

Functional Planning Study



Highway 642 (100 Avenue) In Morinville

May 2013

Prepared for:



HIGHWAY 642 (100 AVENUE) IN MORINVILLE

FUNCTIONAL PLANNING STUDY



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May 2013

Accepted by:

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May 31, 2013
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2013/06/21
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TABLE OF CONTENTS

Letter of Transmittal	
Corporate Authorization	
Acknowledgement	
Executive Summary	
	Page No.
1.0 Introduction	1
1.1 Study Area	1
1.2 Project Background and Objectives.....	1
1.3 Integration with Coeur de Morinville Area Structure Plan	1
1.4 Realignment of Highway 642.....	2
1.5 Horizon Years	2
2.0 Existing Conditions	3
2.1 Existing Road Geometry	3
2.2 Existing Parking.....	3
2.3 Existing Access Management.....	3
2.4 Collision History.....	3
2.5 Historical Resources	3
2.6 Railway Crossing	4
3.0 Land Use	5
3.1 Existing.....	5
3.1.1 Highway 2 Overpass to CN Railway	5
3.1.2 CN Railway to 99 Street.....	5
3.1.3 99 Street to East Boundary Road	5
3.2 Proposed	5
4.0 Transportation Assessment	6
4.1 Existing Traffic	6
4.2 2004 Transportation Master Plan.....	6
4.3 In-House Full Build-Out Traffic Model.....	6
4.3.1 Development Horizon.....	6
4.3.2 Previous Work.....	6

4.3.3	Data Gathered	6
4.3.3.1	Traffic Counts	7
4.3.3.2	Post-2004 Development	7
4.3.4	Traffic Generation	8
4.3.5	Traffic Distribution	9
4.3.6	Mode Choice	9
4.3.7	Route Assignment.....	9
4.3.8	Additional Corridor Traffic	9
4.4	Traffic Analysis	10
4.5	Existing Traffic Operations	10
4.6	Future Traffic Operations at 50% Build Out.....	11
4.7	Future Traffic Operations at Full Build Out.....	12
5.0	Design Criteria and Roadway Standards	14
5.1	Other Major Roads	14
5.2	Design Vehicle.....	14
5.3	Design Criteria Standards	14
5.3.1	Roundabout Design Parameters	14
5.4	Typical Cross-Sections	15
6.0	Plan Development	17
6.1	Options Evaluation	17
6.1.1	Policy Criteria	17
6.1.2	Implementation Criteria	17
6.1.3	Downtown Related Criteria	17
6.1.4	Technical Criteria	18
6.1.5	Public Related Criteria	18
6.2	Roundabout Recommended Option.....	18
7.0	Functional Planning	20
7.1	Long Term Plan	20
7.1.1	Overview	20
7.1.2	Cross Sections	21
7.1.3	Access Management.....	21
7.2	Active Modes	23
7.2.1	Bicycles.....	23
7.2.2	Pedestrians	23

8.0	Implementation and Cost Estimates	24
8.1	Trigger for Improvement	24
8.2	Phased Implementation	24
8.3	Single Lane Roundabouts	24
8.4	Cost Estimate	25
8.4.1	Comparative Costs.....	25
8.4.2	Recommended Option	25
9.0	Public and Stakeholder Consultation	27
9.1	Project Review Committee (PRC)	27
9.2	September 26, 2012 Public Open House	27
9.3	April 2013 Public Open House	28
10.0	Right of Way Requirements	29
11.0	Drainage	30
12.0	Utilities	31
13.0	Conclusions and Recommendations	32
13.1	Conclusions	32
13.2	Recommendations	32

TABLES

Table 4.1 – Measured Residential Traffic Generation Rates

Table 4.2 – Level of Service Criteria for Intersections

Table 4.3 – Level of Service Summary at 100 Avenue Intersections

Table 6.1 – Option Evaluation Matrix

Table 7.1 – Access Inventory

EXHIBITS

Exhibit ES – Recommended Plan

Exhibit 1.1 – Key Map

Exhibit 4.1 – Transportation Model Zones

Exhibit 4.2 – Traffic Distribution

Exhibit 4.3 – 100 Avenue Traffic Volumes Existing

Exhibit 4.4 – 100 Avenue Traffic Volumes 50 % Build Out

Exhibit 4.5 – 100 Avenue Traffic Volumes Full Build Out

Exhibit 5.1 – Design Vehicles

Exhibit 5.2 – AutoTurn Off Tracking Simulation

Exhibit 5.3 – Typical Cross-Section Options A-A and B-B

Exhibit 5.4 – Typical Cross-Section Options C-C and D-D

Exhibit 7.1 – Recommended Plan

Exhibit 7.2 – Recommended Plan

Exhibit 7.3 – Recommended Plan

Exhibit 7.4 – Recommended Plan

Exhibit 7.5 – Long Term Access Management Plan

Exhibit 7.6 – Long Term Access Management Plan

Exhibit 7.7 – Long Term Access Management Plan

Exhibit 7.8 – Long Term Access Management Plan

Exhibit 7.9 – Long Term Access Management Plan

Exhibit 10.1 – Right of Way Requirements

Exhibit 10.2 – Right of Way Requirements

Exhibit 10.3 – Right of Way Requirements

Exhibit 10.4 – Right of Way Requirements

Exhibit 10.5 – Right of Way Requirements

Exhibit 10.6 – Right of Way Requirements

Exhibit 12.1 – Existing Deep Utilities

Exhibit 12.2 – Existing Deep Utilities

Exhibit 12.3 – Existing Deep Utilities

Exhibit 12.4 – Existing Deep Utilities

APPENDICES

Appendix A – Background Information

Appendix B – Conventional Intersection Option / Evaluation

Appendix C – Traffic

Appendix D – Collision Statistics

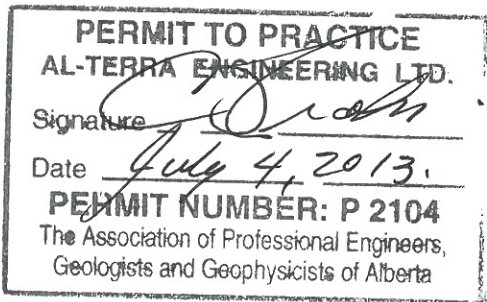
Appendix E – Franchise Utility Plans

Appendix F – Cost Estimates

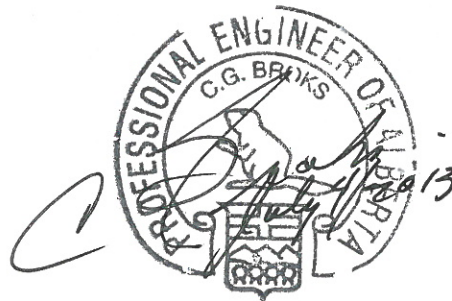
CORPORATE AUTHORIZATION

This report entitled **Highway 642 (100 Avenue) in Morinville, Functional Planning Study** was prepared by Al-Terra Engineering Ltd., under authorization and exclusive use of the Town of Morinville.

The designs and recommendations put forward reflect Al-Terra's best judgment with the information available. Any use of this information in a manner not intended or with the knowledge that situations have changed shall not be the responsibility of Al-Terra Engineering Ltd.



Corporate Permit



Corry G. Broks, P. Eng.

ACKNOWLEDGEMENT

Al-Terra Engineering Ltd. was fortunate to have worked with a highly qualified and dedicated Project Team to complete the **Functional Planning Study for Highway 642 (100 Avenue) in Morinville**. In-house experience in the areas of functional planning and traffic engineering was supplemented with services by Red Willow Planning & Permaculture Inc. and David Klippenstein & Associates Ltd., who managed the Public Involvement process and provided input to land planning issues.

In addition, we would like to acknowledge, with gratitude and appreciation, the assistance of the Project Review Committee for their input, assistance and cooperation during the study.

Project Review Committee members include:

- ◆ **Town of Morinville**
Debbie Oyarzun, CAO
Greg Hofmann, Director of Planning and Development
Claude Valcourt, Director of Public Works
Tim Vrooman, Planner
Danika Dudzik, Planning Intern
James Alaeddine, Traffic Safety Committee
S/Sgt Mac Richards, RCMP
Nicole Boutestein, Municipal Planning Commission
- ◆ **Alberta Transportation**
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- ◆ **Sturgeon County**
Colin Steffes, Manager of Planning
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Kristina Peter, Senior Planner
- ◆ **Morinville and District Chamber of Commerce**
Paula Hittinger
- ◆ **Red Willow Planning & Permaculture Inc.**
Vicki Dodge
- ◆ **David Klippenstein & Associates Ltd.**
David Klippenstein
- ◆ **Al-Terra Engineering Ltd.**
Corry Broks
William Minchin

EXECUTIVE SUMMARY

Al-Terra was retained by the Town of Morinville to conduct a Functional Planning Study (FPS) for 100 Avenue running through Morinville. Being the only major east-west thoroughfare in Morinville, it functions as its 'Main Street' as it passes through the heart of the community. To the Province, it serves as Highway 642 as part of the provincial highway network. Therefore, 100 Avenue serves a dual role – as a regional connector and as a local Main Street. Since provincial jurisdiction also applies to adjacent land use and access control, this also creates a dual land planning authority between the Town and the Province. This report serves to establish the transportation planning goals of these two planning authorities to increase certainty in the planning process, thus promoting the development and redevelopment of the properties along the corridor.

The primary goal of this Functional Planning Study was to explore issues with regard to short and long term adjacent land use, access management, right-of-way requirements, street cross-section and intersection treatment.

A secondary goal of this Functional Planning Study is to provide a technical foundation for the *Coeur de Morinville* Area Structure Plan (ASP). The ASP is being prepared concurrently to provide a vision and policy direction for the development of downtown Morinville and adjacent residential areas that is compatible with the function of 100 Avenue as a provincial highway. The goals of a more compact and pedestrian friendly urban development is mutual to this Functional Planning Study and the Area Structure Plan.

A major element of this Functional Planning Study is to evaluate the need for additional traffic control measures at key intersections in response to increased traffic and resulting decreased level of service at these intersections. The only traffic controls currently present are the traffic signals at the intersection of 100 Avenue and 100 Street and the four-way stop at the east intersection of 100 Avenue and Grandin Drive. There are numerous other intersections; however, traffic from side streets are stop-sign controlled.

A traffic model was developed in-house to project traffic flows at intermediate build-out (about 16,000 population) and full build-out (about 32,000 population) of the Town of Morinville. These traffic projections were then compared with the existing roadway capacity to determine how the road network generally and 100 Avenue in particular would function at full build-out. In addition, traffic movements were analyzed at key intersections to determine the need for and type of traffic control measures. Two options, conventional traffic signals and modern roundabouts, were identified and evaluated according to a comprehensive set of criteria.

After considering the two options on the basis of 20 criteria, including public acceptance, it was concluded that the roundabout option is better able to meet the goals of the project, and is therefore the recommended option. Cost estimates indicated that the roundabout option and the conventional intersection option had similar capital costs, but that right of way costs were significantly higher for the conventional intersection option.

The analysis led to the following conclusions:

- ◆ It is expected that a four lane cross section will provide an appropriate Level of Service (LOS) at full build-out;
- ◆ The proposed long-term street cross-section will provide for two travel lanes in each direction, a narrow centre median, parallel on-street parking west of 100 Street and a slight expansion of sidewalks on each side to enhance the pedestrian precinct for this same section of the corridor;
- ◆ It is felt that the intersections at 107 Street, 104 Street, 102 Street, 100 Street, Grandin Drive (west junction), Grandin Drive (east junction), and East Boundary Road should be provided with all directional access due to the combination of traffic volumes, intersection spacing, road hierarchy, and existing access;
- ◆ All other intersections along the corridor, except the access to the Morinville Community High School and 87 Street are to be converted to right-in, right-out only;
- ◆ Roundabouts are preferred for the all-directional intersections due to their ability to provide vehicular access, including semi-trucks, reduce travel speeds, increase vehicular and pedestrian safety, provide for legal U-turn opportunities, enhance access to individual properties, and maintain vehicular parking along both sides of the corridor;
- ◆ The roundabouts will be designed according to accepted criteria to accommodate vehicular traffic up to semi-trailer vehicles (design vehicle – ‘WB-21’), but not for over-sized loads. This will give the roundabout a typical Inscribed Circle Diameter (ICD) of 39 m, enlarged on the four quadrants to provide truck aprons for right turns;
- ◆ Roundabouts are also typically centered on the existing intersections to minimize right-of-way (ROW) requirements;
- ◆ Roundabouts will generally have a four lane cross section for 100 Avenue traffic and a two lane cross section for cross road traffic, except for 100 Street, which will require a four lane cross-section;
- ◆ There will be slight variations of typical roundabout design as needed due to local circumstances; and,
- ◆ The existing right-of-way will be adequate to handle traffic projected for the 32,000 population, with the exception of right-of-way acquisition required at the intersections designated for roundabout treatment; the total right of way acquisition requirement will be less than one hectare (0.786 ha or 1.94 acres). As this is an urban setting, a clear zone beyond the shoulder of the road will not be provided, as is typical for rural highway design.

The recommended option is illustrated on **Exhibit ES**.

Although it is expected that single lane roundabouts would function well at all intersections except 100 Street for the next 30-35 years combined with a two lane cross section along 100 Avenue, a ‘single lane’ option as part of a phased implementation has not been developed as part of this report. It is anticipated that the issues surrounding how to transition from sections of the corridor when roundabouts have been implemented will be addressed in a future planning exercise or as part of the preliminary design work. However, it may be prudent and more cost effective to implement the roundabouts to their final stage configuration initially, and avoid complex and costly transition and subsequent reconfiguration. Estimated costs for implementation are based on this assumption.

Each roundabout will be warranted when the warrant for signalization at the intersection in question is met. The roundabouts may also be implemented as part of a streetscaping project, or to maintain continuity

along the corridor. Although difficult to predict, it is expected that some improvements on the corridor will be required within the five to ten year horizon.

To provide a forum for public engagement and conversation, two public open houses were held in Morinville. The first was held on September 26, 2012 to present both conventional traffic signal and modern roundabout options for the corridor. Questionnaire response highlighted the importance of critical factors - safe and convenient vehicular access to businesses, on-street parking in front of businesses, improving pedestrian safety, efficient vehicular movement along 100 Avenue through town, and slowing traffic along 100 Avenue. At the same time, respondents showed limited enthusiasm for the roundabout option.

The second public open house was held in April 2013 to present the improved roundabout option to the public. In addition to the open houses, landowners at the intersections impacted by right of way requirements were invited to participate in confidential discussions prior to the April 2013 open house.

Throughout the project, meetings were held with the Project Review Committee (PRC), which included a number of municipal, inter-municipal, local law enforcement, provincial and business stakeholders. The Functional Planning Study was also discussed in a series of stakeholder conversations held with at least thirty representatives of the business community and neighbouring residents in connection with the *Coeur de Morinville* Area Structure Plan. In addition, the two options were presented at a meeting of the Chamber of Commerce in October 2012. Generally, those consulted were supportive of the project and its goals. Concerns highlighted were similar to those expressed at the public open houses: safety along the corridor, on-street parking in front of businesses, and efficient traffic flow along the corridor. A range of responses, some positive, some negative, was also expressed regarding the possible selection of roundabouts as the preferred intersection treatment, where traffic control is needed.

An access management plan developed in conjunction with the study converts all other intersection and lane crossings to right in/out intersections with all directional movements provided only at roundabout intersections, and at the access to the Morinville Community High School and 87 Street. The plans also provide recommendations for management of local access to properties fronting 100 Avenue with the long term goal of appropriate access, while maintaining the integrity of the roadway. The access management plan should be considered in the approval of future development applications and removal and/or consolidation of existing accesses should be considered a long term goal that may require "grandfathering." The Town of Morinville and/or Alberta Transportation may wish to facilitate the process of access elimination and consolidation by working with developers/businesses to front end these activities with a mechanism to recover costs.

Drainage will need to be further addressed during preliminary design. Longitudinally, the corridor is very flat with substandard gradients that will require careful consideration and design effort to achieve an appropriate design. Most of the current drainage is provided by storm drains that cross the corridor at right angles. It is anticipated that during implementation the corridor will follow the existing drainage patterns.

There are several utilities that make use of the highway corridor, including potable water, storm sewer, sanitary sewer, cable television, telecommunications, residential gas service, and electrical power. Most of these utilities tend to cross the corridor, rather than run along it, although as part of the design, the possible utility relocations needed will have to be examined in further detail. As well, at the east end of the corridor there are three petroleum pipelines which cross the road right of way.

Estimated construction costs based on typical 2012 construction costs to implement the recommended plan, including complete overlay of the existing roadways is as follows:

Sections 1 and 2 – West of 107 Street to 99 Street	\$5.3M
Section 3 – 99 Street to East Boundary Road	<u>\$4.0M</u>
Total	\$9.3M

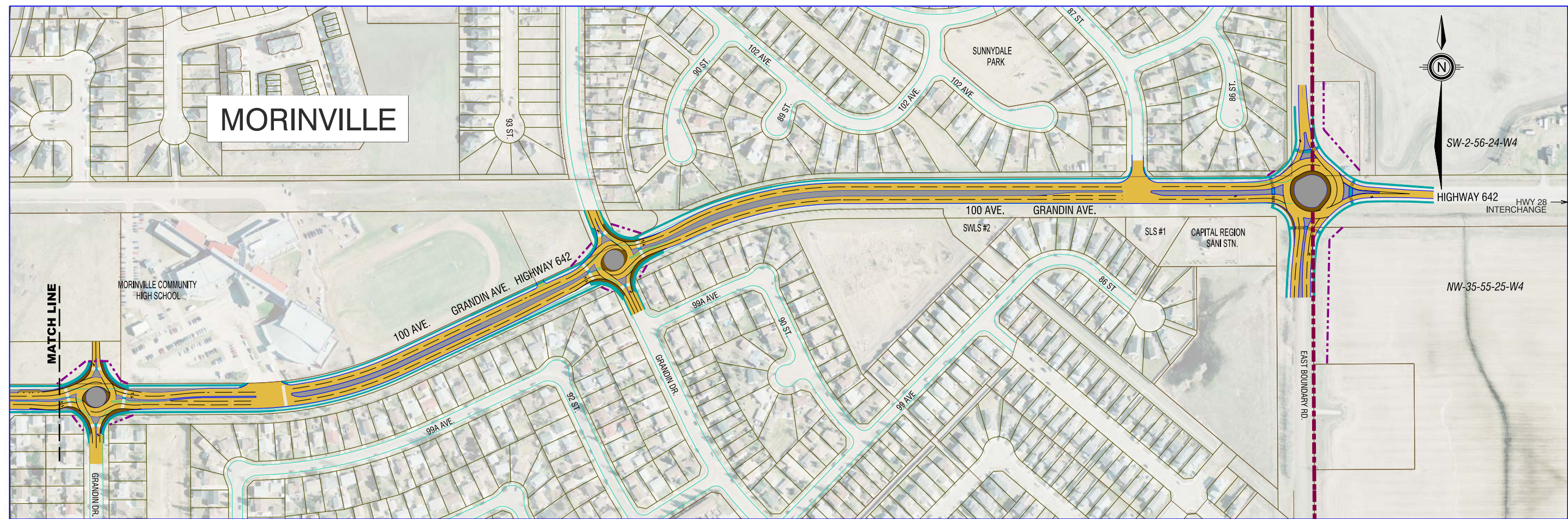
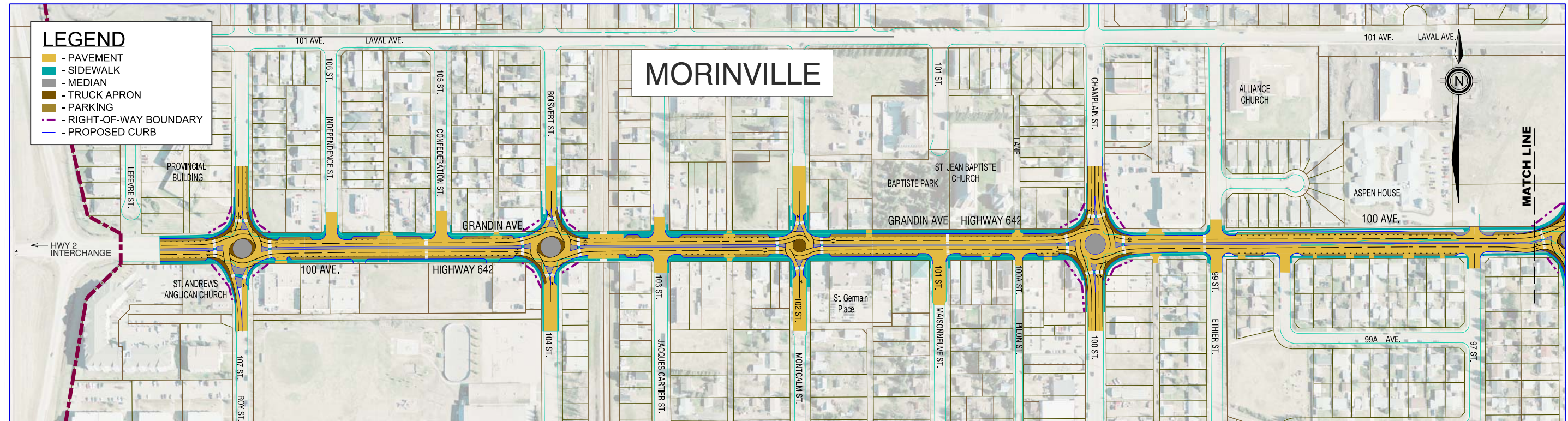
The estimate includes removal and replacement of sidewalk, curb and gutter for 100 Avenue west of the Highway 2 interchange to 99 Street, but assumes that sidewalk, curb and gutter east of 99 Street will not be removed and replaced. The cost estimate is based on standard construction and does not include streetscaping, landscaping, and urban design elements.

Right of way costs, including the purchase of impacted buildings, could reach \$7.0 M, but this could be tempered somewhat by land dedication through development or redevelopment of corner parcels. There may also be opportunity for design and location optimization at specific roundabout locations, but this work is beyond the scope of this study, and should be completed in conjunction with future planning or preliminary design.

Right of way costs, including the purchase of impacted buildings, for the conventional intersection option would likely be in the \$13.4 M range.

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EXHIBIT E.S.



1.0 Introduction

1.1 Study Area

The study area is Highway 642 within the town boundaries of Morinville. Within Morinville, the road is also known as 100 Avenue. Specifically, that covers the road between the Highway 2 overpass in the west and East Boundary Road (Range Road 252) in the east. As the road is presently a provincial highway, it is under the jurisdiction of the Province. The study area is noted in **Exhibit 1.1**.

Morinville is located approximately 35 km north of Edmonton and 20 km north of St Albert. Morinville is surrounded by Sturgeon County and is part of the Capital Region Board.

1.2 Project Background and Objectives

Morinville's Municipal Development Plan (MDP), identifies the need for a Functional Planning Study (FPS) for 100 Avenue to resolve existing access management, and development authority issues affecting timely development of available land along the corridor. The objectives of the Functional Planning Study are described on pages 36-37 of the MDP:

The functional planning study will discuss the access management plan, level of service and right-of-way requirements for the interim and ultimate stages of development in collaboration with Alberta Transportation. It is anticipated the functional plan would address the section of Highway 642 in Morinville as three distinct segments:

1. *Highway commercial from the Highway 2 overpass to the Canadian National Railway crossing.*
2. *The downtown mixed use (commercial, residential, professional) core from the Canadian National Railway crossing to the intersection of Highway 642 (100 Avenue) and 99 Street.*
3. *Major urban arterial from the Highway 642 (100 Avenue) and 99 Street intersection to the eastern boundary of the municipality.*

Specifically, the objectives for this study are:

- ◆ *Review roadway access management along the corridor with recommendations for ultimate access locations which satisfy safety and operational requirements and are acceptable to local stakeholders.*
- ◆ *Develop a long term functional plan based on required levels of service with recommendations for short and medium term improvements.*
- ◆ *Identify the right-of-way requirements for the ultimate plan and any interim stages.*
- ◆ *Identify urban design elements for the second segment of Highway 642 (Canadian National Railway to the Highway 642/100 Avenue and 99 Street intersection) as appropriate to foster the development of a vibrant pedestrian friendly, mixed-use downtown core to be incorporated into the right-of-way design.*

1.3 Integration with Coeur de Morinville Area Structure Plan

This Functional Planning Study forms the technical underpinnings of the *Coeur de Morinville Area Structure Plan (ASP)*. The ASP is a long-range policy document aimed at supporting redevelopment, intensification of land use, and beautification in the downtown and immediately adjacent neighbourhoods. The ASP study

area completely encompasses the project boundary of this Functional Planning Study. In doing so, the ASP will incorporate, to the extent possible, the recommendations of the Functional Plan into policy for implementation over time through the local planning and development decision-making processes. Additionally, the ASP is eligible to receive approval from the Minister of Transportation, which could streamline development approval processes for developments along 100 Avenue that are consistent with ASP policies. This is a significant prospect for increasing certainty for development in the downtown.

1.4 Realignment of Highway 642

In the early stages of this study, a cursory analysis was completed to determine the feasibility of an alternate alignment for Highway 642 in the vicinity of Morinville. The objective of this analysis was to determine if a more suitable or alternate east/west route was available to divert truck traffic from 100 Avenue away from downtown Morinville. A number of alternate routes were identified and evaluated, but through further discussions with Alberta Transportation and Town of Morinville staff, it was determined that the relatively low volume of truck traffic (1.0% of total traffic), did not warrant an alternate truck route. Further, with the proposed future development of East Boundary Road, and the proposed Cardiff Road / Highway 2 interchange, it is expected that East Boundary Road and Cardiff Road to Highway 2 will become the preferred truck route. Highway 37 south of Morinville and Highway 651 north of Morinville also provide alternate east/west routes connecting Highway 2 and Highway 28. Six alignment options considered for Highway 642 are illustrated and shown on Plan No. 7993-A1 included in **Appendix A**.

1.5 Horizon Years

The analysis was conducted assuming “full build-out.” This represents complete development of all lands within the current (2013) Town of Morinville boundary, based on current and projected plans. Morinville is expected to have a population of about 31,800 at full build out. At a current growth rate of approximately 2.0%, this population is expected to be reached in 70-75 years, which is consistent with Capital Region Board projected growth for the Town.

Analysis was also conducted for the “50% build-out” horizon - the half way mark between the existing conditions and “full build-out.” At current growth rates, this population is expected to be reached in 30-35 years, which is consistent with Municipal Development Plan projections for year 2044.

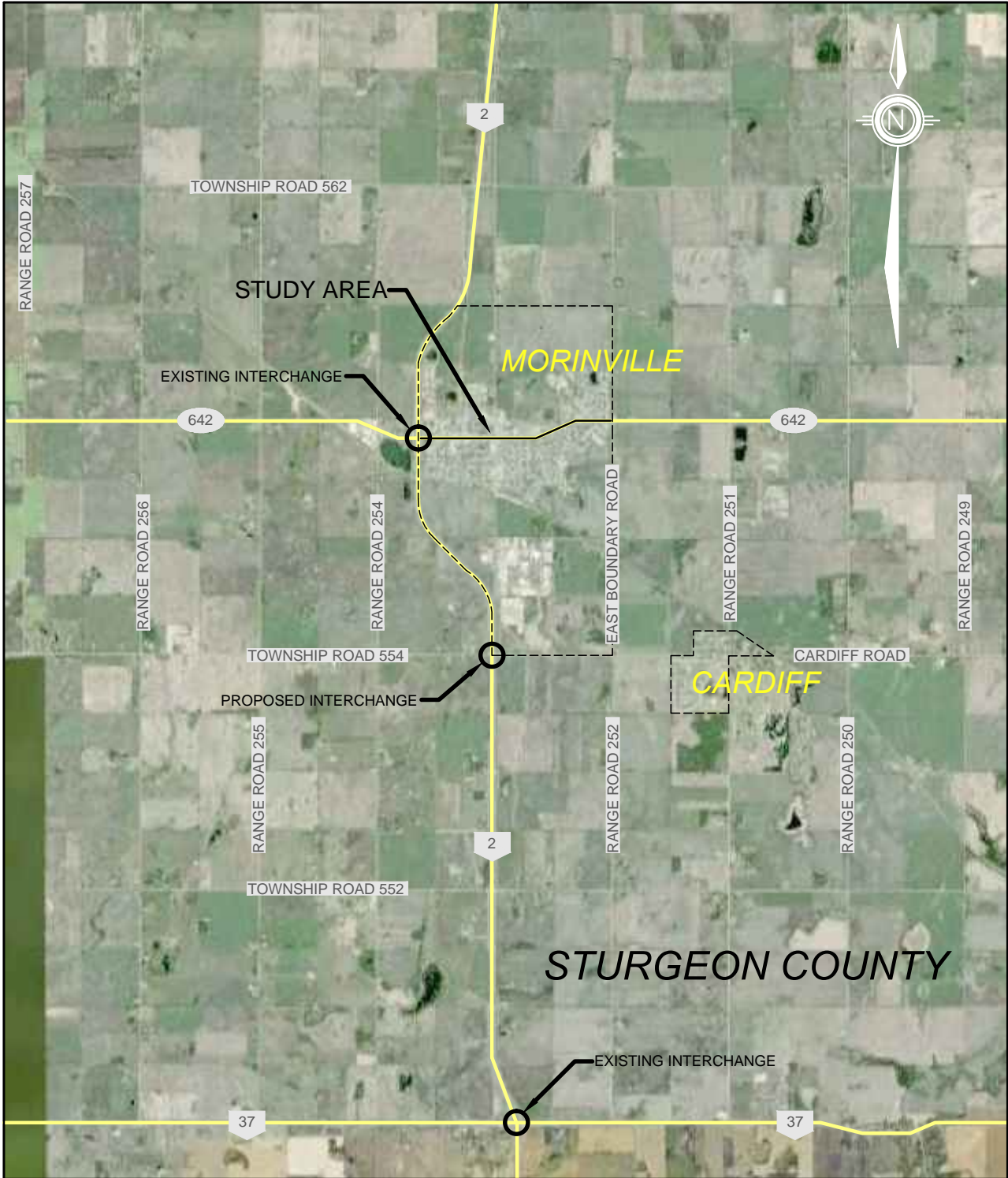


IMAGE © 2010 DIGITAL GLOBE, GOOGLE



TOWN OF MORINVILLE - HIGHWAY 642 (100 AVENUE)
FUNCTIONAL PLANNING STUDY

KEY MAP



NTS

DATE: APRIL 2013

2.0 Existing Conditions

2.1 Existing Road Geometry

From Highway 2 east to 99 Street the paved surface of 100 Avenue is 76 feet [23.2 m] wide with no median, providing two travel lanes in both directions plus parking on both sides. From 99 Street east to East Boundary Road the cross section is more typical of a modern urban arterial. This section currently has a four lane divided cross-section with left turn bays, as appropriate, and a wide median elsewhere.

Design / as-built plans for the 1978 reconstruction of Highway 642 (100 Avenue) for the section between 103 Street and East Boundary Road are included in **Appendix A**.

2.2 Existing Parking

Existing parallel parking is provided along both sides of the corridor from 107 Street to 100 Street. East of 100 Street, there is no on-street parking, except in front of the houses that front the south side of 100 Avenue between 99 Street and 97 Street. On-street parking is also available on many of the crossroads to 100 Avenue. Surface parking lots are also connected with many of the corridor businesses.

