ISL Engineering and Land Services

Inspiring sustainable thinking

City of Grande Prairie

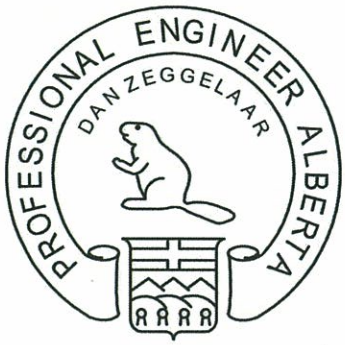
Final Report

92 Street (68 – 116 Avenue)
Functional Planning Study

March 2013

Corporate Authorization

This document entitled "*92 Street (68 – 116 Avenue) Functional Planning Study*" has been prepared by ISL Engineering and Land Services Ltd. (ISL) for the use of "*City of Grande Prairie*". The information and data provided herein represent ISL's professional judgement at the time of preparation. ISL denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without prior written consent from ISL.



March 11, 2013

Dan Zeggelaar, P.Eng.

PERMIT TO PRACTICE
ISL Engineering and Land Services Ltd.
Signature
Date March 11, 2013
PERMIT NUMBER: P 4741
The Association of Professional Engineers and Geoscientists of Alberta

Table of Contents

Appendices

Tables

Exhibits

1.0 Background

1.1 Study Area

The functional study area includes 92 Street from 68 Avenue to 116 Avenue and 100 The study area is shown in Exhibit 1.1.

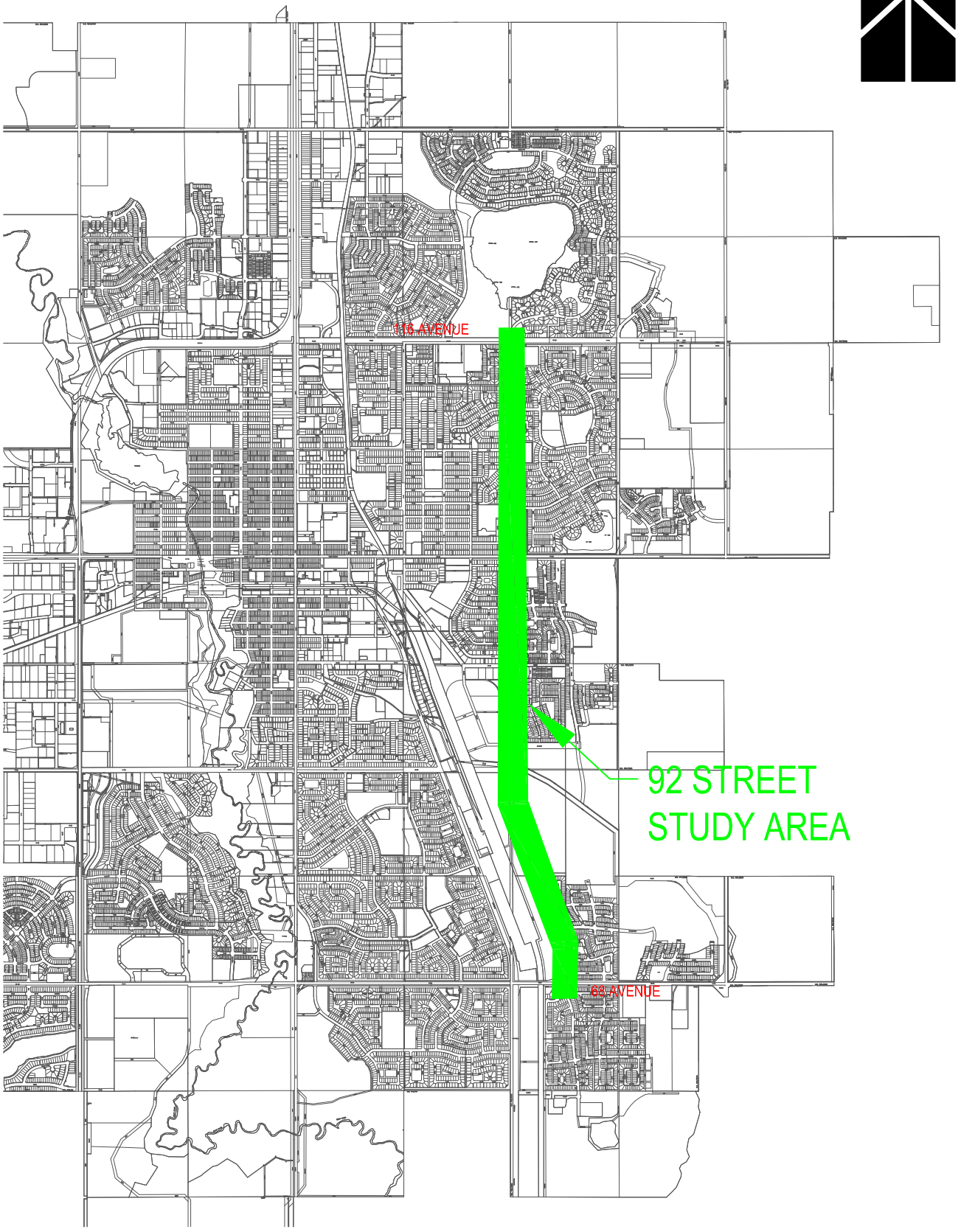
1.2 Study Area Description

92 Street from 68 Avenue to 116 Avenue is currently a two lane undivided arterial roadway along the entire length except between 96 Avenue and 104 Avenue. This section of 92 Street between is a four lane divided roadway, intersecting 100 Avenue and 104 Avenue at traffic signal controlled intersections. The existing two lane section north of 104 Avenue up to 116 Avenue is planned for twinning within the City's current 2012 – 2014 capital plan, however a funding source has not been determined. The existing two lane section south of 96 Avenue is shown as a four lane roadway in the City's current Transportation Master Plan (TMP) at the 90,000 population horizon. The TMP did specify an exact timeline for construction.

