 36-42-2-500000000	1580	1400	1430	1370	1450	1500	1570	1600	1540	1500	1650
53	6	4	Pnka	W OF 771 S OF HOMEGLEN WJ	1580	1380	1360	1370	1450	1500	1570	1600	1540	1500	1650
53	6	8	Pnka	E OF 771 S OF HOMEGLEN WJ	1250	1090	1250	1200	1260	1300	1370	1540	1420	1380	1510
53	6	8	Pnka	W OF 771 S OF HOMEGLEN EJ	1260	1110	1190	1200	1260	1300	1370	1540	1420	1380	1510
53	6	12	Pnka	E OF 771 S OF HOMEGLEN EJ	1300	1140	1280	1290	1370	1410	1510	1580	1540	1500	1650
53	6	12	Pnka	W OF 792 W OF PONOKA WJ	1350	1160	1120	1130	1190	1230	1540	1610	1560	1520	1670
53	6	16	Pnka	E OF 792 W OF PONOKA WJ	1730	1370	1310	1330	1410	1470	1840	1930	1880	1840	2020
53	6	16	Pnka	W OF 792 W OF PONOKA EJ	1720	1370	1310	1330	1410	1470	1840	1930	1880	1840	2020
53	6	20	Pnka	E OF 792 W OF PONOKA EJ	1520	1450	1320	1340	1420	1480	1860	1930	1720	1680	1840
53	6	20	Pnka	W OF RGE RD 270 (ELKHORN RD) 36-42-27-400000000										1910	2130
53	6	20	Pnka	E OF RGE RD 270 (ELKHORN RD) 36-42-27-400000000										2130	2370
53	6	20	Pnka	W OF 795 W OF PONOKA	2200	2180	2040	2040	2160	2160	2460	2720	2500	2480	2760
53	6	24	Pnka	E OF 795 W OF PONOKA	2410	2560	2250	2330	2470	2470	2800	2840	2720	2700	3010
53	6	24	Pnka	W OF 2 W OF PONOKA	2580	2890	2810	2810	2980	2980	3100	3180	3220	3180	3540
53	8	4	Pnka	E OF 2 W OF PONOKA	3800	4110	3990	3970	4040	4080	4260	4470	4500	4500	4910
53	8	4	Pnka	1.7 KM W OF 2A & 53 PONOKA	4180	4490	4360	4370	4350	4430	4590	4810	4840	4800	5240

B Appendix B - Level of Service Definitions

LEVEL OF SERVICE DEFINITIONS AT UNSIGNALIZED INTERSECTIONS[2]

The level of service criteria for unsignalized intersections are given in the table below. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

Level of Service	Features	Average Total Delay (sec/veh)
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	≤ 10
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	> 10 and ≤ 15
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.	> 15 and ≤ 25
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.	> 25 and ≤ 35
E	Very long traffic delays occur. Operations approach the capacity of the intersection.	> 35 and ≤ 50
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.	> 50

(1) Highway Capacity Manual 2000.

C Appendix C - Detailed Capacity Analyses

Project: StoneGate Meadows TIA (Raymond, AB)
Project No: 2010-3991
Date Revised: February 3, 2010

Synchro Results - 2010 AM Background

Intersection	Approach	Movement	Laning	Volume	V/C	Delay (s)	LOS	Intersection Delay (S)	Intersection LOS	95th Queue (m)
Hwy 52 & RR 203	EB	L	LTR	7	0.01	0.0	A	1.2	A	0.1
		T		64	0.10	0.7	A			0.1
		R		7	0.10	0.7	A			0.1
	WB	L	LTR	0	-	-	-			-
		T		69	0.00	0.0	A			0.0
		R		3	0.00	0.0	A			0.0
	NB	L	LTR	5	0.01	9.7	A			0.2
		T		2	0.01	9.7	A			0.2
		R		0	-	-	-			-
	SB	L	LTR	5	0.01	9.2	A			0.3
		T		0	-	-	-			-
		R		4	0.01	9.2	A			0.3

Project: StoneGate Meadows TIA (Raymond, AB)
Project No: 2010-3991
Date Revised: February 3, 2010

Synchro Results - 2010 PM Background

Intersection	Approach	Movement	Laning	Volume	V/C	Delay (s)	LOS	Intersection Delay (S)	Intersection LOS	95th Queue (m)
Hwy 52 & RR 203	EB	L	LTR	7	0.01	0.0	A	1.5	A	0.1
		T		64	0.01	0.7	A			0.1
		R		7	0.01	0.7	A			0.1
	WB	L	LTR	0	-	-	-			-
		T		63	0.00	0.0	A			0.0
		R		4	0.00	0.0	A			0.0
	NB	L	LTR	5	0.01	9.5	A			0.2
		T		0	-	-	-			-
		R		1	0.01	9.5	A			0.2
	SB	L	LTR	5	0.02	9.5	A			0.5
		T		5	0.02	9.5	A			0.5
		R		5	0.02	9.5	A			0.5

Project: StoneGate Meadows TIA (Raymond, AB)
Project No: 2010-3991
Date Revised: February 3, 2010

Synchro Results - 2030 AM Background

Intersection	Approach	Movement	Laning	Volume	V/C	Delay (s)	LOS	Intersection Delay (S)	Intersection LOS	95th Queue (m)
Hwy 52 & Collector Access	EB	L						0.0	A	
		T	TR	116	0.07	0.0	A			0.0
		R		0						
	WB	L	LT	0	0.00	0.0	A			0.0
		T		116						
		R								
	NB	L	LR	0	-	-	-			-
		T								
		R		0						
	SB	L								
		T								
		R								
RR 203 & RR 203 North Access	EB	L	LR	0	-	-	-	0.0	A	-
		T								
		R		0						
	WB	L								
		T								
		R								
	NB	L	LT	0	0.00	0.0	A			0.0
		T		11						
		R								
	SB	L								
		T	TR	11	0.01	0.0	A			0.0
		R		0						
RR 203 & RR 203 South Access	EB	L	LR	0	-	-	-	0.0	A	-
		T								
		R		0						
	WB	L								
		T								
		R								
	NB	L	LT	0	0.00	0.0	A			0.0
		T		11						
		R								
	SB	L								
		T	TR	11	0.01	0.0	A			0.0
		R		0						
400S & Collector Access	EB	L						0.0	A	
		T								
		R								
	WB	L	LR	0	-	-	-			-
		T								
		R		0						
	NB	L								
		T	TR	2	0.00	0.0	A			0.0
		R		0						
	SB	L	LT	0	0.00	0.0	A			0.0
		T		2						
		R								
Hwy 52 & RR 203	EB	L	LTR	11	0.01	0.1	A	1.4	A	0.2
		T		95	0.01	0.8	A			0.2
		R		11	0.01	0.8	A			0.2
	WB	L	LTR	0	-	-	-			-
		T		102	0.00	0.0	A			0.0
		R		5	0.00	0.0	A			0.0
	NB	L	LTR	8	0.02	10.4	B			0.4
		T		3	0.02	10.4	B			0.4
		R		0	-	-	-			-
	SB	L	LTR	8	0.02	9.7	A			0.5
		T		0	-	-	-			-
		R		6	0.02	9.7	A			0.5

Project: StoneGate Meadows TIA (Raymond, AB)
Project No: 2010-3991
Date Revised: February 3, 2010

Synchro Results - 2030 PM Background

Intersection	Approach	Movement	Laning	Volume	V/C	Delay (s)	LOS	Intersection Delay (S)	Intersection LOS	95th Queue (m)
Hwy 52 & Collector Access	EB	L						0.0	A	
		T	TR	116	0.07	0.0	A			0.0
		R		0						
	WB	L	LT	0	0.00	0.0	A			0.0
		T		109						
		R								
	NB	L	LR	0	-	-	-			-
		T								
		R		0						
	SB	L								
		T								
		R								
RR 203 & RR 203 North Access	EB	L	LR	0	-	-	-	0.0	A	-
		T								
		R		0						
	WB	L								
		T								
		R								
	NB	L	LT	0	0.00	0.0	A			0.0
		T		9						
		R								
	SB	L								
		T	TR	19	0.01	0.0	A			0.0
		R		0						
RR 203 & RR 203 South Access	EB	L	LR	0	-	-	-	0.0	A	-
		T								
		R		0						
	WB	L								
		T								
		R								
	NB	L	LT	0	0.00	0.0	A			0.0
		T		9						
		R								
	SB	L								
		T	TR	19	0.01	0.0	A			0.0
		R		0						
400S & Collector Access	EB	L						0.0	A	
		T								
		R								
	WB	L	LR	0	-	-	-			-
		T								
		R		0						
	NB	L								
		T	TR	2	0.00	0.0	A			0.0
		R		0						
	SB	L	LT	0	0.00	0.0	A			0.0
		T		2						
		R								
Hwy 52 & RR 203	EB	L	LTR	11	0.01	0.1	A	1.7	A	0.2
		T		95	0.01	0.8	A			0.2
		R		11	0.01	0.8	A			0.2
	WB	L	LTR	0	-	-	-			-
		T		93	0.00	0.0	A			0.0
		R		6	0.00	0.0	A			0.0
	NB	L	LTR	8	0.02	10.1	B			0.4
		T		0	-	-	-			-
		R		2	0.02	10.1	B			0.4
	SB	L	LTR	8	0.03	10.0	A			0.9
		T		8	0.03	10.0	A			0.9
		R		8	0.03	10.0	A			0.9

Project: StoneGate Meadows TIA (Raymond, AB)
Project No: 2010-3991
Date Revised: February 3, 2010

Synchro Results - 2030 AM Total

Intersection	Approach	Movement	Laning	Volume	V/C	Delay (s)	LOS	Intersection Delay (S)	Intersection LOS	95th Queue (m)
Hwy 52 & Collector Access	EB	L						1.4	A	
		T	TR	135	0.09	0.0	A			0.0
		R		13	0.09	0.0	A			0.0
	WB	L	LT	1	0.00	0.0	A			0.0
		T		174	0.00	0.0	A			0.0
		R								
	NB	L	LR	41	0.07	10.8	B			1.9
		T								
		R		5	0.07	10.8	B			1.9
	SB	L								
		T								
		R								
RR 203 & RR 203 North Access	EB	L	LR	33	0.04	9.0	A	3.0	A	1.1
		T								
		R		4	0.04	9.0	A			1.1
	WB	L								
		T								
		R								
	NB	L	LT	1	0.00	0.0	A			0.0
		T		44	0.00	0.2	A			0.0
		R								
	SB	L								
		T	TR	21	0.02	0.0	A			0.0
		R		11	0.02	0.0	A			0.0
RR 203 & RR 203 South Access	EB	L	LR	33	0.04	8.8	A	4.4	A	1.0
		T								
		R		4	0.04	8.8	A			1.0
	WB	L								
		T								
		R								
	NB	L	LT	1	0.00	0.0	A			0.0
		T		12	0.00	0.6	A			0.0
		R								
	SB	L								
		T	TR	14	0.02	0.0	A			0.0
		R		11	0.02	0.0	A			0.0
400S & Collector Access	EB	L						7.7	A	
		T								
		R								
	WB	L	LR	6	0.06	8.6	A			1.6
		T								
		R		57	0.06	8.6	A			1.6
	NB	L								
		T	TR	2	0.00	0.0	A			0.0
		R		2	0.00	0.0	A			0.0
	SB	L	LT	19	0.01	0.1	A			0.3
		T		2	0.01	6.6	A			0.3
		R								
Hwy 52 & RR 203	EB	L	LTR	11	0.01	0.1	A	3.2	A	0.2
		T		99	0.01	0.6	A			0.2
		R		30	0.01	0.6	A			0.2
	WB	L	LTR	1	0.00	0.0	A			0.0
		T		104	0.00	0.1	A			0.0
		R		5	0.00	0.1	A			0.0
	NB	L	LTR	66	0.12	11.1	B			3.4
		T		7	0.12	11.1	B			3.4
		R		4	0.12	11.1	B			3.4
	SB	L	LTR	8	0.02	9.9	A			0.5
		T		1	0.02	9.9	A			0.5
		R		6	0.02	9.9	A			0.5

Project: StoneGate Meadows TIA (Raymond, AB)
Project No: 2010-3991
Date Revised: February 3, 2010

Synchro Results - 2030 PM Total

Intersection	Approach	Movement	Laning	Volume	V/C	Delay (s)	LOS	Intersection Delay (S)	Intersection LOS	95th Queue (m)
Hwy 52 & Collector Access	EB	L						0.8	A	
		T	TR	173	0.14	0.0	A			0.0
		R		40	0.14	0.0	A			0.0
	WB	L	LT	4	0.00	0.0	A			0.1
		T		141	0.00	0.2	A			0.1
		R								
	NB	L	LR	23	0.04	10.8	B			1.1
		T								
		R		3	0.04	10.8	B			1.1
	SB	L								
		T								
		R								
RR 203 & RR 203 North Access	EB	L	LR	19	0.03	9.1	A	1.6	A	0.6
		T								
		R		2	0.03	9.1	A			0.6
	WB	L								
		T								
		R								
	NB	L	LT	4	0.00	0.0	A			0.1
		T		28	0.00	0.9	A			0.1
		R								
	SB	L								
		T	TR	50	0.05	0.0	A			0.0
		R		32	0.05	0.0	A			0.0
RR 203 & RR 203 South Access	EB	L	LR	19	0.02	8.9	A	2.4	A	0.6
		T								
		R		2	0.02	8.9	A			0.6
	WB	L								
		T								
		R								
	NB	L	LT	4	0.00	0.0	A			0.1
		T		13	0.00	1.7	A			0.1
		R								
	SB	L								
		T	TR	21	0.03	0.0	A			0.0
		R		32	0.03	0.0	A			0.0
400S & Collector Access	EB	L						7.1	A	
		T								
		R								
	WB	L	LR	4	0.04	8.6	A			0.9
		T								
		R		32	0.04	8.6	A			0.9
	NB	L								
		T	TR	2	0.01	0.0	A			0.0
		R		6	0.01	0.0	A			0.0
	SB	L	LT	56	0.04	0.3	A			0.9
		T		2	0.04	7.1	A			0.9
		R								
Hwy 52 & RR 203	EB	L	LTR	11	0.01	0.1	A	2.6	A	0.2
		T		97	0.01	0.5	A			0.2
		R		68	0.01	0.5	A			0.2
	WB	L	LTR	4	0.00	0.0	A			0.1
		T		97	0.00	0.3	A			0.1
		R		6	0.00	0.3	A			0.1
	NB	L	LTR	41	0.08	11.0	B			2.1
		T		2	0.08	11.0	B			2.1
		R		4	0.08	11.0	B			2.1
	SB	L	LTR	8	0.04	10.5	B			1.1
		T		11	0.04	10.5	B			1.1
		R		8	0.04	10.5	B			1.1

D Appendix D - Intersection Treatment Type Analysis

TABLE D.7.4

PROJECT: 2010-3991

INTERSECTION ANALYSIS PROCEDURE

Intersection at Highway 52 & Collector Access
Main (or through) Road Classification RAU-110 Intersecting Road Classification Collector
Main (or through) Road AADT/ASDT/AWDT Current 1544 (Year 2010) Future 3525 (design year 2030)
Intersecting Road AADT/ASDT/AWDT Current 0 (Year 2010) Future 700 (design year 2030)
Design Speed 110km/h Posted Speed 50km/h → Town will reduce posted speed
Type of Treatment (preliminary assessment) Type II, III, IV or V Detailed Analysis Required
(refer to Figure D-7.4, Traffic Volume Warrant Chart for At-Grade Intersection Treatment)

FUNCTIONAL CHARACTERISTICS

PART I (General Information for all treatment types)
Collision Analysis N/A
Access Requirements Proposed collector north access into Stonegate Meadows
Access Control Stop control on northbound approach
Future Development Stonegate Meadows Subdivision
Type of Vehicles for Design WB-21
Percentage of Trucks Assume 3% on Hwy 52, 2% on collector

PART II (Specific Information for main (or through) and intersecting road with daily traffic volumes greater than 1800)
Turning Movement Diagram Attached.
Warrant for Exclusive Left Turn Lane Not warranted
Warrant for Exclusive Right Turn Lane Not warranted
Any Proposed Improvement to Other Highways that would impact the traffic movement at this intersection (evaluate network)? No

GEOMETRIC CHARACTERISTICS

Intersection Sight Distances

	Available		*Required
	left (m)	right(m)	(m)
WB21			
WB15			
SU		N/A	
P			
Other			

*Adjust length for gradient if necessary (see Table D.6.2.6)