2.3 Existing Access Management

There are a high number of accesses along the corridor as it is currently configured. All side roads provide all directional access to and from 100 Avenue. There is no solid median between 107 Street and 98A Street and although there is a solid yellow line, U-turns in this section across this centre line to access parking on the opposite side of the street are reported anecdotally as a safety concern. Through this section, there are eleven accesses to 100 Avenue, or one every 90 m. From 98A Street to East Boundary Road there is a solid median down the centre of 100 Avenue, although there are only a few houses that directly front the road during this section, and there is an all-directional access (including a break in the median) for the Morinville Community High School and Morinville Community Cultural Centre.

2.4 Collision History

Collisions statistics were gathered from the Morinville RCMP in July 2012. This data covered non-injury collisions over the last two years and fatal and injury collisions over the last five years. Collisions along the corridor are a semi-regular occurrence with an average of slightly more than 2 collisions per month over the last two years. Collisions are clustered at intersections. Anecdotally, lack of pedestrian crossing is a particular concern at the intersections with 107 Street, 101 Street, 102 Street, and 99 Street. Also, it is very difficult to find a safe opening to turn left onto the corridor from the sideroads.

The five (5) year collision history is included in **Appendix D**.

2.5 Historical Resources

There are a number of historical resources that have been identified by the Town of Morinville. Where possible, this study has proceeded with an eye towards maintaining these properties. The buildings identified include:

- ◆ The northeast corner of 102 Street and 100 Avenue.
- ◆ The southwest corner of 102 Street and 100 Avenue.
- ◆ The St. Jean Baptiste Catholic Church and Rectory.

- ◆ The northwest corner of 100 Street and 100 Avenue.

2.6 Railway Crossing

There is an existing railway crossing between 104 Street and 103 Street. The track is owned by Canadian National Railways (CN Rail) and serves as an industrial spur that carries approximately two trains per week. It has been suggested that the Town of Morinville received notification from CN Rail that it intends to discontinue use of this track, and therefore, removal may be possible in the future. These aspects should be confirmed prior to preliminary design.

3.0 Land Use

3.1 Existing

The three segments of 100 Avenue analyzed in this Functional Planning Study are characterized by the adjacent existing land uses. The existing land use along the corridor can be broken into three smaller sections: from Highway 2 to the CN railway crossing (located between 104 Street and 103 Street), from the railway crossing to 99 Street, and from 99 Street to East Boundary Road.

3.1.1 Highway 2 Overpass to CN Railway

This segment is characterized by some highway commercial uses such as restaurants and a service station, and independent businesses such as a pub, wellness centre and dollar store. There are also three large, vacant parcels of land located in this segment of 100 Avenue. Buildings along this section are predominately single storey structures with parking in front of the building. We have assumed that downtown Morinville may extend west into and include this area in the long term. It is suggested that the Main Street character of 100 Avenue ultimately be extended west of the CN Rail to 107 Street.

3.1.2 CN Railway to 99 Street

This segment is recognized as Morinville's Main Street, offering a range of service providers including banking institutions, post office, law offices, a local municipal building, a fitness club, a personal care centre, the Chamber of Commerce, and media outlets, as well as retail establishments including a print shop, restaurants, a furniture store, a health food store, a coffee shop and a tea/gift house. There is one large vacant parcel on the northwest corner of 102 Street and 100 Avenue. Buildings along this segment are predominately single and two storey structures built to the front property line.

Boulevard sidewalks (± 3 m in width) and parallel parking lanes on each side exist along this section of 100 Avenue and provide a somewhat pedestrian friendly environment; however, the width of 100 Avenue promotes high vehicle speeds that negatively impact the pedestrian experience.

3.1.3 99 Street to East Boundary Road

The third section, from 99 Street to East Boundary Road, is typically residential. There are some houses that face onto the road, but for most of its length, the houses present back onto the corridor. Also in this section there is a high school and community cultural centre on the north side of the road.

3.2 Proposed

Proposed land use along the corridor is expected to follow the existing patterns. That said, denser and mixed use developments (combining residential and commercial uses) for the segment from 107 Street to 99 Street will be promoted by the ASP.

4.0 Transportation Assessment

4.1 Existing Traffic

Existing traffic was determined using traffic counts performed by Alberta Transportation and by the Town of Morinville. The counts by Alberta Transportation were conducted at Highway 2 and Highway 642 on Wednesday, October 8, 2008 and at Highway 642 (100 Avenue) and 100 Street on Tuesday, June 29, 2010. The counts by the Town of Morinville were conducted May 23 and 24, 2012, and are included in **Appendix C**.

Current (2011) Annual Average Daily Traffic (AADT) volumes were estimated at approximately 8000 vehicles per day. Truck volumes are relatively low along this section of highway, with approximately 2.0-2.5% of the traffic volume being Class D ("Single Unit Truck") and approximately 1.0% of the traffic volume being Class E ("Tractor Trailer Unit") at 100 Street.

4.2 2004 Transportation Master Plan

The *2004 Transportation Plan* was prepared by Alliant Engineering for the Town of Morinville. This model looked at the existing transportation network within Morinville in an effort to update the Transportation Plan for the Town. The report did not estimate turning movement volumes at intersections at full build-out and so an *In-House Full Build-Out Traffic Model* (detailed below) was created to provide these numbers. The modeling of developments within Morinville presented in the *2004 Transportation Plan* was used as the basis for the *In-House Model*.

4.3 In-House Full Build-Out Traffic Model

To support the functional plan, a traffic model of the corridor was created in Microsoft Excel and Trafficware Synchro. The background, assumptions, and some of the findings of this model are detailed in this section; the complete working paper is included in **Appendix C**.

4.3.1 Development Horizon

This model for Morinville is based on the complete build out of the current (2013) Town boundaries. This will represent a population of approximately 31,800. Based on historical data, this build out is expected to take approximately 70-75 years to complete.

4.3.2 Previous Work

This model builds on existing work. Most notable is the *2004 Transportation Plan* (detailed above). The traffic zones dividing Morinville have been maintained in this model and are detailed in **Exhibit 4.1**. As well, the trip projections from this earlier model have been used, although they have been updated to reflect the development and planning that has taken place since 2004.

4.3.3 Data Gathered

To generate the traffic model, additional data was gathered, specifically about existing traffic volumes and development that has taken place or been planned since 2004.

4.3.3.1 Traffic Counts

Turning movement counts were performed by the Town of Morinville for the intersections of 107 Street, 104 Street, 102 Street, and Grandin Drive (East Junction) with 100 Avenue. These counts were 6 hour counts, covering 6:00 – 9:00 am and 3:30 – 6:30 pm, and were conducted on Wednesday, May 23 and Thursday, May 24, 2012. These periods were chosen to cover the AM and PM peak hours.

These traffic movement counts were supplemented by counts for the intersections of Highway 2 and Highway 642 (Highway 2 and 100 Avenue), Highway 642 (100 Avenue) and 100 Street in Morinville, and Highway 2 and Cardiff Road. These counts were originally completed for Alberta Transportation (AT) in 2008 and 2010 and have been projected forward to 2011 volumes based on Automated Traffic Recorders (ATR) nearby.

These two data sets were used to generate a model for existing traffic along the 100 Avenue corridor. For the AM peak hour, the AT counts were found to about 25% higher than the counts performed by the Town. To balance the corridor, the AT volumes were lowered to match the nearby Town counts, and then all volumes along the corridor were increased by 10%. For the PM peak hour, the volumes from the two sources could be balanced 'normally.'

4.3.3.2 Post-2004 Development

The years since the 2004 Transportation Plan have seen significant growth in Morinville; the population of the town has increased by 2,000, or 31%, since 2001. Several zone development percentages were updated. As well, the population targets for several zones were updated based on adopted Area Structure Plans (ASPs). An average of 2.86 people per household was assumed, based on the most recent census (2011).

The values updated, in particular, were:

- ◆ Zone 5 is assumed to have 1,102 households at full build-out.
- ◆ Zone 11 is assumed to have 461 households at full build-out.
- ◆ Zone 12 is assumed to have 1,204 households at full build-out.
- ◆ Zone 14 is assumed to have no residential development.
- ◆ Zone 19 is assumed to have 1,368 households at full-build-out.
- ◆ Zone 11 is assumed not to have a school.
- ◆ Zone 4 is assumed to be 66% built-out in regards to residential trips in 2013.
- ◆ Zone 5 is assumed to be 65% built-out in 2013.
- ◆ Zone 6 is assumed to be 100% built-out in regards to residential trips in 2013.
- ◆ Zones 14 and 15 are assumed to be 33% built-out in 2013.
- ◆ Zone 16 is assumed to be fully built-out in 2013.
- ◆ Zone 19 is assumed to be 33% built-out in regards to residential and 'other' trips in 2013.

Zone boundaries are detailed in **Exhibit 4.1**.

With the updated number of households, the population of Morinville at full build-out is assumed to be about 31,800.

The model does not predict the order of development of zones and its primary purpose was for traffic generation and distribution at build-out of Morinville. An interim horizon of 30-35 years, which corresponds to approximately 50% build-out of the Town was considered reasonable.

4.3.4 Traffic Generation

Traffic generation rates were based on a number of sources. The *2004 Transportation Plan* provides for daily traffic generation rates of five groups of traffic generators – residential, schools, commercial, industrial, and other. Except for residential and other, these volumes were converted to peak hour volumes by comparing Institute of Transportation Engineer’s (ITE’s) daily generation rates to peak hour generation rates, and thus determining a “k factor” (k factor is the proportion of daily traffic represented by the peak hour volumes). The proportion of entering versus exiting traffic was also based on the ITE Land Use code data. The ITE land use codes used in this conversion were:

- ◆ School – ITE Land Use Code 520: Elementary School.
- ◆ Commercial – ITE Land Use Code 820: Shopping Center.
- ◆ Industrial – ITE Land Use Code 110: General Light Industrial.

For ‘other’ traffic, a k value of 0.10 was assumed with 50% of traffic entering in both AM and PM peak hours.

For residential traffic, traffic generation rates were based on the traffic counts conducted at 107 Street, 104 Street, and Grandin Drive (East Junction) and the number of houses assumed to exit through these roads. **Table 4.1** details the observed traffic generation rates. Traffic generation rates of 1.02 trips/house with 42% entering was used for the AM Peak Hour and 0.90 trips/house with 54% entering for the PM Peak Hour. The ITE average traffic generation rates for Single Family Housing (Land Use Code 210) are also detailed in **Table 4.1**. ITE rates were lower during the AM peak and higher during the PM peak than the traffic generation numbers used.

Table 4.1 – Measured Residential Traffic Generation Rates

	Houses	AM				PM			
		Trips In	Trips Out	Gen. Rate	% Entering	Trips In	Trips Out	Gen. Rate	% Entering
South on 107 Street and 104 Street	228	108	182	1.27	37%	131	164	1.29	44%
North on Grandin Drive E	370	120	228	0.94	34%	131	96	0.61	58%
South on Grandin Drive E	350	178	154	0.95	54%	166	110	0.79	60%
Rates Used				1.02	42%			0.90	54%
ITE Average Rate				0.75	25%			1.01	63%

Traffic generation rates were only applied to future development; future traffic volumes are the combination of existing traffic volumes plus the volumes from projected future development.

4.3.5 Traffic Distribution

Traffic distribution was calculated on a percentage basis from each zone for additional traffic generated. Overall, the traffic pattern was designed to approximate the existing traffic split. Overall, across all exits from Morinville:

- ◆ 13% of traffic is assumed internal to the zone.
- ◆ 13% of traffic is assumed to exit to the north.
- ◆ 9% of traffic is assumed to exit to the east.
- ◆ 57% of traffic is assumed to exit to the south.
- ◆ 8% of traffic is assumed to exit to the west.

The specific distribution from each zone to each exit vector is included in **Appendix C**.

For the traffic from each zone accessing 100 Avenue, the split among crossroads is included in **Appendix C**. Note that this only covers traffic that is routed via 100 Avenue. Traffic exiting from Morinville is summarized in **Exhibit 4.2** by exit.

4.3.6 Mode Choice

All trips were assumed to be made in private automobile. At the present time, there is no known city bus, rail transport, or other regional public transit available in Morinville, and none are forecasted to be implemented on a known timeline. The Capital Region Plan actually identifies Morinville for receiving future inter-municipal transit service, but no further planning in that regard has been completed. No adjustments have been made for car passenger rates as all traffic generation rates used are in the number of vehicle trips generated (rather than in passengers generated).

If the downtown is densified and an emphasis is placed on pedestrians, it is possible that pedestrian trips would increase while decreasing automotive trips. However, no basis for forecasting this effect is available, and so it has not been included in the model.

4.3.7 Route Assignment

Based on the distribution and the split among crossroads noted included in **Appendix C**, trips were assigned from the zones in Morinville to outside of Morinville. These numbers are totaled and form the basis of the traffic model.

4.3.8 Additional Corridor Traffic

Highway 642 is 100 Avenue through Morinville continuing to the east to Highway 28, and to the west to Highway 44 and beyond. Recognizing that some traffic on 100 Avenue is highway corridor through traffic, this volume was calculated and included in the model. Based on the assumed existing corridor through traffic volumes of 1500 vehicles/day (based on traffic counts at Highways 28 and Highway 642, and Highways 44 and Highway 642), these volumes are grown at 2.5% per year (linear growth) for 70 years, assumed to have a k factor of 0.10, and to be evenly split between the two directions. This results in an additional 131 vehicles per hour per direction along the length of the corridor through Morinville.

Exhibits 4.3, 4.4, and 4.5 illustrate existing traffic, projected 50% build out traffic (30 – 35 year horizon), and projected 100% build out traffic (70 – 75 year horizon), respectively for 100 Avenue through Morinville. These volumes were applied to complete further traffic analysis for the respective traffic analysis.

4.4 Traffic Analysis

Operations of the 100 Avenue corridor were evaluated for existing and future horizons using Synchro/Sim (V.8) Traffic Software. The software is based on the Highway Capacity Model procedure included in the Highway Capacity Manual (HCM) 2010 for at-grade intersections. The methodology determines the Level of Service (LOS) for a variety of transportation facilities including at-grade intersections.

The LOS criteria for intersections is based on an average delay that vehicles experience at the intersection and is presented in sections of delay per vehicle (s/veh). The delays are calculated for particular movements and overall for the entire intersection. The LOS is represented with letters A through F, for which LOS A indicates a very good operation and LOS F indicates failure. The LOS criteria vary for signalized and unsignalized intersections are described in **Table 4.2** below.

Table 4.2 Level of Service Criteria for Intersections

Level of Service	Average Control Delay (s/veh)		Operation
	Signalized Intersection	Unsignalized Intersection	
A	10.0 or less	10.0 or less	Very good operation
B	10.1 to 20.0	10.1 to 15.0	Good operation
C	20.1 to 35.0	15.1 to 25.0	Acceptable operation
D	35.1 to 55.0	25.1 to 35.0	Congestion
E	55.1 to 80.0	35.1 to 50.0	Significant congestion
F	More than 80.0	More than 50.0	Unacceptable operation

Additionally, the volume to capacity (v/c) ratio is also considered for all the intersection movements. Technically, the v/c ratio cannot be greater than 1.00 for any movement for the intersection to function properly. In order to provide acceptable operations at the intersections, the v/c ratio should be as low as possible. The HCM also determines queue lengths at the intersections, which are used to determine requirements for turning lanes. The estimated queues indicate if accesses adjacent to the analyzed intersection are blocked.

Considering communities similar in size to Morinville, an appropriate target Level of Service is D, before improvements are implemented at intersections. However, complaints from the community could be expected much sooner due to the current relatively low traffic volumes and the inherent current high Level of Service.

4.5 Existing Traffic Operations

Existing intersections along the 100 Avenue corridor are two-way stop controlled with two exceptions:

- ◆ Signalized intersection at 100 Street and 100 Avenue
- ◆ Four-way stop controlled at 100 Avenue and Grandin Drive East

Analysis of the AM and PM peak hours indicate intersections performing at LOS A and B, with two instances of LOS C for some minor left turn movements. Overall, 100 Avenue presently performs well from a vehicular traffic perspective.

Synchro Reports are included in **Appendix C**.

4.6 Future Traffic Operations at 50% Build Out

The 50% build out traffic was modeled with Synchro assuming the existing road network.

Table 4.3 below is the Level of Service (LOS) summary at 100 Avenue intersections modeled with traffic at 50% Morinville Build Out (30 to 35 Year Horizon) assuming the existing road network.

Table 4.3 Level of Service Summary at 100 Avenue Intersections

100 Avenue Intersection	LOS during AM (PM) Peak					Notes
	EB	WB	NB	SB	Intersection	
107 Street	A(A)	A(A)	F(F)	F(F)	D(E)	Intersection warrants control change (improvement) earlier than 50% Morinville Build Out Level – estimated 5-10 years
106 Street	A(A)	A(A)		D(D)	A(A)	
105 Street	A(A)	A(A)		D(F)	A(A)	
104 Street	A(A)	A(A)	E(F)	D(F)	A(A)	Intersection warrants control change (improvement) earlier than 50% Morinville Build Out Level – estimated 10-15 years
103 Street	A(A)	A(A)	D(F)	D(D)	A(A)	
102 Street	A(A)	A(A)	E(F)	D(F)	A(A)	Intersection warrants control change (improvement) earlier than 50% Morinville Build Out Level – estimated 10-15 years
101 Street	A(A)	A(A)	C(D)		A(A)	
100 Street (Signals)	B(C)	B(C)	B(C)	B(A)	B(C)	
99 Street	A(A)	A(A)	C(E)	B(B)	A(A)	
Grandin Drive West	A(A)	A(A)	C(C)	C(D)	A(A)	Intersection may warrant control improvement earlier at proposed commercial (north) – to be reviewed with Development Application
Morinville High School Access	A(A)	A(A)		C(B)	A(A)	
Grandin Drive East (4-Way Stop)	C(B)	D(B)	C(B)	C(B)	C(B)	Intersection may warrant control change earlier
87 Street	A(A)	A(A)		B(B)	A(A)	
East Boundary Road	A(A)	A(A)	D(C)	E(C)	B(B)	Assumed East Boundary Road Improved, Intersection may warrant control change

Analyses indicate that the intersection at 107 Street fails, and that some other intersections delay increases causing some minor movements to perform at LOS D to F.

During the AM peak, assuming no geometric improvements, 95th percentile queues may be a concern for the southbound off ramp from Highway 2, north and southbound traffic on 107 Street, and northbound traffic on 100 Street. Storage bays for east and westbound left turning traffic at 100 Street are also shorter than the projected 95th percentile queue lengths. Delays for crossroad traffic trying to access 100 Avenue are a concern for traffic from both north and southbound Highway 2 off ramps, north and southbound traffic on 107 Street, 104 Street northbound traffic at Grandin Drive (east junction), and north and southbound traffic on East Boundary Road.

During the PM peak, assuming no geometric improvements 95th percentile queues become a concern for southbound traffic on 107 Street and northbound traffic on 100 Street. Storage bays for east and westbound left turning traffic at 100 Street are also shorter than the 95th percentile queue lengths. Delays for crossroad traffic trying to access 100 Avenue are a concern for traffic from both north and southbound Highway 2 off ramps, north and southbound traffic on 107 Street, southbound traffic on 105 Street, north and southbound traffic on 104 Street, northbound traffic on 102 Street, and northbound traffic at Grandin Drive (east junction). Where queue lengths are a concern, providing additional storage length should be considered.

It is assumed that improvements on 100 Avenue would be implemented prior to 50% build out of Morinville, as the current road infrastructure would be beyond its estimated life cycle.

Accordingly, traffic was modeled along the 100 Avenue corridor for both the roundabout option and the conventional intersection option. As would be expected, both road options provide reasonable Level of Service, but in general, the roundabout option provides superior operations at intersections.

Level of Service of 100 Avenue intersections modeled with two lane roundabout control for 100 Avenue indicates LOS A and B at all approaches at intersections except the 100 Street intersection. At 100 Street roundabout LOS C is experienced by SB traffic during AM peak and by NB traffic during PM Peak. Overall Level of Service is good; queues are short, ranging from 1 to no more than 4 vehicles.

Synchro Reports for the roundabout option at 50% build-out of Morinville, based on two-lane roundabouts are included in **Appendix C**, as these represent the recommended option

4.7 Future Traffic Operations at Full Build Out

It is assumed that roundabouts implemented at 50% Build Out will still operate at the time of Morinville full build out. The intersections at 107 Street, 104 Street, 102 Street, 100 Street, Grandin Drive W and E and East Boundary Road were analyzed using estimated Full Build Out traffic volumes.

Synchro analyses indicate LOS ranging from A to C for all roundabouts except for 100 Street roundabout.

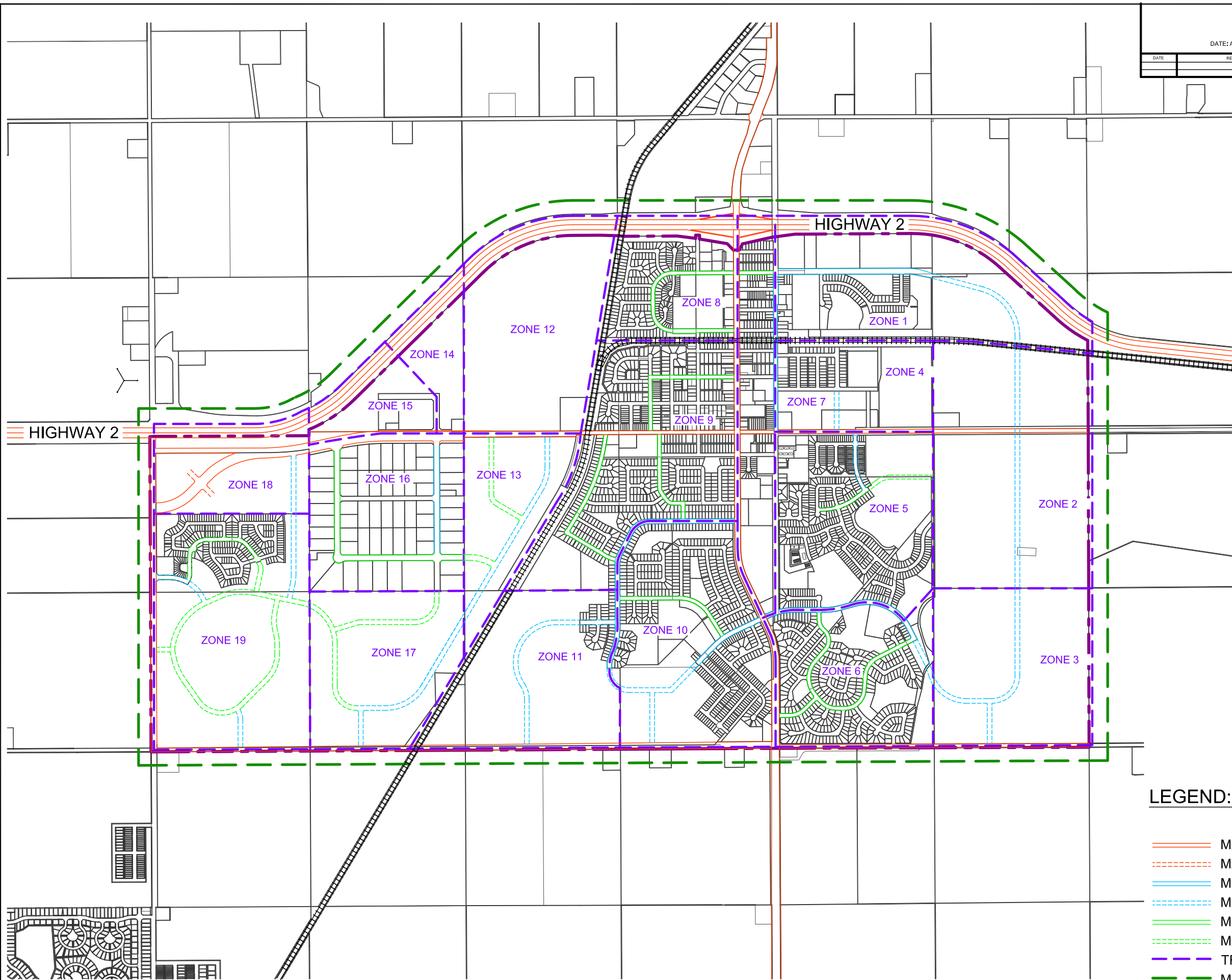
100 Avenue and 100 Street roundabout indicates LOS E in WB direction during AM Peak and LOS F in NB direction during PM Peak.

Reports of Synchro analyses are included in **Appendix C**.

Traffic was also modeled assuming signal control at the above noted intersections. In general, operations of all signalized intersections are inferior to the roundabout options. LOS ranges from LOS A to E for specific movements. Similar to 100 Street roundabout control, signalized intersection at that location also indicates less than acceptable operations. Under conventional intersection control it was assumed that intersection would be widened to accommodate double left turn lanes in addition to 2 through lanes and a right turn lane in WB and EB direction and 3 lanes NB and SB including left, through and right turn each. The intersection would require significant amount of widening to assure no path overlap for left turning vehicles, hence significant impact on adjacent properties.

The inherent uncertainty and difficulty of predicting traffic volumes for the 70-75 year horizon, and the uncertainty of how travel in this distant future will be accomplished, suggests that planning of further road infrastructure improvements at 100 Street and 100 Avenue may not be prudent at this time. As noted, our current traffic prediction model assumes vehicular traffic as the primary mode of travel. It is reasonable to assume that transit service will be available as the population of Morinville increases, accordingly, the traffic projections could be considered conservative and may not occur. In addition, alternate routes of travel may become available in the future that would result in lower volumes than currently predicted.

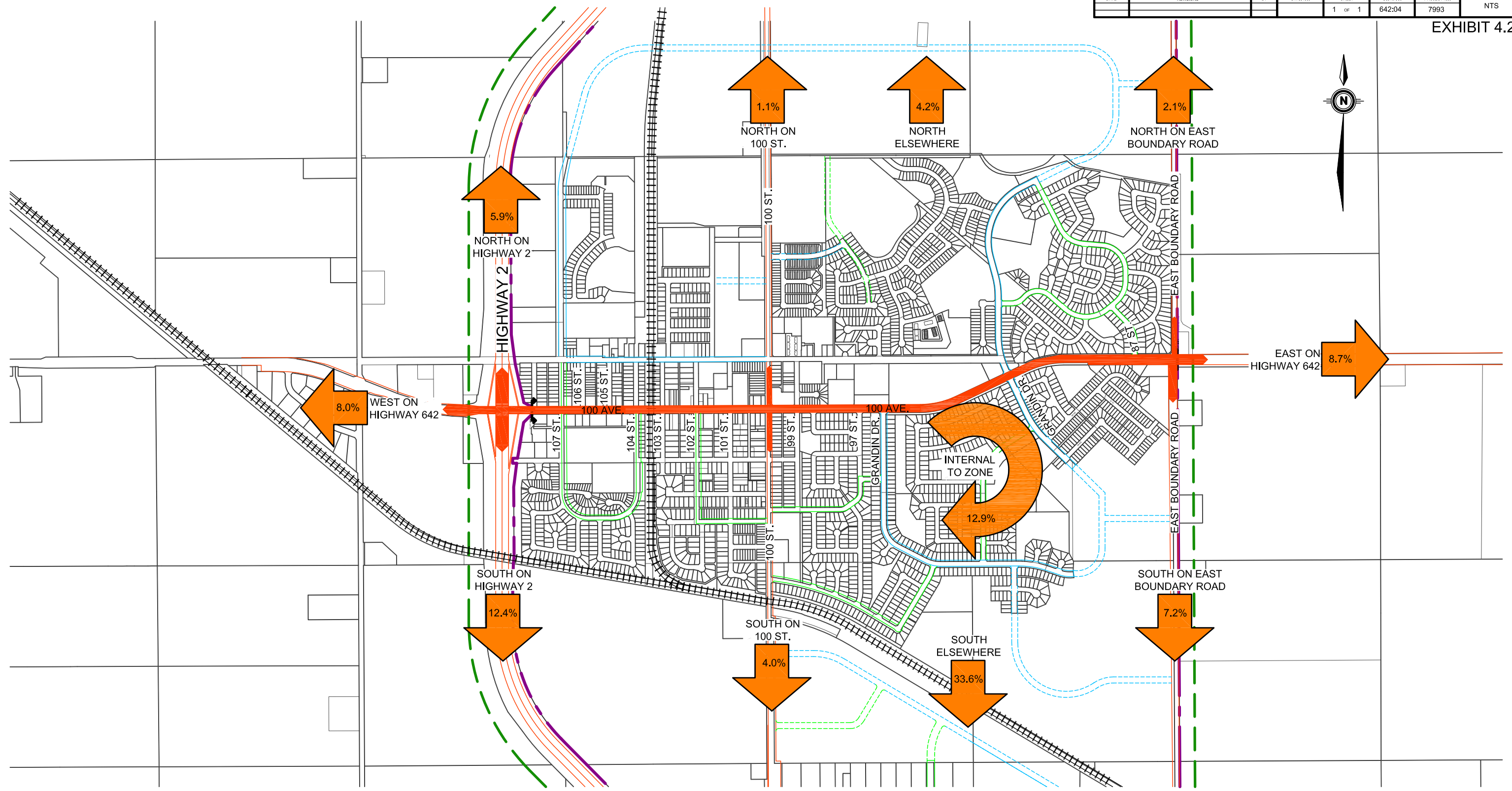
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LEGEND:

- MAJOR ARTERIALS - EXISTING
- - - MAJOR ARTERIALS - FUTURE
- MINOR ARTERIALS / MAJOR COLLECTORS - EXISTING
- - - MINOR ARTERIALS / MAJOR COLLECTORS - FUTURE
- MINOR COLLECTORS - EXISTING
- - - MINOR COLLECTORS - FUTURE
- - - TRAFFIC ZONE BORDER
- - - MORINVILLE TOWN LIMITS

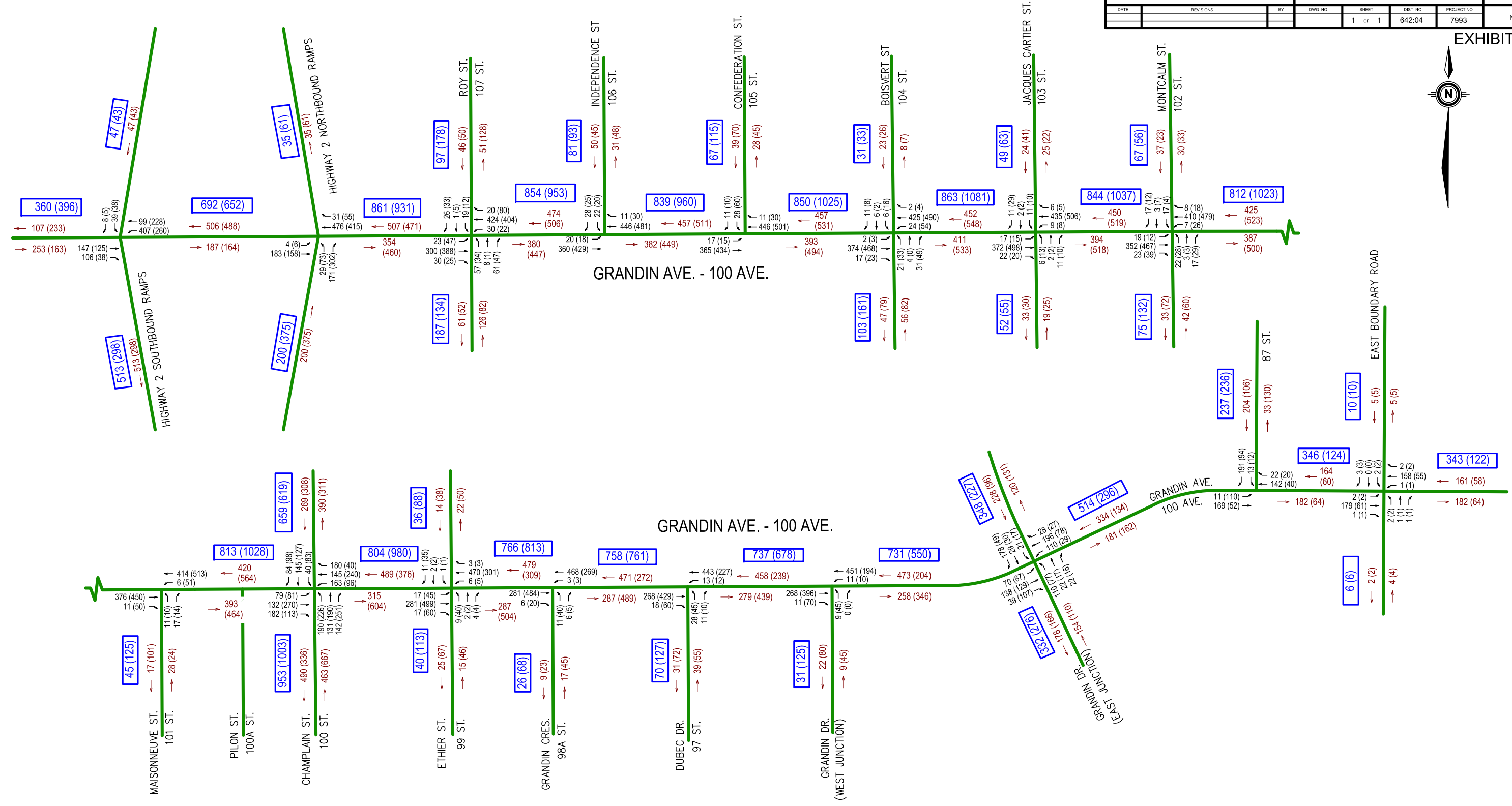
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LEGEND:

- MAJOR ARTERIALS - EXISTING
- - - MAJOR ARTERIALS - FUTURE
- MINOR ARTERIALS / MAJOR COLLECTORS - EXISTING
- - - MINOR ARTERIALS / MAJOR COLLECTORS - FUTURE
- MINOR COLLECTORS - EXISTING
- - - MINOR COLLECTORS - FUTURE
- - - MORINVILLE TOWN LIMITS
- PERCENTAGE OF TRAFFIC USING EXIT ROUTE

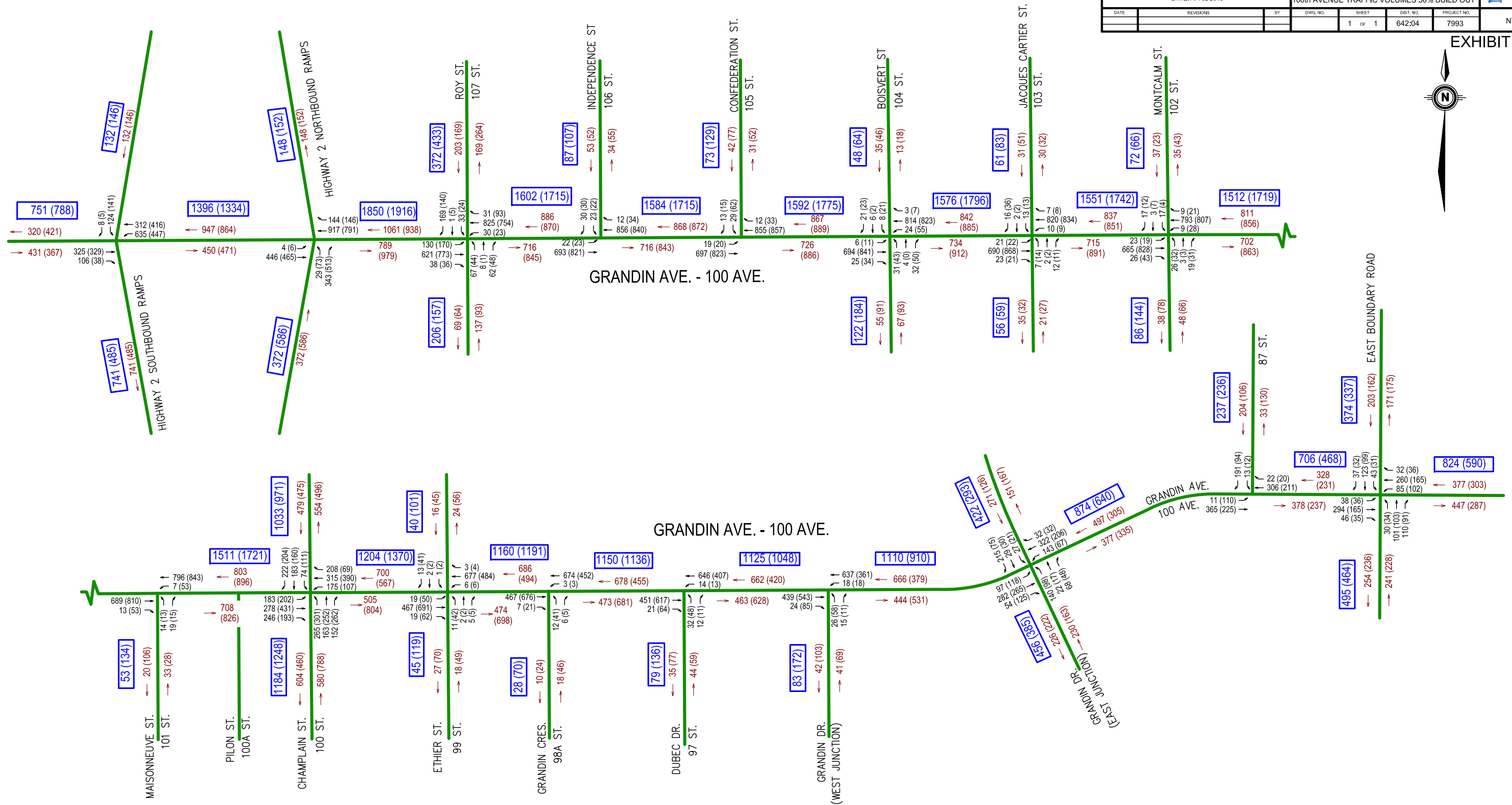
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LEGEND:

PEAK HOUR TURNING VOLUME - AM(vph) (PM(vph)) -	106 (38)
PEAK HOUR DIRECTIONAL TURNING VOLUME - AM(vph) (PM(vph)) -	457 (531)
TOTAL (BOTH DIRECTIONS) VOLUME - AM(vph) (PM(vph)) -	850 (1025)

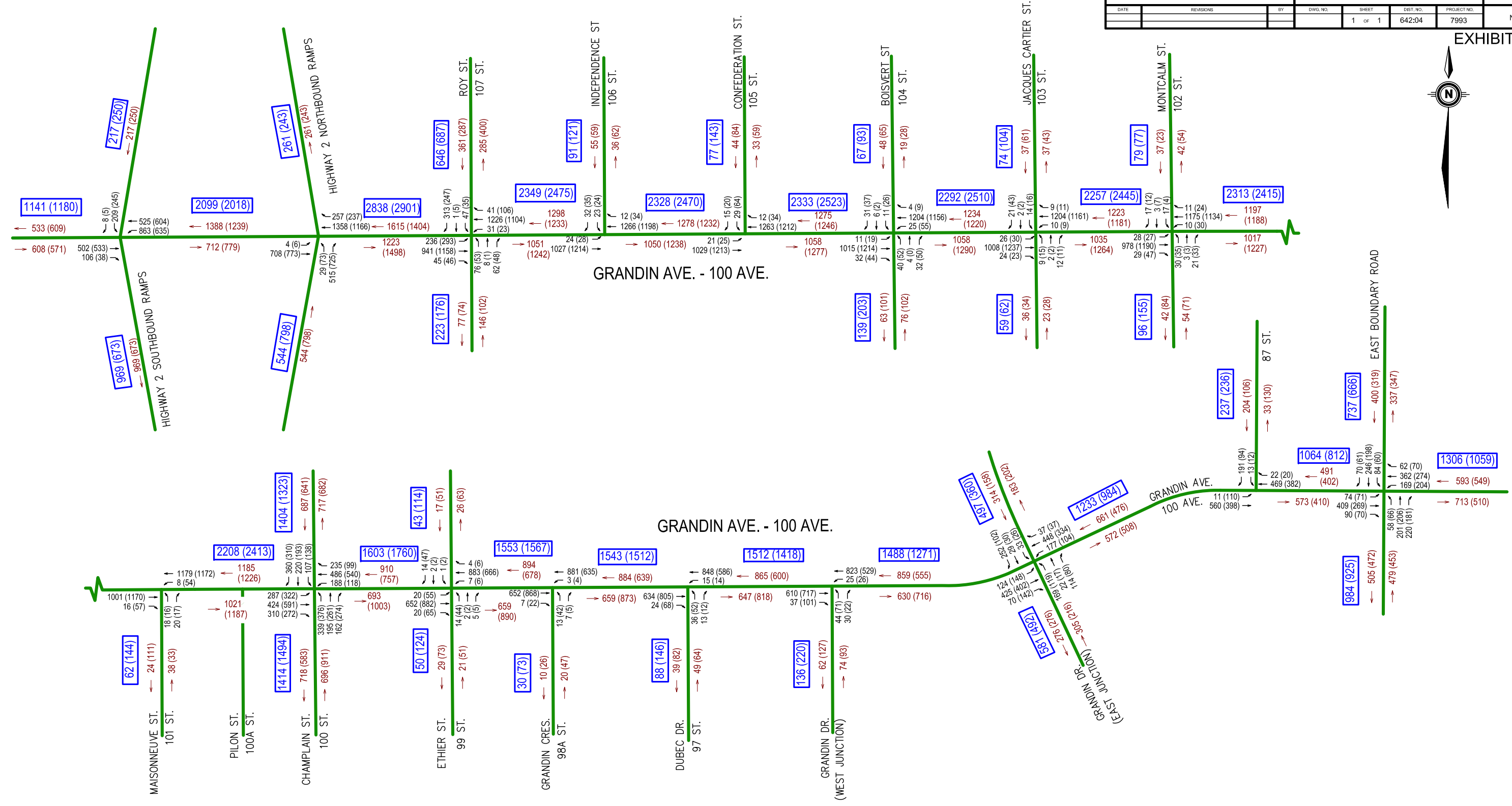
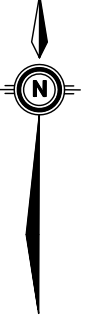
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LEGEND:

- PEAK HOUR TURNING VOLUME - AM(vph) (PM(vph)) - 106 (38)
- PEAK HOUR DIRECTIONAL TURNING VOLUME - AM(vph) (PM(vph)) - 457 (531)
- TOTAL (BOTH DIRECTIONS) VOLUME - AM(vph) (PM(vph)) - **850 (1025)**

DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
				1 OF 1	642:04	7993



LEGEND:

PEAK HOUR TURNING VOLUME - AM(vph) (PM(vph)) -	106 (38)
PEAK HOUR DIRECTIONAL TURNING VOLUME - AM(vph) (PM(vph)) -	457 (531)
TOTAL (BOTH DIRECTIONS) VOLUME - AM(vph) (PM(vph)) -	850 (1025)

5.0 Design Criteria and Roadway Standards

Highway 642 through the Town of Morinville is a four lane urban arterial roadway. From the west town boundary to 97 Street (Grandin Drive) the existing road is undivided. In the area of a few blocks west and east of 100 Street, the pavement markings identify the turning lanes at intersections and development access. East of 97 Street to East Boundary Road the roadway has a divided cross-section with an approximately 5 m wide median, which accommodate left turn lanes at intersections.

Considering the character of 100 Avenue as a highly walkable area with commercial, office, parks, schools, churches, and retirement communities nearby it is proposed to use a 60 km/h design speed for the roadway, which would be posted as 50 km/h to provide safety and security for all road users.

In the west undivided portion of the roadway there are numerous public and private accesses. Considering the arterial classification of the roadway it would be preferable to provide access only via public intersections, for the long term plan.

5.1 Other Major Roads

Highway 2, a provincial primary highway designated as freeway, is located west of the study limit and provides major access to the Town via Highway 642.

100 Street is a major north/south roadway that intersects Highway 642. 100 Street has a four lane undivided urban cross-section in the Town centre with a posted speed of 50 km/h.

East Boundary Road, at the east limit of this study, is at present a two-lane gravel roadway, but is expected to be improved to a four lane divided cross-section in the future. The design speed of East Boundary Road and Highway 642 east of the Town boundary is 90 km/h, corresponding to 80 km/h posted speed.

5.2 Design Vehicle

As part of the provincial highway network Highway 642 is a truck route through the Town of Morinville, and is designed to carry all trucks that can travel Alberta highways without a special permit. The largest of these is generally considered to be the WB-21 (tractor with single trailer) and WB-23 (tractor with double trailer). For the purpose of this project, the WB-21 design vehicle would be used to design intersections within the Town of Morinville boundary as it exhibits off-tracking characteristics. Design vehicles, including emergency services (typical fire truck) are shown on **Exhibit 5.1**.

5.3 Design Criteria Standards

All geometrical designs are based on the Transportation Association of Canada (TAC) Geometric Design Guideline for Canadian Roads (1999), which provides design parameters of all roadway design such as minimum desired values of horizontal, vertical, and cross-section features. In addition, sight distances such as stopping, intersectional, and decision should be provided. The designs are based on the roadway design speed and are applicable to conventional and roundabout designs.

5.3.1 Roundabout Design Parameters

Roundabout designs are fairly new on Canadian roadways and there are no Canadian guidelines for roundabout designs at this time. Designs occurring in Canada adopt American guidelines included in NCHRP Report 672: Roundabouts: An Informational Guide, 2nd Edition.

The Design Criteria for roundabouts along 100 Avenue include:

- ◆ Roundabout design speed (circulating): 40 km/h;
- ◆ Roundabout has to conform to consistency checks for entry, exit, and circulating speeds – fastest path check;
- ◆ Entry angle between 2.5 and 53 degrees for single lane and 12 to 34 degrees at multilane roundabout.
- ◆ Stopping sight distance maintained at corners, at approaches, and at pedestrian crossings.
- ◆ Roundabout Roadway width to accommodate cars and busses, apron at central island and at right turn to accommodate Single Unit (SU) trucks, fire truck, and WB-21/WB-23.

During the preliminary stage of roundabout design the design criteria should be refined to assure safety and appropriate operations of all users.

Exhibit 5.2 illustrates typical AutoTurn off tracking simulation for the 107 Street / 100 Avenue roundabout, and shows the vehicle wheel paths for various right and left turn maneuvers at this roundabout that would be typical for all roundabouts, except at 102 Street.

5.4 Typical Cross-Sections

A variety of options were considered during the evaluation stage of the project and included the traditional approach to arterial design with signalized intersection and roundabouts. Cross-section options were developed that included a raised or painted median and a continuous turning lane. The effort was made to assure adequate traffic operations along the corridor, while parking was provided in the Town centre as well as wide public sidewalks to promote walkability. The options of typical cross-sections are included in **Appendix B**.

Recommended 100 Avenue (Highway 642) typical cross-sections for the roundabout option are illustrated on **Exhibits 5.3 and 5.4**.

There are four distinct cross-sections through the project area.

The typical cross-section between 107 Street to 100 Street is illustrated on **Exhibit 5.3** as cross-section A-A.

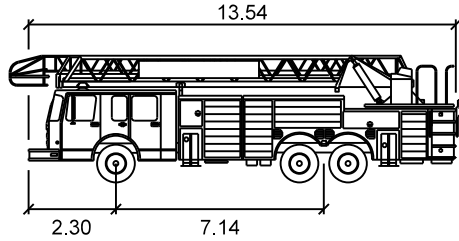
The cross-sections will generally include buildings built out to property lines on both sides, sidewalks next to the property lines, two general purpose travel lanes in each direction, limited parking lanes, and a raised median. The sidewalk will vary in width, but is generally 4.1 m wide, including curb and gutter (variable gutter width through the study). Travel lanes are 3.5 m wide each and remaining width of 3.0 m each direction will be used as parking. The concrete slab median is typically 1.5 m wide with 0.25 m wide offsets on each side. It is assumed that during project implementation, existing curb and gutter, and sidewalk will be replaced.

Cross-section B-B illustrates the road section between 100 Street and 99 Street. There are two travel lanes in each direction with a 2 m wide median (1.5 m slab on and 0.25 m offsets on both sides) with no parking provided at this location. Proposed travel lane width is 3.5m. Remaining right of way will be utilized as a public roam with wide walk and boulevard.

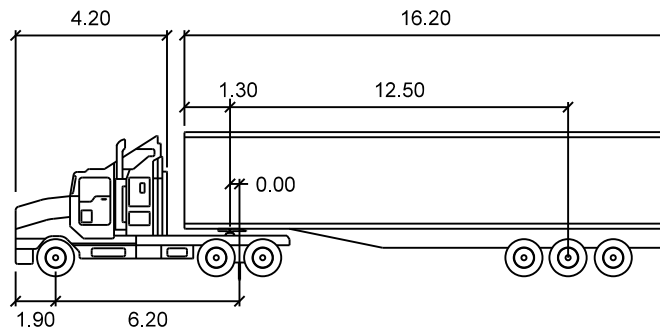
Between 99 Street and 97 Street the existing roadway would have a cross-section similar to cross-section A-A and will include two travel lanes in each direction, a 2 m median, and parking lanes on both sides. The cross-section will utilize existing curb and gutter, where possible.

East of Grandin Drive West, the existing lanes and 5.0m median will be maintained, so the 2 m wide median east of the roundabout will tie-in to the existing left turn median at the Morinville High School access. Typical cross-section C-C is illustrated on **Exhibit 5.4**. To the east, the existing lanes and 5.0 m median will be maintained, which is illustrated on cross-section D-D of the same exhibit.

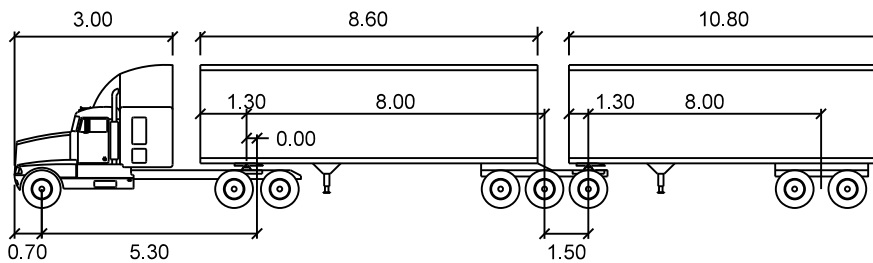
ROUNDBABOUT DESIGN VEHICLES



FIRE TRUCK in meters
 Total Length : 14.0
 Width : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 33.1



WB21 meters
 Total Length : 23.0
 Tractor/Trailer Width : 2.60
 Tractor Track : 2.60
 Trailer Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 26.6
 Articulating Angle : 70.0



WB23 meters
 Total Length : 25.0
 Tractor/Trailer Width : 2.60
 Tractor Track : 2.60
 Trailer Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 28.6
 Articulating Angle : 70.0



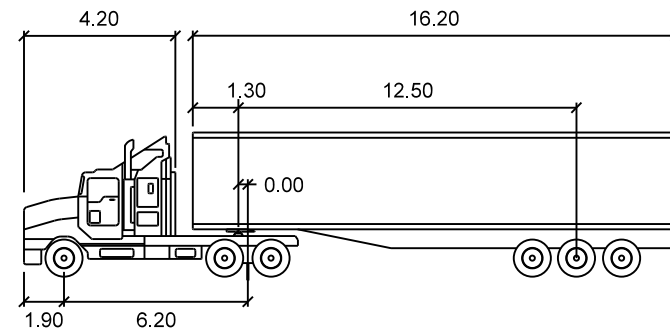
TOWN OF MORINVILLE - HIGHWAY 642 (100 AVENUE)
 FUNCTIONAL PLANNING STUDY

DESIGN VEHICLES

NTS.

DATE: APRIL 2013

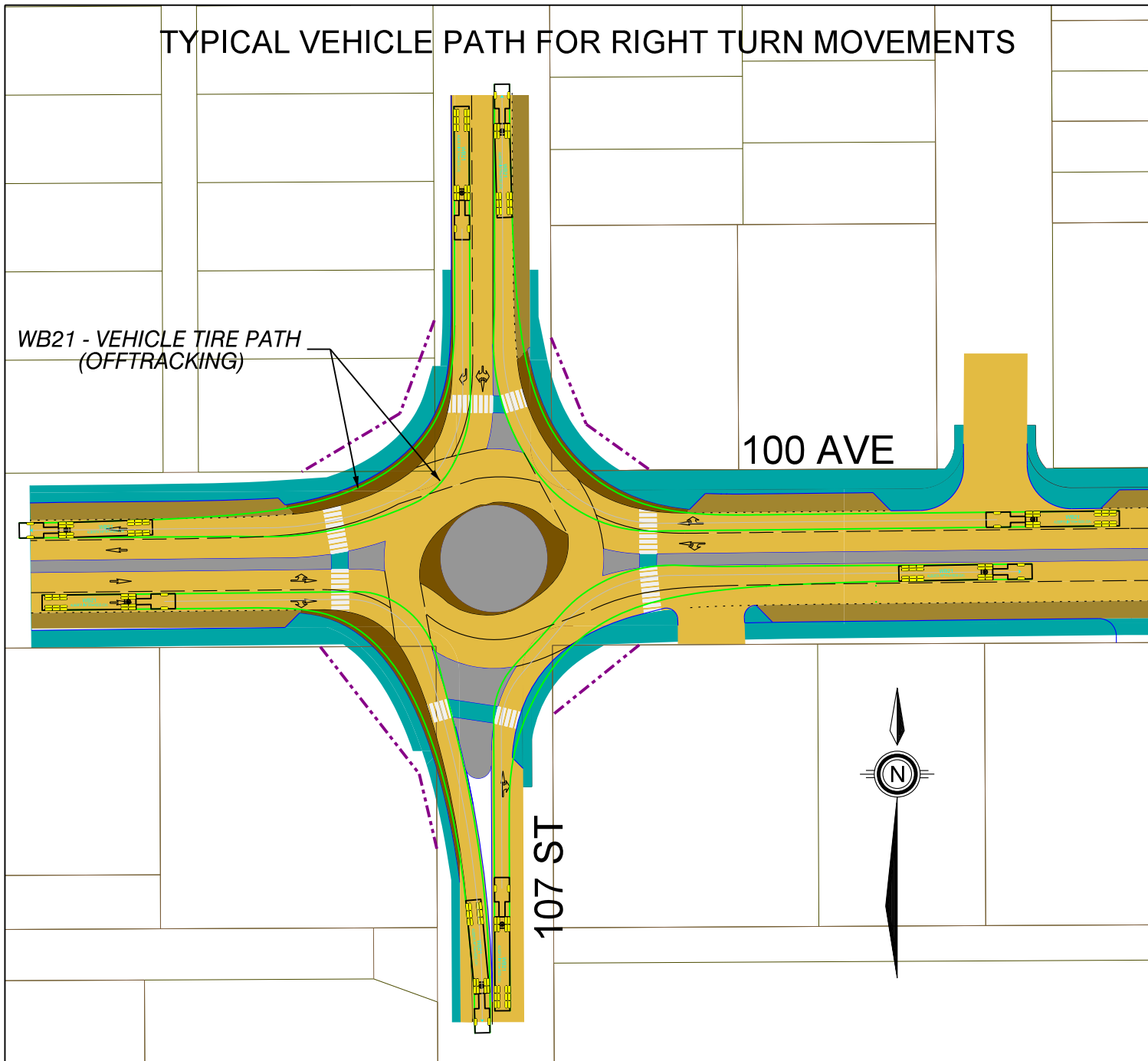
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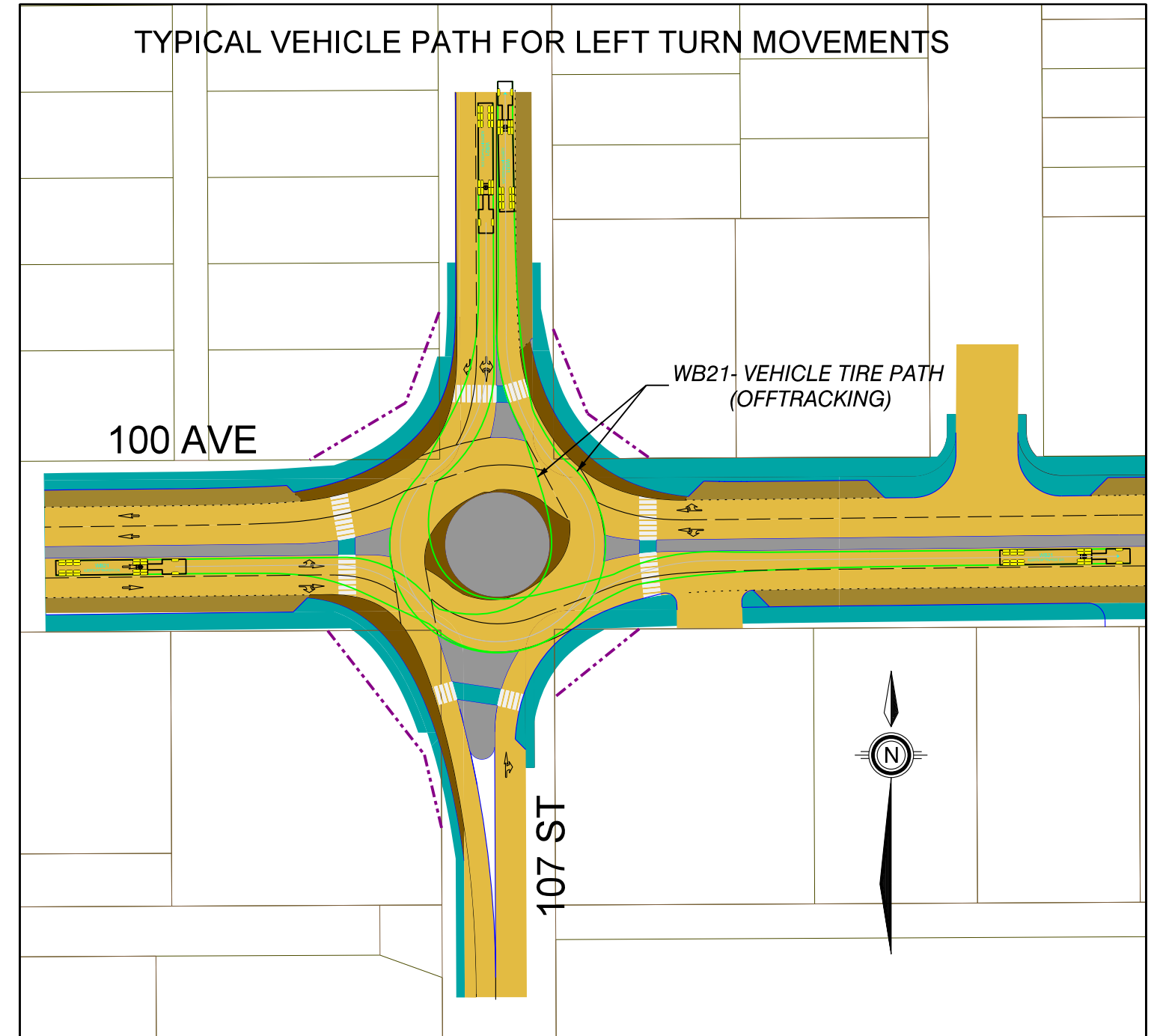
WB21	Tractor Width	: 2.60	Lock to Lock Time	: 6.0
	Trailer Width	: 2.60	Steering Angle	: 26.6
	Tractor Track	: 2.60	Articulating Angle	: 70.0
	Trailer Track	: 2.60		

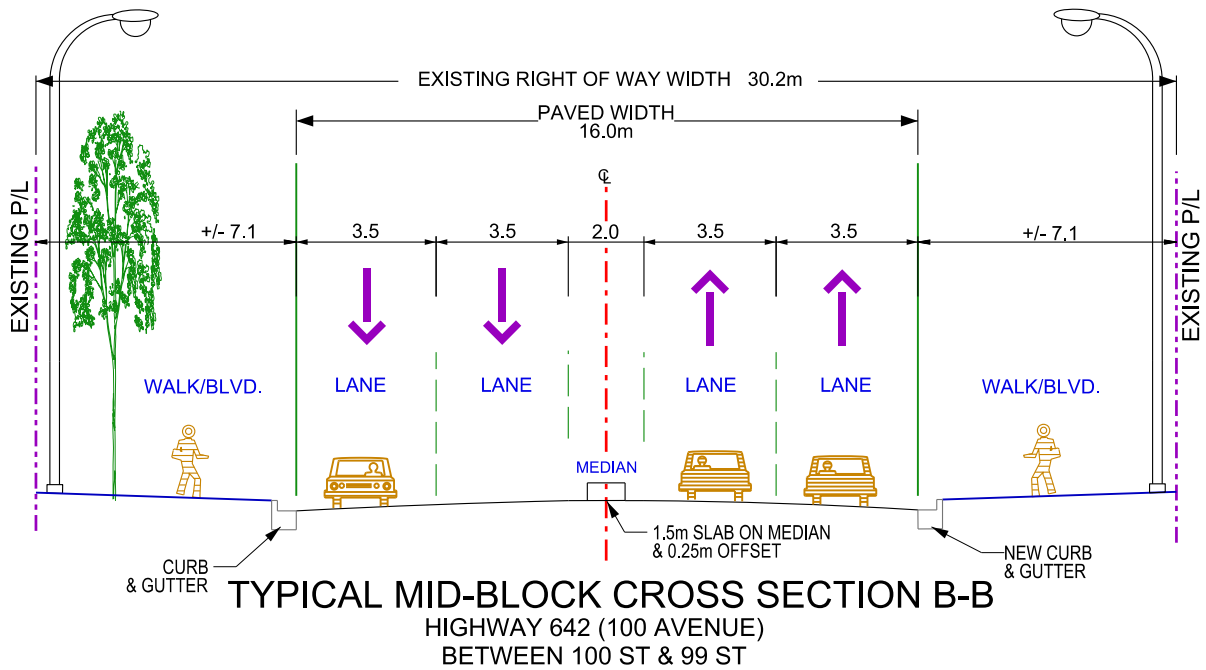
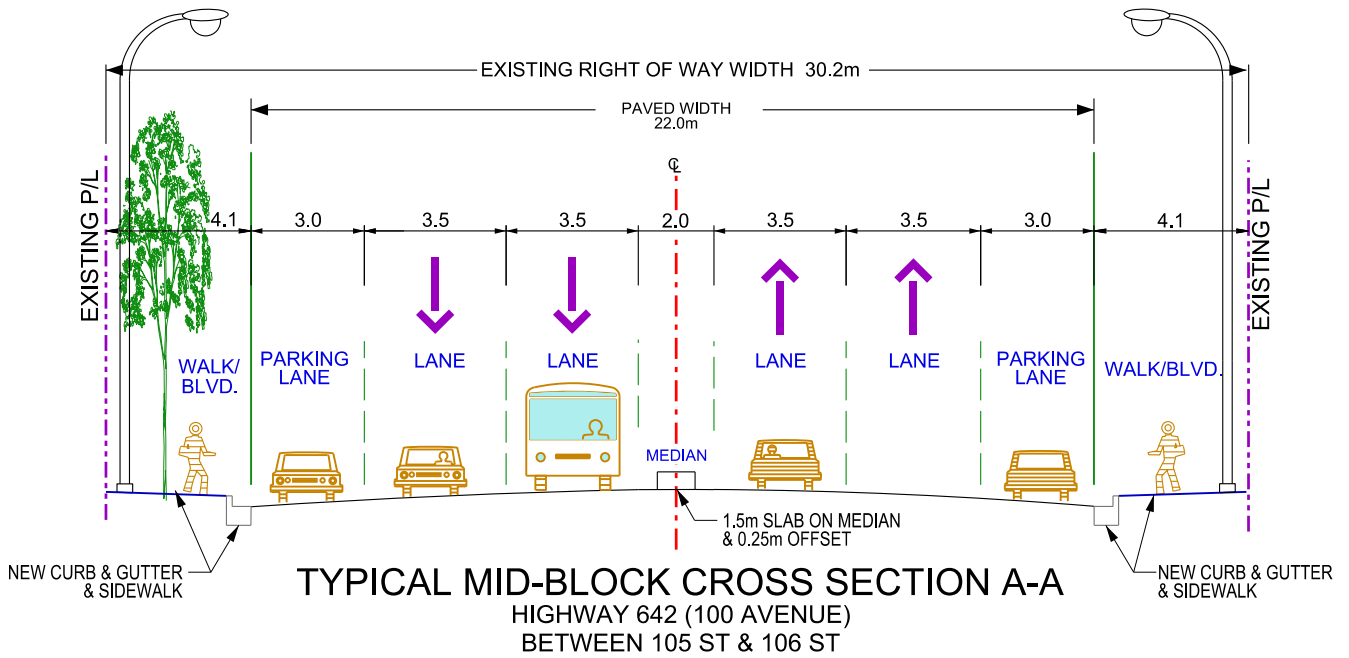
NOTE:
PAVEMENT EDGES, APRONS INSIDE AND
OUTSIDE LIMITS TO BE FINALIZED DURING
DETAIL DESIGN