1.3 Study Purpose

The purpose of this functional study is to determine the ultimate roadway alignment and cross section for widening to a four lane cross-section, including timelines for construction. Other issues related to future roadway widening include:

- Storm water management
- Right of Way Requirements
- Overview of Potential Environment Impacts
- Opinion of Probable Costs
- Noise Attenuation
- Utilities
- Access Management
- Woody Channel Crossing
- Traffic Control and Staging
- Pedestrian Access/Connectivity



ISL Engineering and Land Services

GRANDE PRAIRIE

FUNCTIONAL PLANNING STUDY

92 STREET - 68 AVE - 116 AVE

EXHIBIT 1.1

NTS

SEPTEMBER, 2012

2.0 Design Criteria

2.1 Design Requirements

In terms of roadway design the following elements were assumed as design requirements:

- Number of Lanes
  - 4 Lanes
- Intersection Geometry
  - Sufficient Turn Bay Lengths to Accommodate Future Traffic Volumes
- Trail Connectivity
  - Trails on one side
  - Sidewalks on the other
- Access Management
  - Ensure access issues are addressed
  - Ensure needs for access to businesses and residences are met
- Design Speed
  - 70 km/hr
- Posted Speed
  - 60 km/hr
- Traffic Operations
  - LOS D or better – Further Discussed in Section 3.0
- Construction Staging Requirements
  - 65,000 Population Horizon
  - 78,000 Population Horizon
  - 90,000 Population Horizon
- Overall Roadway Alignment
  - Including right of way requirements
- Stormwater, Environment and Utility Constraints

Each of the elements listed were applied to the roadway design. Typical cross sections are shown in the following section.

2.2 Typical Cross Section

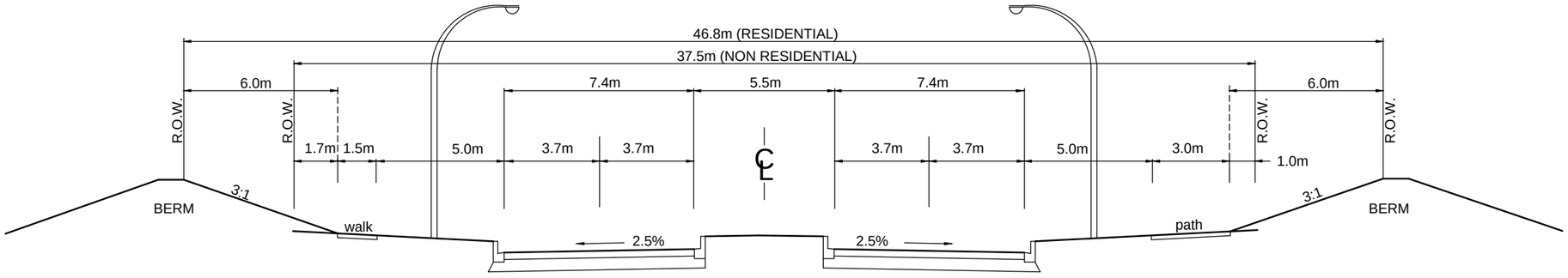
The amount of potential right of way (ROW) required for 92 Street is significant. The typical cross section assumed for this section was applied where required and where potential right of way is available. At the time of determining this cross section the City was completing an update to the Design and Construction Manual. Therefore, the typical roadway cross section assumed may be out of date as it was assumed based on the most up to date information available at the time of this study. However, the agreed upon cross section used is provided, including:

- 4 Lane Divided
  - 3.7 m Lanes
  - 5.5 m Median (to allow for addition of left turn bays at intersections)
- Pedestrian Connections
  - 3 m Trail
  - 1.5 m Sidewalk
- 2 m Berm (Abutting Residential Developments) and solid fence
- Street Lighting

As shown in the above list of requirements, where the roadway abuts residential developments a 2m berm at a 3:1 slope is required. This is to mitigate traffic noise generated from the roadway. Pedestrian connections are required in the form of a trail and a sidewalk on opposite sides of the roadway. The typical cross section for both non-residential and residential applications is shown illustrated in Exhibit 2.1. As discussed, the difference is the berm requirement where the roadway abuts residential.

As shown in Exhibit 2.1 the maximum road right of way requirement is 46.8 m and the minimum is 37.5 m. The minimum requirement is where the roadway is applied in locations where only industrial or commercial developments abut each side. The maximum requirement is where the roadway is applied in locations where only residential abut each side of the roadway.

It should be noted that the typical cross-section was considered as ideal and fit in where ROW was currently available or available in the future.



TYPICAL 4 LANE ARTERIAL DIVIDED ROAD

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

100 Avenue Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

TYPICAL CROSS SECTION
92 STREET

Drawing No. 2.1

Sheet No. / Revision No.