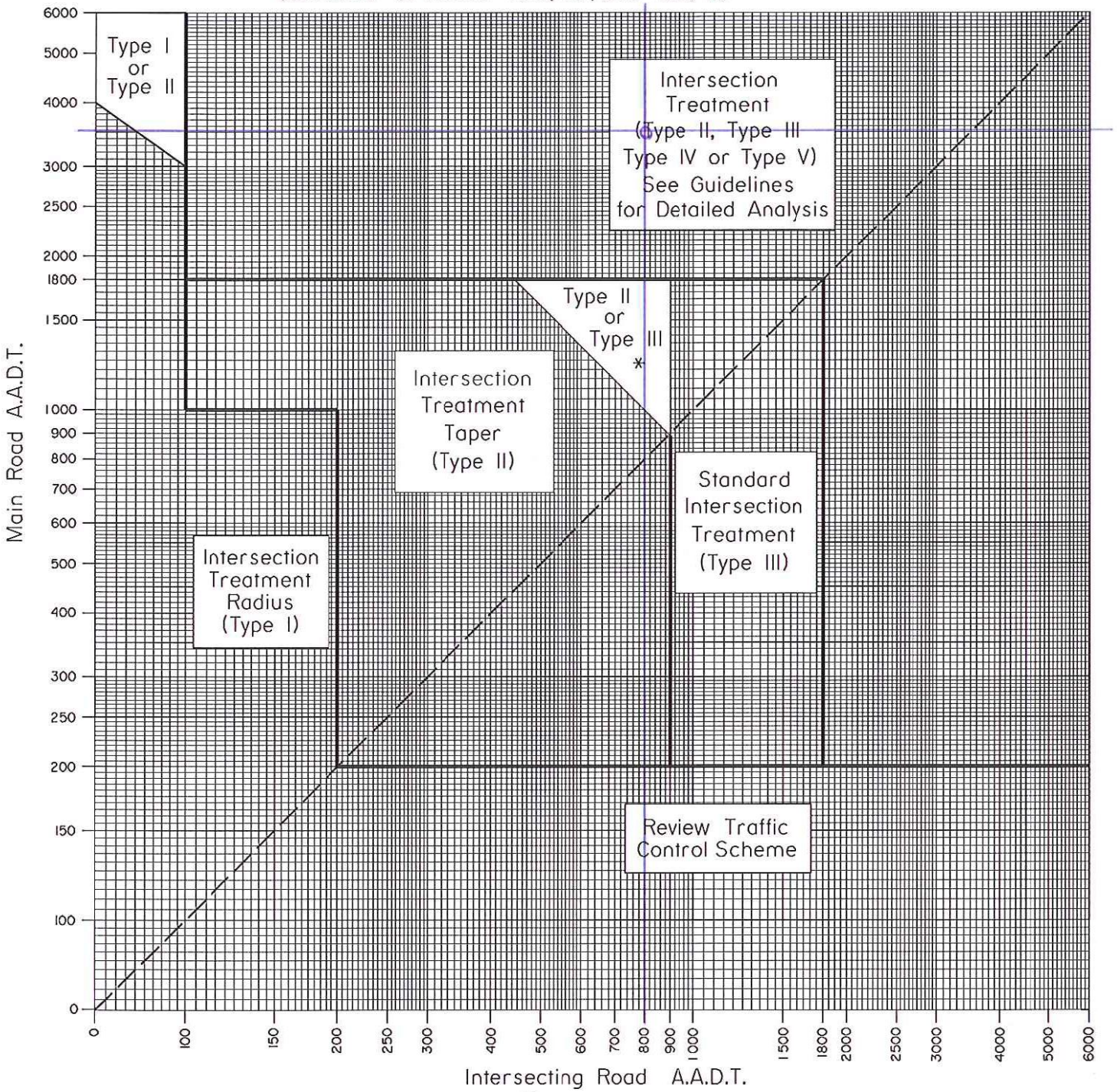
Decision Sight Distance: N/A
Skew Angle: 0
Intersection on Horizontal Curve Yes ____ No ✓ If yes, superelevation rate = ____ m/m
Profile grade of Main Road 0 % Intersecting Roadway 0 %

OTHER CHARACTERISTICS

Utility Impact N/A
Right-of-Way Impact N/A
Warrant for Future Signalization N/A
(Check with Traffic Operations Branch if necessary)
Warrant for Illumination N/A
(Check with Traffic Operations Branch if necessary)
Recommendation of Type of Intersection Treatment based on Functional, Geometric and Other Characteristics:
Type II a.

Designer: S.T. Date: Feb 2010
Approved: ____ Date: ____

FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)

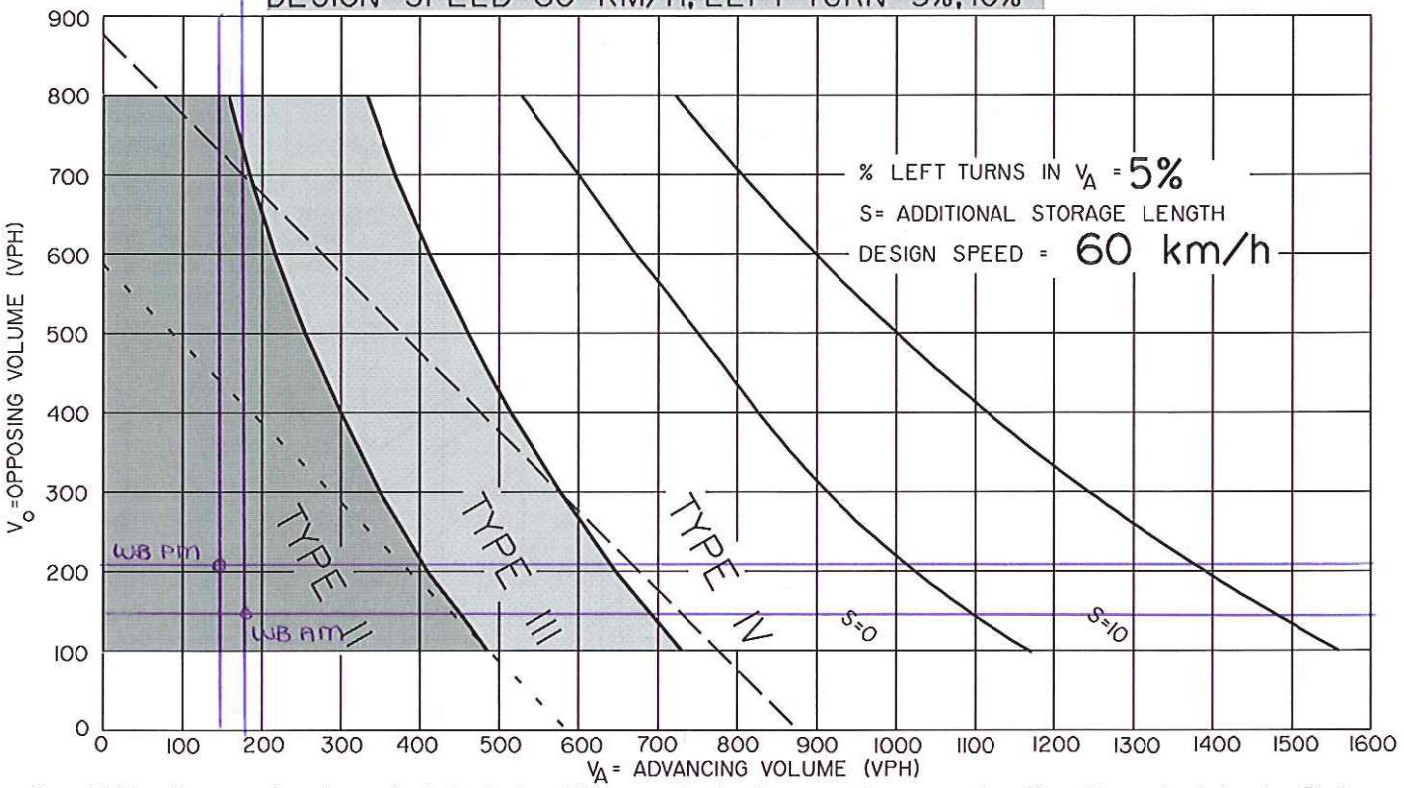


Notes:

1. If main road, or intersecting road, is <100 AADT provide Type I Intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management
   - — — If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design
   Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

FIGURE D-7.6-2a WARRANTS FOR LEFT TURN TREATMENT AND STORAGE REQUIREMENTS FOR TWO-LANE HIGHWAYS DESIGN SPEED 60 KM/H, LEFT TURN 5%, 10%

Hwy 52 & Proposed Collector Road



S = Additional storage length required, that is, in addition to what is shown on the appropriate Type IV standard drawing. Designers should check additional storage requirements for trucks, also see Table D.7.6a.

- - - - Traffic signals may be warranted in rural areas, or urban areas, with restricted flow.

—— —— —— Traffic signals may be warranted in "free flow" urban areas.

Notes:

1. The traffic signal warrant lines are provided for reference only. For detailed analysis of the requirements for signals, contact Roadway Engineering Branch.
2. Warrant for Type I treatment is shown in Figure D-7.4.

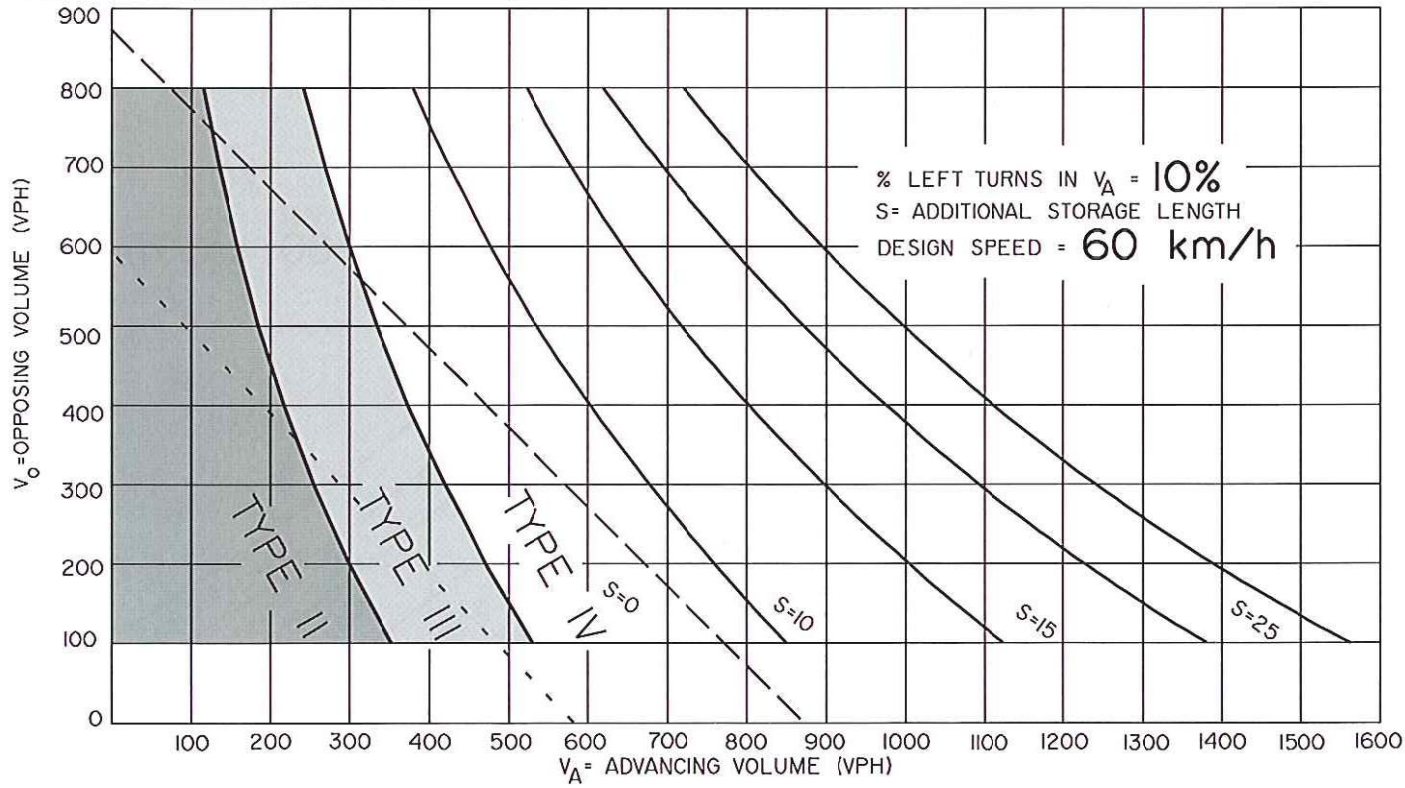
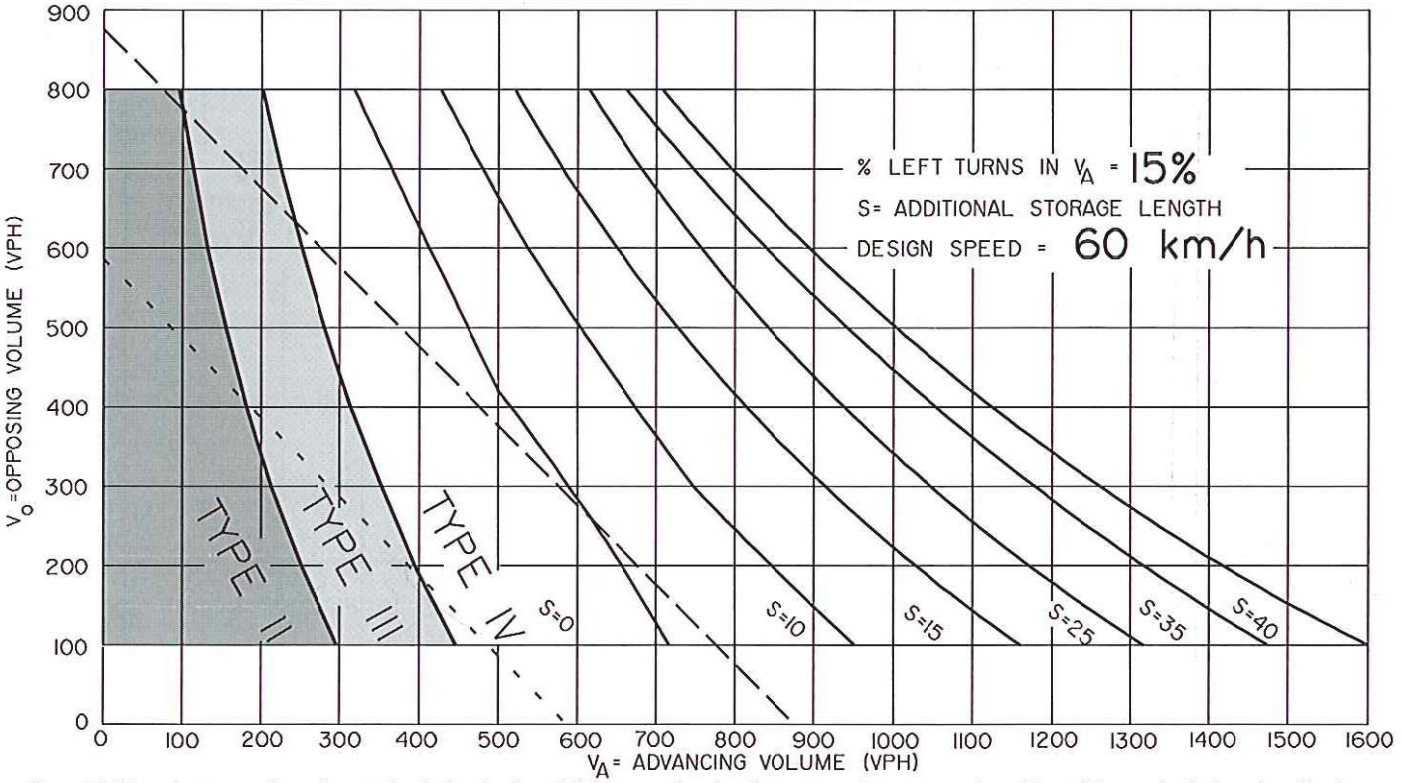


FIGURE D-7.6-2b WARRANTS FOR LEFT TURN TREATMENT AND STORAGE REQUIREMENTS FOR TWO-LANE HIGHWAYS DESIGN SPEED 60 KM/H, LEFT TURN 15%, 20%



S = Additional storage length required, that is, in addition to what is shown on the appropriate Type IV standard drawing. Designers should check additional storage requirements for trucks, also see Table D.7.6a.

- - - - Traffic signals may be warranted in rural areas, or urban areas, with restricted flow.

— — — Traffic signals may be warranted in "free flow" urban areas.

Notes:

1. The traffic signal warrant lines are provided for reference only. For detailed analysis of the requirements for signals, contact Roadway Engineering Branch.
2. Warrant for Type I treatment is shown in Figure D-7.4.