TYPICAL VEHICLE PATH FOR RIGHT TURN MOVEMENTS



TYPICAL VEHICLE PATH FOR LEFT TURN MOVEMENTS





NOTE: PREFERRED LOCATIONS OF LIGHTS STANDARDS
 0.5m FROM PROPERTY LINE

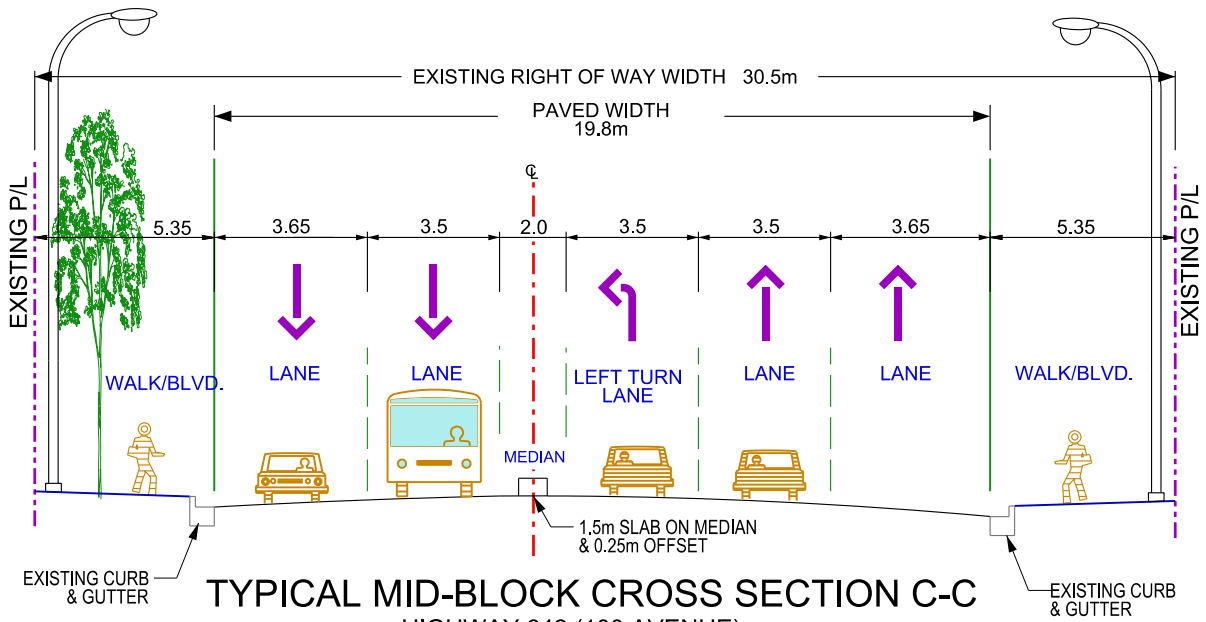


TOWN OF MORINVILLE - HIGHWAY 642 (100 AVENUE)
 FUNCTIONAL PLANNING STUDY

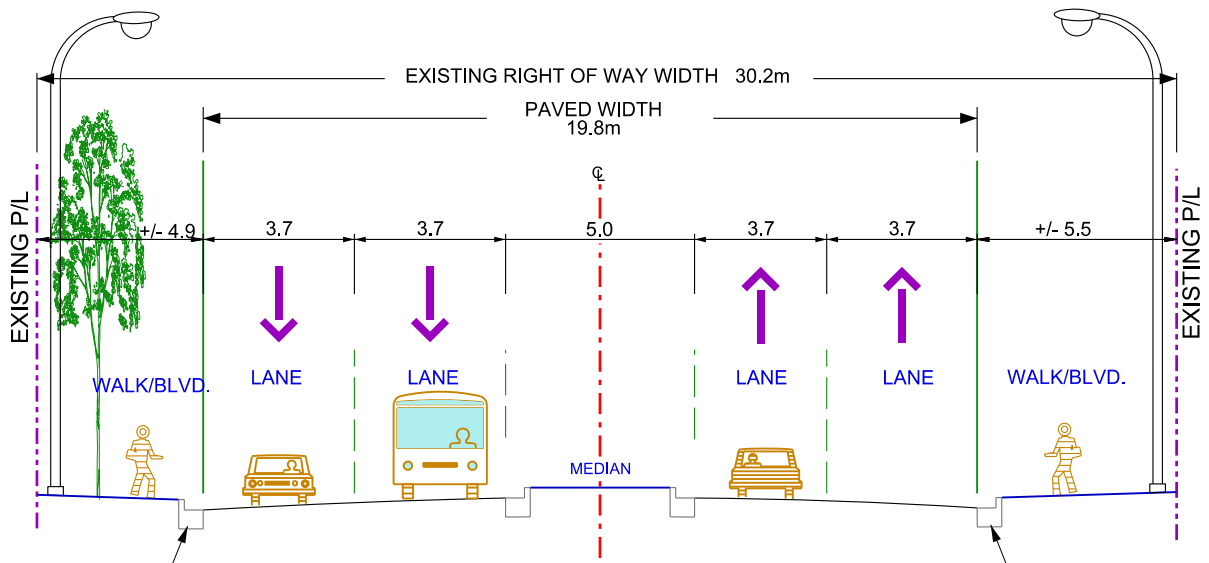
TYPICAL CROSS-SECTION OPTIONS

NTS.

DATE: APRIL 2013



TYPICAL MID-BLOCK CROSS SECTION C-C
 HIGHWAY 642 (100 AVENUE)
 WEST OF HIGH SCHOOL ACCESS



TYPICAL MID-BLOCK CROSS SECTION D-D
 HIGHWAY 642 (100 AVENUE)
 BETWEEN GRANDIN DRIVE (EAST JUNCTION) & 87 ST

NOTE: PREFERRED LOCATIONS OF LIGHTS STANDARDS
 0.5m FROM PROPERTY LINE



TOWN OF MORINVILLE - HIGHWAY 642 (100 AVENUE)
 FUNCTIONAL PLANNING STUDY

TYPICAL CROSS-SECTION OPTIONS

NTS.

DATE: APRIL 2013

6.0 Plan Development

6.1 Options Evaluation

At the preliminary stage, two alternatives for the corridor were considered and presented at the first public Open House on September 26, 2012. The two alternatives were to improve the corridor intersections with conventional signalized intersections, or to improve them with modern roundabouts.

The two options were considered on the basis of several criteria (listed below), noting whether each alternative 'does not meet,' 'partially addresses,' 'mostly addresses,' or 'fully addresses' the requirements of each criteria. The baseline model is the corridor as it functions today. The criteria were chosen in an effort to highlight all major needs and requirements of the alternative chosen.

The criteria are:

6.1.1 Policy Criteria

- ◆ **Consistent with Morinville policy** – is the alternative consistent with the Town's Municipal Development Plan (MDP), Municipal Sustainability Plan (MSP), and applicable Area Structure Plans (ASPs)?
- ◆ **Supports Area Structure Plan (ASP) Goals** – does the alternative support the goals outlines in the Coeur de Morinville ASP? Namely contributing to 'place-making' (landmarks, streetscapes, definition of precincts) and contributing to/enabling streetscape improvements and enhancements.
- ◆ **Consistent with Alberta Transportation policy** – is the alternative consistent with existing Alberta Transportation policy? This includes policies on items such as intersection treatments, intersection spacing, access management, right of way widths, design cross-sections, design vehicles, etc.
- ◆ **Highway Network Connectivity** – does the alternative maintain connectivity between Highway 642 east of Morinville, Highway 642 west of Morinville, and Highway 2? Does the alternative mesh well with the regional highway network?

6.1.2 Implementation Criteria

- ◆ **Up Front Costs** – does the alternative limit up front implementation (capital) costs? This includes detailed planning, land acquisition, construction, etc.
- ◆ **Maintenance Costs** – does the alternative limit ongoing maintenance and operational costs?
- ◆ **Land Requirements** – does the alternative limit the amount of right of way required for its constructions?

6.1.3 Downtown Related Criteria

- ◆ **"Fit" in Downtown Morinville** – does the alternative align with the existing character of downtown Morinville?
- ◆ **Ease of Property (Business) Access** – does the alternative provide easy access to the properties and businesses that front onto the corridor?

- ◆ **Promotes Economic Development** – does the alternative encourage economic development along the corridor? Does the alternative provide stability and direction to encourage business plans?
- ◆ **On Street Parking** – does the alternative maintain on-street parking, as compared to the baseline model?

6.1.4 Technical Criteria

- ◆ **Intersection Capacity** – does the alternative provide sufficient capacity at all intersections along the corridor? Can side streets easily access the corridor? Can traffic on the corridor easily access side streets?
- ◆ **Vehicle Safety** – does the alternative maintain or increase safety for vehicular traffic along the corridor, relative to the baseline model?
- ◆ **Pedestrian Safety** – does the alternative maintain or increase safety of pedestrians along and crossing the corridor, relative to the baseline model?
- ◆ **Lowers Vehicle Speeds** – does the alternative serve to encourage lower vehicle speeds along the corridor?
- ◆ **Minimize Traffic Delay** – does the alternative serve to lower overall delay by traffic using the corridor?
- ◆ **Accommodation of Large Vehicles** – does the alternative provide access and passage to large vehicles, such as semi-trucks (WB-21)?

6.1.5 Public Related Criteria

- ◆ **Public Acceptance** – is the public comfortable with and accepting of the alternative?
- ◆ **Driver Familiarity** – are local drivers familiar with the intersection treatments contained in the alternative?
- ◆ **Ease of Pedestrian Access** – does the alternative provide easy access for pedestrians to the corridor? Is it easy for pedestrians to cross the corridor?

The evaluation matrix is attached as **Table 6.1**. Based on the evaluation matrix, the roundabout option was selected as better able to meet the goals of the project for the corridor.









































6.2 Roundabout Recommended Option





The additional benefits of roundabout intersections can be summarized as follows:

- ◆ The roundabout option provides four lanes with parking on both sides of 100 Avenue between 107 Street and 100 Street without requiring additional right of way, except at roundabout intersections. The total right of way required for the roundabout option is 0.75 ha (1.94 ac), whereas the conventional intersection option requires approximately 1.0 ha (2.41 ac), and requires buy-out of approximately 61,000 ft² of building area versus 30,000 ft² for the roundabout. The right of way costs for the roundabout option are approximately 50% lower than the conventional intersection option.
- ◆ The roundabout option provides for legal U-turns at roundabout intersections along 100 Avenue, which is more conducive to conversion of minor intersections to right in/out and in general implementation of an access management strategy.
- ◆ The roundabout option will provide operational improvements on the 100 Avenue corridor through traffic calming, but does not necessarily increase the time of travel. Traffic flow is

more continuous with roundabouts, particularly during off peak travel time, because traffic is not stopped by signals. The cost benefit of reduced delays can be significant, particularly as traffic volumes increase.

Option Evaluation Matrix

	Conventional (Traffic Signals)	Roundabouts
Policy Criteria		
Consistent with Morinville Policy		
Supports ASP Goals		
Consistent with Alberta Transportation Policy		
Highway Network Connectivity		
Implementation Criteria		
Up Front Costs		
Maintenance Costs		
Land Requirements		
Downtown Related Criteria		
"Fit" in Downtown Morinville		
Ease of Property (Business) Access		
Promotes Economic Development		
On Street Parking		
Technical Criteria		
Intersection Capacity		
Vehicle Safety		
Pedestrian Safety		
Lowers Vehicle Speeds		
Minimizes Traffic Delay		
Accommodation of Large Vehicles		
Public Related Criteria		
Public Acceptance		
Driver Familiarity		
Ease of Pedestrian Access		

-  - does not meet criteria
-  - partially addresses criteria
-  - mostly addresses criteria
-  - fully addresses criteria

7.0 Functional Planning

7.1 Long Term Plan

7.1.1 Overview

The long term functional plan envisions a four lane cross-section with seven roundabouts along 100 Avenue and all other all-directional accesses (except the High School and 87 Street) being converted to right-in/right-out. Parallel parking on both sides of the road is provided west of 100 Street.

The roundabouts at 107 Street, 104 Street, 100 Street, Grandin Drive (west junction), and Grandin Drive (east junction) are all based on the same basic design. Each is designed based on the 'P' design vehicle (a passenger car), has an inscribed circle diameter (ICD) of approximately 39 m, and has outside truck aprons to allow WB-21 trucks to make right turns. With the outside truck aprons, the effective ICD is approximately 45 m. The roundabout shown schematically at East Boundary Road has been designed as a typical rural roundabout to meet Alberta Transportation standards and has an ICD of approximately 60m.

All roundabouts have two lanes for 'mainline' (100 Avenue) traffic for both entering and exiting.

At 107 Street, 104 Street, Grandin Drive (west junction), and Grandin Drive (east junction) central island is extended by means of a truck apron to the east and west to only allow a single circulating lane for traffic exiting to the either the north or south. This is because there is only one entering and exiting lane for north- and southbound traffic at these locations, except at 107 Street where there are two entering southbound lanes.

100 Street is designed similar to the above roundabouts, but with two entering and exiting lanes for north- and southbound traffic and no central island extensions.

102 Street is a smaller design due to the presence of historical buildings on two of the four corners. It is therefore designed to fit within the existing curblines. This gives an approximate ICD of 29 m. The roundabout has only one lane entering and exiting for north- and southbound traffic. The central island is fully transversable and without the spiral extensions that are present for most of the other roundabouts along the corridor.

The roundabouts at 107 Street, 104 Street, 102 Street, and 100 Street are centered on the existing intersections. The roundabouts at Grandin Drive (west junction) and Grandin Drive (east junction) have been shifted north of the existing alignment in an effort to mitigate the impact on landowners in the southeast and southwest quadrants of the intersection.

Right of way (ROW) around all roundabouts is provided for 5 m beyond the curbline up to the crosswalks, and 3 m beyond the curbline further from the intersection. The exception is the 102 Street roundabout where no additional ROW is required.

Exhibits 7.1 through 7.4 illustrate the long term recommended Functional Plan. Tie-ins to existing infrastructure and sidewalk placement will need to be confirmed as part of the future planning process.

An alternate option for the functional plan, based on conventional intersection treatments, is illustrated in **Appendix B**.

7.1.2 Cross Sections

Typical cross-sections are also shown on functional plan **Exhibits 7.1 through 7.4**. Cross-sections will generally include buildings built out to property lines on both sides, sidewalks next to the property lines, two travel (general purpose) lanes, and a raised median. The sidewalk will vary in width, but is generally 4 m wide, including curbs (assumed to be 0.5 m wide). Travel lanes are 3.5 m wide each. The median is generally 1.5 m wide, with 0.25 m offset on each side. The median is wider than this to the east of 97 Street where it ties into an existing median. West of 100 Street, there is also a parking lane along both sides of the road. This parking lane is approximately 3.0 m wide. All dimensions should be finalized and optimized during further planning and design for the implementation of the project.

7.1.3 Access Management

Appropriate access management along the Highway 642 (100 Avenue) corridor is important to both the Town of Morinville and Alberta Transportation as it directly impacts the safety and operation of the roadway. Numerous direct accesses to individual parcels, particularly between 99 Street and 107 Street currently exist, in addition to the crossing roads and rear lanes. The proposed long term plan, which provides a divided roadway for 100 Avenue with roundabouts at major intersections and right in/out stop-controlled intersection at minor crossing roads and lanes, provides a significant improvement to access control along the corridor.

Development of additional access management guidelines (strategy) were prepared to assist in the review of future development applications for development or redevelopment of parcels along the corridor in the downtown area (99 Street to 107 Street). Access to 100 Avenue is complicated and constrained by the generally narrow lot configuration and the lack of continuous rear lane for lots fronting onto 100 Avenue. Past developments for these lots required some form of street access that could only be provided from 100 Avenue and has resulted in a proliferation of accesses in some locations. It is considered desirable to remove and consolidate accesses where possible; however, any access closure or consolidation may be triggered by one of the following:

- ◆ Development / redevelopment application from property owner
- ◆ Town / Alberta Transportation initiated to address safety or operational concerns, or implement a road improvement.

In each case, it will be necessary for alternate suitable access to be made available for the property impacted to ensure the access control provides reasonable access for lot function and operation, and safe operations for both pedestrians and vehicles

The access management strategy will require further study, but the following should be considered for both existing and proposed developments / redevelopments.

General rules for access management:

- ◆ Minimize the number of accesses along major roadways by:
 - Removing access and providing it at the minor road or back lane, if possible.
 - Consolidate multiple access.
 - Consolidate access to adjacent properties with a joint and/or cross access agreement between owners.

- ◆ If removal of access is not possible, relocate existing access to provide adequate corner clearance for proper operation and safety. For 100 Avenue, the desired corner clearance from a minor intersection is:
 - 25.0 m downstream
 - 35.0 m upstreamThe desired corner clearance on the minor road is:
 - 20.0 m downstream
 - 25.0 m upstream
- ◆ Driveway widths should be minimized to the extent possible to provide more pedestrian friendly crossings:
- ◆ Residential – one-way 3.0 m to 4.3 m, two-way 3.0 m to 7.3 m
 - Commercial – one-way 4.5 m to 7.5 m, two-way 7.2m to 12.0 m
- ◆ For parallel street parking a minimum of 6.0 m to 7.0 m should be provided between the access and the nearest parking to assure adequate sight lines for vehicles exiting from driveways.

For new developments, direct access from 100 Avenue should be avoided to the extent possible and practical. For existing driveways the foregoing rules may not be practical for implementation during road improvement, so site specific access analysis would be required.

The development type, volumes of traffic generated, and the location of the access in relation to the intersection would need to be considered for all new developments.

In addition to the above noted general rules, Transportation Association of Canada (TAC) guidelines would apply throughout.

The Long Term Access Management Plan illustrated on **Exhibits 7.5 to 7.9** was prepared based on the general rules described and should be considered as a guide for future developments and/or road improvements.

The Long Term Access Management Plan was prepared for 100 Avenue between 107 Street and 99 Street, as this area represents the commercial district (downtown), whereas east of 99 Street to East Boundary Road is primarily residential with lots backing onto 100 Avenue and no direct access. The exception is along the one block section on the south side between 99 Street and 97 Street where front drive garages have direct access to 100 Avenue via an existing parking lane. This area will be retained in its current configuration as no suitable feasible alternative exists. It should be recognized that it may not be possible to fully implement the Access Management Plan, but rather the plan should be considered as the long term goal for the corridor.

In addition, the Town should continue to work with landowners along the corridor to consolidate properties where two or more properties are owned by an individual or entity. Further consolidation of properties will mitigate the risk of additional 100 Avenue accesses being required in the future.

Table 7.1, Highway 642 (100 Avenue) Morinville Access Inventory provides a summary of existing accesses as well as suggested access or changes.

The Access Management Plan proposed for the project establishes a long term goal for the 100 Avenue corridor. Implementation of the entire plan should be pursued; however, some businesses that currently

have non-compliant accesses, which require unsafe and/or illegal maneuvers for their operations may not be willing participants. Decisions regarding the resolution of these matters will be required by Alberta Transportation and the Town.

7.2 Active Modes

7.2.1 Bicycles

Although specific bicycle lanes on 100 Avenue have not been provided for in the functional plans, the general purpose right hand lanes should provide sufficient width for bicycles and passage, and could serve both vehicular traffic and bicycles for many years.

Separate bicycle lanes were considered as an option for 100 Avenue, particularly as an interim stage, when traffic volumes can be readily met with a single lane in each direction. The recommended design would accommodate bicycle lanes as an interim measure; however, the parallel to 100 Avenue routes on 99 Avenue and 101 Avenue may be more appropriate through the downtown area.

7.2.2 Pedestrians

Providing pedestrian facilities is a major goal of this study and the accompanying ASP. Wide sidewalks, stretching from the curb edge of the property line, are provided along both sides of the corridor west of 99 Street and separate walks are provided along both sides of the corridor east of 99 Street. The roundabouts are designed to have crosswalks for all legs of the intersections.

The recommended plan provides for a new and slightly wider sidewalk on each side of 100 Avenue between 107 Street and 100 Street, to enhance the pedestrian experience in this area. Although not included in this study, streetscaping and urban design elements should be considered at the time of road improvements to maximize cost efficiencies and benefits.

Midblock crossings (or more exactly, crossings between roundabouts) should be considered upon implementation, especially at locations that now have all directional vehicular access, and thus crosswalks today. Provision has been included for a pedestrian crossing at 101 Street and 105 Street, these locations should be confirmed prior to the implementation of the plan.

Highway 642 (100 Avenue) - Morinville Access Inventory

Location	Present Owner / Land Description	Existing Access	Suggested Access or Changes
100 Avenue at 107 Street			
North-West Corner	Provincial Building (Plan 8779 S, Block 1)	No direct access off 100 Avenue	No change
South-West Corner	St. Andrews Anglican Church - (Plan 822 1284 Block 1, Lot 12)	Access off 107 Street, close to the corner.	1. Relocate access to rear lane; 2. Option of one way operation with access moved south as much as possible and other access at the rear lane.
North-East Corner	Vacant Lot (Plan 042 0228, Block 8, Lot 3)	No access defined	Access to be provided off 107 Street ~25m from south property line.
South East Corner	Shell Gas Station	Access modifications required as part of an active development application have not yet been implemented and should be addressed as soon as possible.	With roundabout implementation, two accesses closest to the corner will require relocation away from the roundabout. The closest access may be provided next to pedestrian crossing away from roundabout.
100 Avenue - 107 Street to CN Railway Tracks - Eastbound			
Properties, east of Shell	Strip Mall, Front parking (Plan 792 2048, Lot 2)	Joint with Shell access from 100 Avenue	Access to be reconfigured, consolidate access with Shell site.
	Strip Mall, Front parking (Plan 802 1047, Lot 3A)	Existing access at east end of the lot	Access may be relocated to property line to provide joint access with adjacent Lot 4 joint access / crossing agreement between the two owners would be required.
	Vacant Lot (Plan 072 2234, Block A, Lot 4)	Empty lot, no defined access	Access to be provided via back service road, and possible joint access with the Lot 3A.
	Vacant Lot (Plan 792 2048, Block B, Lot 3)	Empty lot, access off 100 Avenue at the east end of property.	
	Rednex - Bar and Grill (Plan CDE 972 4224)	Existing access off 100 Avenue with frontage parking.	Possible access relocation if joint with adjacent empty Lot 3. Crossing agreement between the two owners would be required.

Location	Present Owner / Land Description	Existing Access	Suggested Access or Changes
100 Avenue and 104 Street Intersection			
South-West Corner	The Flower Shop	Access off 104 Street, close to the corner.	Lot to be acquired for the roundabout footprint. If lot is redeveloped, access from the rear lane.
South-East Corner	"Sal's Famous" Restaurant	Access off 100 Avenue and 104 Street	Lot partially affected by roundabout footprint, land to be acquired. If lot redeveloped, access from 104 Street, access location away from roundabout pedestrian crossing.
100 Avenue - 107 Street to CN Railway Tracks - Westbound			
Northwest Corner of 100 Avenue 106 Street	A&W Restaurant (Plan 952 2958, Block 8, Lot 2)	One access off 100 Avenue, one off 106 Street (Independence Street)	Relocate 100 Avenue access to 106 Street
Northwest Corner of 100 Avenue 106 Street	KFC Restaurant, (Plan 946 Q, Block 5, Lots 13,14&15)	One access off 100 Avenue, one off 106 Street (Independence Street)	Relocate 100 Avenue access to the lane, make it joint access to KFC, the lane and lots 12,11
	Friend and Neighbours Restaurant, (Plan 946 Q, Block 5, Lots 11, 12)	Access off 100 Avenue	Relocate 100 Avenue access to the lane, make it joint access with KFC, the lane and lots 12,11
Northwest Corner of 100 Avenue and 105 Street	(Plan 946 Q Block 5, Lot 10)	Vacant Commercial Building	If access required, to be provided via 105 Street
Northeast Corner of 100 Avenue and 105 Street	(Plan 946 Q, Block 4, Lot 14)	Access off 100 Avenue	Access to be relocated to 105 Street
	Vacant Commercial Site, (Plan 946 Q, Block 4, Lot 13)	Access off 100 Avenue	Relocate 100 Avenue access to the lane.
Northwest Corner of 100 Avenue and 104 Street	(Plan 762 1617, Block 4, Lot 11 and 10)	Strip Mall to Number of Businesses; parking in front, direct access off 100 Avenue.	Property affected by the Roundabout footprint, property to be acquired. If property redeveloped, access to be provided via 104 Street or the lane.
Northeast Corner of 100 Avenue and 104 Street	(Plan 762 1617, Block 1, Lot 34)	Existing Access off 104 Street.	Property affected by the Roundabout footprint, property would be affected. If property redeveloped, access to be provided off 104 Street.
100 Avenue CN Railway Tracks to 102 Street - Eastbound			
CN Railway to 103 Street	Integra Tire Auto Centre Plan 9201 S, Block 2, Lot12	Two direct accesses to the building off 100 Avenue in addition to access off 103 Street.	Until the business changes into other profile, may not be possible to remove existing access.
103 Street to the lane	Hotel, Pizza Restaurant, Mini Storage (Plan 4187 HW, Lots 86-88)	No direct access off 100 Avenue	No change, if the access is required, it can be provided off 103 Street or the lane
The lane to 102 Street	Golden Palace Restaurant, Health Food Store, Law Office and others (Plan 8 RN, Lots 73 to 75)	Strip Mall to Number of Businesses; No direct access off 100 Avenue. Lot 73 - Empty	If redeveloped, access to be provided via the lane or off 102 Street. Access dedication may be required.

Location	Present Owner / Land Description	Existing Access	Suggested Access or Changes
100 Avenue CN Railway Tracks to 102 Street - Westbound			
CN Railway to 103 Street	Homes 2Broz Inc. (Plan 9201 S, Block 1, Lot 11)	Access off 100 Avenue	If possible relocate access to 103 Street
East of 103 Street to the lane	Canada Post, Servus Credit Union, Carrie's Hair	No direct access to the businesses; Canada Post access off 103 Street One common parking in the back for the businesses, access via the lane.	Retain existing access scheme.
The lane to 102 Street	(Plan 8 RN, Lots 70 to 72)	No direct access.	Access via 102 Street.
100 Avenue 102 Street to 100 Street - Eastbound			
102 Street to 101 Street	St. Germain Place: RBC Financial, , Morinville Information Centre, Hunters printers and Copy, Alta Gas. (Plan 8 RN, Lots 41-43 and 54-56)	No direct access.	Access via 102 Street.
101 Street to 100A Street	Quinn's Plumbing & Heating Ltd.; (Plan 2549 MC Lot F), Highstreet Interiors inc. (Lot G & Lot 23)	Access to parking space created for businesses (part of lot 23)	Relocate access if possible.
101 Street to 100A Street	Shooters Supplies and Other Businesses (Plan 2549 MC, Lot 22)	No direct access	Access via 101 Street.
100A Street to 100 Street	Don's Bistro, MuniWare, Morinville Hotel (Plan 20 KS, Lots 9-10)	Access to Parking Lot off 100 Avenue and 100 Street behind the hotel.	Morinville Hotel property is affected by the proposed Roundabout. Access to be resolved at that time of Roundabout implementation. Preferably no direct access to 100 Avenue.
100 Avenue 102 Street to 100 Street - Eastbound			
	Strip Mall East of 102 Street	No direct access off 100 Avenue for all businesses but Body Shop next to the Park and trail (access to garage in the back)	Lot has no connection to back lane - removal not possible. Acquisition of the lot is an option.
	Baptiste Park and St. Jean Baptiste Church	Access to Chrch Parking lot via the Lane opposite 100A Street.	Access to remain.
	(Plan 7732 R , Block A, Lot 22, 23, 24, 25)	Access via back lanes.	Lots 22 and 23 would be affected by the proposed Roundabout footprint. Access to be reviewed at the time of Roundabout implementation.

Location	Present Owner / Land Description	Existing Access	Suggested Access or Changes
100 Avenue 100 Street to Grandin Dr. - Eastbound			
100 Street and 100 Avenue - South-East Corner	Scotia Bank	Access off 100 Avenue to the parking lot	Building/property is affected by the Roundabout footprint - When property redeveloped, access to be provided via existing lane.
	Private Residence (Lot 24)	Driveway to garage off 100 Avenue	Access to be relocated to the lane, if possible.
99 Street to Grandin Dr.		Residential properties with front facing driveways	Accesses will remain as is.
100 Avenue 100 Street to Grandin Dr. - Eastbound			
100 Street and 100 Avenue - North-East Corner	Sobeys	Two accesses one off 100 Avenue and one of 100 Street.	Property would be affected by the Roundabout but accesses will remain.