3.0 Traffic Analysis

3.1 Analysis Criteria

Operational analyses were performed using Synchro 7. This software is used to evaluate the performance of intersections on the roadway network using the Highway Capacity Manual (HCM) techniques. Using the HCM methodology, intersection performance is categorized by its "Level of Service", or LOS. There are six levels of service as follows:

- LOS A represents the highest level of service, or generally "free flowing conditions"
- LOS F generally represents a "breakdown" or "gridlock" condition in vehicular flow. At signalised intersections drivers will experience waits of two or more cycles.
- Levels of service B, C, D and E are intermediate levels of performance between each extreme
- LOS D reflects "normal" peak hour congestion, generally accepted criterion for design analysis.
- LOS E reflects an intersection or movement experiencing congestion and high delays. It may be accepted for certain movements only (such as low volume or low v/c ratio movements). Typically, LOS D or better is the accepted standard for peak hour operations of all movements at an intersection.

Table 3.1 shows average delay per vehicle values that correspond with the six service levels.

Table 3.1: LOS Criteria for Signalized and Unsignalized Intersections

	Signalized	Unsignalized
LOS	**Delay**	**Delay**
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

Synchro also calculates volume to capacity (v/c) ratio. A v/c ratio of 1.0 represents an intersection or movement at full capacity with no ability to accommodate additional traffic. Typically, a v/c ratio of 0.85 or lower for all intersection movements is the accepted standard for peak hour operations. Finally, Synchro also calculates the 95th percentile vehicle queue length for each intersection movement. This allows the determination of left and right turn storage requirements. Use of the 95th percentile vehicle queue length criterion is accepted practice for normal peak hour operation; it means that the queue length is exceeded 5% of the time.

3.2 Design Volumes

Design volumes were based on the Transportation Master Plan (TMP) Traffic model. The traffic model was created based on the existing, 2009 overall roadway network grown to the 90, 000 population horizon accounting for growth areas throughout the City. The growth assumptions applied in the TMP model are shown in Appendix A. The traffic volumes at each intersection along 92 Street are shown in Appendix B.

3.3 Traffic Analysis

The traffic volumes from the TMP were applied to the ultimate roadway alignment, assuming basic intersection geometry at the intersections and upgrading as required to add capacity. The intersection LOS and max v/c ratio is reported at each intersection along with forecasted intersection improvements. This is provided in Table 3.2, below. Detailed Synchro reports can be found in Appendix C.

Table 3.2: Intersection LOS, Max v/c, Additional Intersection Improvements

Intersection	LOS	Max v/c	Traffic Control		Additional Intersection Improvements (Beyond 4 Lane Divided)
			Existing	Ultimate	
92 Street					
116 Avenue	B	0.71	TS	TS	Convert NBT to shared NBT/L*
114 Avenue	US	0.34	US	US	NBLT and SBLT
111 Avenue	US	0.54	US	US	WBRT, NBLT and SBLT
108 Avenue	US	0.72	US	US	NBLT and EBRT
104 Avenue	B	0.79	TS	TS	No change to existing
100 Avenue	C	0.75	TS	TS	Extent SBLT Lane, Convert Left NBT to shared NBT/L
96 Avenue	A	0.68	TS	TS	No change to existing
92 Avenue	B	0.73	US	TS	NBLT and SBLT
89 Avenue	US	0.21	US	US	SBLT
84 Avenue*	US	0.27	US	TS	NBLT and SBLT
80 Avenue	US	0.24	US	US	NBLT and SBLT
76 Avenue	US	0.26	US	US	NBLT and SBLT
72 Avenue	B	0.68	US	TS	NBLT and SBLT, WBRT
68 Avenue	B	0.82	TS	TS	WB Channelized RT, EB Dual LT

Note: US – Unsignalized, TS – Signalized
*Split N/S timings required

A shown in Table 3.2, intersection improvements are required at all the intersections with the exception of 104 Avenue/92 Street and 96 Avenue/92 Street. These two intersections do not require further upgrades. All intersections movements operate at a LOS of D or better with a v/c ratio of 0.85 or better. Detailed improvements are shown on the alignment plans in the section 6 of this report. The intersection of 84 Avenue and 92 Street will remain unsignalized unless 84 Avenue is extended east from resources to 92 Street. This is, according to the TMP, recommended within the 10 year timeline. Refer to section 3.5 for traffic analysis of this scenario.

3.4 Construction Timelines

Staging construction allows the City of accommodate future traffic growth without constructing the ultimate alignment. It is expected that prior to upgrading to 4 lane divided the road network will experience traffic problems at the intersections as opposed to between intersections. Therefore, additional lanes or upgrades to traffic signals at the intersections may be appropriate measures to accommodate future traffic volumes. Installing traffic signals and/or additional lanes will provide additional capacity and defer the need to install the ultimate geometric improvements. It should be noted that any additional lanes recommended should be installed to match the ultimate roadway alignment to minimize throw away costs.

Intersection improvements will be required when traffic volumes exceed the capacity of the existing traffic control under the existing intersection configuration. To estimate this

each intersection was analyzed using Synchro assuming existing geometric and traffic control conditions and determining the approximate critical point for when upgrades are required. Shown in Table 3.3, below, are the approximate timeline when upgrades are required based on a percentage of ultimate traffic volumes. Detailed Synchro reports are provided in Appendix D.