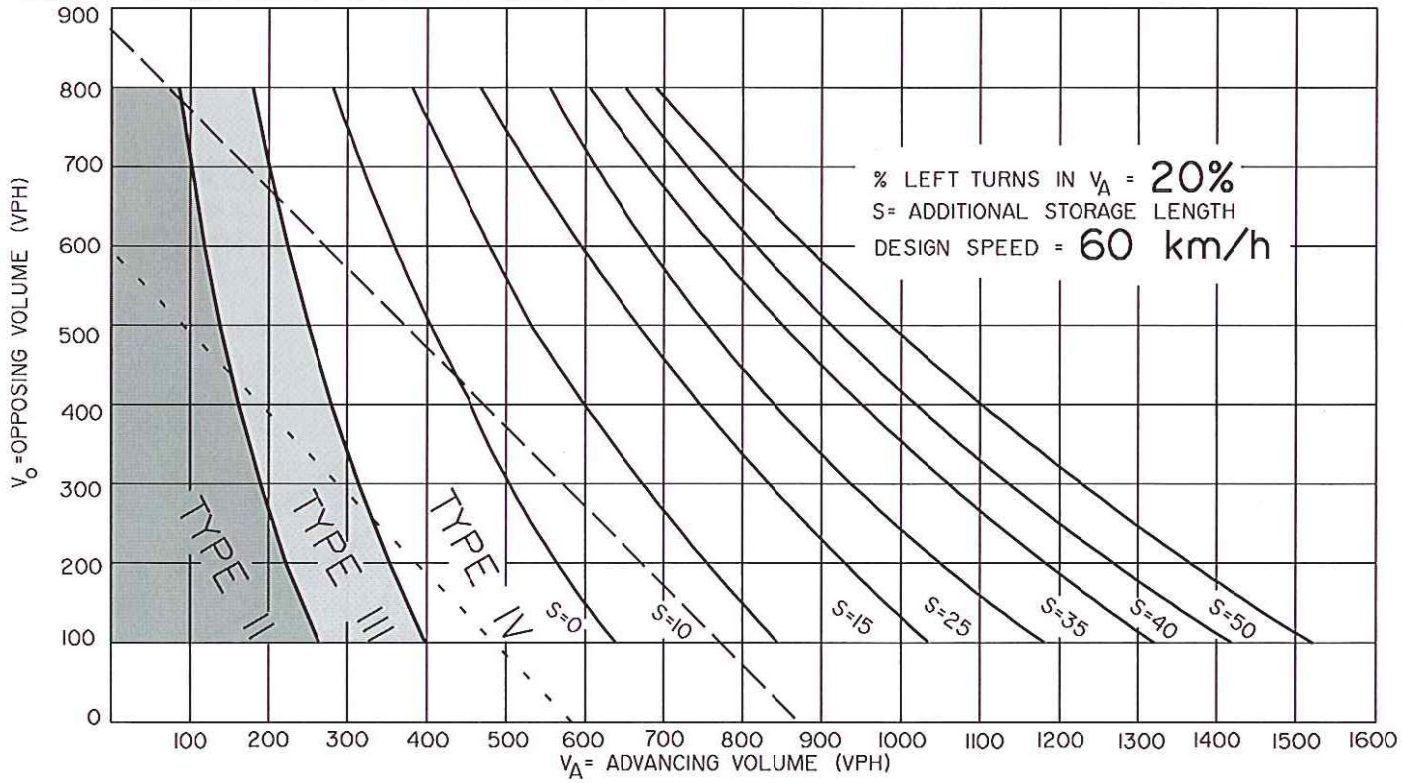


TABLE D.7.4

PROJECT: 2010-3991

INTERSECTION ANALYSIS PROCEDURE

Intersection at Highway 52 & Range Road 203
Main (or through) Road Classification RAU - 110 Intersecting Road Classification Local
Main (or through) Road AADT/ASDT/AWDT Current 1465 (Year 2010) Future 2708 (design year 2030)
Intersecting Road AADT/ASDT/AWDT Current 163 (Year 2010) Future 772 (design year 2030)
Design Speed 110 km/h Posted Speed 50 km/h → Town will reduce posted speed
Type of Treatment (preliminary assessment) Type II, III, IV or V Detailed analysis required
(refer to Figure D-7.4, Traffic Volume Warrant Chart for At-Grade Intersection Treatment)

FUNCTIONAL CHARACTERISTICS

PART I (General Information for all treatment types)
Collision Analysis N/A
Access Requirements Two accesses for StoneGate Meadows along RR203, south of Hwy 52
Access Control Stop control on northbound and southbound approaches
Future Development StoneGate Meadows subdivision
Type of Vehicles for Design WB21
Percentage of Trucks Assume 3%

PART II (Specific Information for main (or through) and intersecting road with daily traffic volumes greater than 1800)
Turning Movement Diagram See attached
Warrant for Exclusive Left Turn Lane Not warranted
Warrant for Exclusive Right Turn Lane Not warranted
Any Proposed Improvement to Other Highways that would impact the traffic movement at this intersection (evaluate network)? NO

GEOMETRIC CHARACTERISTICS

Intersection Sight Distances

	Available		*Required
	left (m)	right(m)	(m)
WB21			
WB15			
SU		N/A	
P			
Other			

*Adjust length for gradient if necessary (see Table D.6.2.6)

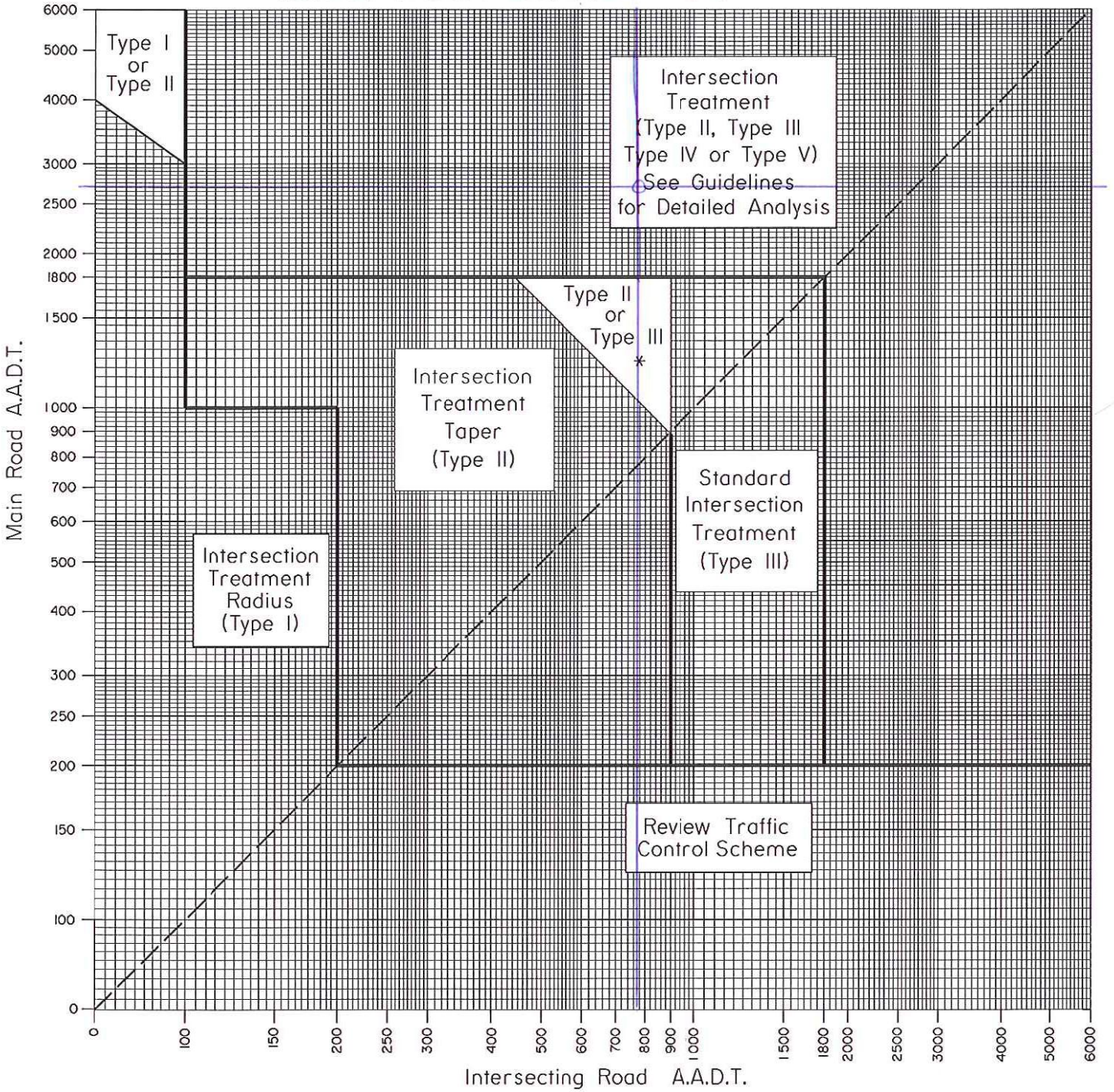
Decision Sight Distance: N/A
Skew Angle: 0
Intersection on Horizontal Curve Yes ____ No ✓ If yes, superelevation rate = ____ m/m
Profile grade of Main Road 0 % Intersecting Roadway 0 %

OTHER CHARACTERISTICS

Utility Impact N/A
Right-of-Way Impact N/A
Warrant for Future Signalization N/A
(Check with Traffic Operations Branch if necessary)
Warrant for Illumination N/A
(Check with Traffic Operations Branch if necessary)
Recommendation of Type of Intersection Treatment based on Functional, Geometric and Other Characteristics:
Type IIc (RR203 AADT → 200)

Designer: S.T. Date: Feb 2010
Approved: ____ Date: ____

FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)

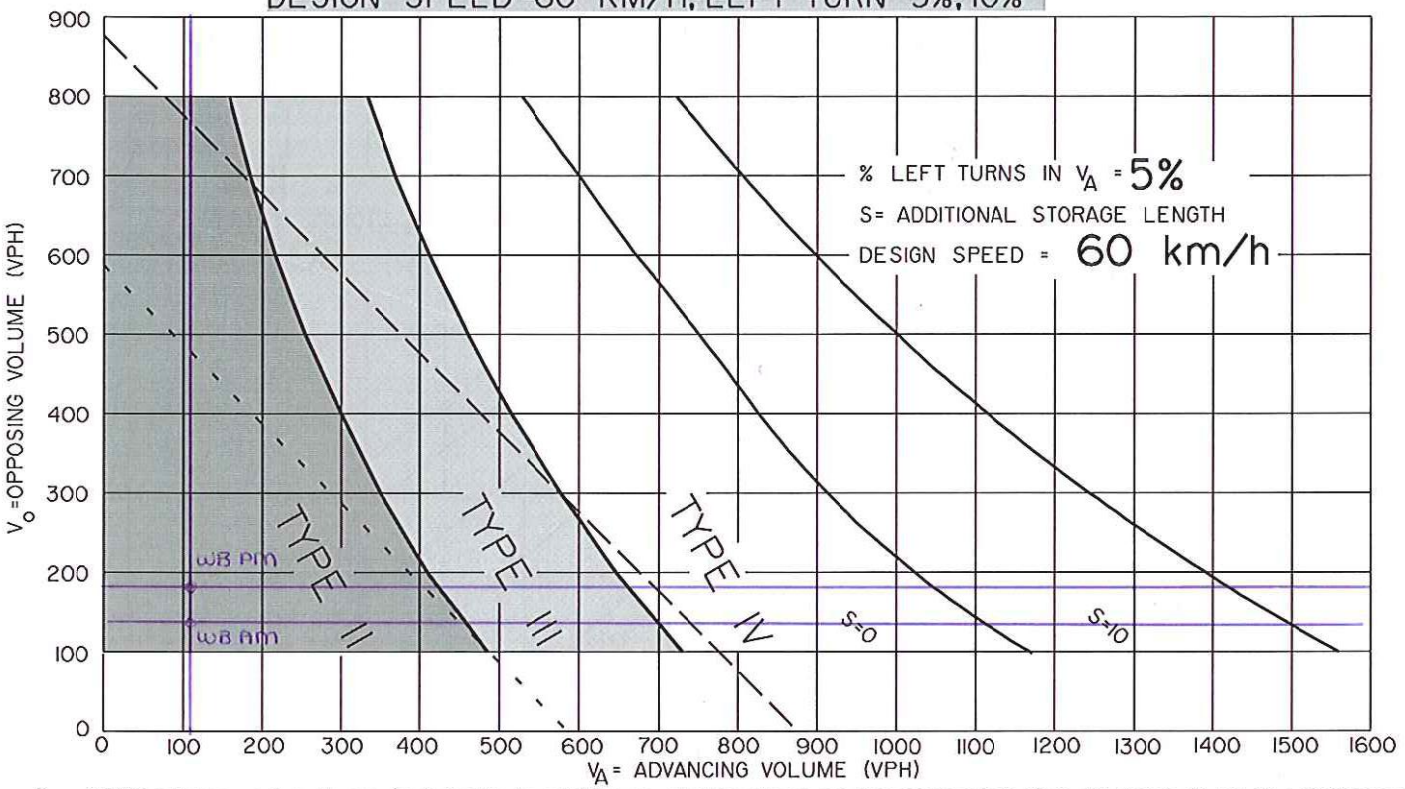


Notes:

1. If main road, or intersecting road, is <100 AADT provide Type I Intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management
   - — — If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design
   Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

FIGURE D-7.6-2a WARRANTS FOR LEFT TURN TREATMENT AND STORAGE REQUIREMENTS FOR TWO-LANE HIGHWAYS DESIGN SPEED 60 KM/H, LEFT TURN 5%, 10%

Hwy 52 & RR203



S = Additional storage length required, that is, in addition to what is shown on the appropriate Type IV standard drawing. Designers should check additional storage requirements for trucks, also see Table D.7.6a.

- - - - Traffic signals may be warranted in rural areas, or urban areas, with restricted flow.

—— —— Traffic signals may be warranted in "free flow" urban areas.

Notes:

1. The traffic signal warrant lines are provided for reference only. For detailed analysis of the requirements for signals, contact Roadway Engineering Branch.
2. Warrant for Type I treatment is shown in Figure D-7.4.

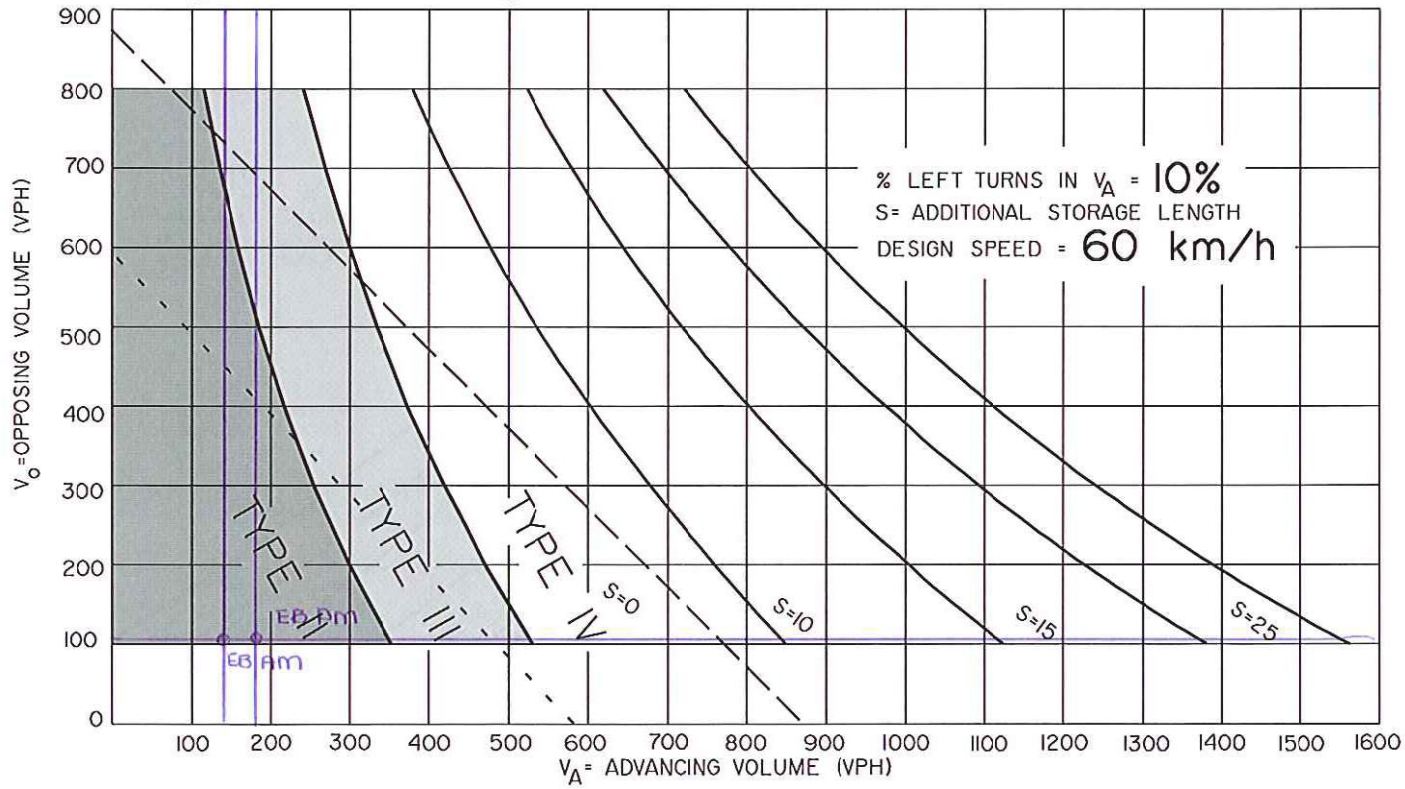
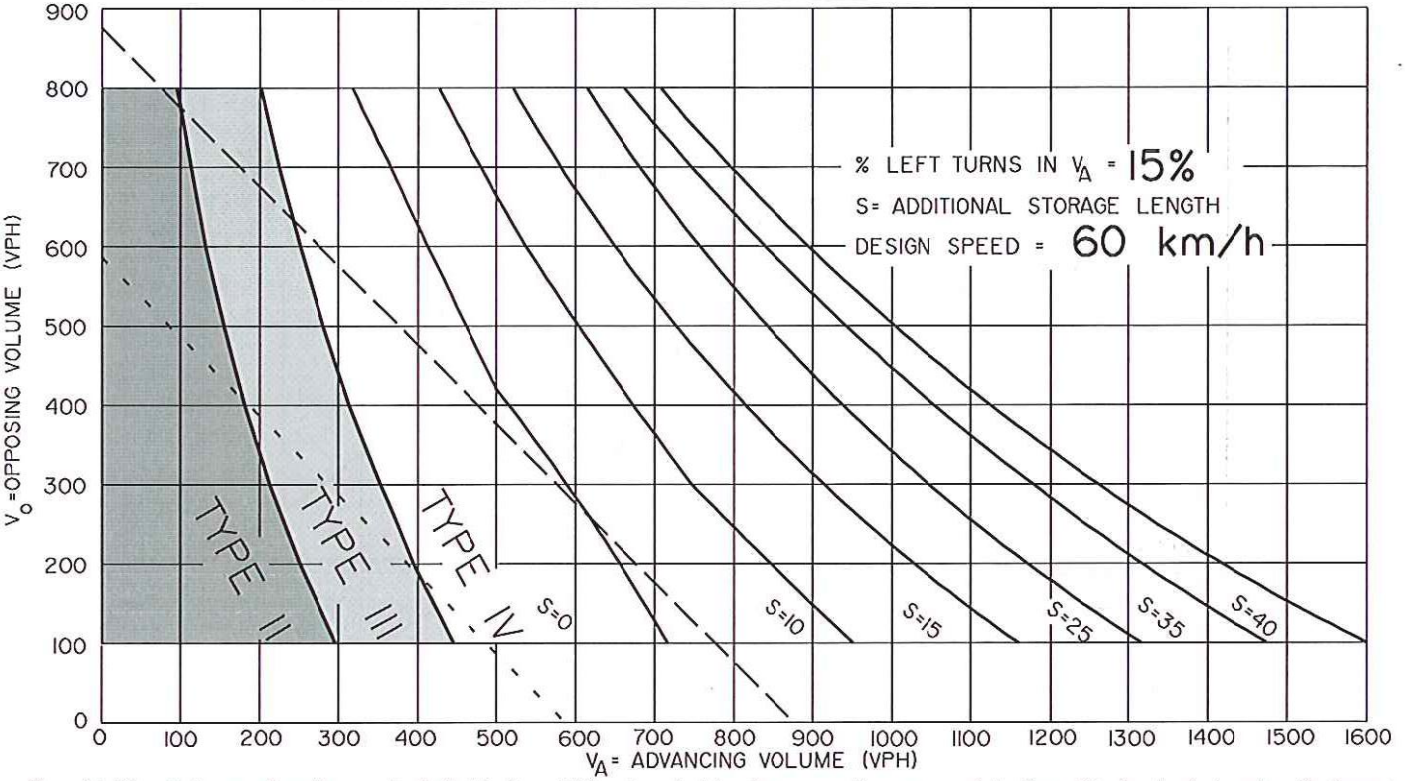