- LEGEND**
- PAVEMENT
 - SIDEWALK
 - MEDIAN
 - TRUCK APRON
 - PARKING
 - RIGHT-OF-WAY BOUNDARY
 - PROPOSED CURB

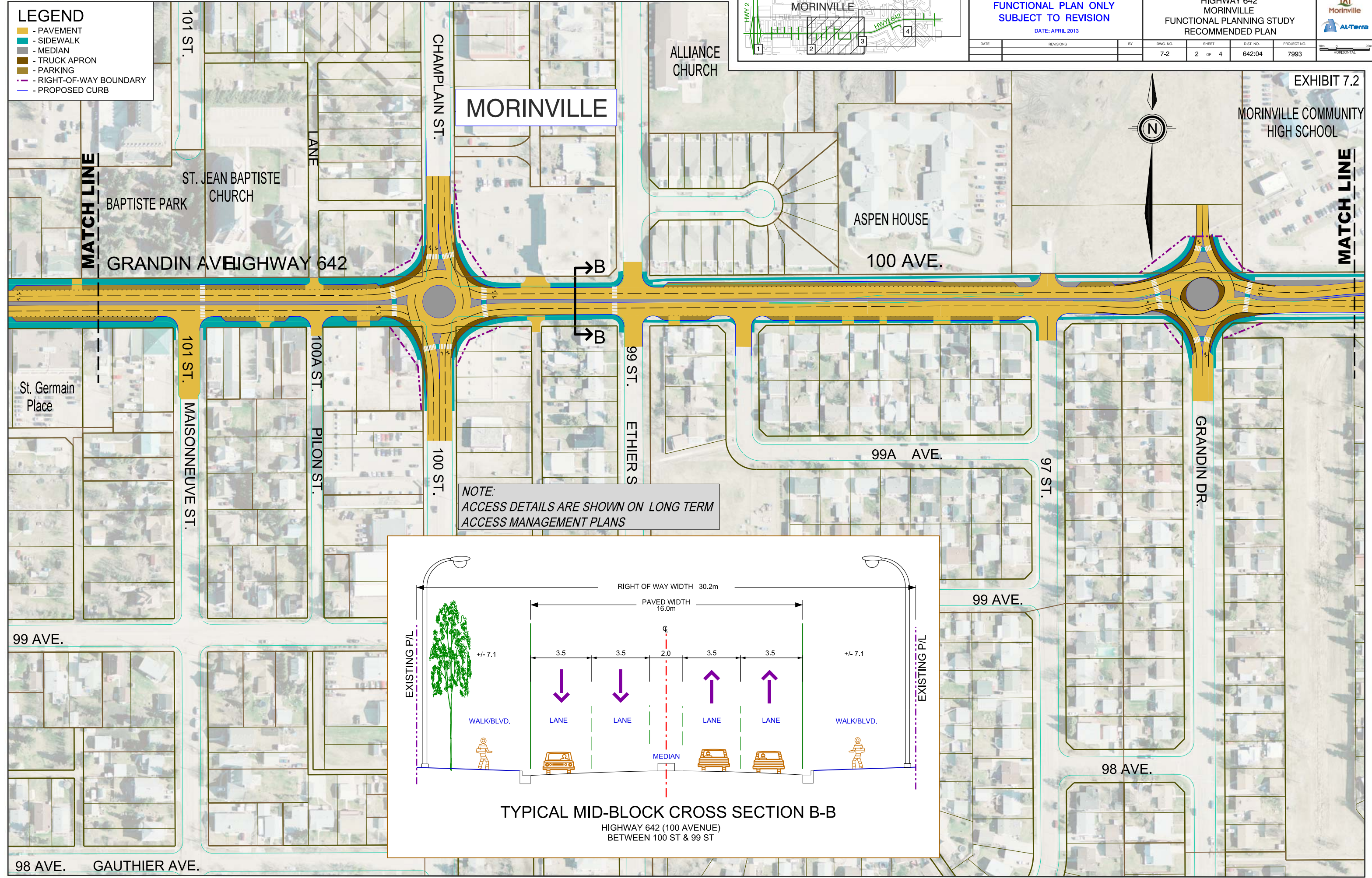
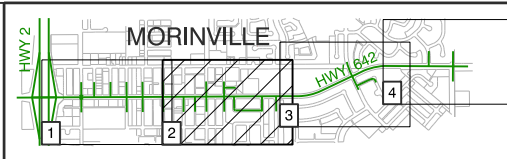
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SUBJECT TO REVISION

DATE: APRIL 2013

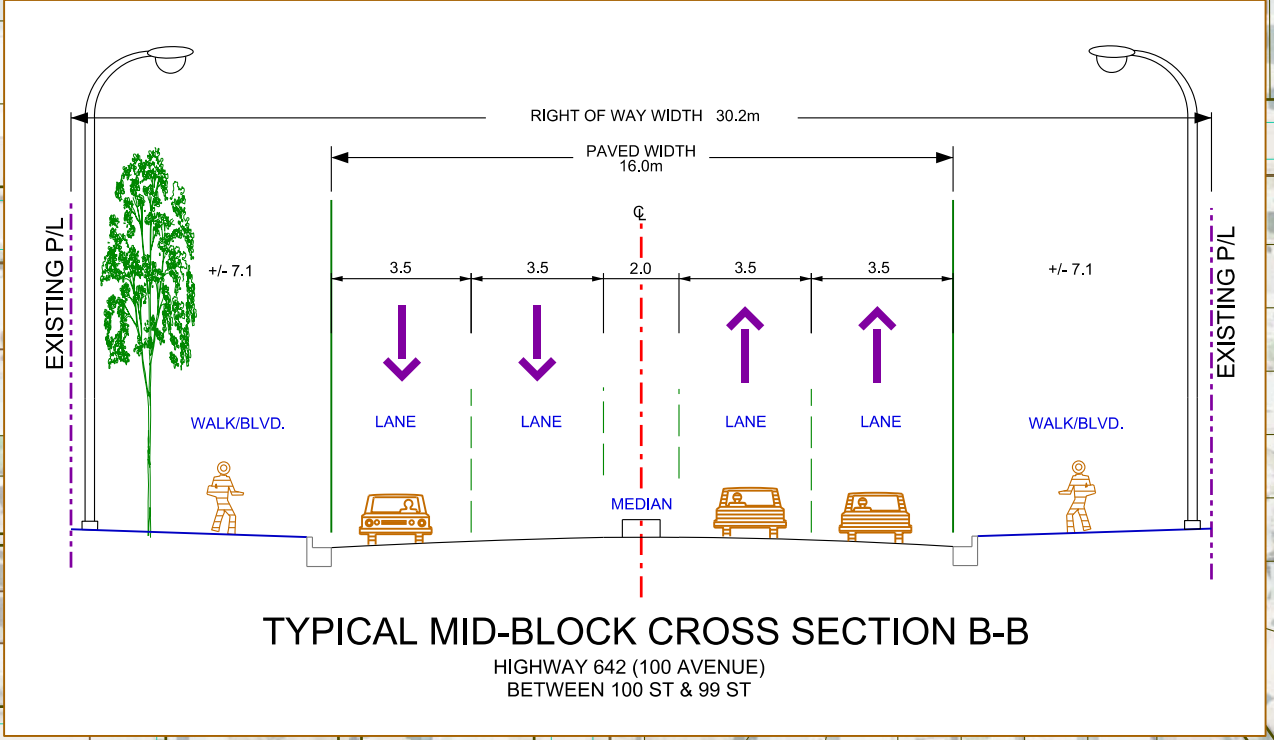
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MORINVILLE
FUNCTIONAL PLANNING STUDY
RECOMMENDED PLAN



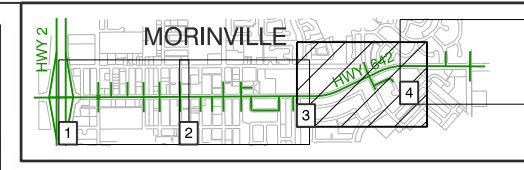
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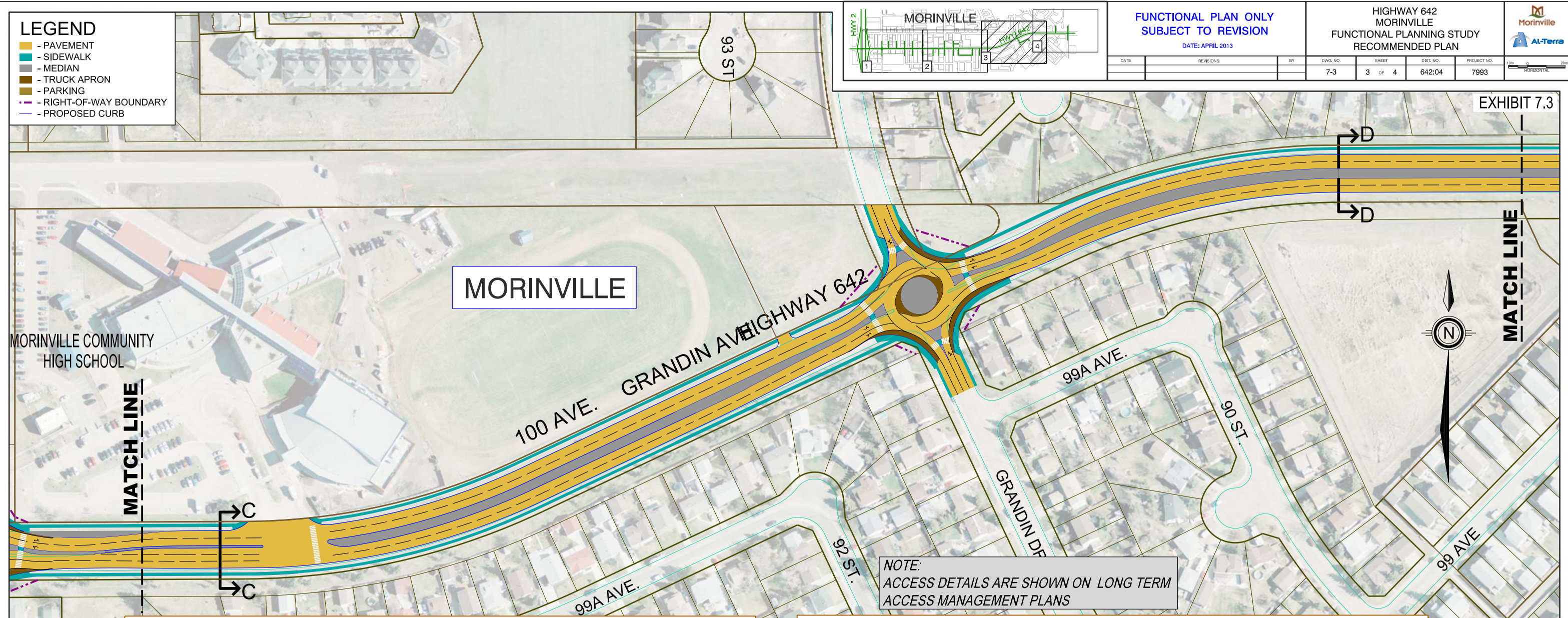
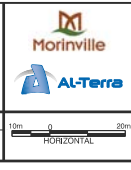
NOTE:
ACCESS DETAILS ARE SHOWN ON LONG TERM
ACCESS MANAGEMENT PLANS



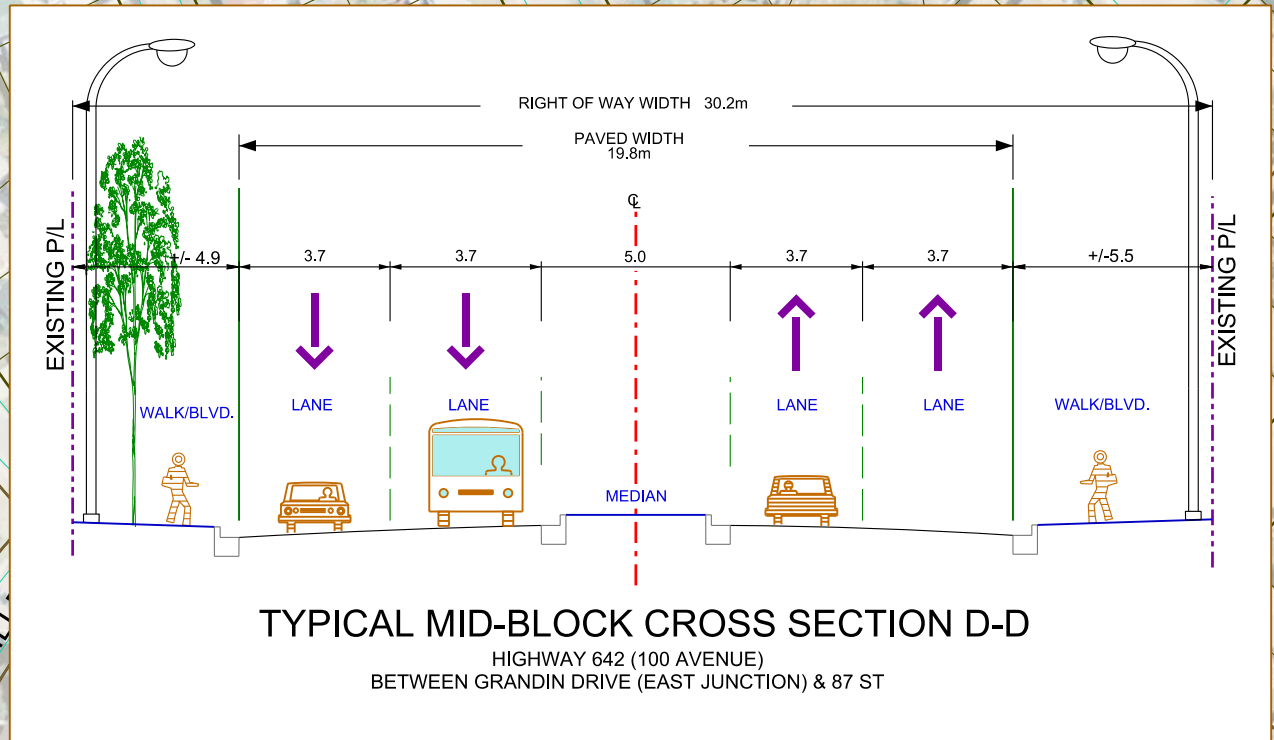
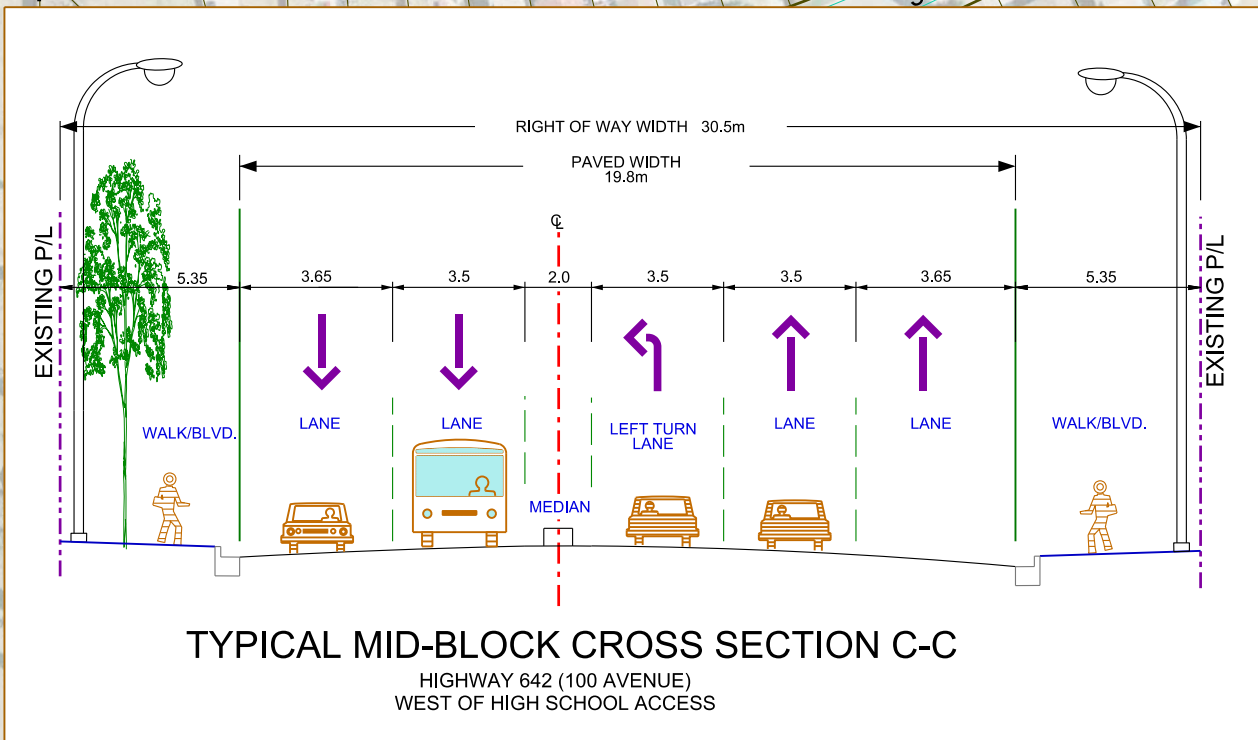
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- PAVEMENT
 - SIDEWALK
 - MEDIAN
 - TRUCK APRON
 - PARKING
 - RIGHT-OF-WAY BOUNDARY
 - PROPOSED CURB



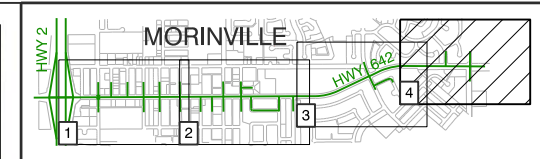
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SUBJECT TO REVISION			FUNCTIONAL PLANNING STUDY			
DATE: APRIL 2013			RECOMMENDED PLAN			
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NOTE:
ACCESS DETAILS ARE SHOWN ON LONG TERM
ACCESS MANAGEMENT PLANS



- LEGEND**
- PAVEMENT
 - SIDEWALK
 - MEDIAN
 - TRUCK APRON
 - PARKING
 - RIGHT-OF-WAY BOUNDARY
 - PROPOSED CURB



FUNCTIONAL PLAN ONLY
SUBJECT TO REVISION

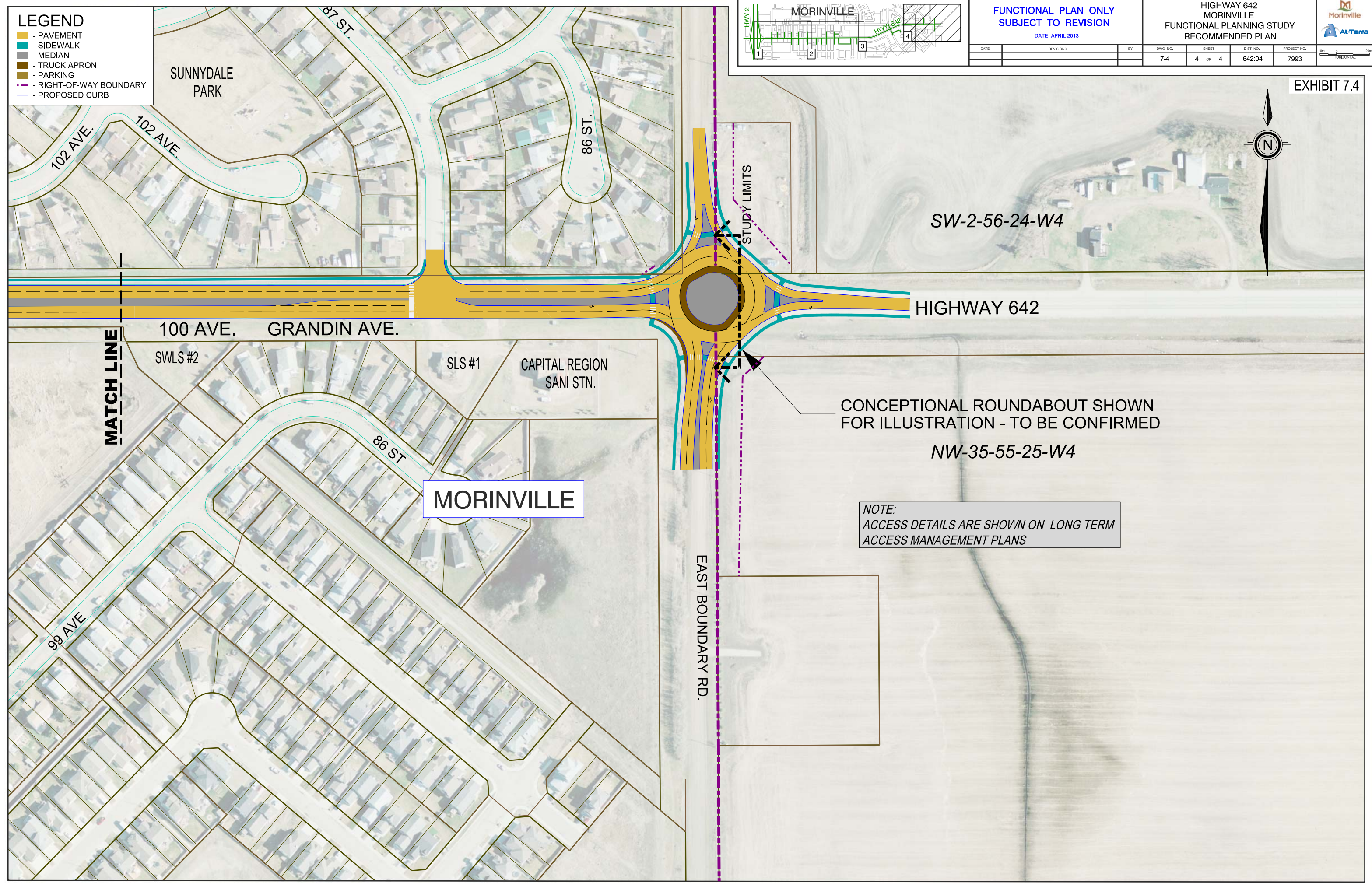
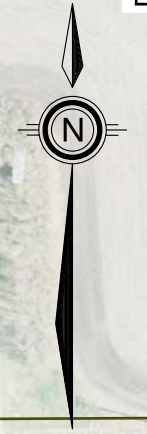
DATE: APRIL 2013

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HIGHWAY 642
 MORINVILLE
 FUNCTIONAL PLANNING STUDY
 RECOMMENDED PLAN



EXHIBIT 7.4

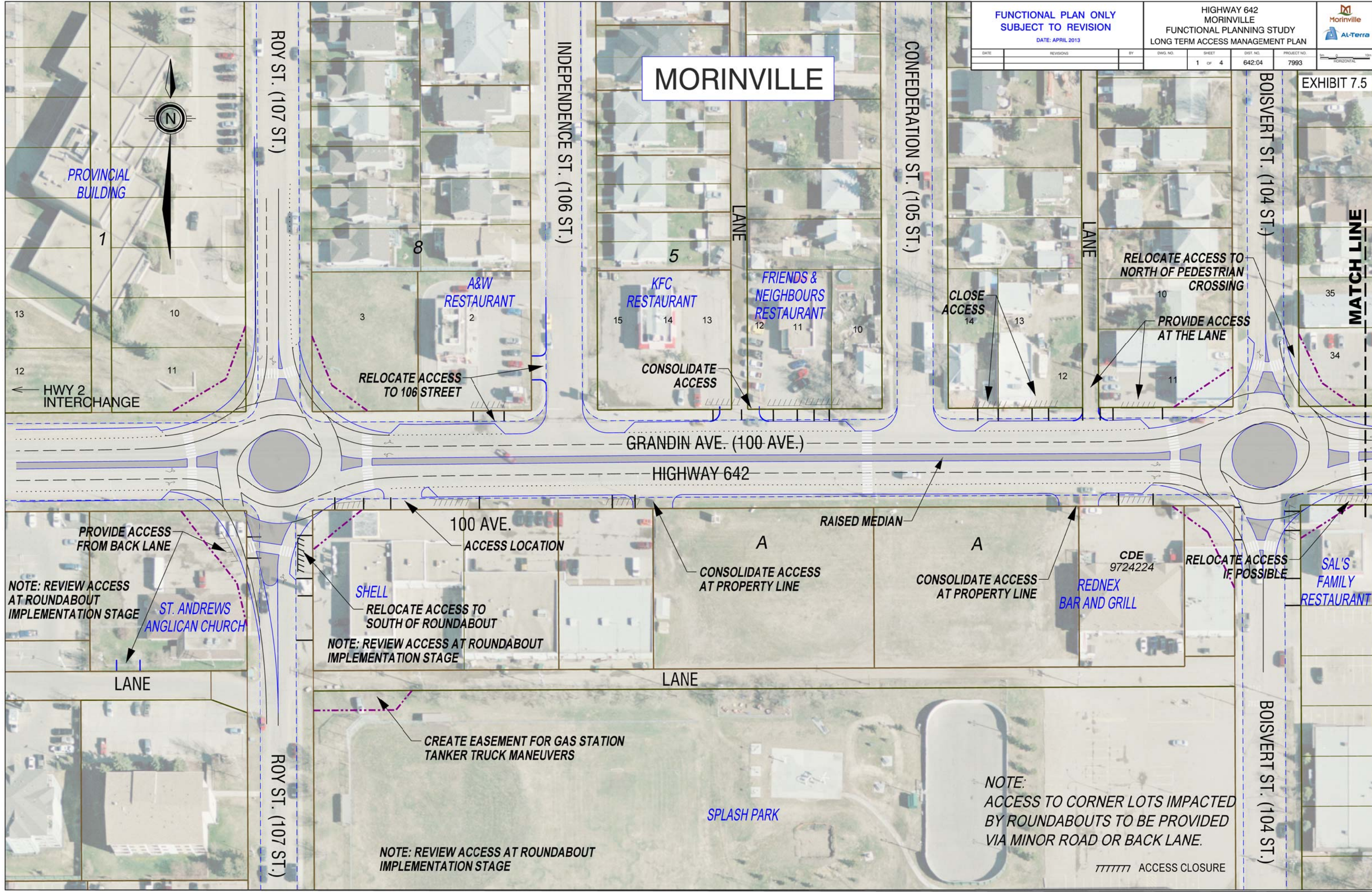


CONCEPTIONAL ROUNDABOUT SHOWN FOR ILLUSTRATION - TO BE CONFIRMED

NOTE:
 ACCESS DETAILS ARE SHOWN ON LONG TERM ACCESS MANAGEMENT PLANS

DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
				1 of 4	642:04	7993

MORINVILLE



MATCH LINE

NOTE:
ACCESS TO CORNER LOTS IMPACTED
BY ROUNDABOUTS TO BE PROVIDED
VIA MINOR ROAD OR BACK LANE.

TTTTTT ACCESS CLOSURE

NOTE: REVIEW ACCESS AT ROUNDABOUT
IMPLEMENTATION STAGE

NOTE: REVIEW ACCESS AT ROUNDABOUT
IMPLEMENTATION STAGE

NOTE: REVIEW ACCESS
AT ROUNDABOUT
IMPLEMENTATION STAGE

HWY 2
INTERCHANGE



PROVINCIAL
BUILDING

A&W
RESTAURANT

KFC
RESTAURANT

FRIENDS &
NEIGHBOURS
RESTAURANT

ST. ANDREWS
ANGLICAN CHURCH

REDNEX
BAR AND GRILL

SAL'S
FAMILY
RESTAURANT

SPLASH PARK

ROY ST. (107 ST.)

INDEPENDENCE ST. (106 ST.)

CONFEDERATION ST. (105 ST.)

BOISVERT ST. (104 ST.)

ROY ST. (107 ST.)

BOISVERT ST. (104 ST.)

GRANDIN AVE. (100 AVE.)

HIGHWAY 642

100 AVE.
ACCESS LOCATION

RAISED MEDIAN

CONSOLIDATE ACCESS
AT PROPERTY LINE

CONSOLIDATE ACCESS
AT PROPERTY LINE

RELOCATE ACCESS
IF POSSIBLE

RELOCATE ACCESS TO
SOUTH OF ROUNDABOUT

PROVIDE ACCESS
FROM BACK LANE

CREATE EASEMENT FOR GAS STATION
TANKER TRUCK MANEUVERS

RELOCATE ACCESS TO
NORTH OF PEDESTRIAN
CROSSING

PROVIDE ACCESS
AT THE LANE

CONSOLIDATE
ACCESS

CLOSE
ACCESS

RELOCATE ACCESS
TO 106 STREET

1

8

5

10

35

13

10

3

2

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14

13

12

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10

14

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12

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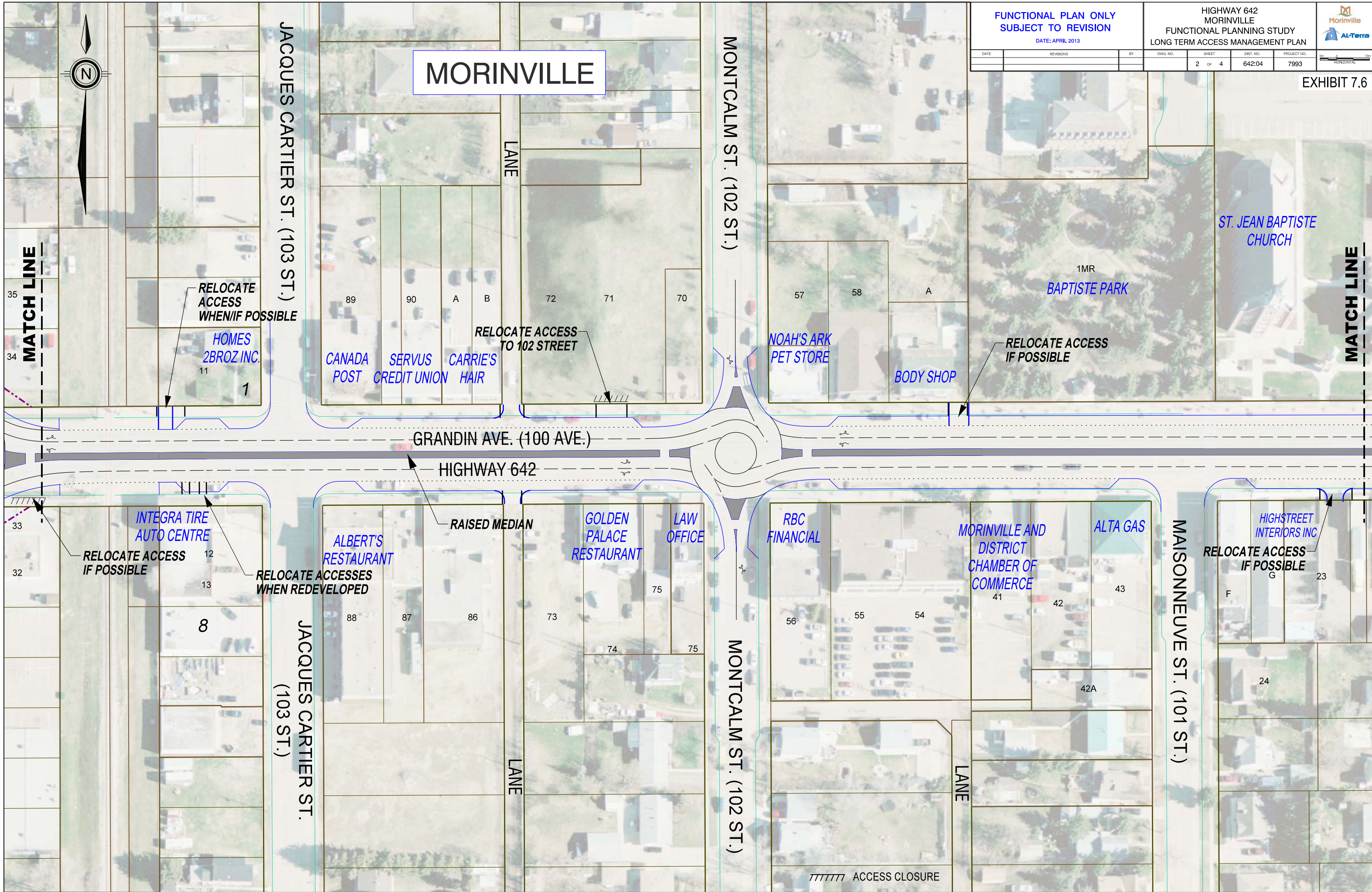
34

12

11

DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
				2 OF 4	642:04	7993

MORINVILLE



JACQUES CARTIER ST. (103 ST.)

MONTCALM ST. (102 ST.)

GRANDIN AVE. (100 AVE.)

HIGHWAY 642

JACQUES CARTIER ST. (103 ST.)

MONTCALM ST. (102 ST.)

MAISONNEUVE ST. (101 ST.)