Table 3.3: Staging Alternatives, Timelines

Intersection		Capacity (% of Ultimate)	Critical Point	Related Improvement	Population Horizon
N/S Road	E/W Road				
92 Street	68 Avenue	0.75	Eastbound LT	Add LT Lane	78 K
92 Street	72 Avenue	0.60	Traffic Control	Add Traffic Signals	65 K
92 Street	92 Avenue	<0.50	Traffic Control	Add Traffic Signals	< 65 K

As shown in Table 3.3, construction of the ultimate cross section can be delayed given improvements are installed at the intersections shown. It should be noted that the method of analysis is approximate and should be used with caution. However, this provides a reasonable basis for planning and budgeting purposes. The specific date for construction would need to be determined through continual monitoring.

3.4.1 Construction Timelines Summary

The following timelines for construction are recommended, shown in Table 3.4, below.

Table 3.4: 92 Street Recommended Construction Timelines

Segment			Recommended Upgrade	Estimated Timeline
68 Ave	to	92 Ave	Upgrade to 4 Lane Divided	90,000 Population
96 Ave	to	104 Ave	Maintain Existing	Na
104 Ave	to	116 Ave	Upgrade to 4 Lane Divided	2014/2015
Intersection			**Recommended Upgrade**	**Estimated Timeline**
92 St	&	68 Ave	Install Second East Bound Left Turn Install West Bound Right Turn	78,000 Population 90,000 Population
92 St	&	72 Ave	Traffic Signals	78,000 Population
92 St	&	84 Ave	Traffic Signals	90,000 Population
92 St	&	92 Ave	Traffic Signals	65,000 Population
92 St	&	100 Ave	Create second northbound left turn lane using through lane (shared lane)	65,000 Population
92 St	&	108 Ave	Traffic Signals	65,000 Population
92 St	&	111 Ave	Traffic Signals	65,000 Population

Shown in Table 3.4 are the recommended construction time lines for 92 Street. Construction of traffic signals at 108 Avenue and 111 Avenue at the 65,000 population is based on the City's TMP but may not be warranted until a later population horizon. These two intersections should be evaluated prior to each budget cycle to determine whether signals are required. Traffic signals at 84 Avenue intersection are not needed until the 90, 000 population horizon however if 84 Avenue is extended to 92 Street these signals may be required earlier. Upon completion of the 84 Avenue extension it is recommended that the City evaluate the need for signals.

At the intersection of 100 Avenue and 92 Street the traffic signals should be timed so that north/south timings are staggered. This is required due to left turn interlock between NBL (second shared left/through lane) and SBL turning vehicles.

As previously discussed, the intersection of 92 Street and 92 Avenue may require a traffic signal prior to the 65,000 population, based on the results shown in table 3.3.

3.5 Recommended Changes to Capital Plan (TMP)

It is recommended that the City revise their 5 and 10 year capital plan provided in their TMP to reflect the staging information provided in this report. These changes are shown in Table 3.5, below.

Table 3.5: Recommended Changes to Current City Capital Plan (TMP)

Intersection		Current Plan	Recommended Improvements	Recommend Changes to Current TMP Capital Plan
N/S Road	E/W Road			
92 Street	68 Avenue	No Plan	Add EB LT Lane	Add to 10 Year Plan
92 Street	72 Avenue	No Plan	Traffic Signals	Add to 5 Year Plan
92 Street	92 Avenue	No Plan	Traffic Signals	Immediate Follow Up
92 Street	100 Avenue	No Plan	Add NBLT Lane	Add to 10 Year Plan
92 Street	108 Avenue	5 Year Plan (TMP)	Traffic Signals	Confirmation Required
92 Street	111 Avenue	5 Year Plan (TMP)	Traffic Signals	Confirmation Required

The recommendations in Table 3.5 are given as a result of the staging analysis for this functional study.

4.0 Other Relevant Information

4.1 Utilities

Exhibit 4.1 to 4.10 show the existing utilities found in each section of roadway. The plans should be used with caution as there may be other utilities not located. The utilities shown are:

- Water
- Sanitary
- Storm Water
- ATCO Gas
- ATCO Pipelines
- Telus

Other utilities which may exist but not shown include (not limited to):

- Eastlink
- Traffic Signal Cabling
- Third Party Fiber Optics Line

Crossing locations are shown in the following table.

It is recommended that at the time of detailed design and prior to construction the locations of all utilities be confirmed, as required.

The most sensitive utility is the high pressure gas line owned by Atco Pipelines. This high pressure gas line runs parallel to 92 Street. At detailed design it should be determined if this utility requires any realignment or lowering. In the case there is any relocating required ATCO Pipeline should be given advance notification.

It should be noted that the utility plans were circulated amongst the relevant utility companies and no comments/requests were received. It is recommended that the City follow up with utility companies as required to determine future needs as it is available.