FIGURE D-7.6-2b WARRANTS FOR LEFT TURN TREATMENT AND STORAGE REQUIREMENTS FOR TWO-LANE HIGHWAYS DESIGN SPEED 60 KM/H, LEFT TURN 15%, 20%



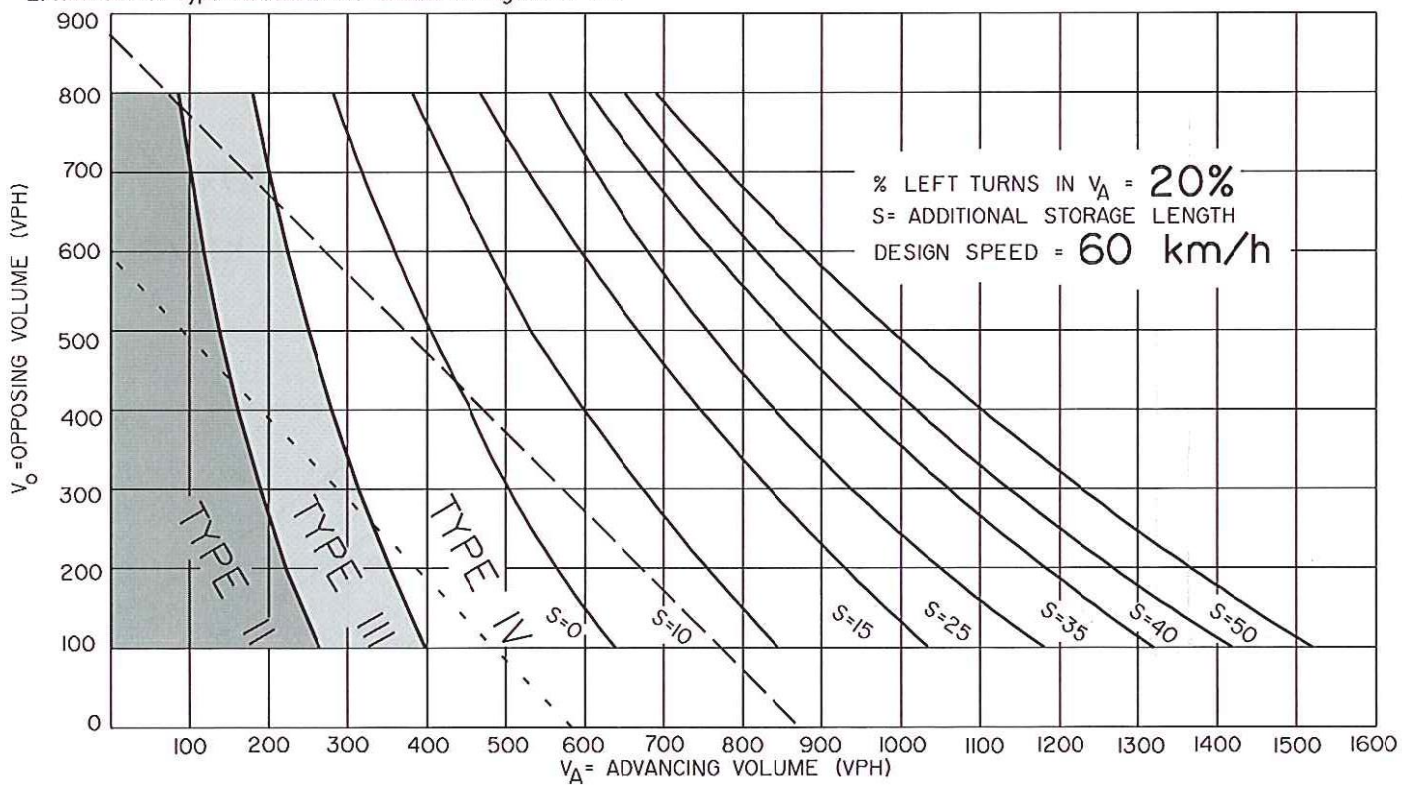
S = Additional storage length required, that is, in addition to what is shown on the appropriate Type IV standard drawing. Designers should check additional storage requirements for trucks, also see Table D.7.6a.

- - - - Traffic signals may be warranted in rural areas, or urban areas, with restricted flow.

— — — Traffic signals may be warranted in "free flow" urban areas.

Notes:

1. The traffic signal warrant lines are provided for reference only. For detailed analysis of the requirements for signals, contact Roadway Engineering Branch.
2. Warrant for Type I treatment is shown in Figure D-7.4.



Intersection: Highway 52 & Collector Road Access
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed: 60 km/h
Percent of Trucks in V_i: 3%

- 2030 AM Total -

			North					
			0					
			Right	Through	Left			
			0	0	0			
West	Left	0				0	Right	East
148	Through	135				174	Through	175
	Right	13				1	Left	
			41	0	5			
			Left	Through	Right			
			46					
			South					

For WB Left-Turn Lane:

VI = 1 v.p.h
Va = 175 v.p.h
L = 1%
Vo = 148 v.p.h

POSSIBLY WARRANTED
NOT WARRANTED TYPE II

Figure D-7.6-2a

For EB Left-Turn Lane:

VI = 0 v.p.h
Va = 148 v.p.h
L = 0%
Vo = 175 v.p.h

NOT WARRANTED

Intersection: Highway 52 & Collector Road Access
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed: 60 km/h
Percent of Trucks in V_i: 3%

- 2030 PM Total -

			North					
			0					
			Right	Through	Left			
			0	0	0			
West	Left	0				0	Right	East
213	Through	173				141	Through	145
	Right	40				4	Left	
			23	0	3			
			Left	Through	Right			
			26					
			South					

For WB Left-Turn Lane:

VI = 4 v.p.h
Va = 145 v.p.h
L = 3%
Vo = 213 v.p.h

POSSIBLY WARRANTED
NOT WARRANTED TYPE II

Figure D-7.6-2a

For EB Left-Turn Lane:

VI = 0 v.p.h
Va = 213 v.p.h
L = 0%
Vo = 145 v.p.h

NOT WARRANTED

Intersection: Highway 52 & Collector Road Access
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed:	60 km/h
Percent of Trucks in V_i:	3%

- 2030 AM -

For WB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	3,525
Intersecting road AADT equal to or greater than 900?	N	700
Right-turn daily traffic volume equal to or greater than 360?	N	0
NOT WARRANTED		

For EB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	3,525
Intersecting road AADT equal to or greater than 900?	N	700
Right-turn daily traffic volume equal to or greater than 360?	N	130
NOT WARRANTED		

Intersection: Highway 52 & Collector Road Access
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed:	60 km/h
Percent of Trucks in V_i:	3%

- 2030 PM -

For WB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	3,525
Intersecting road AADT equal to or greater than 900?	N	700
Right-turn daily traffic volume equal to or greater than 360?	N	0
NOT WARRANTED		

For EB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	3,525
Intersecting road AADT equal to or greater than 900?	N	700
Right-turn daily traffic volume equal to or greater than 360?	Y	400
NOT WARRANTED		

Left turn Right turn Warrant_20100203\Hwy 52 & Collector Access Right

Intersection: Highway 52 & Range Road 203
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed: 60 km/h
Percent of Trucks in V_i: 3%

- 2030 AM Total -

			North						
			15						
			Right	Through	Left				
			6	1	8				
West	Left	11				5	Right	East	
140	Through	99				104	Through	110	
	Right	30				1	Left		
			66	7	4				
			Left	Through	Right				
			77						
			South						

For WB Left-Turn Lane:

Vl = 1 v.p.h
Va = 110 v.p.h
L = 1%
Vo = 140 v.p.h

POSSIBLY WARRANTED
NOT WARRANTED — TYPE II

Figure D-7.6-2a

For EB Left-Turn Lane:

Vl = 11 v.p.h
Va = 140 v.p.h
L = 8%
Vo = 110 v.p.h

POSSIBLY WARRANTED
NOT WARRANTED — TYPE II

Figure D-7.6-2a

Intersection: Highway 52 & Range Road 203
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed: 60 km/h
Percent of Trucks in V_i: 3%

- 2030 PM Total -

			North						
			27						
			Right	Through	Left				
			8	11	8				
West	Left	11				6	Right	East	
176	Through	97				97	Through	107	
	Right	68				4	Left		
			41	2	4				
			Left	Through	Right				
			47						
			South						

For WB Left-Turn Lane:

Vl = 4 v.p.h
Va = 107 v.p.h
L = 4%
Vo = 176 v.p.h

POSSIBLY WARRANTED
NOT WARRANTED — TYPE II

Figure D-7.6-2a

For EB Left-Turn Lane:

Vl = 11 v.p.h
Va = 176 v.p.h
L = 6%
Vo = 107 v.p.h

POSSIBLY WARRANTED
NOT WARRANTED — TYPE II

Figure D-7.6-2a

Intersection: Highway 52 & Collector Road Access
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed:	60 km/h
Percent of Trucks in V_i:	3%

- 2030 AM -

For WB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	2,608
Intersecting road AADT equal to or greater than 900?	N	874
Right-turn daily traffic volume equal to or greater than 360?	N	50
NOT WARRANTED		

For EB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	2,608
Intersecting road AADT equal to or greater than 900?	N	874
Right-turn daily traffic volume equal to or greater than 360?	N	300
NOT WARRANTED		

Intersection: Highway 52 & Collector Road Access
Project No: 2010.3991
Date Revised: February 3, 2010

Design Speed:	60 km/h
Percent of Trucks in V_i:	3%

- 2030 PM -

For WB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	2,608
Intersecting road AADT equal to or greater than 900?	N	874
Right-turn daily traffic volume equal to or greater than 360?	N	60
NOT WARRANTED		

For EB Right Turn Lane:		
Main (or through) road AADT equal to or greater than 1800 ?	Y	2,608
Intersecting road AADT equal to or greater than 900?	N	874
Right-turn daily traffic volume equal to or greater than 360?	Y	680
NOT WARRANTED		

Left turn Right turn Warrant_20100203\Hwy 52 & RR 203 Right

APPENDIX F - CONDOMINIUM DEVELOPMENT SLOPE REPORT

January 11, 2013

AMEC File: BX30236

Wilde Brothers Engineering Ltd.
P.O. Box 49
Welling, Alberta, T0K 2N0

Attention: Mr. Darin Wilde

RE: SLOPE ASSESSMENT
PROPOSED STONEGATE CONDOMINIUM DEVELOPMENT
HIGHWAY 52, EAST OF RAYMOND, ALBERTA

At the request of Mr. Darin Wilde of Wilde Brothers Engineering Ltd. (Wild Bros), AMEC Environment & Infrastructure, a division of AMEC Americas Limited (AMEC) has carried out a slope assessment in conjunction with the proposed condominium development at the above captioned site.

The general anticipated site layout is illustrated on the attached drawing, provided by Wilde Bros. As illustrated on the plan, several proposed condominium lots (i.e., Lots 19, 20, 5 and 22) are bounded to the northwest by a slope, which slopes downward to a low area at the northwest corner of the development. This particular slope is the subject of the current assessment.

Site Reconnaissance and Observations

In order to assess the subject slope, AMEC visited the site on October 15, 2012. During the site, AMEC carried out a visual review of the subject slope, and monitored the excavation of a several test pits on the slope face.

The slope has a total height of approximately 3.5 m, and is inclined at about 5 Horizontal to 1 Vertical (5H:1V), with a localized portion of the slope as steep as about 2H:1V at the northwest corner of Lot 19 (adjacent to an existing old residence). No evidence of recent, ongoing or historical slope failure was noted during AMEC's site reconnaissance.

At the time of AMEC's visit, the slope was well vegetated with grass, with a row of bushes at the crest of the slope. Some of the bushes had been removed, resulting in disturbance of the soils to about 1 m depth, or more.

Some evidence of seepage from the slope face was noted near the boundary between the proposed Lots 19 and 20, and appears to originate from an old septic system associated with the existing residence. At the time AMEC's visit, the existing residence was understood to be vacant, and no actual seepage from the slope face in this area was observed. It is understood that the existing residence and associated septic system will be removed as part of the proposed development.

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
469 – 40th Street South
Lethbridge, AB, CANADA T1J 4M1
Tel +1 (403) 327-7474
Fax +1 (403) 327-7682
www.amec.com

As indicated previously, several test pits were excavated into the face of the slope during AMEC's visit. A total of five test pits were excavated using a locally sub-contracted loader backhoe (provided by the owner); the test pit excavations extended to about 2.5 m below existing grades.

The stratigraphy at each of the test pit locations was generally comprised of a thin layer of topsoil underlain by medium plastic silty clay. The clay was in a firm to stiff and damp to dry condition to depths of about 1.8 m, below which the clay was described as medium brown, very stiff to hard and damp to moist. No groundwater seepage was observed within any of the test pit excavations.

Discussion and Recommendations

Based on discussions with Wild Bros, it is anticipated that the proposed condominiums will consist of one (possibly two) storey wood framed residential (ABC Part 9) structures with walk-out basements, which would encroach onto the subject slope face.

In general, the soil and slope conditions are considered suitable to support the proposed development, subject to the following:

It was noted that the subject slope soils were in a dry to damp condition, particularly within the upper 1.5 m to 1.8 m. Accordingly, some shear strength and stability changes should be anticipated in the event of changes in post-development groundwater levels. In particular, softening of the soils would be anticipated where high groundwater conditions occur as a result of lawn irrigation activities, or increased surface water flows at the slope crest.

In order to lower the risk of foundation movements associated with potential post-development groundwater changes, it is recommended that the rear foundations of the proposed residential structures be deepened to a minimum of 2.4 m below existing, such that the rear building walls bear on the very stiff to hard clay stratum encountered at this depth. Geotechnical review of the exposed soil bearing surfaces at the time of construction is recommended.

The transition from the deepened footings to the footings for the remainder of the structures should be done in maximum 0.6 m high by 0.6 m long steps, with the first step occurring a minimum of 1.2 m from the rear foundation wall.

The placement of weeping tile along the deepened footing should also be considered, as this would help to relieve potential porewater pressure build-up within the slope adjacent to the foundations. In this case, the weeping tile can be discharged out to the slope face, or to the toe of the slope as desired.

Careful attention should also be paid to surface water drainage around the structures. Surface water from downspout leaders and table land grading should be promoted away from the slope crest. Rather, surface water from downspouts and the table land around the structures should be directed toward the front of the lots for discharge to a storm sewer system. Alternatively, the surface water should be collected into a pipe and discharge at the toe of the slope rather than allow the water to drain over the face of the slope.

Closing Comment

The recommendations given above are based upon the observed and interpreted conditions by AMEC on October 15, 2012, and our understanding of the proposed development of the site, both as summarized within this report.