LANE

LANE

LANE

MATCH LINE

MATCH LINE

RELOCATE ACCESS WHEN/IF POSSIBLE
HOMES 2BROZ INC.
11 1

RELOCATE ACCESS TO 102 STREET

RELOCATE ACCESS IF POSSIBLE

RELOCATE ACCESS IF POSSIBLE

RELOCATE ACCESSES WHEN REDEVELOPED

RELOCATE ACCESS IF POSSIBLE

RAISED MEDIAN

TTTTTT ACCESS CLOSURE



35
34

33
32

89 90 A B 72 71 70

57 58 A

12 13 8

88 87 86 73 74 75

56 55 54 41 42 43

F G 23

24

1MR
BAPTISTE PARK

ST. JEAN BAPTISTE CHURCH

NOAH'S ARK PET STORE

BODY SHOP

INTEGRA TIRE AUTO CENTRE

ALBERT'S RESTAURANT

GOLDEN PALACE RESTAURANT

LAW OFFICE

RBC FINANCIAL

MORINVILLE AND DISTRICT CHAMBER OF COMMERCE

ALTA GAS

HIGHSTREET INTERIORS INC

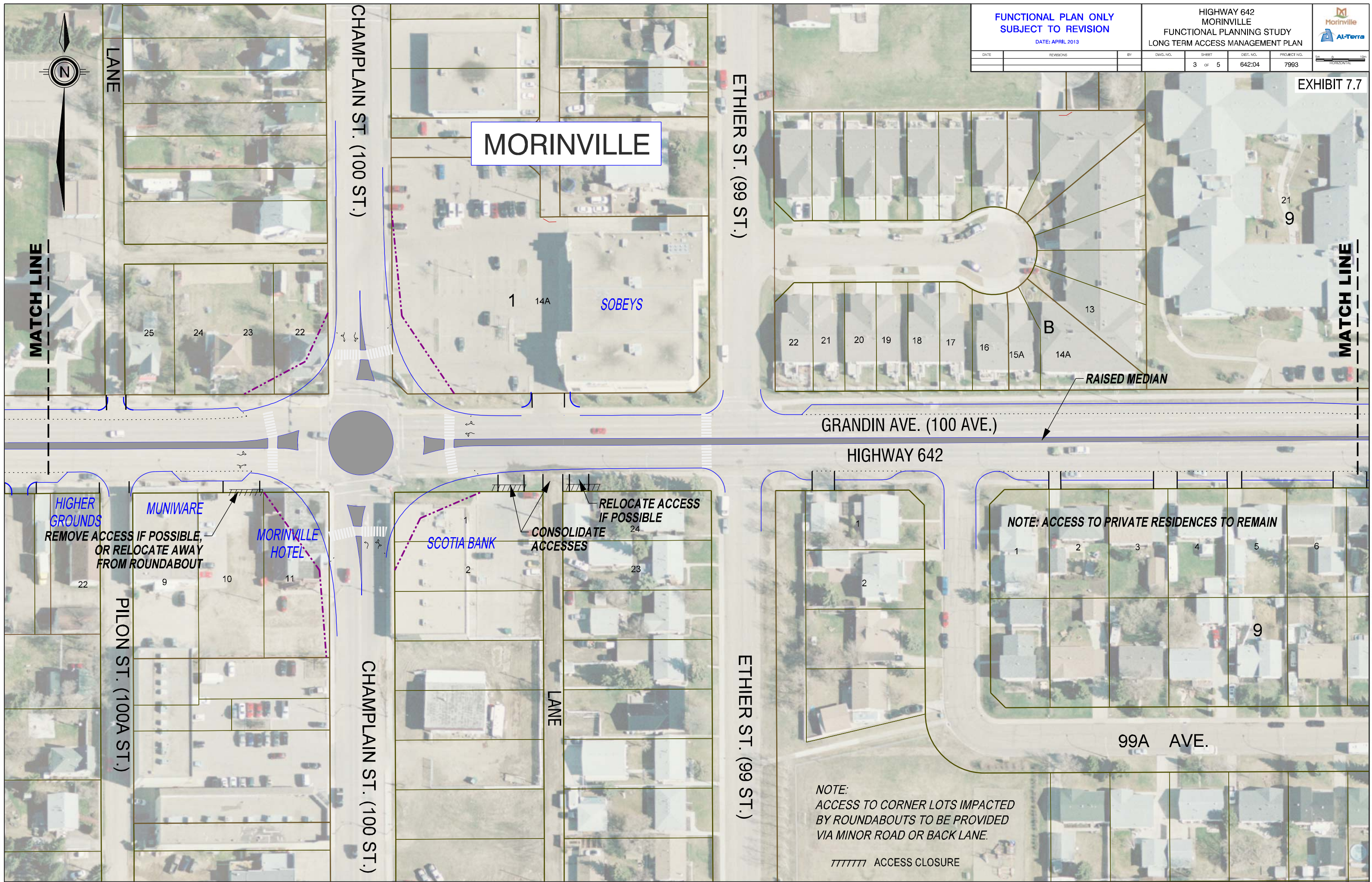
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HIGHWAY 642
MORINVILLE
FUNCTIONAL PLANNING STUDY
LONG TERM ACCESS MANAGEMENT PLAN



DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
				3 of 5	642:04	7993

EXHIBIT 7.7



MORINVILLE

SOBEYS

SCOTIA BANK

MORINVILLE HOTEL

MUNIWARE

HIGHER GROUNDS

NOTE: ACCESS TO PRIVATE RESIDENCES TO REMAIN

NOTE: ACCESS TO CORNER LOTS IMPACTED BY ROUNDABOUTS TO BE PROVIDED VIA MINOR ROAD OR BACK LANE.

TTTTTT ACCESS CLOSURE

MATCH LINE

MATCH LINE



LANE

LANE

ETHIER ST. (99 ST.)

ETHIER ST. (99 ST.)

CHAMPLAIN ST. (100 ST.)

CHAMPLAIN ST. (100 ST.)

PILON ST. (100A ST.)

GRANDIN AVE. (100 AVE.)

HIGHWAY 642

99A AVE.

25

24

23

22

1

14A

22

21

20

19

18

17

16

15A

14A

B

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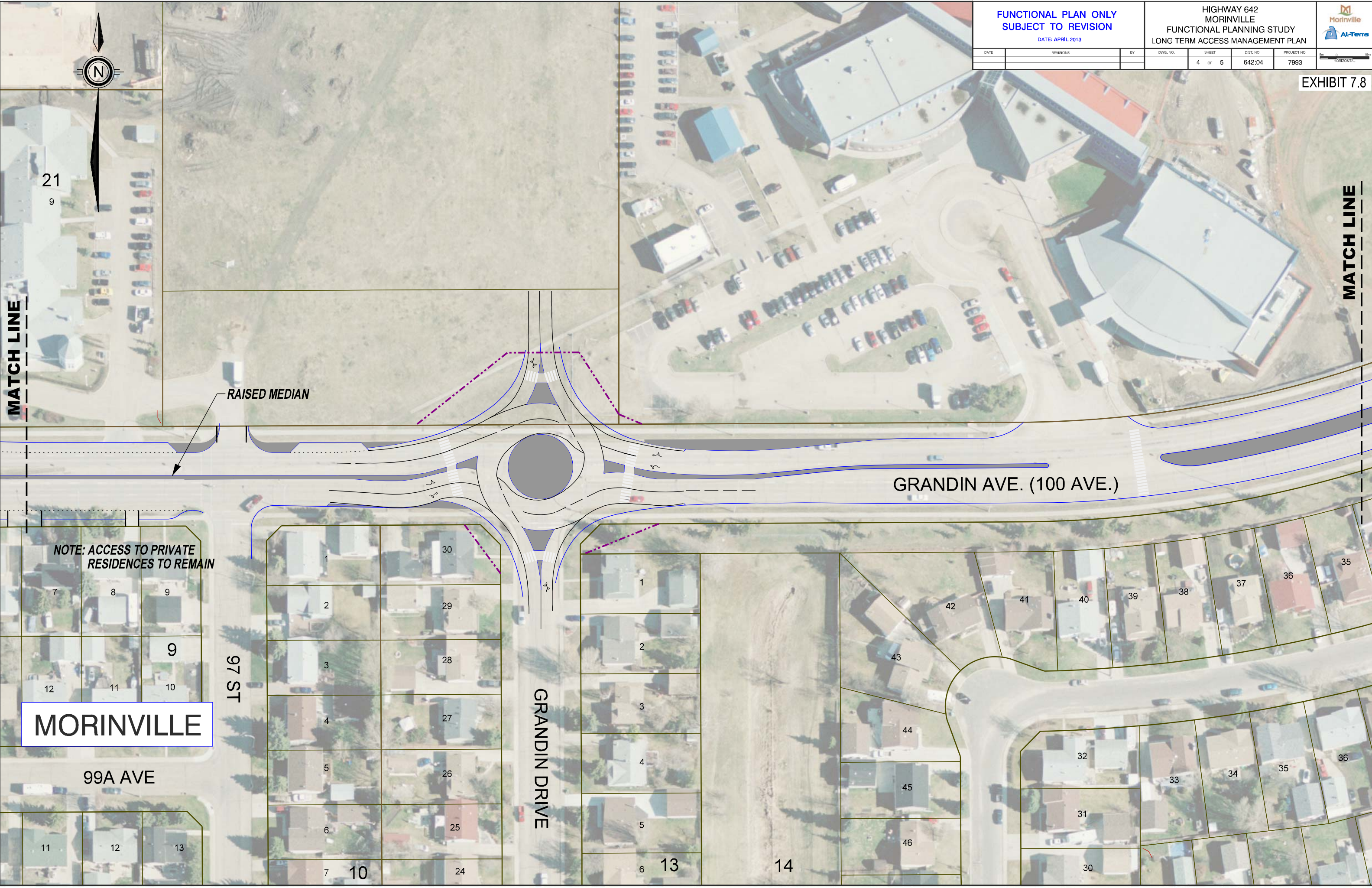
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HIGHWAY 642
MORINVILLE
FUNCTIONAL PLANNING STUDY
LONG TERM ACCESS MANAGEMENT PLAN



DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
				4 of 5	642:04	7993

EXHIBIT 7.8



21
9

MATCH LINE

MATCH LINE

RAISED MEDIAN

GRANDIN AVE. (100 AVE.)

GRANDIN DRIVE

97 ST

MORINVILLE

99A AVE

NOTE: ACCESS TO PRIVATE RESIDENCES TO REMAIN

7 8 9
12 11 10

1 30
2 29
3 28
4 27
5 26
6 25
7 10 24

1 2 3 4 5 6 13

14

42 41 40 39 38 37 36 35
43 44 45 46
32 33 34 35 36
31 30



MORINVILLE

FUNCTIONAL PLAN ONLY
SUBJECT TO REVISION
 DATE: APRIL 2013

DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
				5 of 5	642:04	7993

HIGHWAY 642
 MORINVILLE
 FUNCTIONAL PLANNING STUDY
 LONG TERM ACCESS MANAGEMENT PLAN

Morinville
 Al-Terra

0 10m
 HORIZONTAL

EXHIBIT 7.9

GRANDIN DR.

POSSIBLE RIGHT-IN/RIGHT-OUT ACCESS,
IF SUPPORTED BY TRAFFIC IMPACT ASSESSMENT

ACCESS LOCATED
SOUTH OF PEDESTRAIN CROSSING

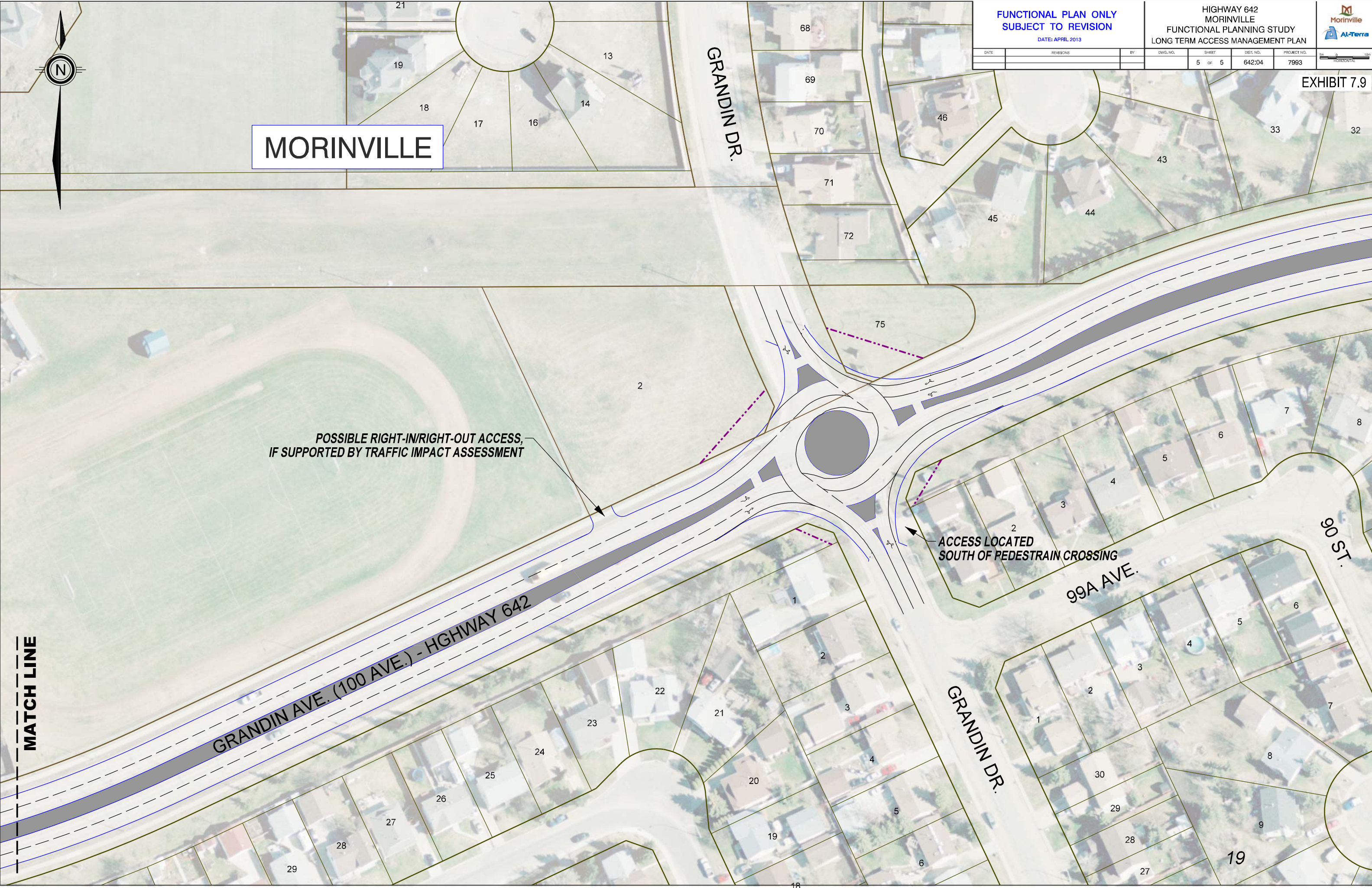
MATCH LINE

GRANDIN AVE. (100 AVE.) - HIGHWAY 642

99A AVE.

GRANDIN DR.

90 ST.



8.0 Implementation and Cost Estimates

8.1 Trigger for Improvement

There are a number of conditions that may trigger improvements on the 100 Avenue corridor; however, the timing of these is very difficult to predict due to the number of factors that may contribute to these conditions.

Possible triggers:

1. Warrant for signalization at any of the proposed roundabout intersections. The timing for this condition is dependent on Level of Service (LOS), tolerance of the community, and based on target LOS D for Morinville, warrant for signalization at 107 Street is expected within approximately 10 years. However, a development that generates high traffic volumes on 107 Street could also result in warrant for signalization, but it is more likely that the public will demand improvements when LOS C is eminent, which could occur within five years.
2. Streetscape and/or downtown redevelopment/beautification may trigger improvements on the corridor or a specific section of the corridor.
3. Need to address safety or operational concerns at an intersection for any number of reasons. An example could be 107 Street where multiple access currently in use coupled with growing traffic demand could trigger warrants for improvement.

Although somewhat intangible, we believe that within the five to ten year horizon some improvements on the corridor will be required due to one of the triggers noted above.

8.2 Phased Implementation

This report does not present a phasing plan or a partial implementation plan. Once the warrant at one intersection is met, part of the preliminary design work needed will be to decide whether to improve the intersection in question in isolation, or to improve adjacent intersections at the same time to maintain corridor consistency.

Typical transitions between parts of the corridor improvement with roundabouts and those maintaining conventional intersections have not been developed as part of this project. These transitions will have to be developed as part of the preliminary design.

8.3 Single Lane Roundabouts

Considered but not designed was the option of implementing the roundabout as a single lane for the first stage. It is anticipated that the roundabouts would be built out to their final outside diameter and the inside travel lane would be implemented along the rest of the corridor. Thus, widening would be to the outside for the corridor and to the inside at the roundabouts. Transitions between those sections thus converted to roundabouts and neighbouring unimproved sections would need to be carefully considered.

It is anticipated that single lane roundabouts would provide sufficient capacity along the corridor at all locations except 100 Street for 30+ years. The intersection at 100 Street would likely require a two lane roundabout by the 20 year horizon, and thus should be built (or easily converted) to that standard when implemented, even if the other roundabouts are first built to a single lane standard.

The issue surrounding how to transition from sections of the corridor when a roundabout has been implemented was considered beyond the scope of this study. It is anticipated that these issues will be addressed in a future planning exercise or as part of the preliminary design work. It may be prudent to implement the roundabouts with their final stage configuration initially, avoiding complex transitions (much easier transitions) and later reconfiguration.

8.4 Cost Estimate

8.4.1 Comparative Costs

Concept level cost estimates were prepared to compare the capital cost of the long term roundabout intersection option and the long term more conventional signalized intersection system. These cost estimates were based on estimated construction costs for intersection improvements and asphalt overlay, and included construction costs for reconstruction of curb and gutter and sidewalks for both sides of Highway 642 (100 Avenue) between 107 Street and 99 Street. The estimate for conventional intersections included south side widening, as well as replacement of curb, gutter and sidewalk. The capital cost of the roundabout option is estimated to be approximately \$0.1M higher than the capital cost for the conventional intersection option; however, operating costs for signals for the conventional signalized intersection concept would have ongoing operating/maintenance costs of \$3,000 to \$4,000 per year. Right of way costs would be approximately \$6.4M higher for the conventional intersection option, which suggests that from a cost perspective, the roundabout option provides a cost effective long term strategy for the upgrading of Highway 642 (100 Avenue) through Morinville. Detailed conceptual cost estimates for both options are included in **Appendix F**.

8.4.2 Recommended Option

A more comprehensive conceptual construction cost estimate based on 2012 typical construction costs for the long term roundabout intersection option was subsequently prepared to address the following additional issues:

- ◆ Condition assessment of curb and gutter, and sidewalk between Highway 2 and 99 Street indicated that much of this infrastructure was showing its age (+35 years), and hence significant deterioration, particularly in some sections.
- ◆ A desire to maximize the public realm through widening of sidewalks throughout, but particularly through Main Street Morinville between 107 Street and 99 Street. The roundabout option creates an opportunity to provide ± 4.0 m wide sidewalks on each side, within the existing Highway 642 right-of-way, but will require reconstruction of curb and gutter, and sidewalks between intersections.

The construction cost estimate for the roundabout roadway option included in **Appendix F** is based on the following assumptions:

- ◆ Construction costs are based on 2012 typical construction costs and standard construction, and do not include streetscape elements, landscape and tree plantings, or other urban design elements.
- ◆ Existing road base is sound and extensive reconstruction will not be required. Further assessment and evaluation should be completed prior to construction to confirm road rehabilitation requirements.

- ◆ No reprofiling on the roadway to correct current substandard profile.
- ◆ 100 Avenue road improvements between 107 Street and 99 Street are expected to include:
 - Roundabout intersection improvements as indicated on the recommended plans.
 - Remove and replace curb and gutter on each side of the road.
 - Remove existing sidewalk on each side of the road and install new standard sidewalk (+4.0 m wide).
 - Provide 1.5 m wide raised slab on median to separate travel direction.
 - Pavement overlay on entire roadway with \pm 50 mm asphalt.
- ◆ 100 Avenue road improvements between 99 Street and East Boundary Road are expected to include:
 - Roundabout intersection improvements at Grandin Drive (east) and Grandin Drive (west). Roundabout at East Boundary Road is not included in cost estimate as it is primarily outside of town jurisdiction.
 - Median modified only as required to accommodate roundabout intersections. New median between 100 Street and Grandin Drive (east).
 - No replacement of curb and gutter or sidewalks as existing is to be retained.
 - Pavement overlay on entire roadway with 50 mm asphalt.

As noted, cost estimates do not include any amount for right-of-way costs, streetscaping or street lighting, but 30% miscellaneous and contingency have been included to cover unforeseen costs. In addition no costs have been carried for franchise utility relocation and/or modification as the road profile remains unchanged. Any franchise utility upgrades should therefore be the responsibility of the franchise utility.

The cost estimate included only minor modifications of the storm drainage system, as required to facilitate the intersection improvements and assumed that the existing storm drainage system would not require improvements due to condition and/or capacity constraints.

The cost estimate was based on the assumption that the entire project would be completed in a single contract. Although this will not likely occur, as many staging options are possible, this will provide an order of magnitude cost for implementation.

Estimated construction cost to implement the plan as described:

Sections 1 and 2 – West of 107 Street to 99 Street	\$5.3M
Section 3 – 99 Street to East Boundary Road	\$4.0M
Total	\$9.3M

Right of way costs, including damages could be in the order of \$7.0 M, depending on the amount available through dedication as a result of development or redevelopment applications.

The estimated cost of right of way, including damages for the conventional intersection option, would be in the range of \$13.4 M.

9.0 Public and Stakeholder Consultation

9.1 Project Review Committee (PRC)

At the Town's request, a Project Review Committee (PRC) was formed. This committee served as a sounding board to present ideas to and gather feedback from before going to the public. The committee met a number of times during the course of this study. The PRC included members representing:

- ◆ Al-Terra Engineering
- ◆ PlanFirst Consulting Group
- ◆ Morinville RCMP
- ◆ Town of Morinville (Planning and Development, Public Works, Bylaw Enforcement, Office of the CAO, and Elected Officials)
- ◆ Morinville and District Chamber of Commerce
- ◆ Alberta Transportation
- ◆ Sturgeon County

Further to the meetings with the PRC, the project was also presented to the Morinville and Area Chamber of Commerce on October 3, 2012.

9.2 September 26, 2012 Public Open House

A joint public Open House for this project and the Coeur de Morinville ASP was held at the Morinville Community Cultural Centre on September 26, 2012. There were about 35 attendees, of which 21 completed available Feedback Forms. This is a small sample size which may or may not represent the views of the larger community.

Of those that completed the feedback form:

- ◆ 68% were residents
- ◆ 89% of respondents agree (or strongly agree) that safe vehicular access to businesses is important
- ◆ 85% of respondents agree (or strongly agree) that access to on-street parking access in front of businesses is important
- ◆ 100% of respondents agree (or strongly agree) that improving pedestrian safety is important
- ◆ 35% of respondents do not agree that off-street parking downtown is a suitable alternative to on-street parking
- ◆ 30% of respondents agree (or strongly agree) that off-street parking downtown is a suitable alternative to on-street parking
- ◆ 70% of respondents agree (or strongly agree) that efficient vehicular movement along 100 Avenue through town is important.
- ◆ 85% of respondents agree (or strongly agree) that slowing traffic along 100 Avenue is important.
- ◆ 82% of respondents agree (or strongly agree) that mid-block crossings are important downtown
- ◆ 64% of respondents agree (or strongly agree) that conventional traffic signals offer the most suitable traffic and access management option for downtown

- ◆ 17% of respondents disagree that conventional traffic signals offer the most suitable traffic and access management option for downtown
- ◆ 33% respondents agree (or strongly agree) that roundabouts offer the most suitable traffic and access management option for downtown
- ◆ 61% respondents disagree that roundabouts offer the most suitable traffic and access management option for downtown

Additionally, feedback was recorded by the PlanFirst Consulting Group who performed business owner and resident stakeholder interviews for the Coeur de Morinville ASP project. Of the 14 business owners, the following themes appeared:

- ◆ Desire to resolve access management issues
- ◆ Desire to remove development restrictions
- ◆ Desire to maintain existing parking
- ◆ Desire to improve aesthetics in downtown
- ◆ Desire to improve pedestrian safety
- ◆ Desire to slow down traffic
- ◆ General support for roundabouts

PlanFirst also interviewed 26 residents and the following themes appeared:

- ◆ Desire to slow down traffic
- ◆ Desire to improve pedestrian safety
- ◆ Desire to avoid short-cutting through residential neighbourhoods
- ◆ Mixed preferences between conventional lights and roundabouts, but very limited outright rejection of either option

Based on the above data, the majority of interested parties agreed or strongly agreed with the importance of the following issues:

- ◆ Safe vehicular access to business,
- ◆ On-street parking for businesses along 100 Avenue,
- ◆ Improving pedestrian safety,
- ◆ Slowing traffic through town, and
- ◆ Ensuring efficient movement of vehicles through town.

In general, many people accept the idea of modern roundabouts while some remain cautious in their acceptance of the option. Familiarity likely plays a role in level of acceptance of either option. Both options require thorough evaluation.

9.3 April 2013 Public Open House

The second public Open House will be held in April 2013 to present the improved roundabout option to the public. In addition to this Open House, landowners at the intersections impacted by right-of-way requirements were invited to participate in confidential discussions prior to the Open House.

Although there continued to be some opposition to the roundabout option at the second Open House, it was perceived that generally many concerns were properly addressed.

10.0 Right of Way Requirements

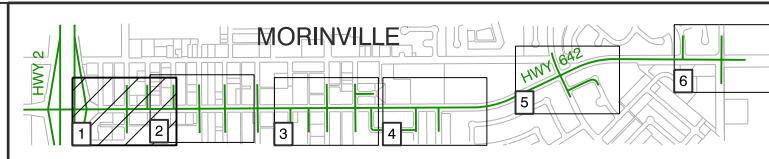
Right of Way (ROW) will be required to implement the roundabouts as proposed in this Functional Plan. ROW will typically be needed at each quadrant of an intersection where a roundabout is proposed, but no extra ROW will be required along the length of the corridor. A total of 7,860 m² [1.94 acres] of ROW is required. Approximately 2,785 m² [29,980 sq ft] of buildings along the corridor will need to be removed as well. The ROW required is detailed on **Exhibits 10.1 through 10.6** and will have an estimated cost of approximately \$7.0 M, which includes right of way and impacted building purchase.

If the conventional intersection option was selected, the required ROW would total 9,772 m² [2.41 acres]. This would include a strip of land along the south side of the corridor from 107 Street to 100 Street. Approximately 5,675 m² [61,082 sq ft] of buildings along the corridor would need to be removed as well. Plans showing the ROW required for this option are detailed in **Appendix B**. The estimated cost of right of way and building purchase for the conventional intersection option would be approximately \$13.4 M.

It may be possible to significantly mitigate the cost of right of way for the roundabout option through a design optimization process. This is beyond the scope of this study, and would initially require contacting impacted landowners to identify willing sellers, if any. The current roundabout design centres each roundabout at the centreline of the intersecting roadways. Shifting the location should significantly decrease the impact on some quadrants, while increasing the impact on others. It may be prudent to undertake such optimization when willing sellers come forward to the Town or Alberta Transportation.

Right of way cost estimates for both the roundabout option and conventional intersection option are included in **Appendix F**. The cost estimates assume that where road widening impacts an existing building, the entire building is deemed to require purchase (demolition).