4.2 Stormwater Management

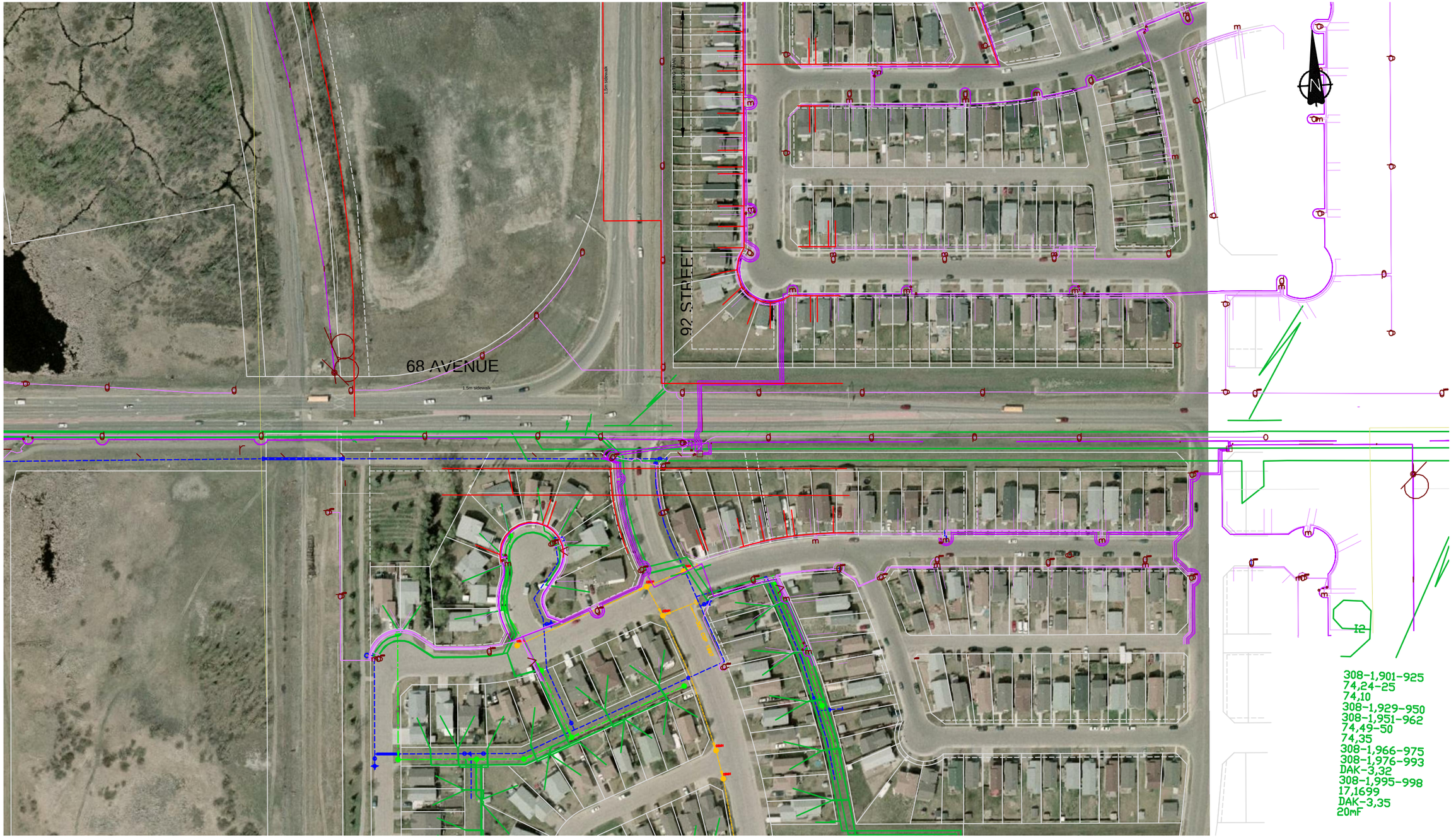
Much of the existing roadways are comprised of two lane rural sections, four lane urban sections, with some two lane urban sections. Stormwater management considerations for the proposed development include:

- Flow conveyance,
- Water quality treatment, and
- Spill containment.

4.2.1 Flow Conveyance

Flow conveyance considerations involve the following:

- Provision of a convenience drainage system that can collect and convey surface runoff from the proposed development corridor to an adequate outlet during a small design flood event (the 1:5 year) without surface ponding – a storm sewer system;
- Provision of a major drainage system that can collect and convey surface runoff from the proposed development corridor to an adequate outlet during a large design flood event (the 1:100 year) in a manner that provides:
    - Public safety – limited maximum surface ponding depths and conveyance velocities



LEGEND

POWER
GAS
TELEPHONE
SANITARY
STORM
WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