This report has been prepared for the exclusive use of Wilde Bros. for the specific application to the development described in this report. Any use that a third party makes of this report, or any reliance or decisions based on this report are the sole responsibility of those parties. This report has been prepared in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

Respectfully submitted,

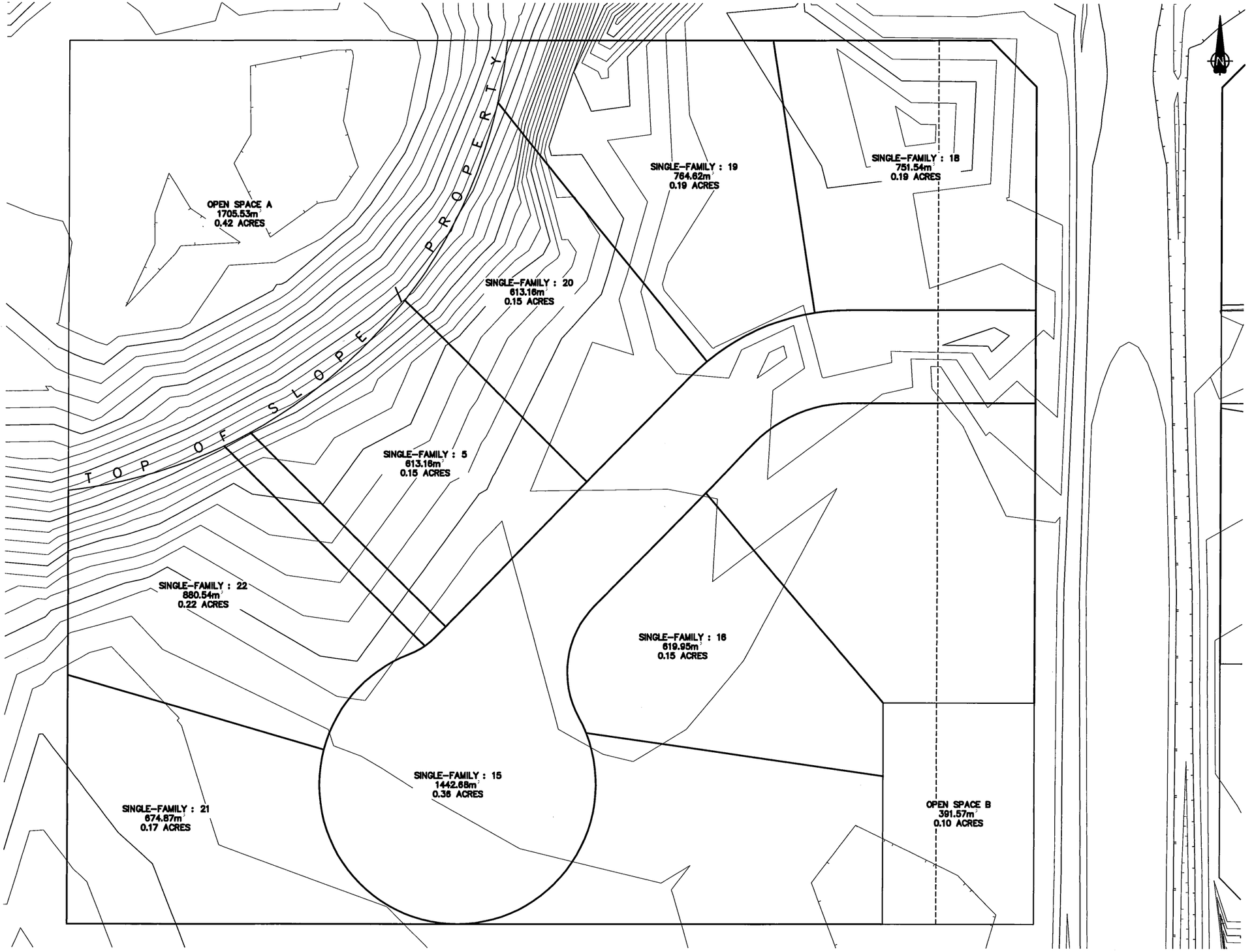
AMEC Environment & Infrastructure
A division of AMEC Americas Ltd.

PROFESSIONAL ENGINEER ALBERTA
JOHN LOBBEZOO
12, 2013

APEGA Permit: P04546

John Lobbezoo, P.Eng.
Geotechnical Project Engineer

Attachment: Figure by Wilde Bros: '*Possible Layout with Ground Contours*'



NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	9JAN'13	FOR REVIEW ONLY

WILDE BROTHERS
ENGINEERING LTD.
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P08438

WILDE BROS. ENGINEERING LTD.
Welling, Alberta

PROPOSED BARELAND CONDOS

POSSIBLE LAYOUT WITH EXISTING GROUND CONTOURS

DESIGNED:	CHECKED:
DRAWN: JPL	JOB:
SCALE: 1:400	DIMENSIONS: METERS
DATE: 9 JAN 2013	DRAWING No: — —

Appendix G - RID Letter Regarding Walking Path

Gmail

Mark Boltezar <markboltezar@raymond.ca>

Stonegate

Jason Miller <jason@raymondirrigationdistrict.ca> Tue, Jun 29, 2021 at 3:36 PM
To: Mark Boltezar <markboltezar@raymond.ca>

Hi Mark,

My board met this morning and I shared with them the idea of the walking path and the double fence thoughts from council.

I wanted to let you know that the RID Board will only consider approving a walking path on our right of way if the path is located on the far north edge of our right of way with a 4' chain link fence directly on the south edge of the path. We expect the path would only be 1-1.5 meters in width. All installation costs and future maintenance of the fence and path will be the responsibility of the town and/or the developer. The RID is in no way giving the land to the developer or town; the number one purpose of the right of way will remain irrigation, and the RID reserves the right to use the full right of way for irrigation purposes as needed.

Unfortunately, this is a deal breaker for us. The path must be on the far north edge of our property and there must be a 4' chain link fence separating the path from our road and canal.

Please let me know if you have any questions.

Jason

Jason Miller, CPA, CA
General Manager
Ph: (403) 752-3511
Cell: (403) 915-5579

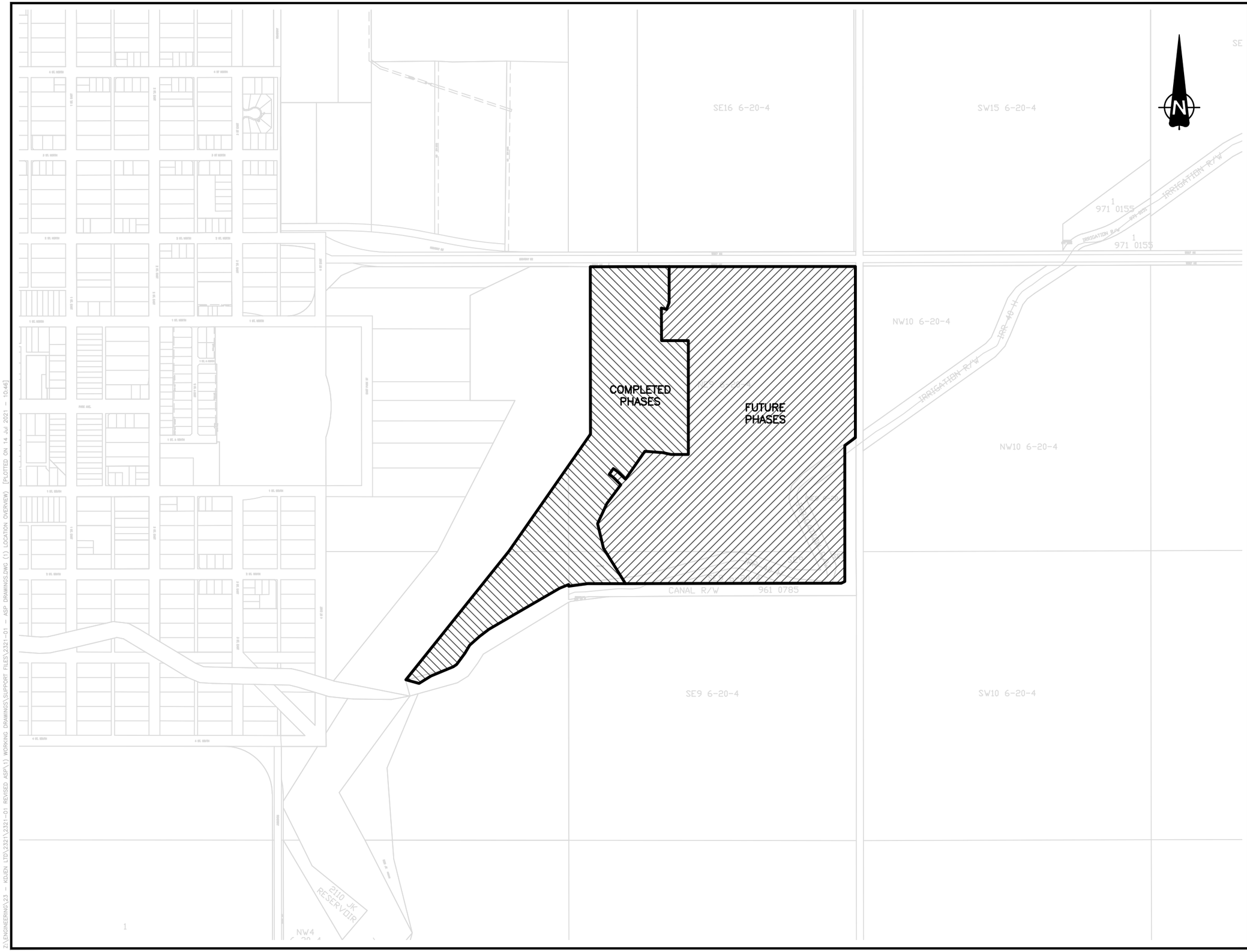
PO Box 538
Raymond, AB T0K 2S0

RID
Raymond Irrigation District

On Thu, Jun 24, 2021 at 4:45 PM Mark Boltezar <markboltezar@raymond.ca> wrote:
[Quoted text hidden]

DRAWINGS

Drawing 1 - Proposed Site Location



LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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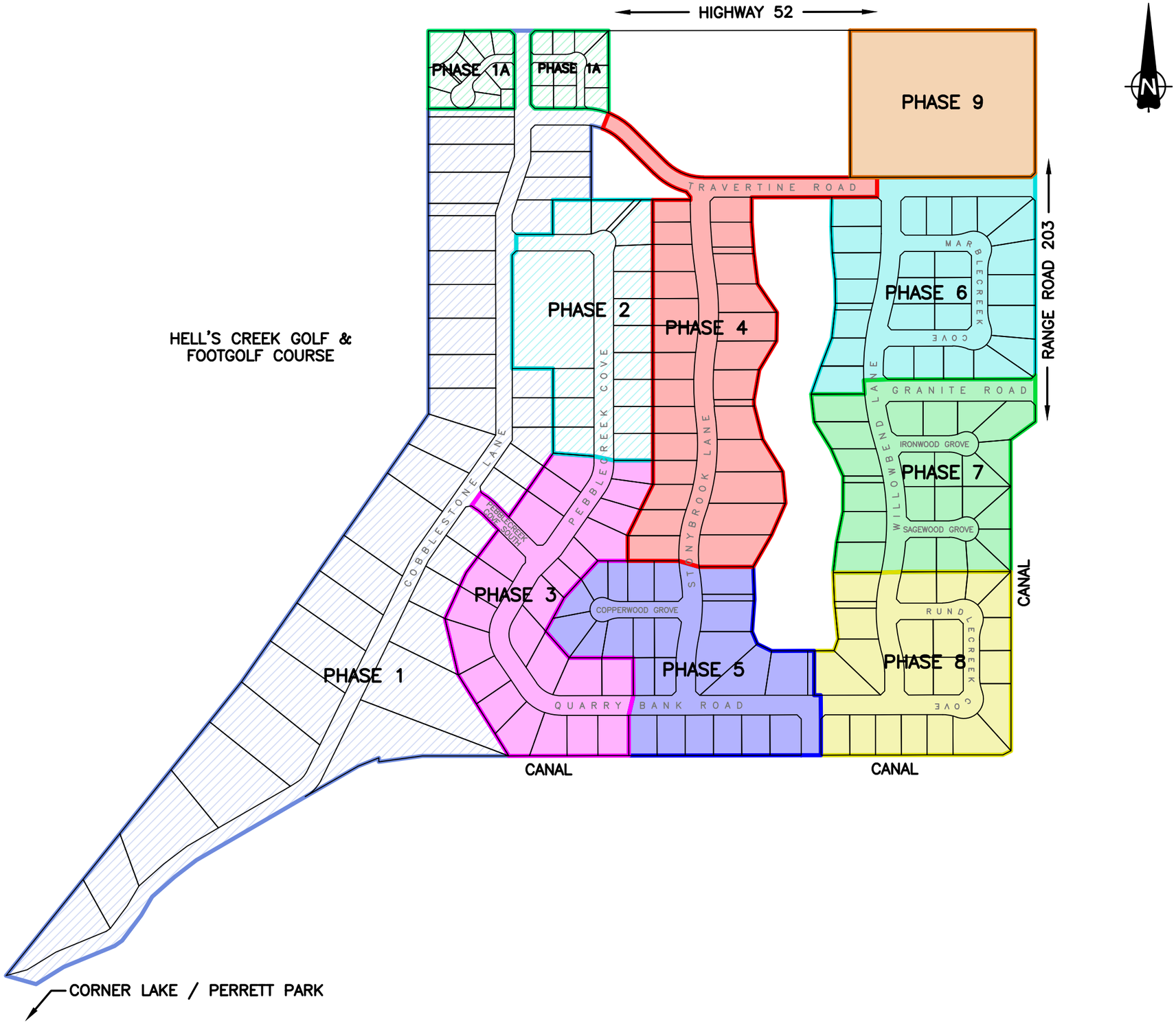
Raymond, Alberta

KDJEN LTD

STONEGATE MEADOWS AREA STRUCTURE PLAN SITE LOCATION

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:10000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 1

Drawing 2 - Proposed Developmental Phases



LEGEND / NOTES

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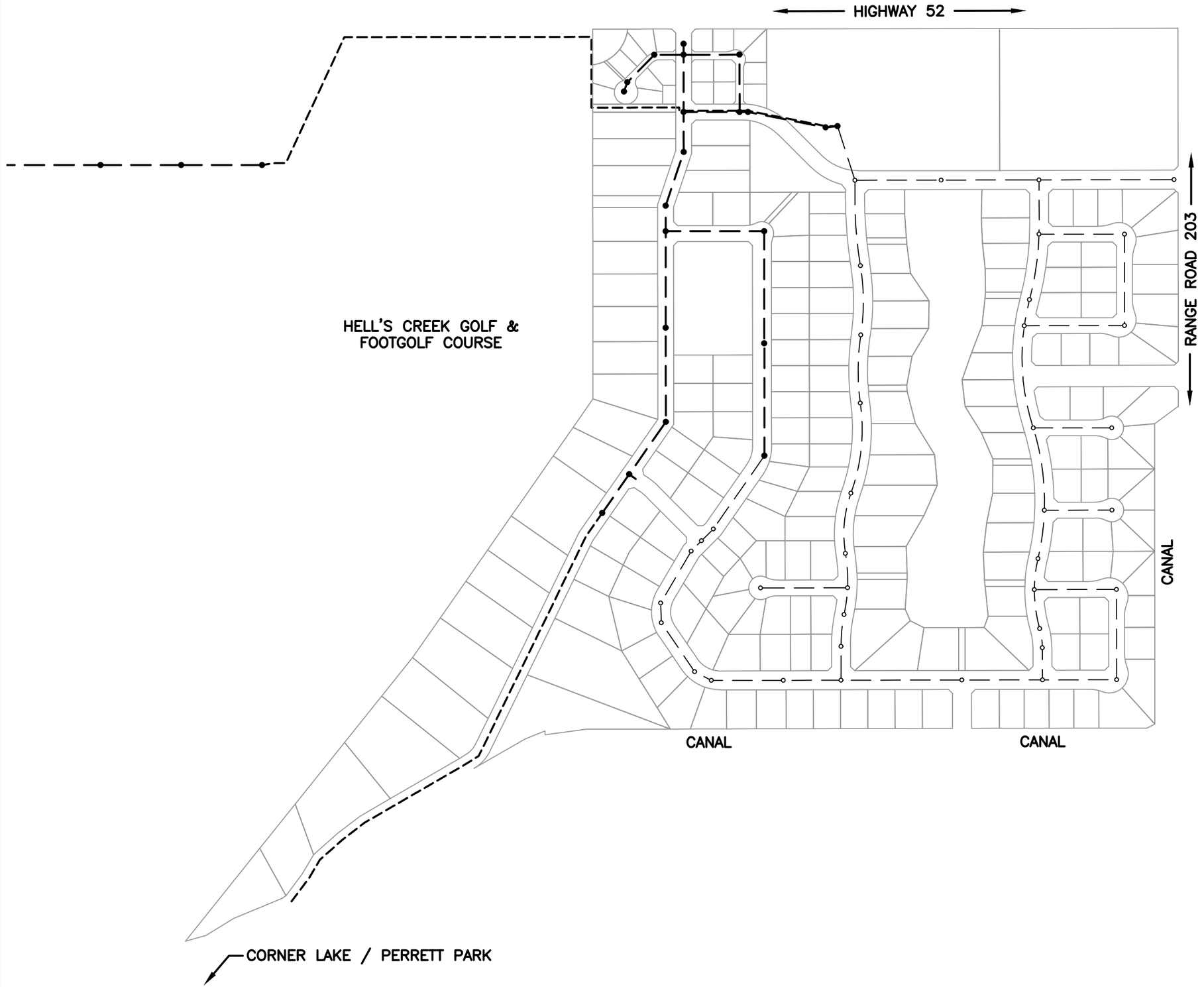
STONEGATE MEADOWS
AREA STRUCTURE PLAN
PROPOSED DEVELOPMENTAL PHASES

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:5000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 2