LEGEND
■ - REQUIRED RIGHT-OF-WAY

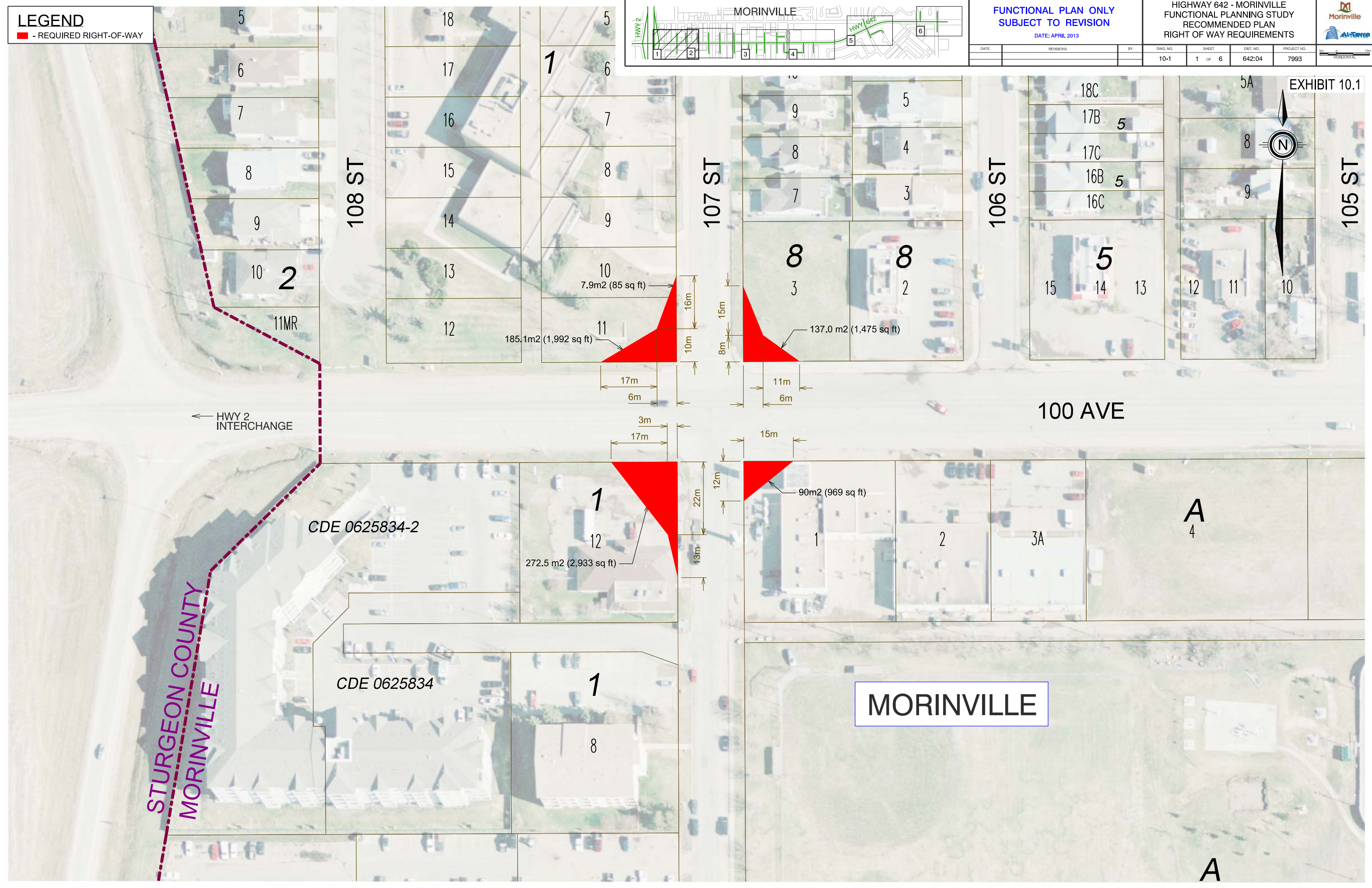


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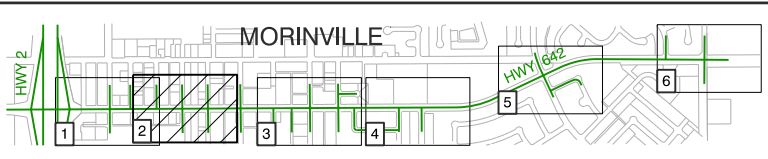
HIGHWAY 642 - MORINVILLE
 FUNCTIONAL PLANNING STUDY
 RECOMMENDED PLAN
 RIGHT OF WAY REQUIREMENTS



DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
			10-1	1 OF 6	642:04	7993



LEGEND
 - REQUIRED RIGHT-OF-WAY

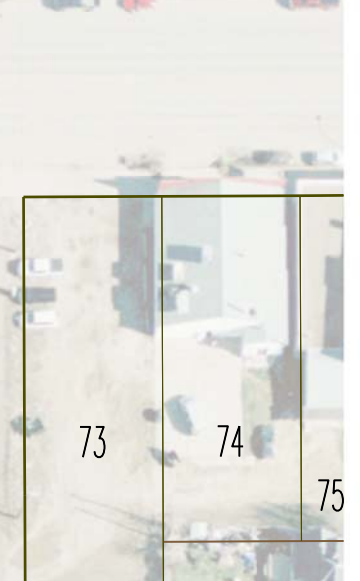
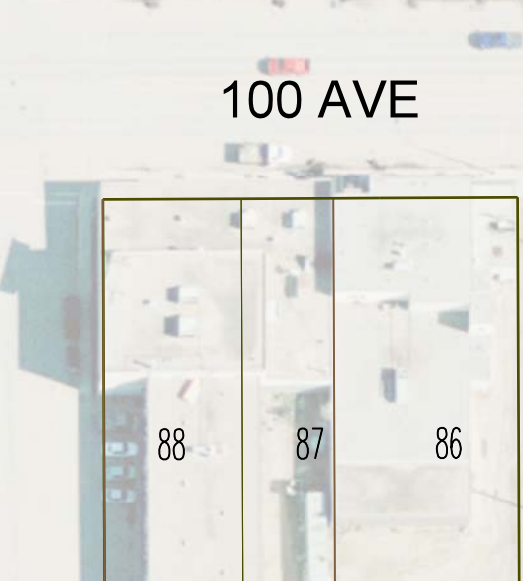
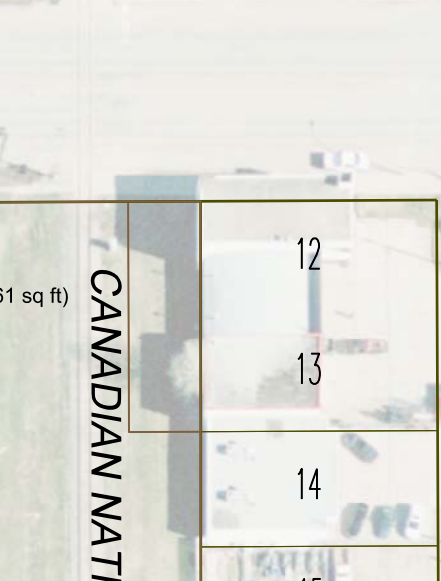
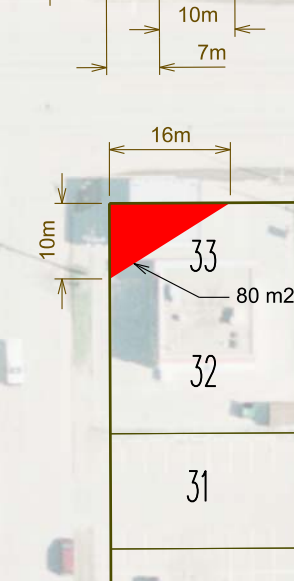
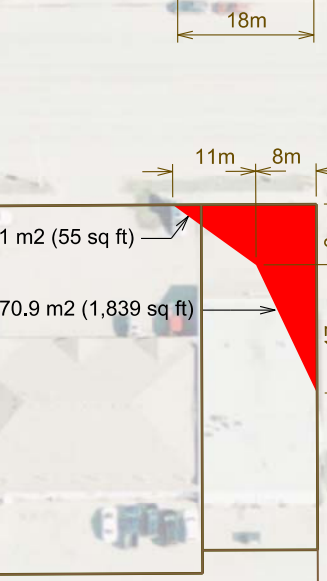
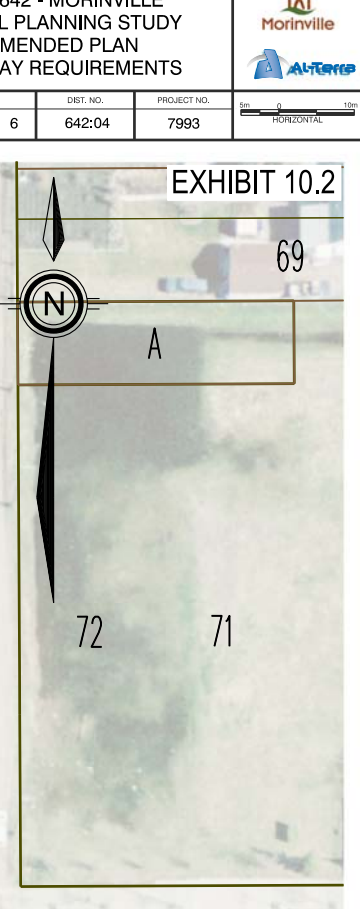
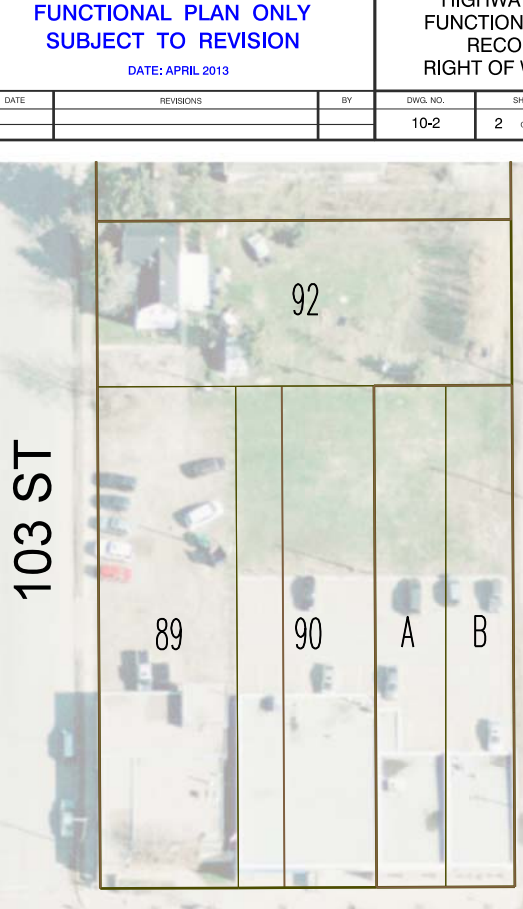
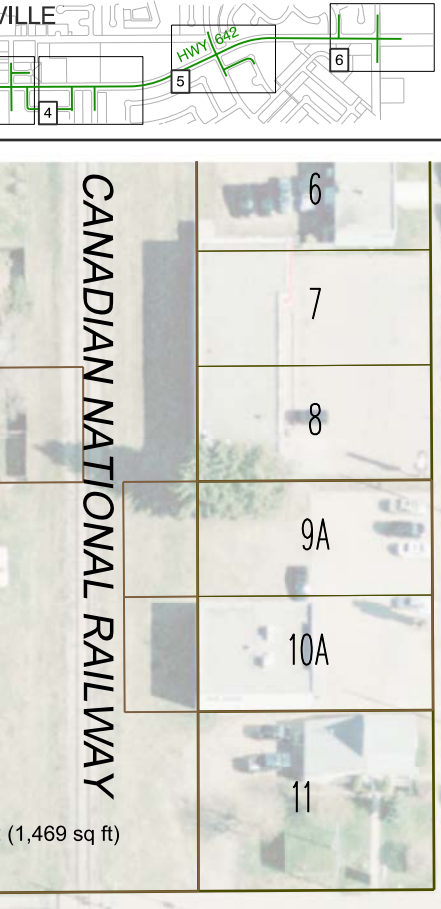
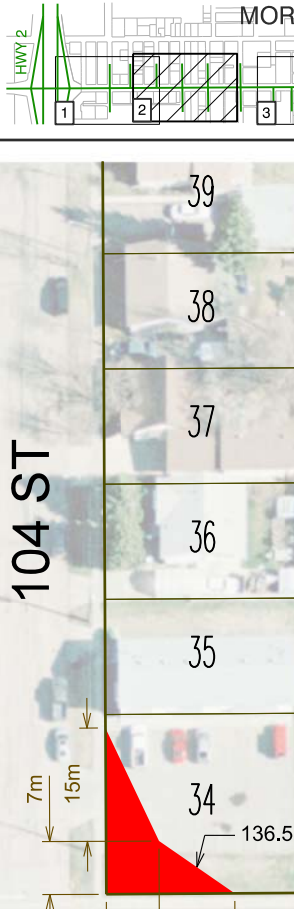
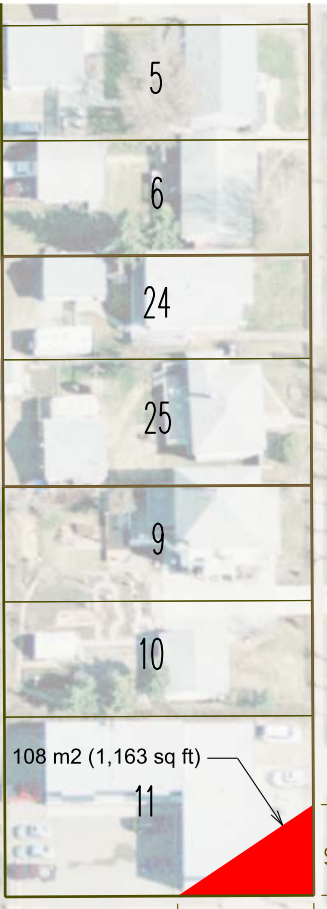
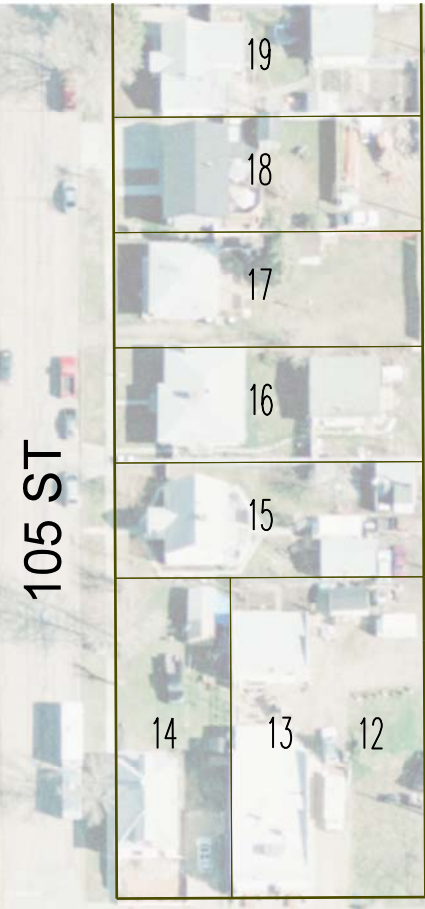
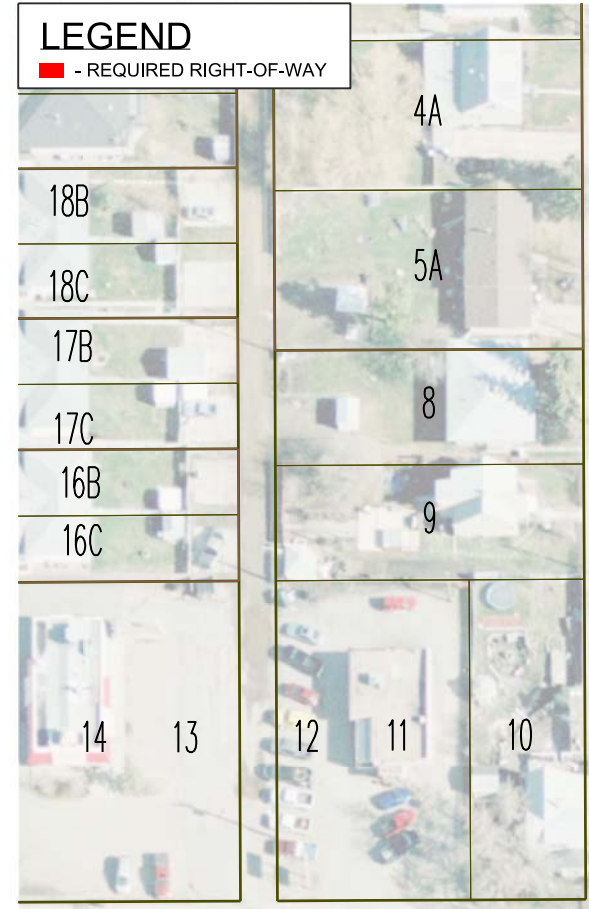


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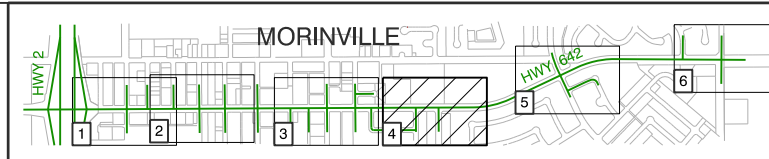
HIGHWAY 642 - MORINVILLE
 FUNCTIONAL PLANNING STUDY
 RECOMMENDED PLAN
 RIGHT OF WAY REQUIREMENTS



DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
			10-2	2 OF 6	642:04	7993



LEGEND
■ - REQUIRED RIGHT-OF-WAY



FUNCTIONAL PLAN ONLY
SUBJECT TO REVISION
 DATE: APRIL 2013

HIGHWAY 642 - MORINVILLE
 FUNCTIONAL PLANNING STUDY
 RECOMMENDED PLAN
 RIGHT OF WAY REQUIREMENTS



DATE	REVISIONS	BY	DWG. NO.	SHEET	DIST. NO.	PROJECT NO.
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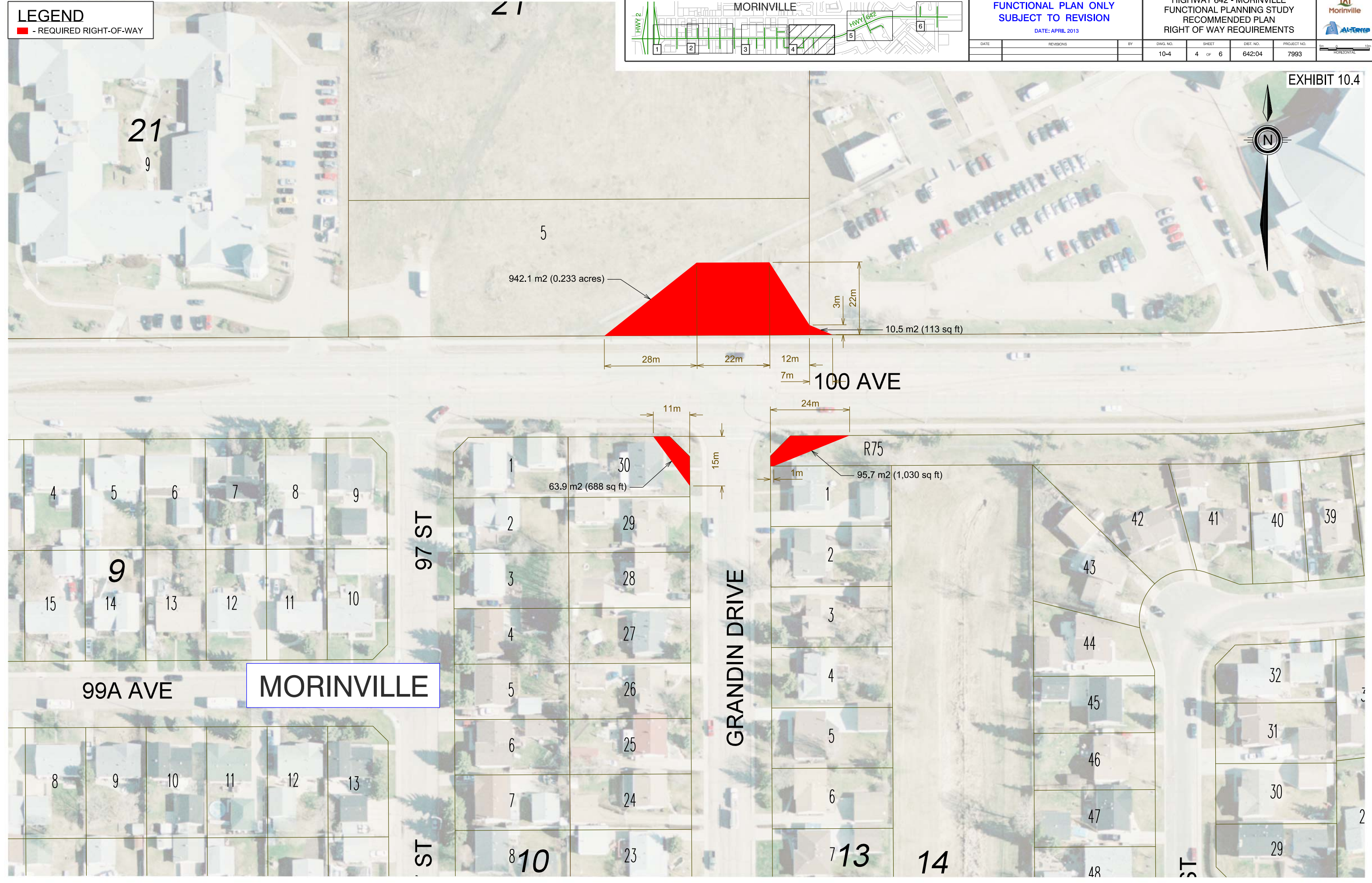
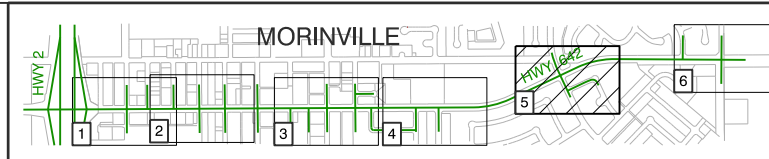


EXHIBIT 10.4



LEGEND
■ - REQUIRED RIGHT-OF-WAY



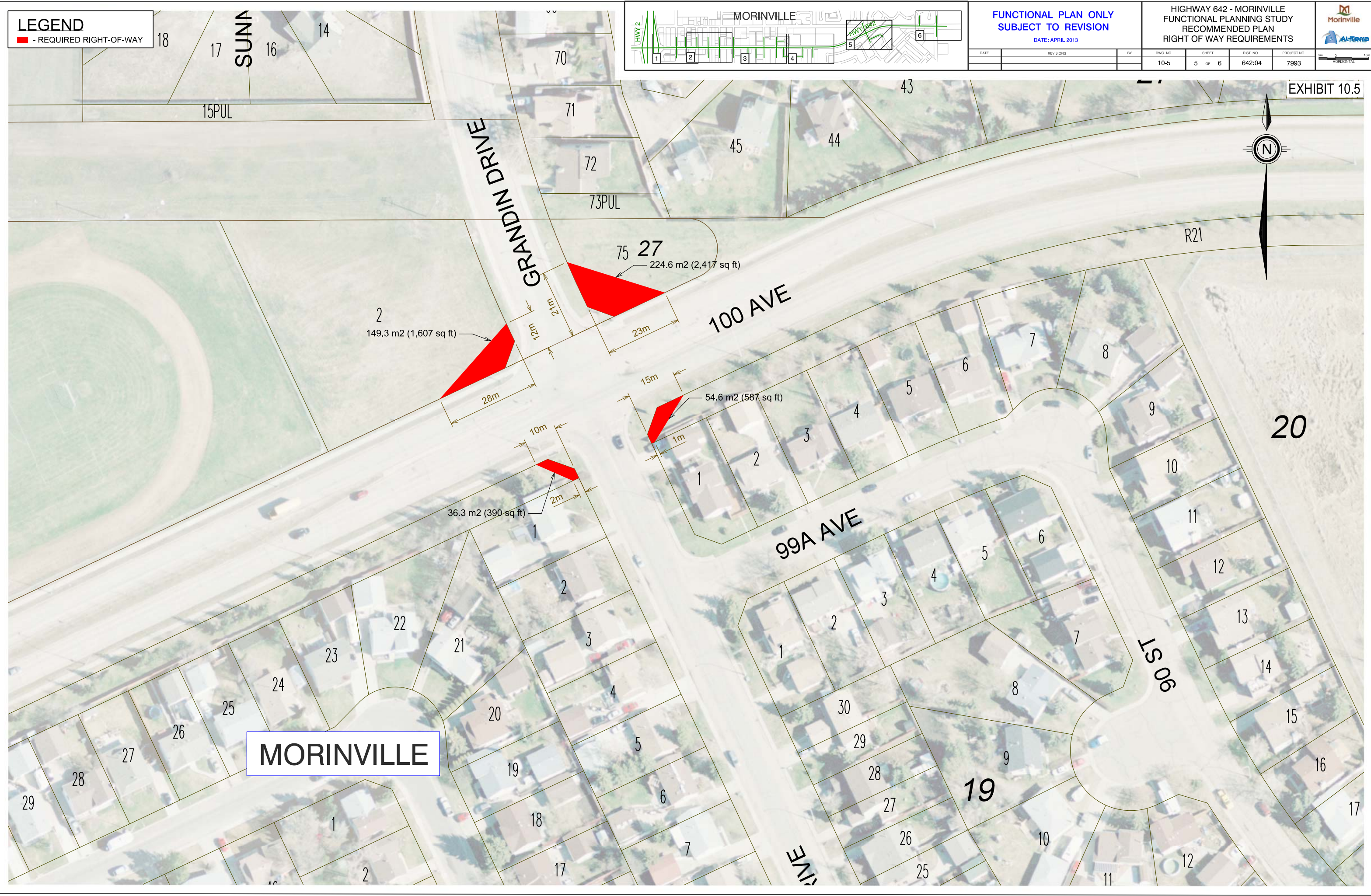
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HIGHWAY 642 - MORINVILLE
 FUNCTIONAL PLANNING STUDY
 RECOMMENDED PLAN
 RIGHT OF WAY REQUIREMENTS

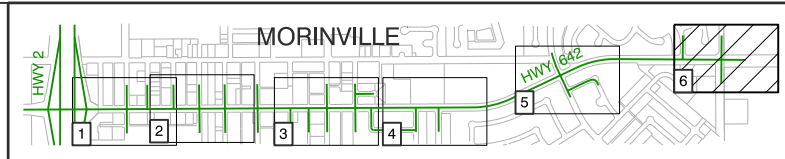


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			10-5	5 OF 6	642:04	7993

EXHIBIT 10.5



LEGEND
 - REQUIRED RIGHT-OF-WAY



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HIGHWAY 642 - MORINVILLE
 FUNCTIONAL PLANNING STUDY
 RECOMMENDED PLAN
 RIGHT OF WAY REQUIREMENTS



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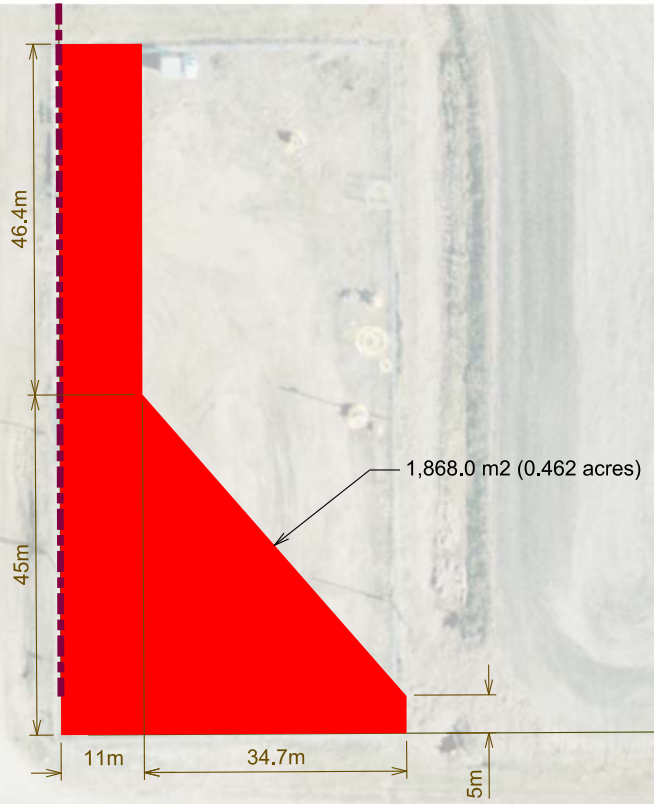
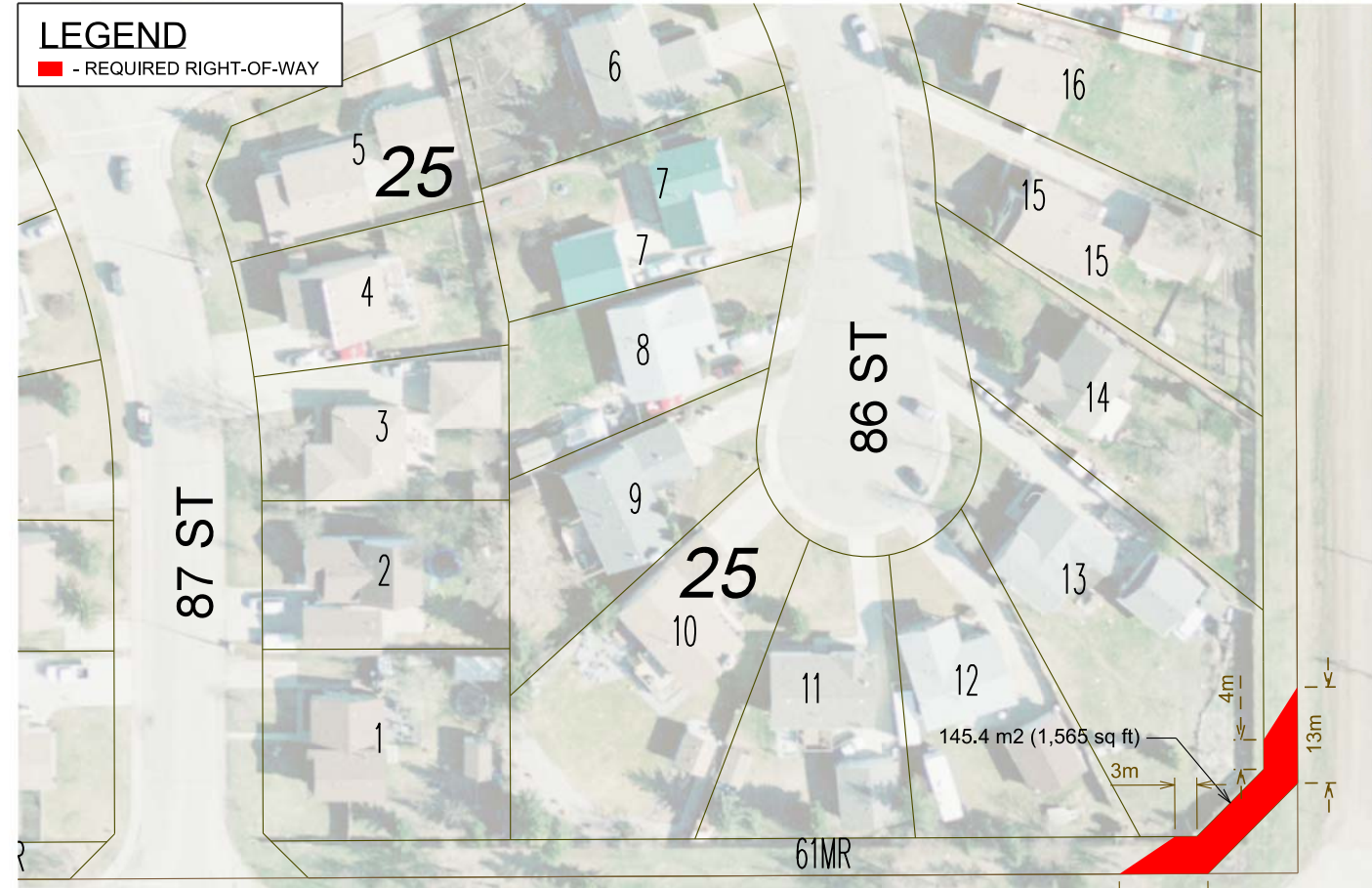
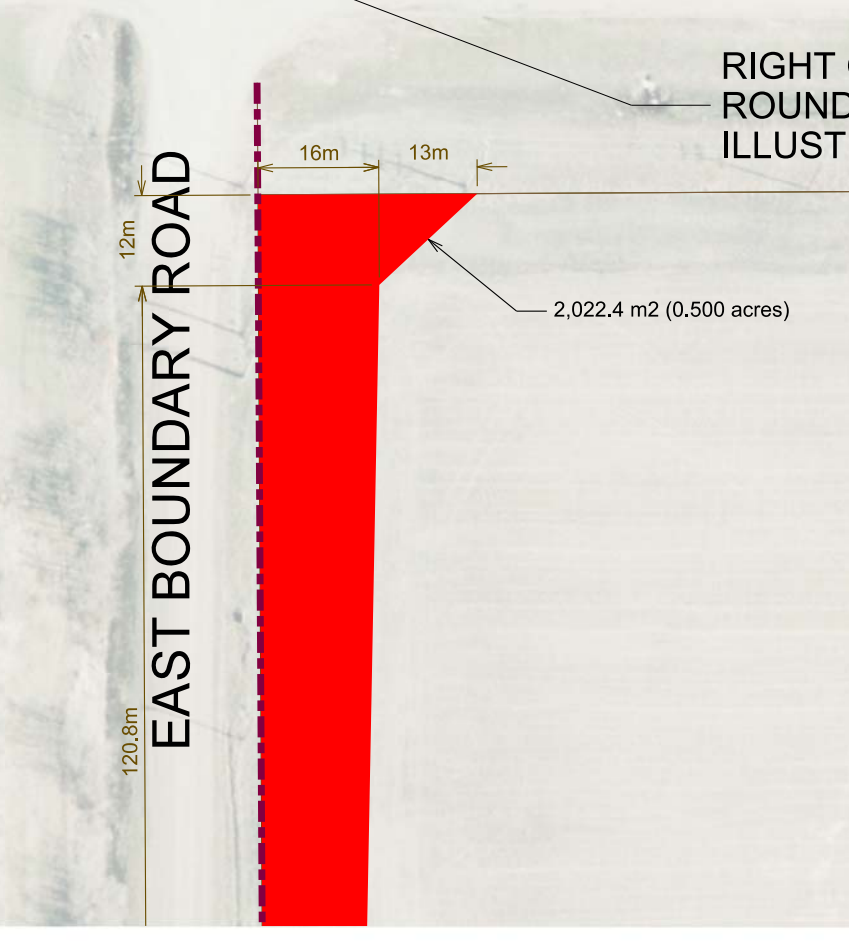
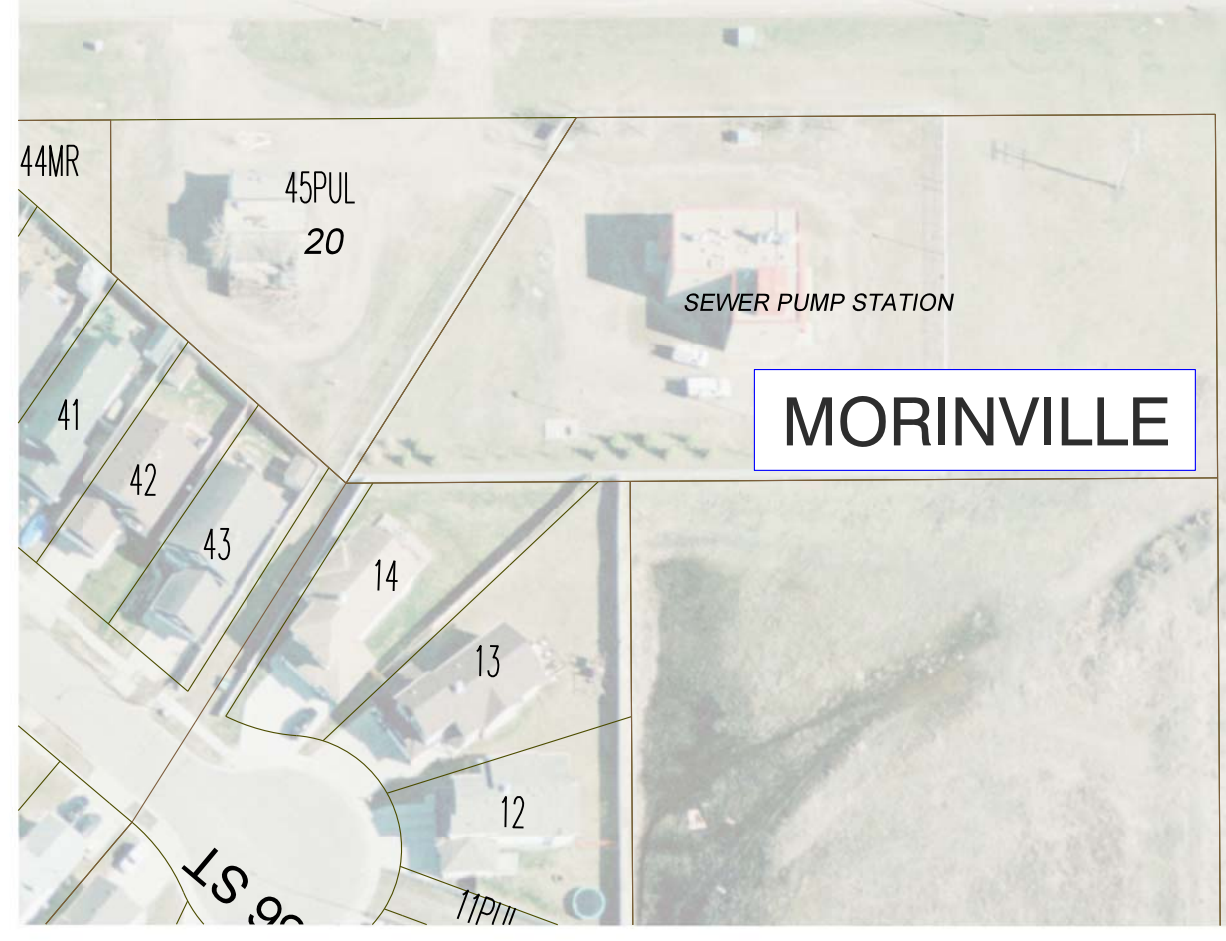
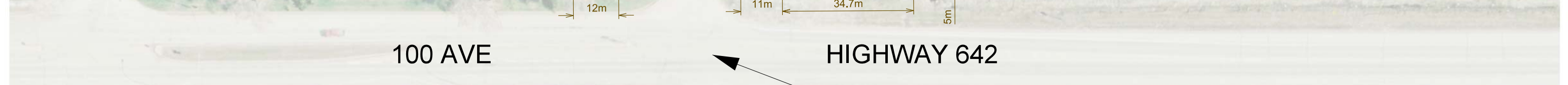


EXHIBIT 10.6



RIGHT OF WAY FOR CONCEPTIONAL
 ROUNDABOUT SHOWN FOR
 ILLUSTRATION - TO BE CONFIRMED

11.0 Drainage

Plans and profile drawings showing design and as-built information for 100 Avenue road improvements between 103 Street and East Boundary Road are included in **Appendix A**. The drawings indicate the corridor is longitudinally very flat, particularly between 103 Street and 97 Avenue, where grades as low as 0.13% are noted (minimum design grade is 0.5%). Although it would be desirable to provide improved grades for this roadway in conjunction with the proposed improvements, we do not expect this would be feasible or cost effective due to many adjacent constraints by existing development. It was determined during the study that it would likely only be feasible to generally keep the roadway at the existing profile and provide limited improvements where required and appropriate.