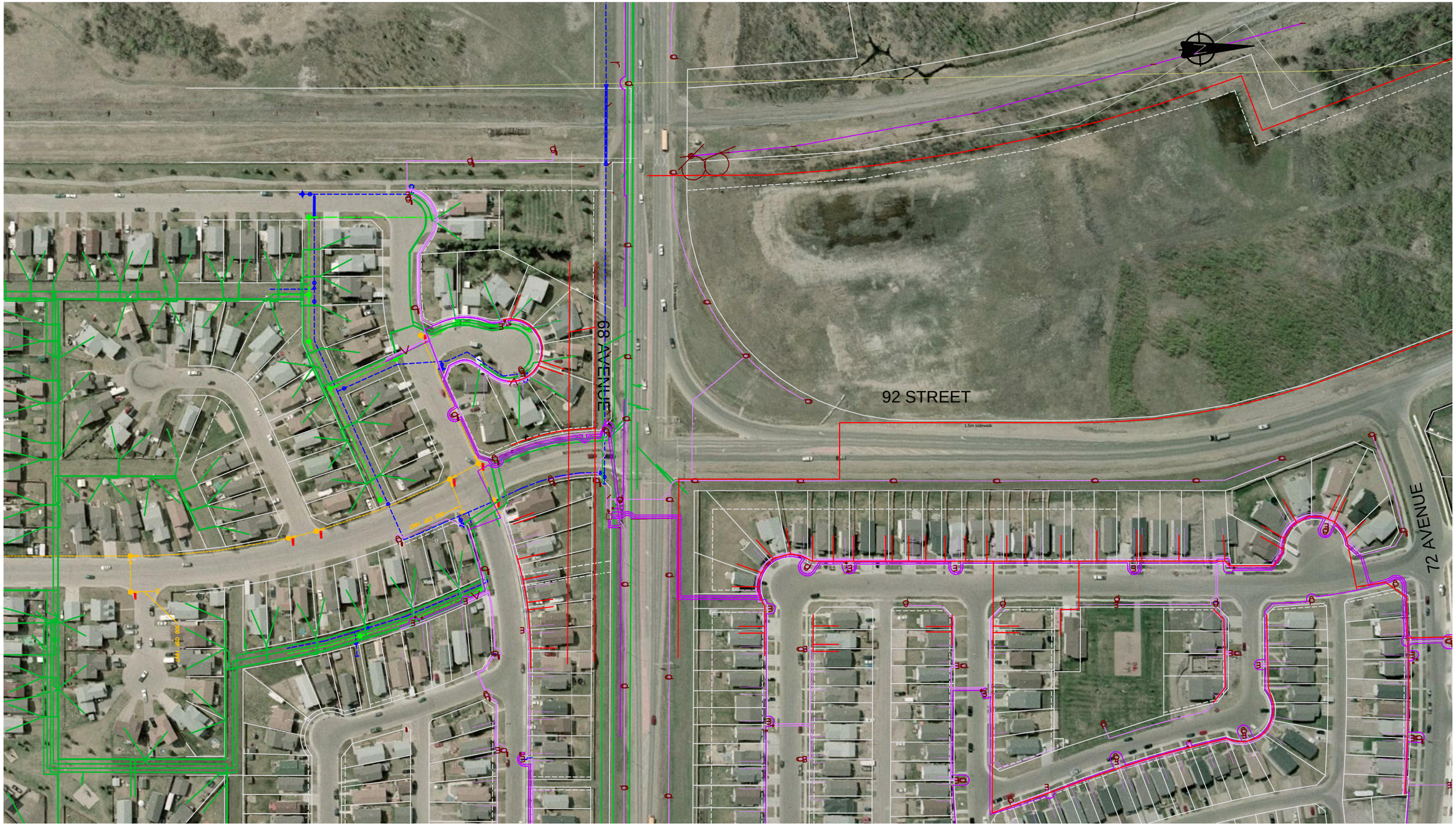
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

UTILITIES
68 Avenue

Drawing No. 4.1

Sheet No. / Revision No.

Ralph Schmanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg



LEGEND

POWER
GAS
TELEPHONE
SANITARY
STORM
WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn:
Designed:
Design Checked:
Discipline Review:
Date:
Date:

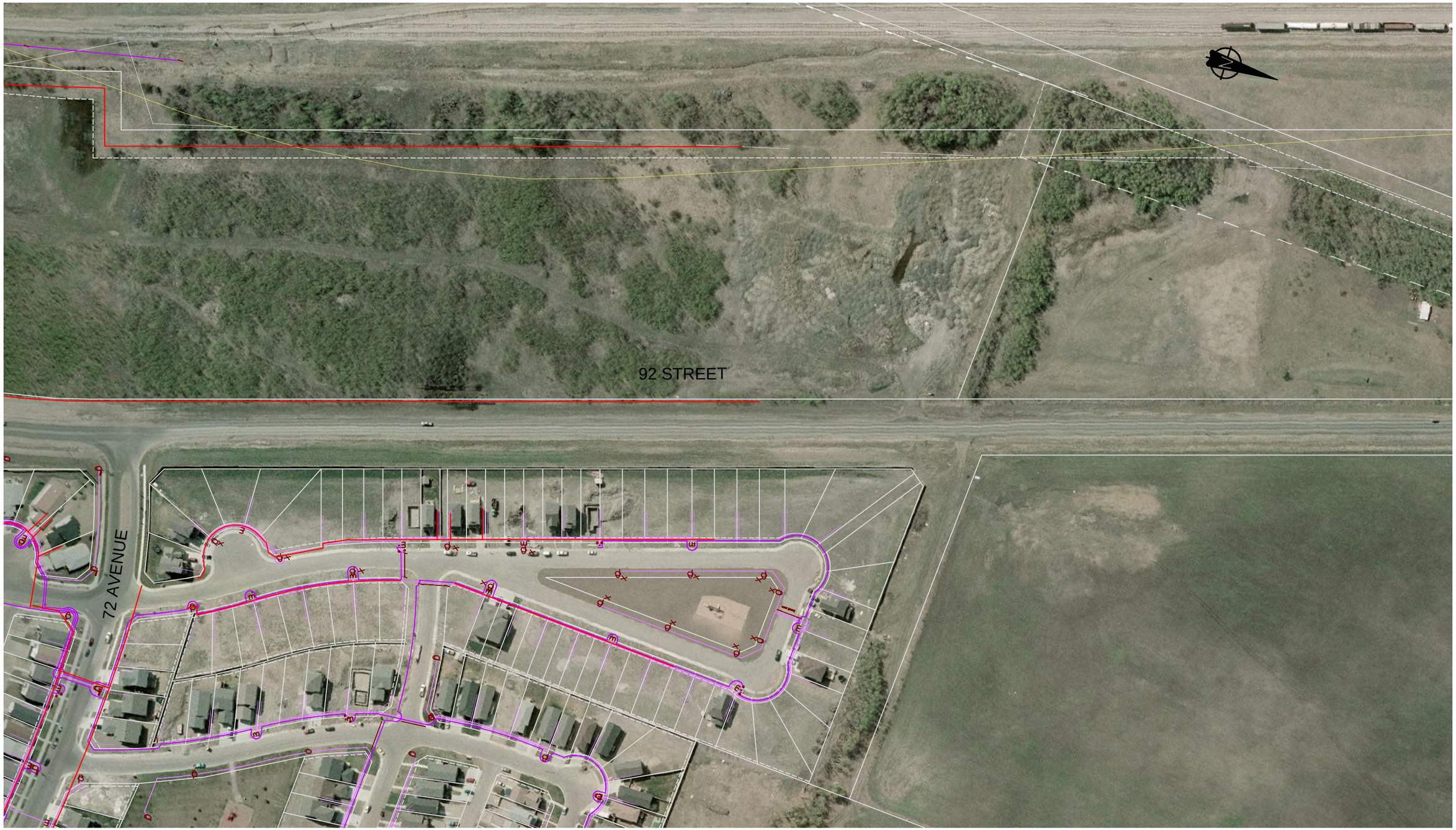
UTILITIES
92 Street

Drawing No. 4.2

Sheet No.

Revision No.

Ralph Schimanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg



LEGEND

- POWER
- GAS
- TELEPHONE
- SANITARY
- STORM
- WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

UTILITIES
92 Street

Drawing No. 4.3
Sheet No.
Revision No.

Ralph Schimanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg

LEGEND

POWER
GAS
TELEPHONE
SANITARY
STORM
WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