DRAWING 3 - PROPOSED SEWER SERVICES



LEGEND / NOTES

- EXISTING SANITARY MAIN (GRAVITY)
- EXISTING SANITARY MAIN (FORCE)
- FUTURE SANITARY MAIN (GRAVITY)
- EXISTING SANITARY MANHOLE
- FUTURE SANITARY MANHOLE

ISSUE	DATE	REVISION DESCRIPTION
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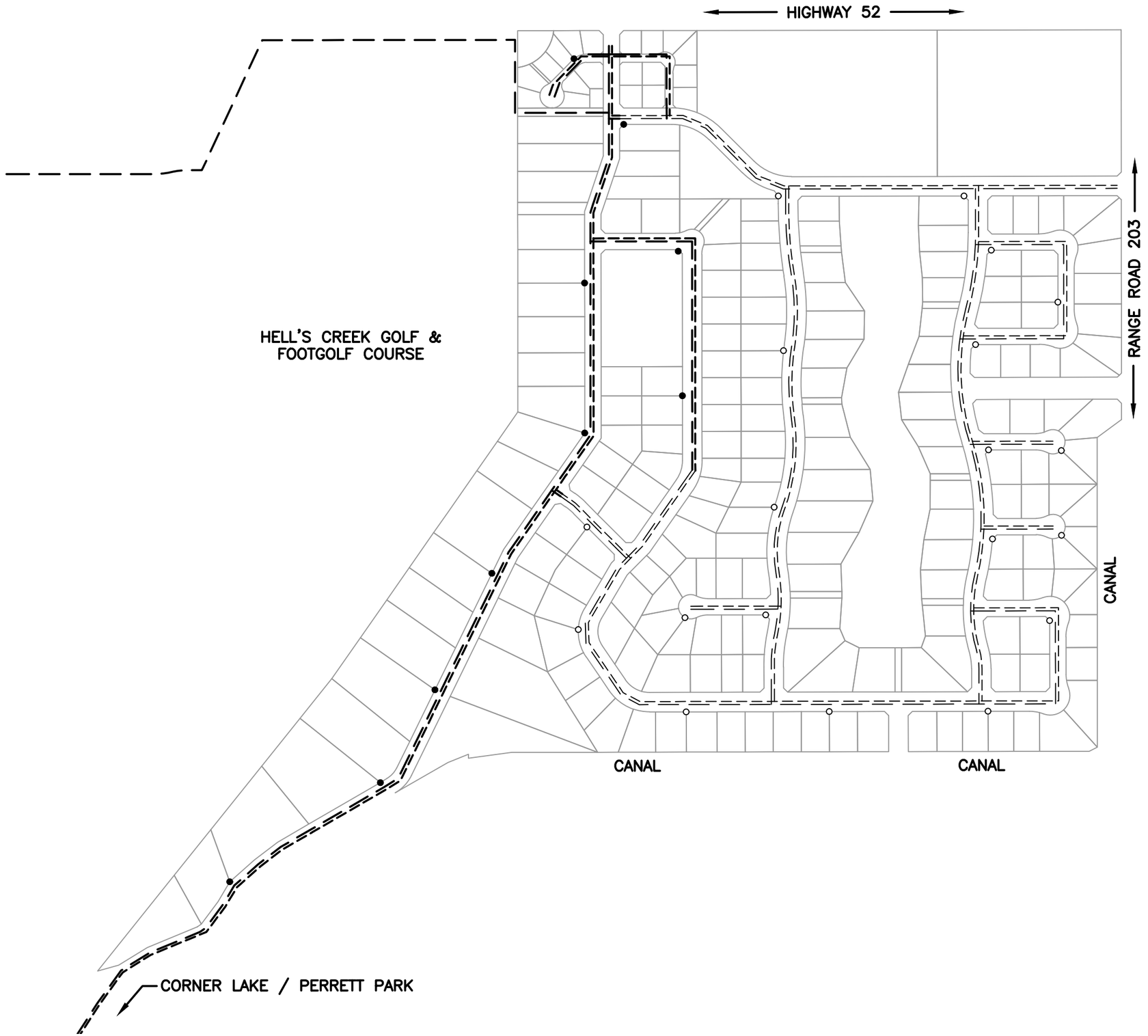
STONEGATE MEADOWS AREA STRUCTURE PLAN PROPOSED SANITARY SEWER MAINS

DESIGNED:		CHECKED:	
DRAWN:	JPL	JOB:	2321-01
SCALE:	1:5000	DIMENSIONS:	METERS
DATE:	14 JULY 2021	DRAWING No:	3

DRAWING 4 - PROPOSED WATER SERVICES



LEGEND / NOTES

- EXISTING POTABLE WATER MAIN
- EXISTING RAW WATER MAIN
- FUTURE POTABLE WATER MAIN
- FUTURE RAW WATER MAIN
- EXISTING FIRE HYDRANT
- FUTURE FIRE HYDRANT

ISSUE	DATE	REVISION DESCRIPTION
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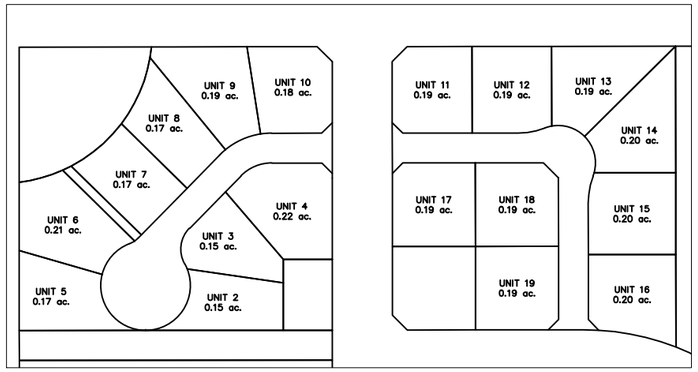
STONEGATE MEADOWS AREA STRUCTURE PLAN PROPOSED POTABLE AND RAW WATER MAINS

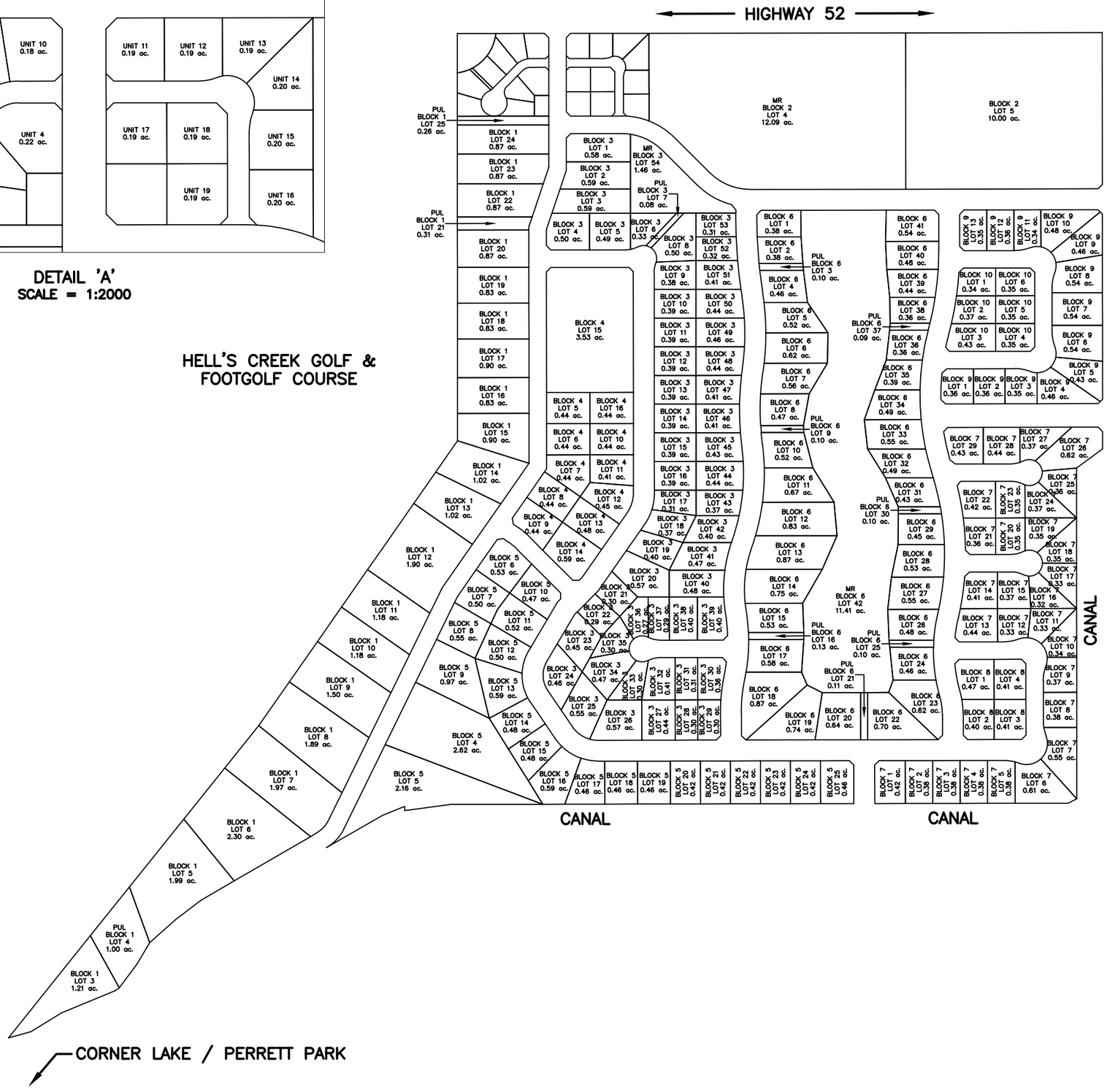
DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:5000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 4

Drawing 5 - Proposed Lot and Road Design Layout



DETAIL 'A'
SCALE = 1:2000

HELL'S CREEK GOLF & FOOTGOLF COURSE



LEGEND / NOTES

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STONEGATE MEADOWS
AREA STRUCTURE PLAN
PROPOSED POTABLE AND
RAW WATER MAINS

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:5000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 5

Z:\ENGINEERING\23 - KDJEN LTD\2321\2321-01 REVISED ASP\1 WORKING DRAWINGS\SUPPORT FILES\2321-01 - ASP DRAWINGS.DWG (5) LAYOUT [PLOTTED ON 14 Jul 2021 - 10:46]

DRAWING 6 - PROPOSED LAND USES

LEGEND / NOTES

- POTENTIAL MULTI–UNIT DWELLING
- NEIGHBORHOOD COMMERCIAL
- BARELAND CONDOMINIUM
- INSTITUTIONAL
- MUNICIPAL RESERVE

ISSUE	DATE	REVISION DESCRIPTION
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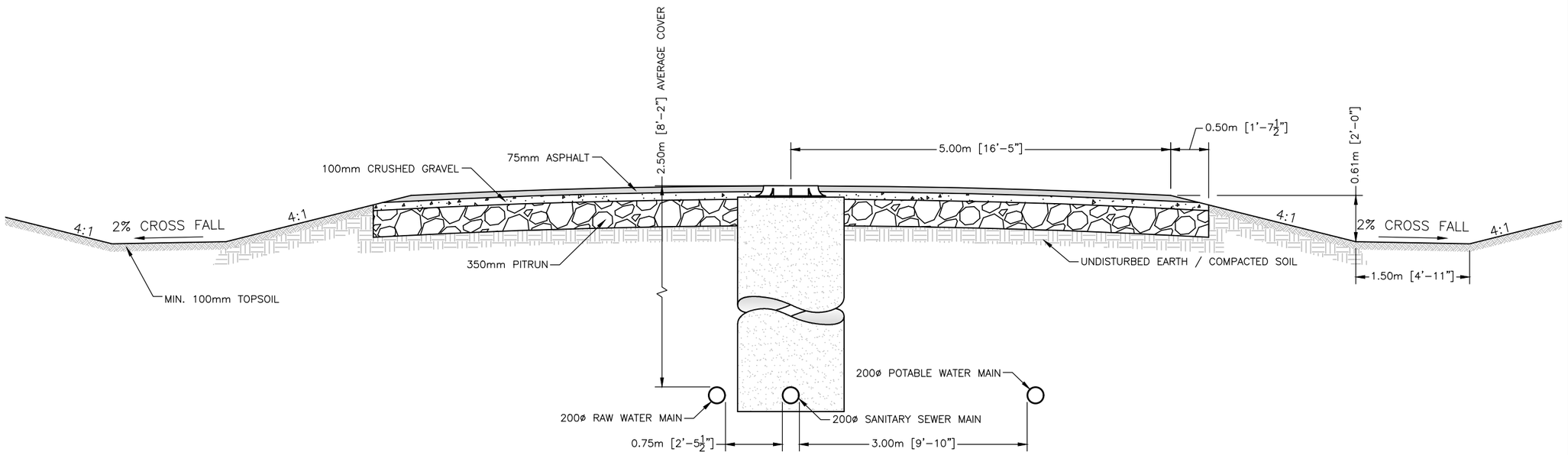
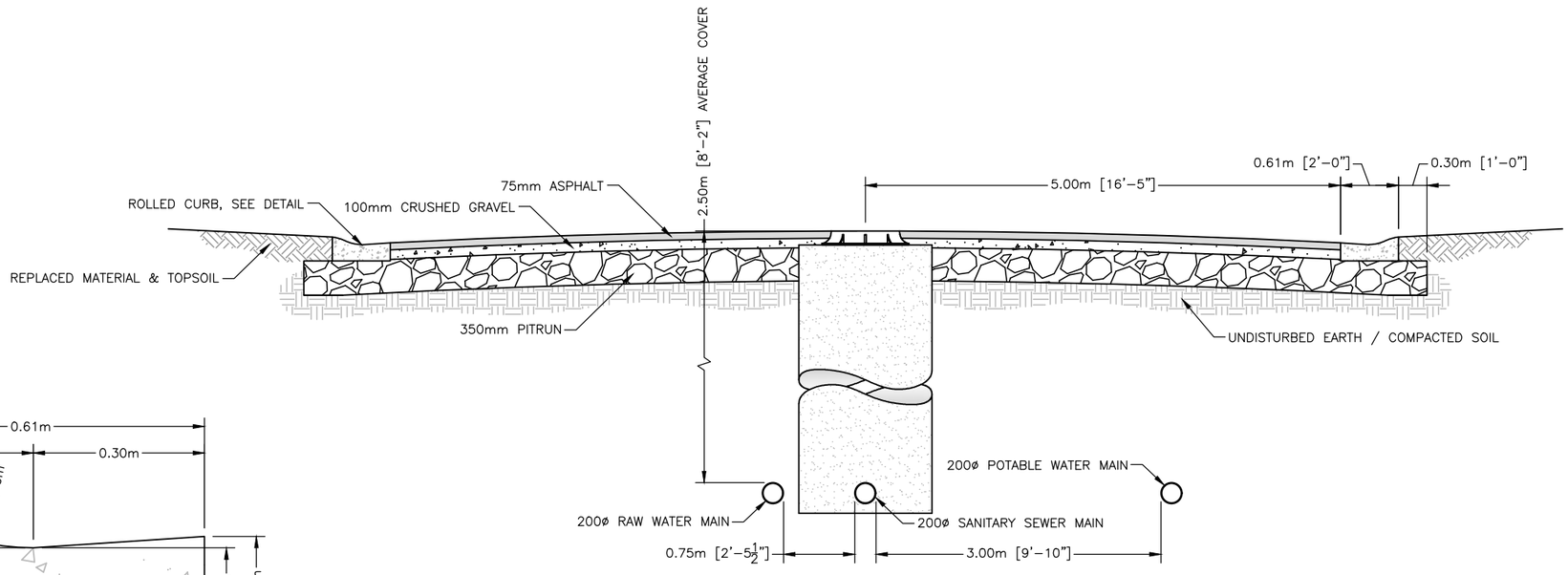
STONEGATE MEADOWS AREA STRUCTURE PLAN PROPOSED LAND USES

DESIGNED:		CHECKED:	
DRAWN:	JPL	JOB:	2321–01
SCALE:	1:5000	DIMENSIONS:	METERS
DATE:	14 JULY 2021	DRAWING No:	6

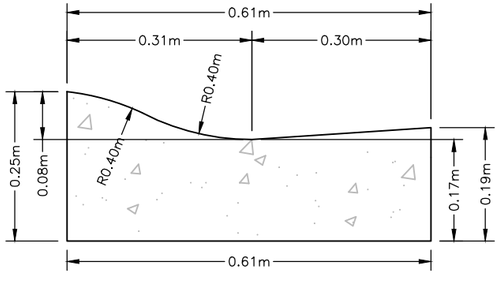
Drawing 7 - Typical Road Design Cross Section