The storm drainage system that serves this section of 100 Avenue between 99 Street and 107 Street includes storm crossing mains at most intersections. Catch basins are connected to these storm crossings to provide a reasonably effective and efficient roadway drainage system. Minor modifications and extension of the existing drainage is anticipated for the proposed road improvements, and it has been assumed that existing storm sewers have sufficient capacity and are of suitable condition to continue to accommodate 100 Avenue drainage.

East of 99 Street the storm drainage system consists of a combination of storm sewers crossing 100 Avenue, and in some sections, running parallel to the roadway outside of the carriage. As the curb and gutter for the roadway in this section will generally stay intact, except at the proposed roundabout intersections, little modification of storm sewer is anticipated. Sufficient capacity is assumed to be available within the storm sewer system to accommodate drainage from additional roundabouts.

Exhibits 12.1 to 12.4 illustrate the existing storm drainage system along the 100 Avenue corridor, along with sanitary sewers and watermains. A condition assessment of all deep utilities in the vicinity of, or impacted by, the 100 Avenue road improvements should be completed in advance of implementation, and any remedial works completed in advance or in conjunction with road improvements.

12.0 Utilities

Utilities are an important part of any modern city. Utilities are of particular interest to road project such as this because utilities are often placed within the road right of way for easy access. Utilities can be broken into 'deep utilities' and 'shallow utilities.' Utilities are mentioned as part of this report to ensure that they are considered as part of the detailed design work and arrangements can be made for their relocation as necessary.

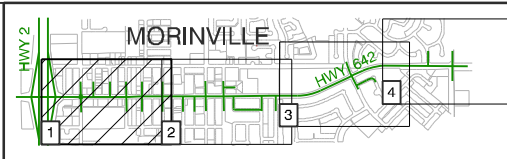
'Deep utilities' refers to the potable water, storm sewer, and sanitary sewer systems. These are typically buried below the frost line to avoid problems with freezing. Along the 100 Avenue corridor, the storm and sanitary sewer typically runs at a right angle to the corridor. That said, there is a sanitary sewer line that runs along the south side of the corridor from 103 Street to 100 Street, and then again from 99 Street to 97 Street. East of Grandin Drive (west junction), there is a strip of municipal reserve land along the south side of the corridor, but separate from the road right of way, that carries storm and sanitary sewer lines. For much of the corridor, there is also a potable water line along the edge of the right of way. From the Highway 2 interchange to Grandin Drive (west junction), this line runs along the south edge, and from Grandin Drive (west junction) to Grandin Drive (east junction), this line runs along the north edge of the road right of way. **Exhibits 12.1 through 12.4** show the existing deep utilities.

'Shallow utilities' refers to utilities such as cable television, telecommunications, residential gas service, and electrical power. These utilities often make use of the road right of way through an agreement with the road authority. This agreement will specify the procedures for moving these utilities and the cost share for doing so. Utility plans were requested and received from Shaw, Telus, and AltaGas. The Shaw plans show several coax cable crossings, a coax cable running along the south edge of the road right of way from 100 Street to 97 Street, and another coax cable running along the north edge of the road right of way from 87 Street to East Boundary Road. The Telus plan shows a cable running along 100 Avenue from 99 Street to East Boundary Road, as well as several road crossings. The AltaGas plans show a gas pipeline running along the north edge of the road right of way from 107 Street to 104 Street, and from Grandin Drive (east junction) to East Boundary Road, as well as several crossings. **Appendix E** has shallow utility plans.

In addition, there are three petroleum pipelines that cross the road right of way about halfway between Grandin Drive (east junction) and 97 Street. All three pipelines are owned by Pembina Pipeline Corporation and are 10 ¾" [273.1 mm], 16" [406.4 mm], and 16" [406.4 mm] in diameter. Two of the pipelines carry crude oil and one carries Low Vapour Pressure (LVP) products. Cross agreements for these pipelines will be required for any construction or reconstruction over these pipelines.

LEGEND

- POTABLE WATER MAIN
- SANITARY SEWER MAIN
- STORM SEWER MAIN
- HYDRANT
- PROPOSED RIGHT-OF-WAY BOUNDARY
- EXISTING CURB



FUNCTIONAL PLAN ONLY
SUBJECT TO REVISION

DATE: APRIL 2013

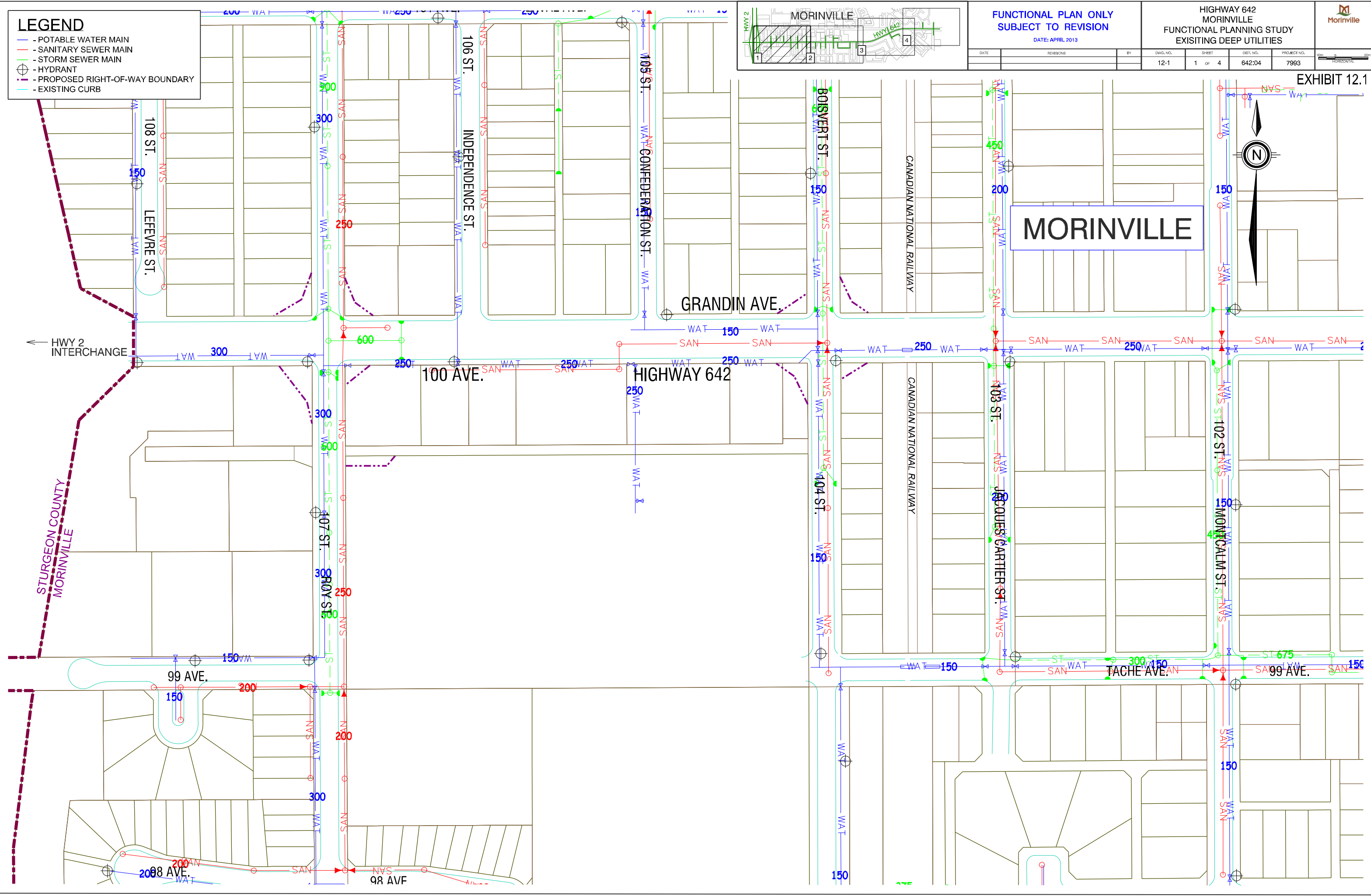
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HIGHWAY 642
MORINVILLE
FUNCTIONAL PLANNING STUDY
EXISTING DEEP UTILITIES

Morinville

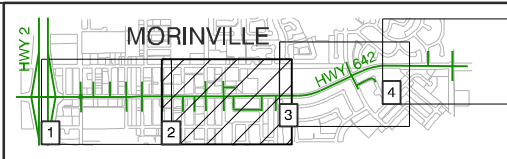
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HORIZONTAL

EXHIBIT 12.1



LEGEND

- POTABLE WATER MAIN
- SANITARY SEWER MAIN
- STORM SEWER MAIN
- HYDRANT
- PROPOSED RIGHT-OF-WAY BOUNDARY
- EXISTING CURB



FUNCTIONAL PLAN ONLY
SUBJECT TO REVISION
 DATE: APRIL 2013

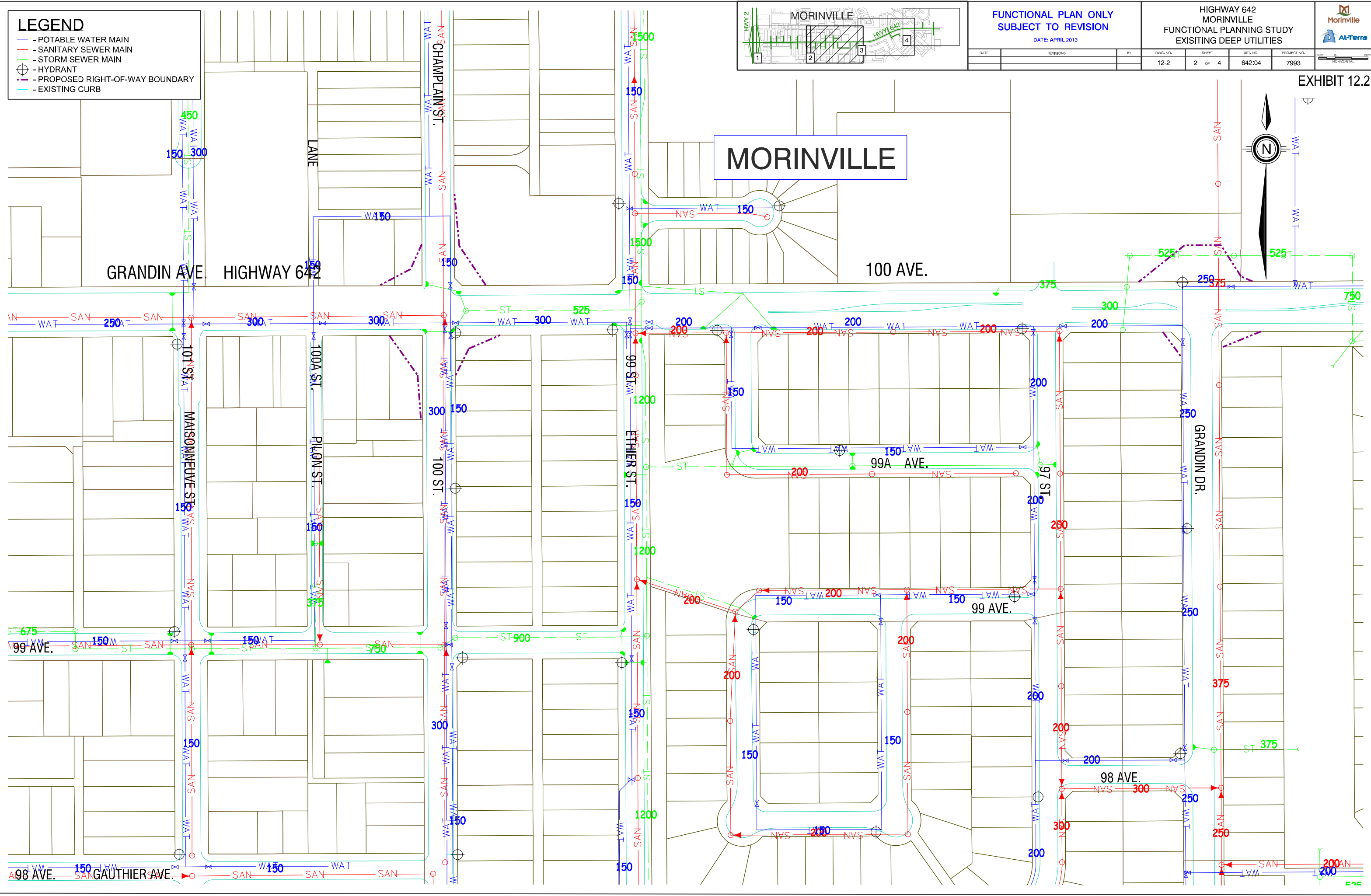
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HIGHWAY 642 MORINVILLE
FUNCTIONAL PLANNING STUDY
EXISTING DEEP UTILITIES

Morinville
 Al-Terra

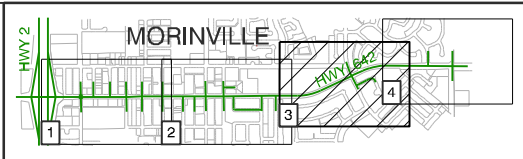
10m 0' 30m
 HORIZONTAL

EXHIBIT 12.2



LEGEND

- POTABLE WATER MAIN
- SANITARY SEWER MAIN
- STORM SEWER MAIN
- HYDRANT
- PROPOSED RIGHT-OF-WAY BOUNDARY
- EXISTING CURB



FUNCTIONAL PLAN ONLY
SUBJECT TO REVISION
 DATE: APRIL 2013

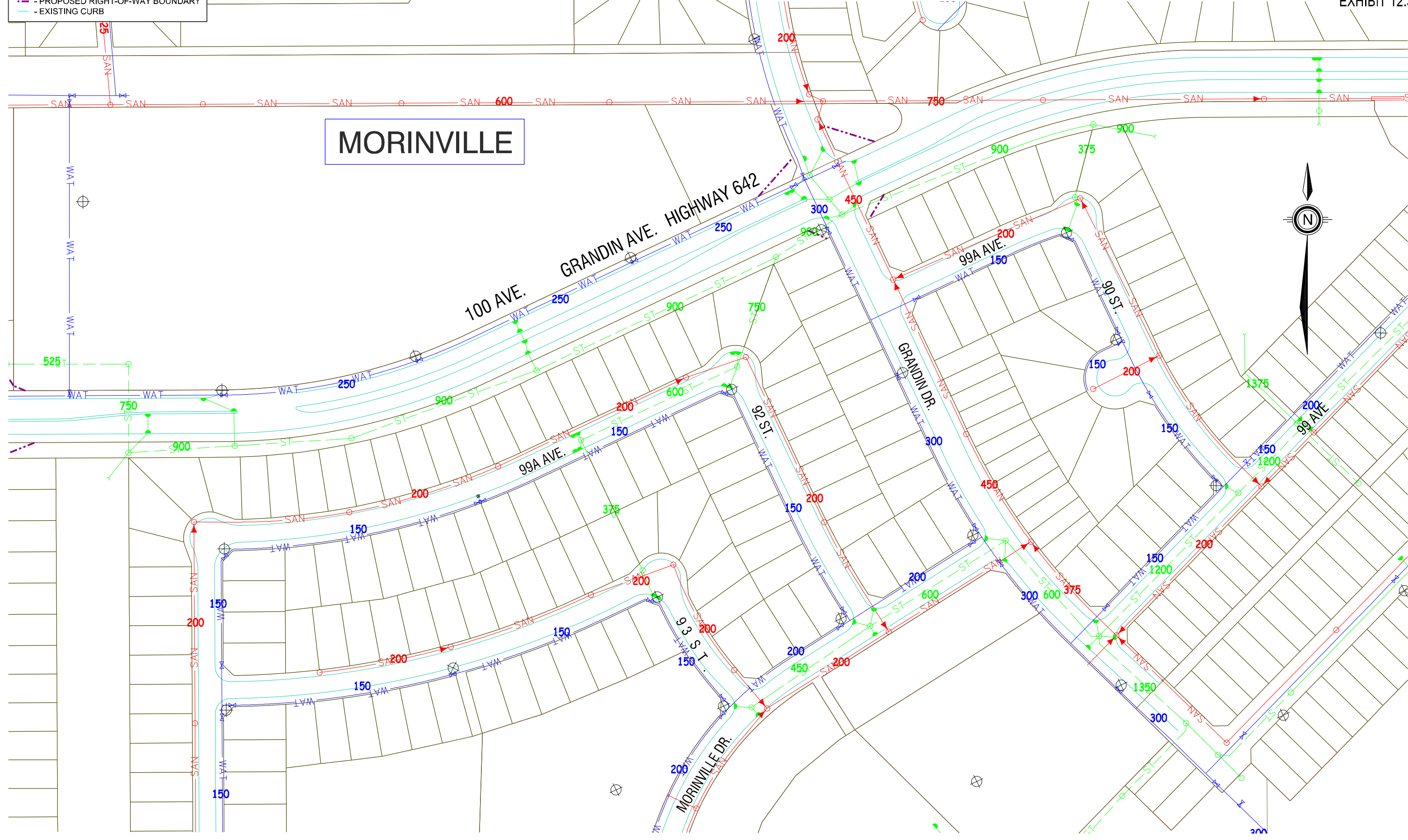
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HIGHWAY 642
 MORINVILLE
 FUNCTIONAL PLANNING STUDY
 EXISTING DEEP UTILITIES

Morinville
 Al-Terra
 HORIZONTAL

EXHIBIT 12.3

MORINVILLE



LEGEND

- POTABLE WATER MAIN
- SANITARY SEWER MAIN
- STORM SEWER MAIN
- HYDRANT
- PROPOSED RIGHT-OF-WAY BOUNDARY
- EXISTING CURB

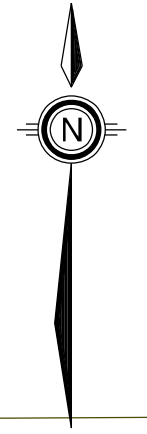
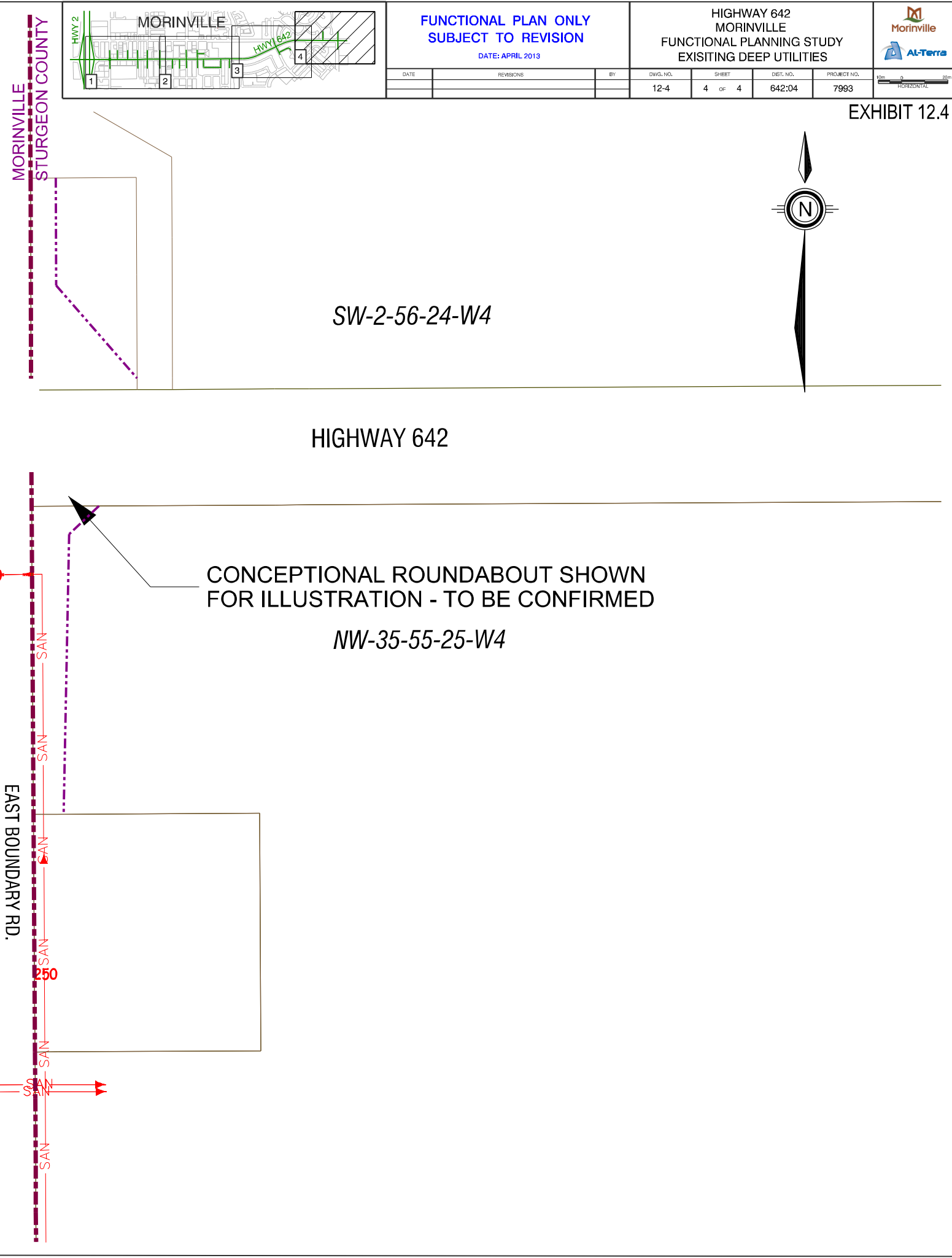
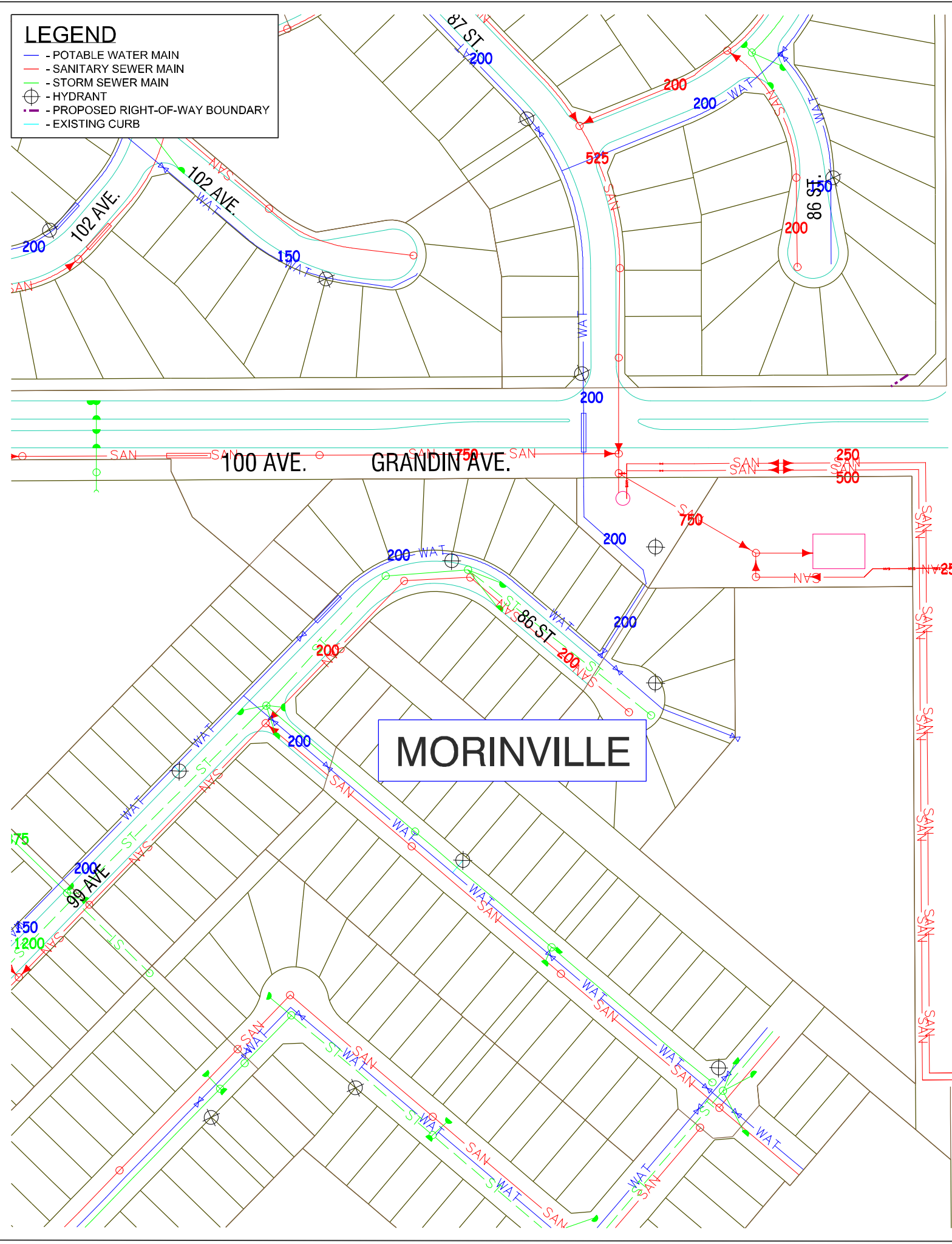
FUNCTIONAL PLAN ONLY
SUBJECT TO REVISION
DATE: APRIL 2013

HIGHWAY 642
MORINVILLE
FUNCTIONAL PLANNING STUDY
EXISTING DEEP UTILITIES



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EXHIBIT 12.4



13.0 Conclusions and Recommendations

13.1 Conclusions

Roundabouts have been presented as a cost effective and efficient solution to provide a high Level of Service for both vehicular and pedestrian traffic along 100 Avenue through downtown Morinville. Roundabouts also serve to provide access management while providing good access from side roads and business along the corridor to both directions of 100 Avenue, through the ability of roundabouts to offer safe U-turns. Additionally, roundabouts provide passage along the corridor for semi-trucks, thus allowing 100 Avenue to continue to function as Highway 642, part of the provincial highway network. It is anticipated that single lane roundabouts will provide an adequate Level of Service at all intersections except 100 Street for 30+ years and that two lane roundabouts will provide an adequate Level of Service at all intersections at the full build out of Morinville.

13.2 Recommendations

It is recommended that seven roundabouts be installed along 100 Avenue through Morinville with one at each of the intersections of 107 Street, 104 Street, 102 Street, 100 Street, Grandin Drive (west junction), Grandin Drive (east junction), and at East Boundary Road. It is recommended that right of way for each of these roundabouts be obtained at the soonest possible occasion or, if this is not possible, that any application for development or redevelopment at these corners is made dependant on making this right of way available. It is also recommended that further planning be undertaken to determine a first stage implementation plan and to examine transition issues between redeveloped sections of the road and existing sections of the road. A cursory analysis indicated that it may be prudent and cost effective to construct two-lane roundabouts as part of the initial implementation to avoid the costly and complex transitions associated with a staged implementation strategy. Further study is also recommended to determine a staging strategy for sequential implementation of roundabouts to meet the short and long term goals of both the Town of Morinville and Alberta Transportation.