TYPICAL ROAD & DITCH SECTION



TYPICAL ROAD & CURBS SECTION



TYPICAL ROLLED CURB

LEGEND / NOTES

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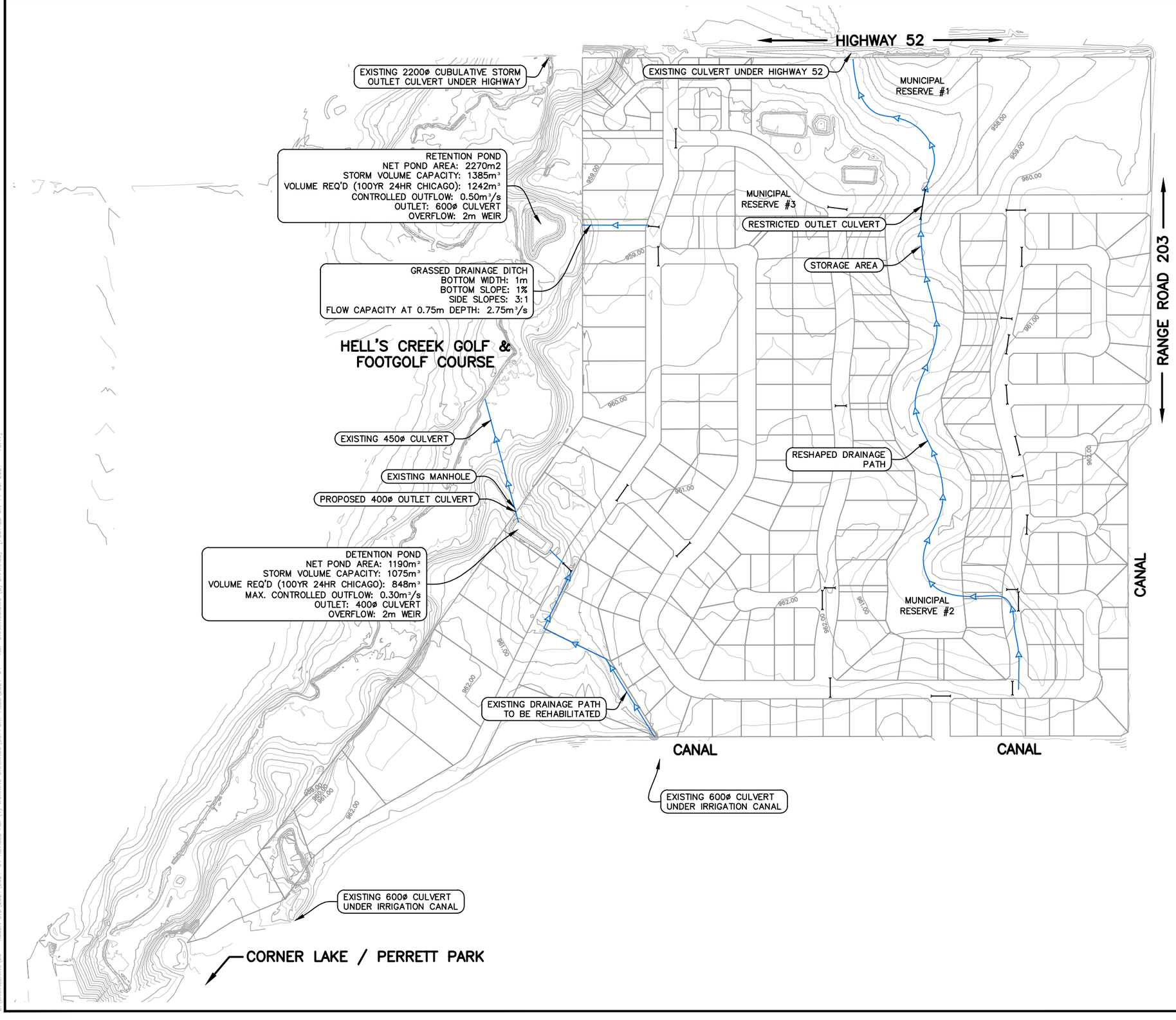
STONEGATE MEADOWS
AREA STRUCTURE PLAN
ROAD TYPE TYPICAL SECTIONS

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:60	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 7

DRAWING 8 - SUBDIVISION DRAINAGE



LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
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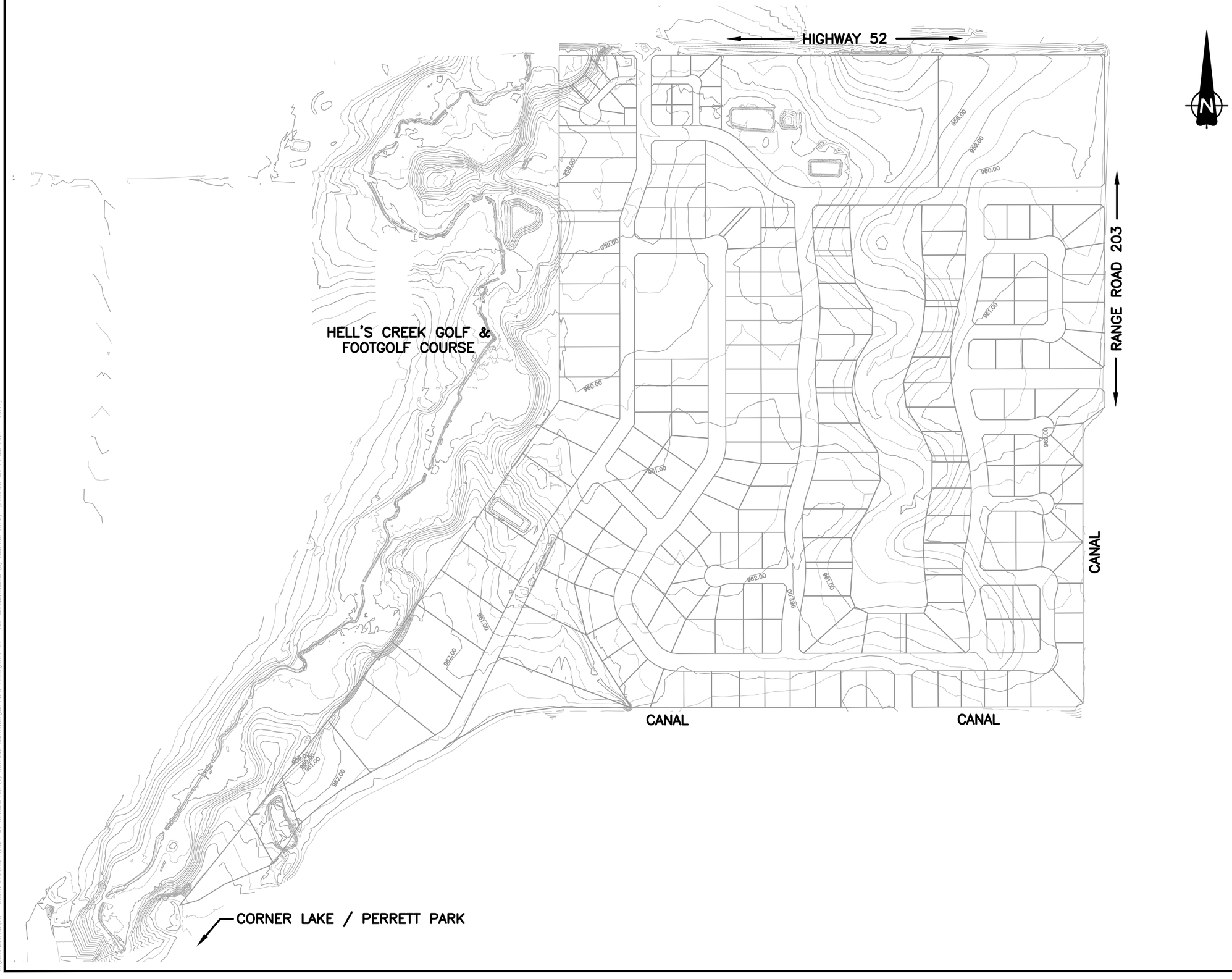
STONEGATE MEADOWS AREA STRUCTURE PLAN EXISTING & PROPOSED DRAINAGE PATHS

DESIGNED:		CHECKED:	
DRAWN:	JPL	JOB:	2321-01
SCALE:	1:5000	DIMENSIONS:	METERS
DATE:	14 JULY 2021	DRAWING No:	8

DRAWING 9 - EXISTING TOPOGRAPHY



LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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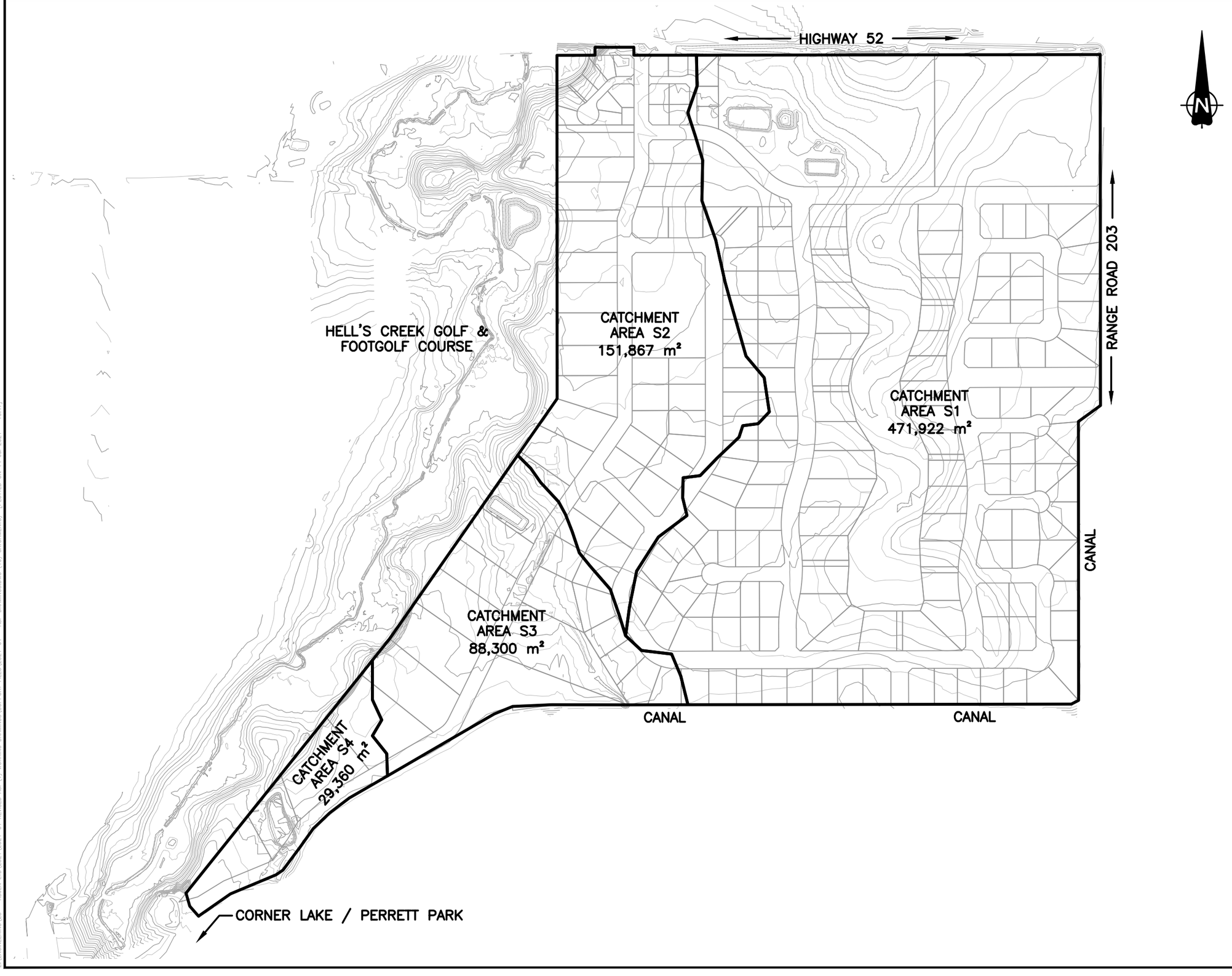
STONEGATE MEADOWS
AREA STRUCTURE PLAN
EXISTING TOPOGRAPHY

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:5000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 9

DRAWING 10 - CATCHMENT AREAS



LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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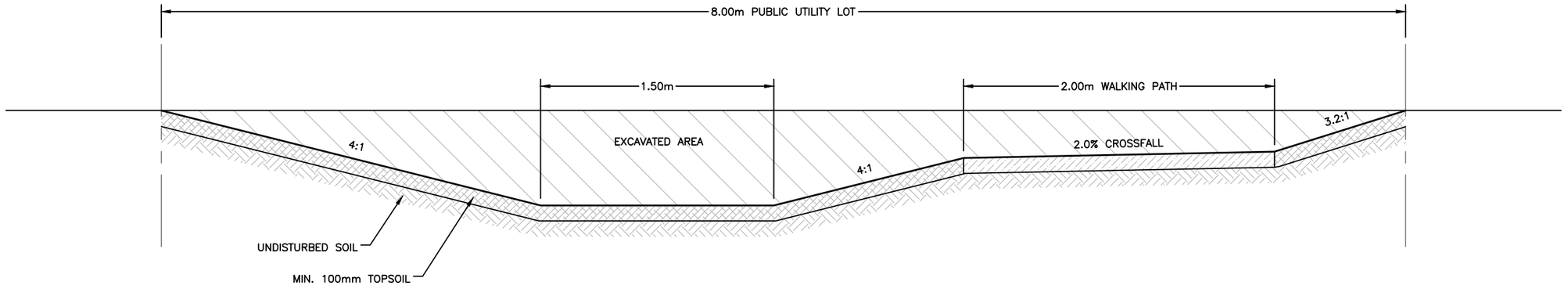
STONEGATE MEADOWS
AREA STRUCTURE PLAN
PRE-DEVELOPMENT
CATCHMENT AREAS

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:5000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 10

Drawing 11 - Typical Walking/Drainage Path P.U.L. Section



TYPICAL WALKING/DRAINAGE PATH P.U.L.
SCALE = N.T.S.

LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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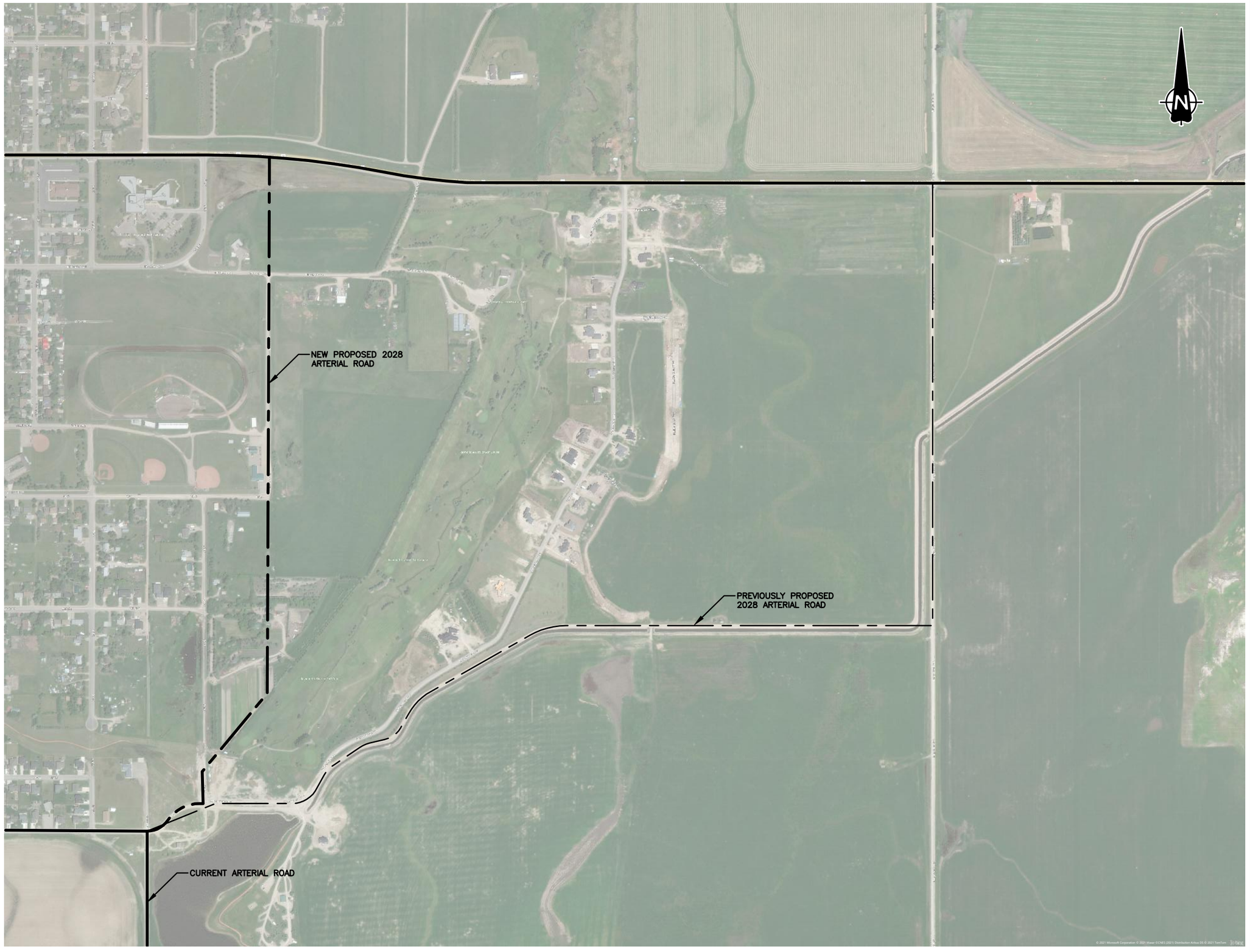
Raymond, Alberta

KDJEN LTD

STONEGATE MEADOWS
AREA STRUCTURE PLAN
WALKING/DRAINAGE PATH P.U.L.
TYPICAL SECTION

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:30	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 11

Drawing 12 - Proposed Relocation of Arterial Road



LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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Raymond, Alberta

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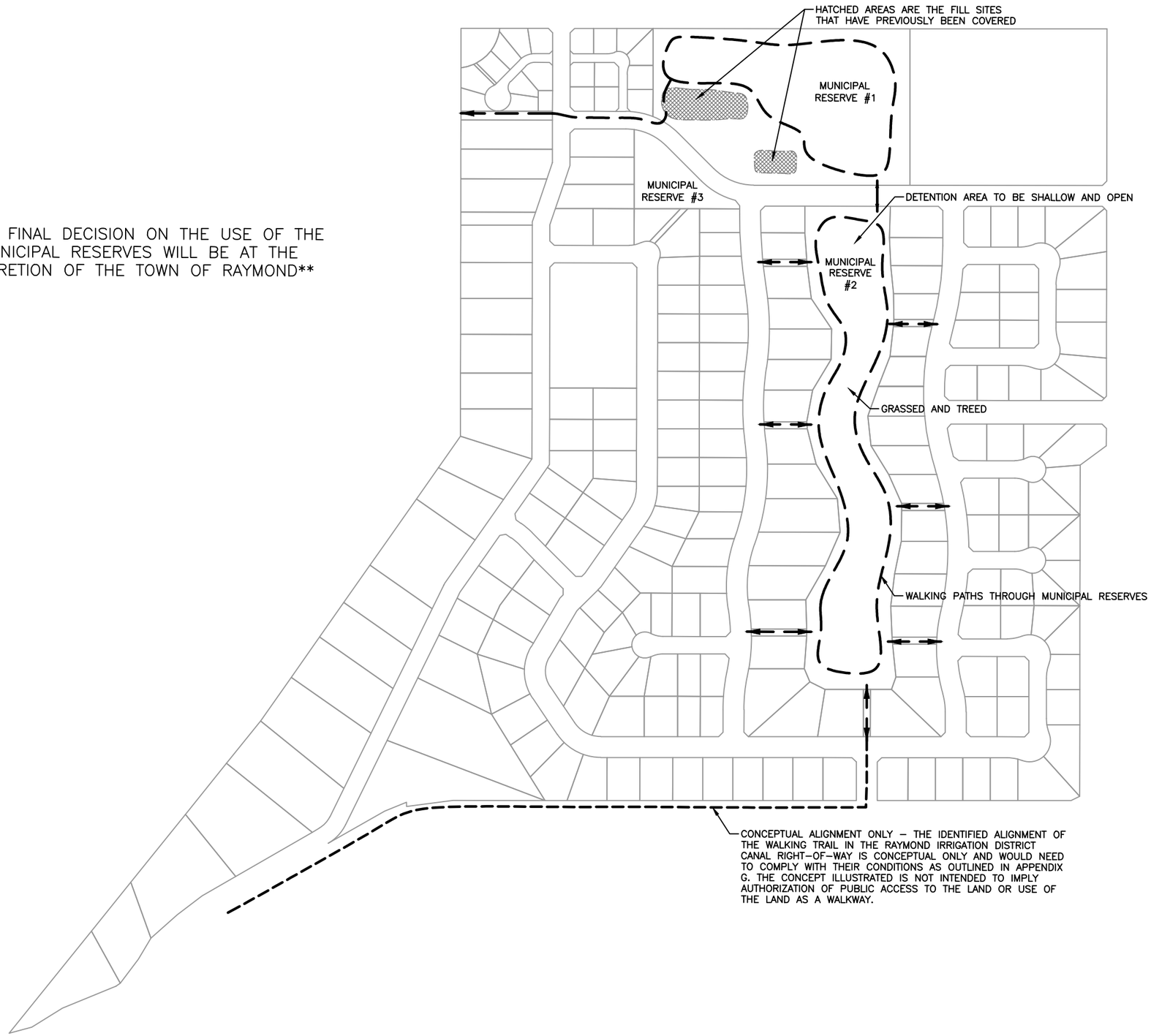
STONEGATE MEADOWS
AREA STRUCTURE PLAN
PROPOSED ARTERIAL ROAD
ROUTING

DESIGNED:		CHECKED:	
DRAWN:	JPL	JOB:	2321-01
SCALE:	1:7500	DIMENSIONS:	METERS
DATE:	14 JULY 2021	DRAWING No:	12

Drawing 13 - Walking Trails and Municipal Reserve

THE FINAL DECISION ON THE USE OF THE MUNICIPAL RESERVES WILL BE AT THE DISCRETION OF THE TOWN OF RAYMOND



LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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ENGINEERING LTD.
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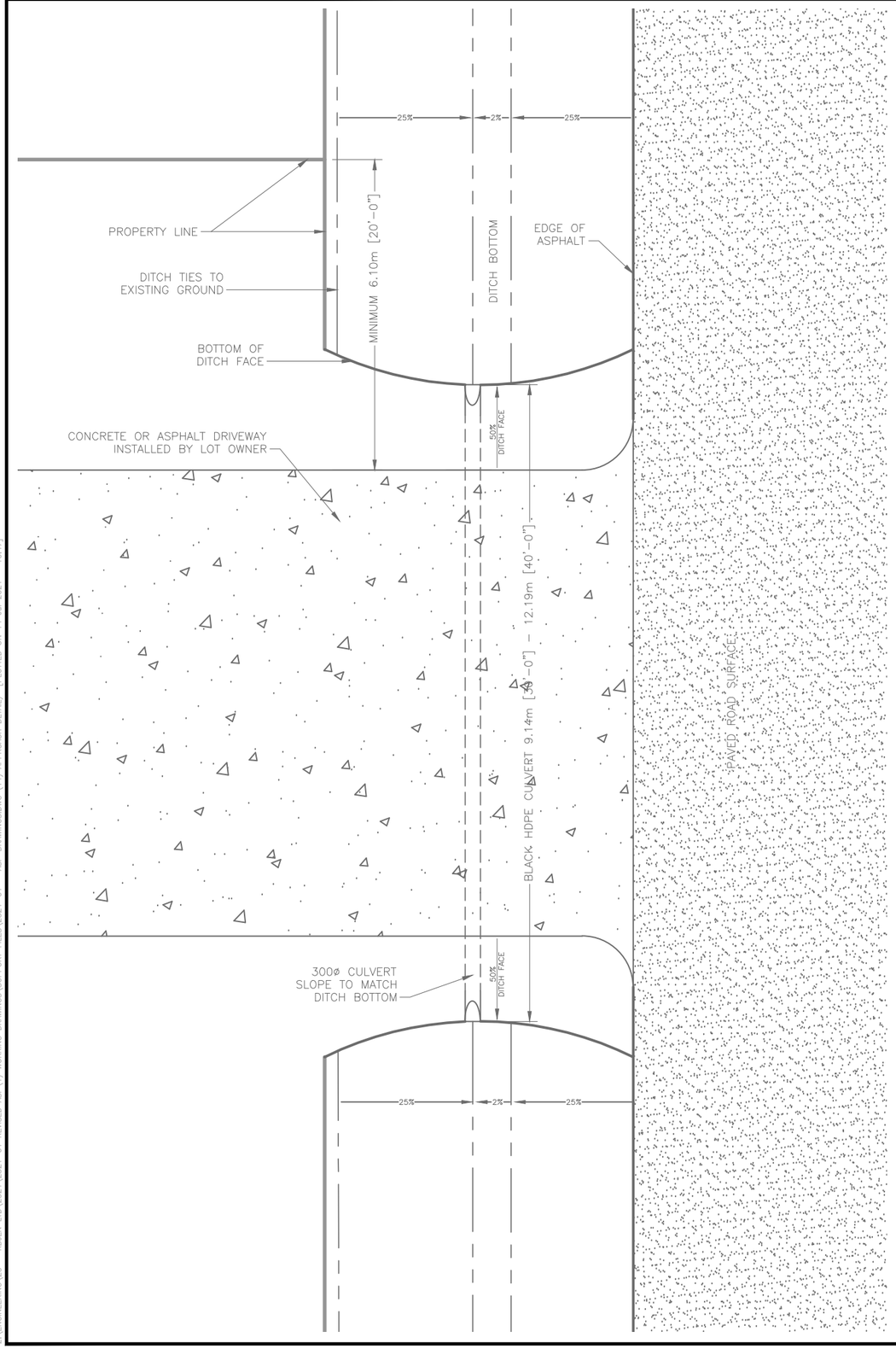
WILDE BROS. ENGINEERING LTD.
Raymond, Alberta

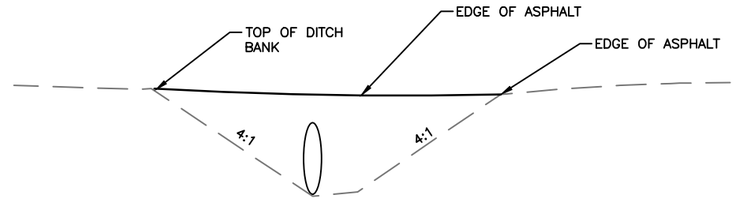
KDJEN LTD

STONEGATE MEADOWS
AREA STRUCTURE PLAN
PROPOSED WALKING PATHS

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321–01
SCALE: 1:5000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 13

Drawing 14 - Standard Driveway Approach Detail & Profile





TYPICAL DRIVEWAY CROSS SECTION

LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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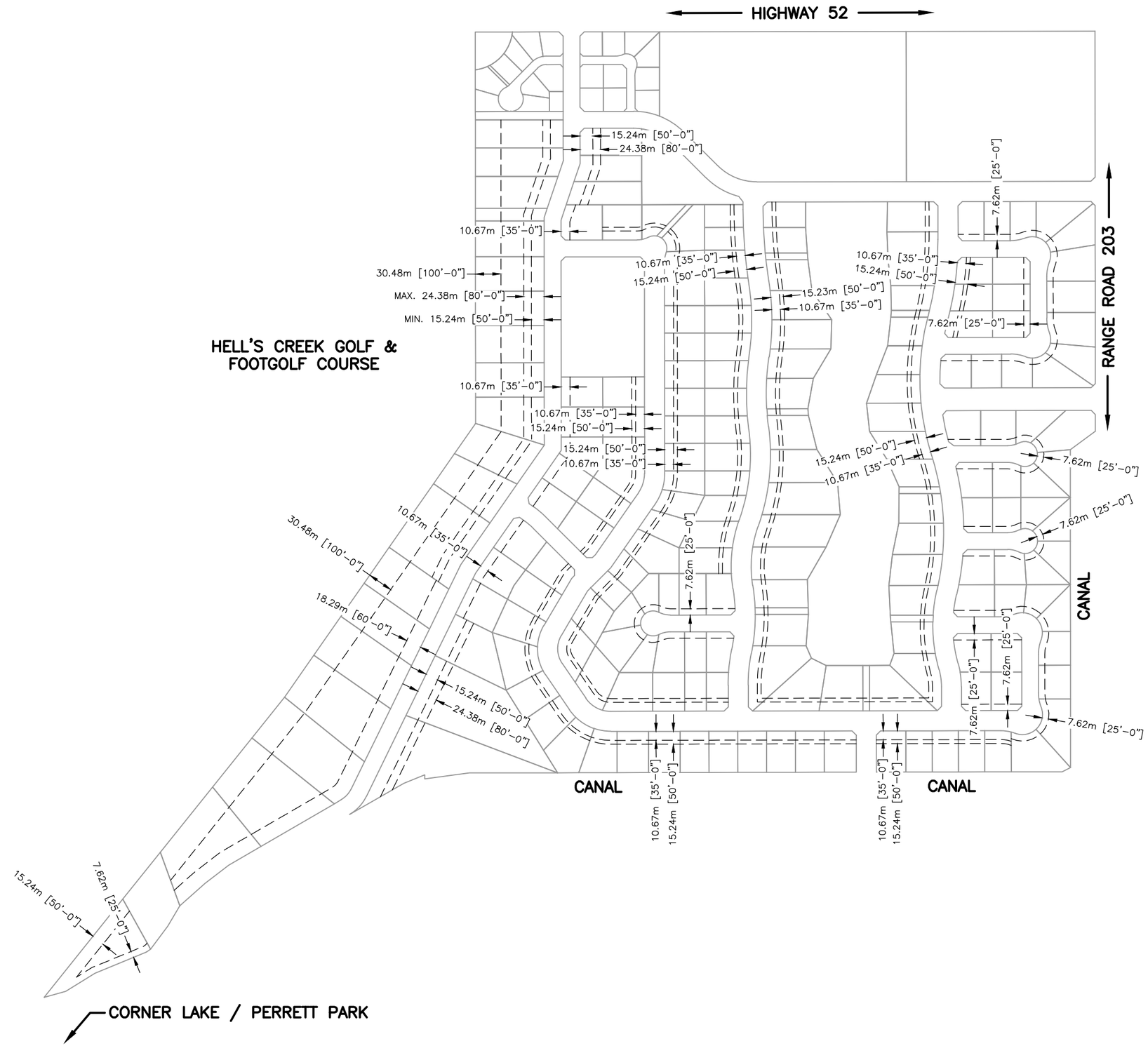
Raymond, Alberta

KDJEN LTD

STONEGATE MEADOWS
AREA STRUCTURE PLAN
STANDARD DRIVEWAY
APPROACH WITH PROFILE

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: N.T.S.	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 14

Drawing 15 - Proposed Front Setbacks



LEGEND / NOTES

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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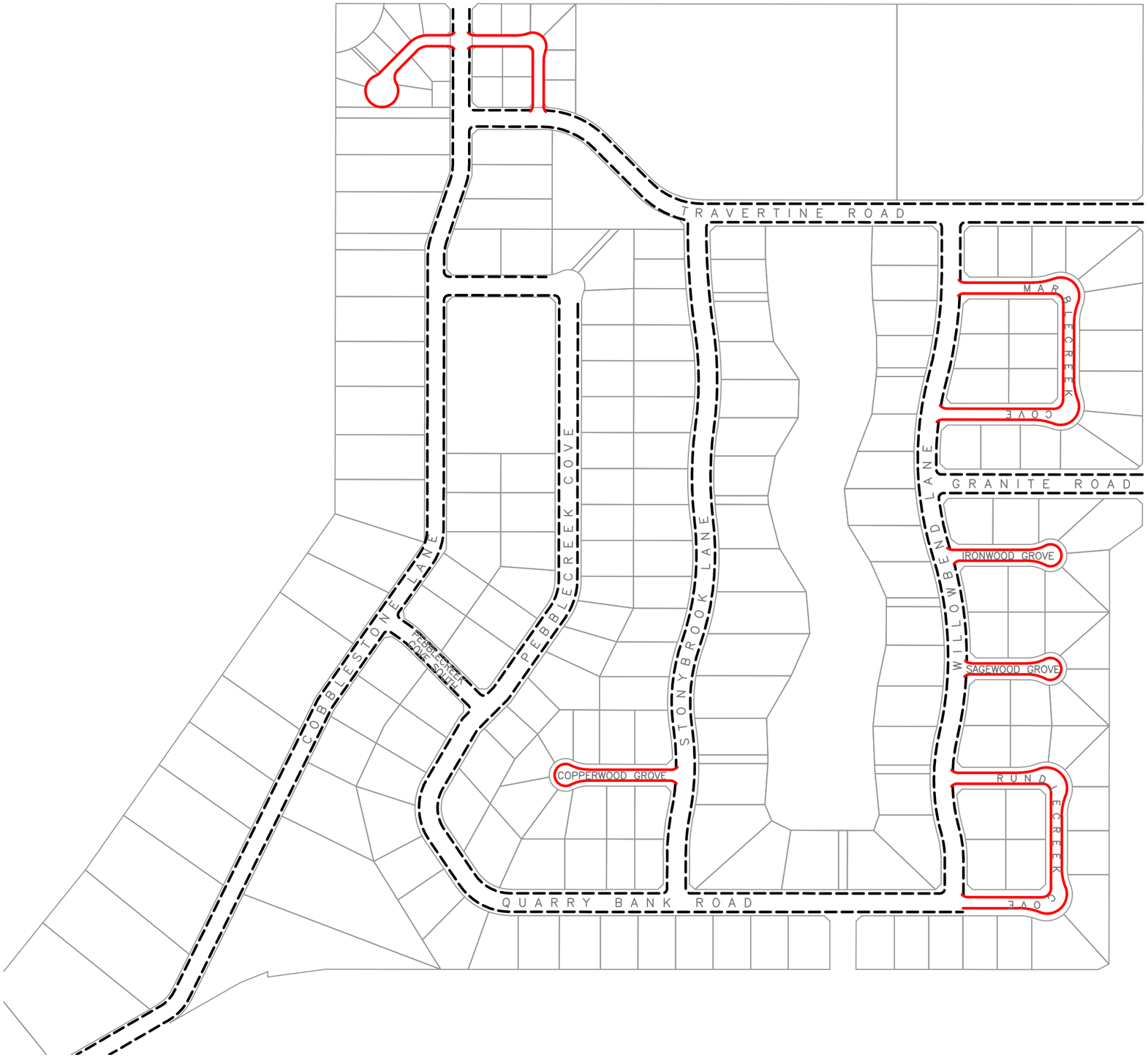
STONEGATE MEADOWS
AREA STRUCTURE PLAN
PROPOSED MINIMUM & MAXIMUM
FRONT SETBACKS FOR
RESIDENTIAL LOTS

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:5000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 15

Drawing 16 - Curbing and Ditch Regions



LEGEND / NOTES

CURB & GUTTER

ROADSIDE DITCH

ISSUE	DATE	REVISION DESCRIPTION
0	14JUL'21	PRELIMINARY

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STONEGATE MEADOWS
CURB AND DITCH REGIONS

DESIGNED:	CHECKED:
DRAWN: JPL	JOB: 2321-01
SCALE: 1:4000	DIMENSIONS: METERS
DATE: 14 JULY 2021	DRAWING No: 16