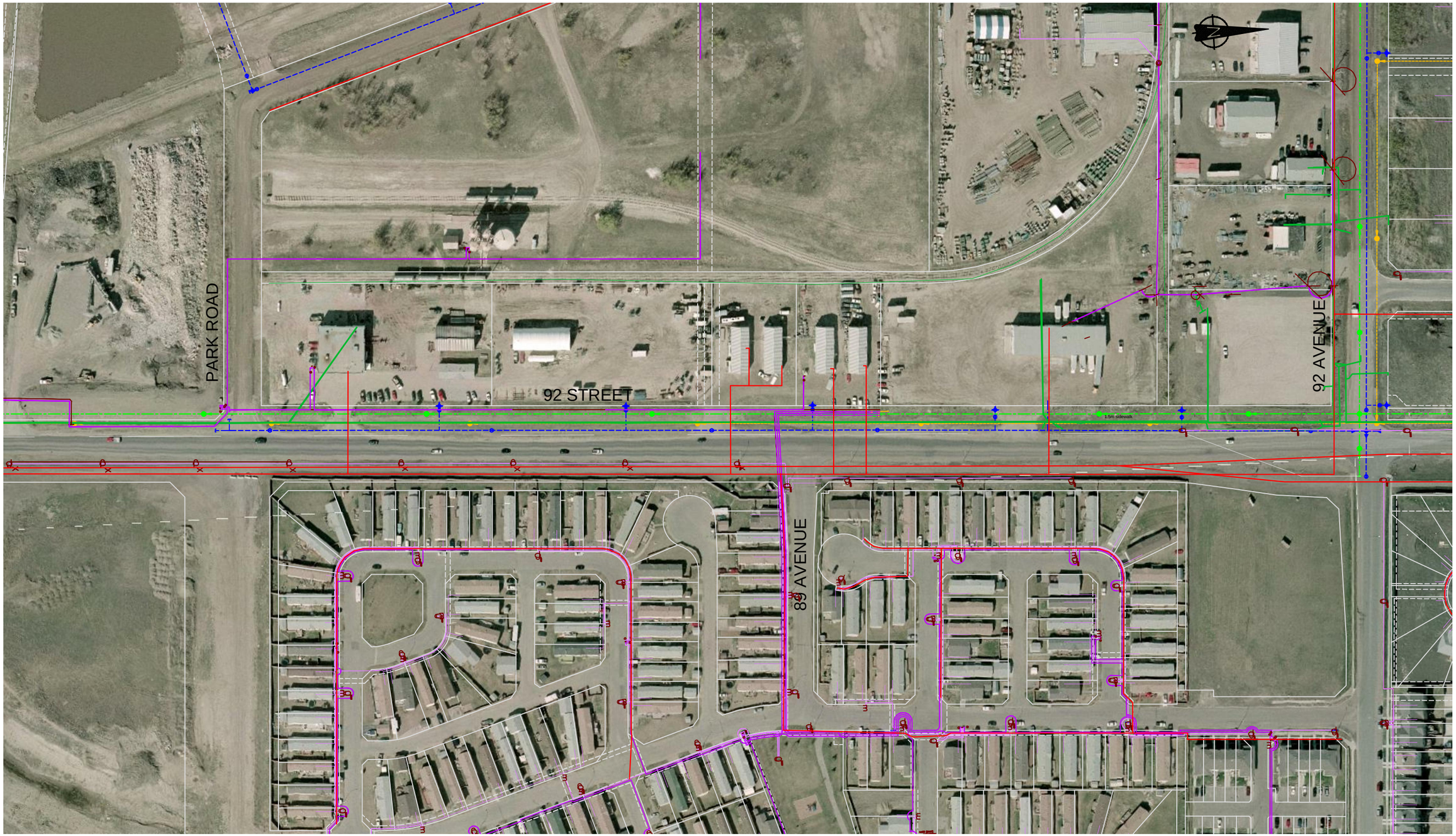
UTILITIES
92 Street

Drawing No. 4.4

Sheet No.

Revision No.

Ralph Schmanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg



LEGEND

POWER
GAS
TELEPHONE
SANITARY
STORM
WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

UTILITIES
92 Street

Drawing No. 4.5
Sheet No.
Revision No.

Ralph Schmanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg

LEGEND

- POWER
- GAS
- TELEPHONE
- SANITARY
- STORM
- WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

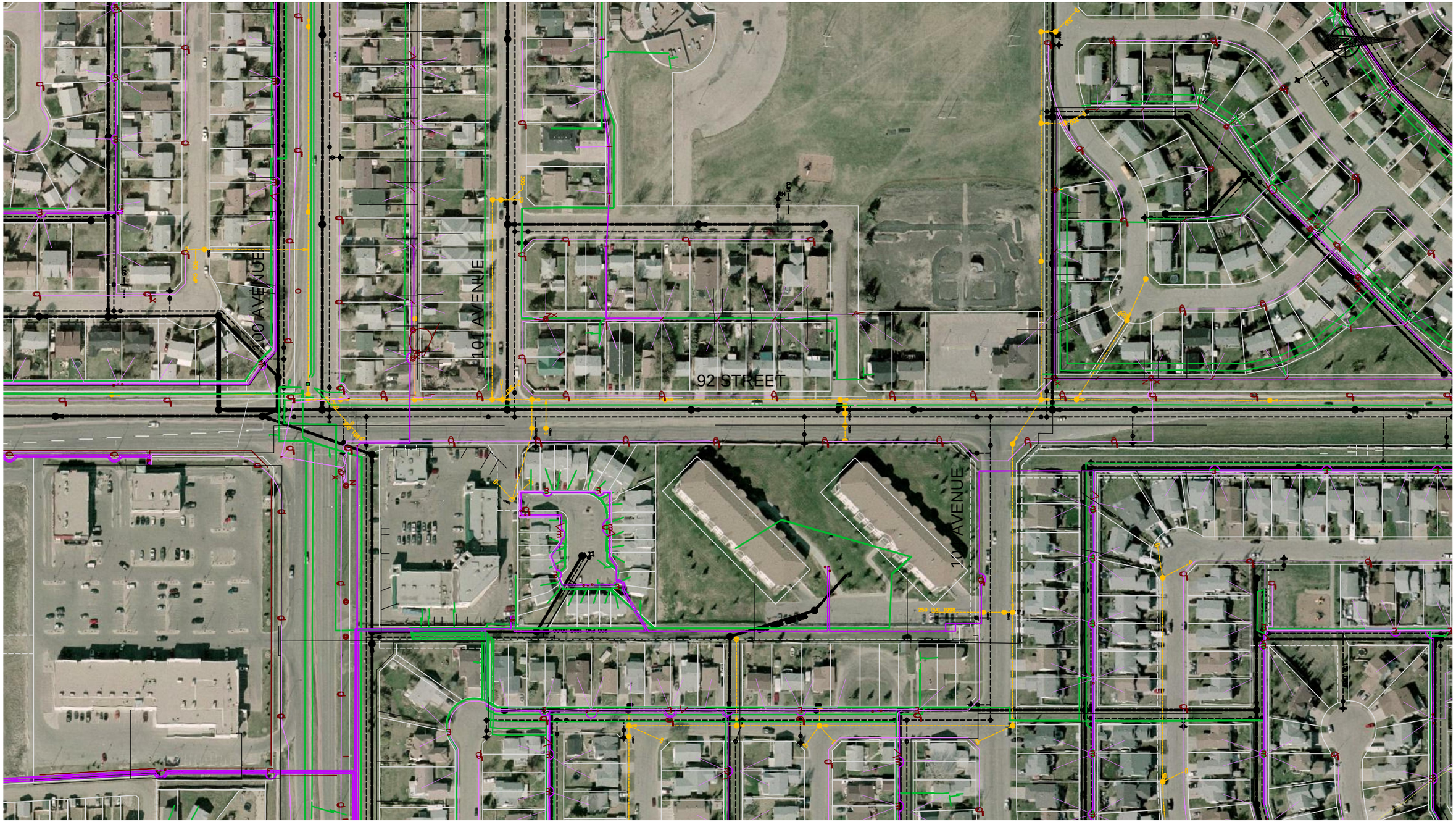
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

UTILITIES
92 Street

Drawing No. 4.6

Sheet No. / Revision No.

Ralph Schimanke / Jan. 11, 12 / J:\1\2800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg



LEGEND

POWER
GAS
TELEPHONE
SANITARY
STORM
WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

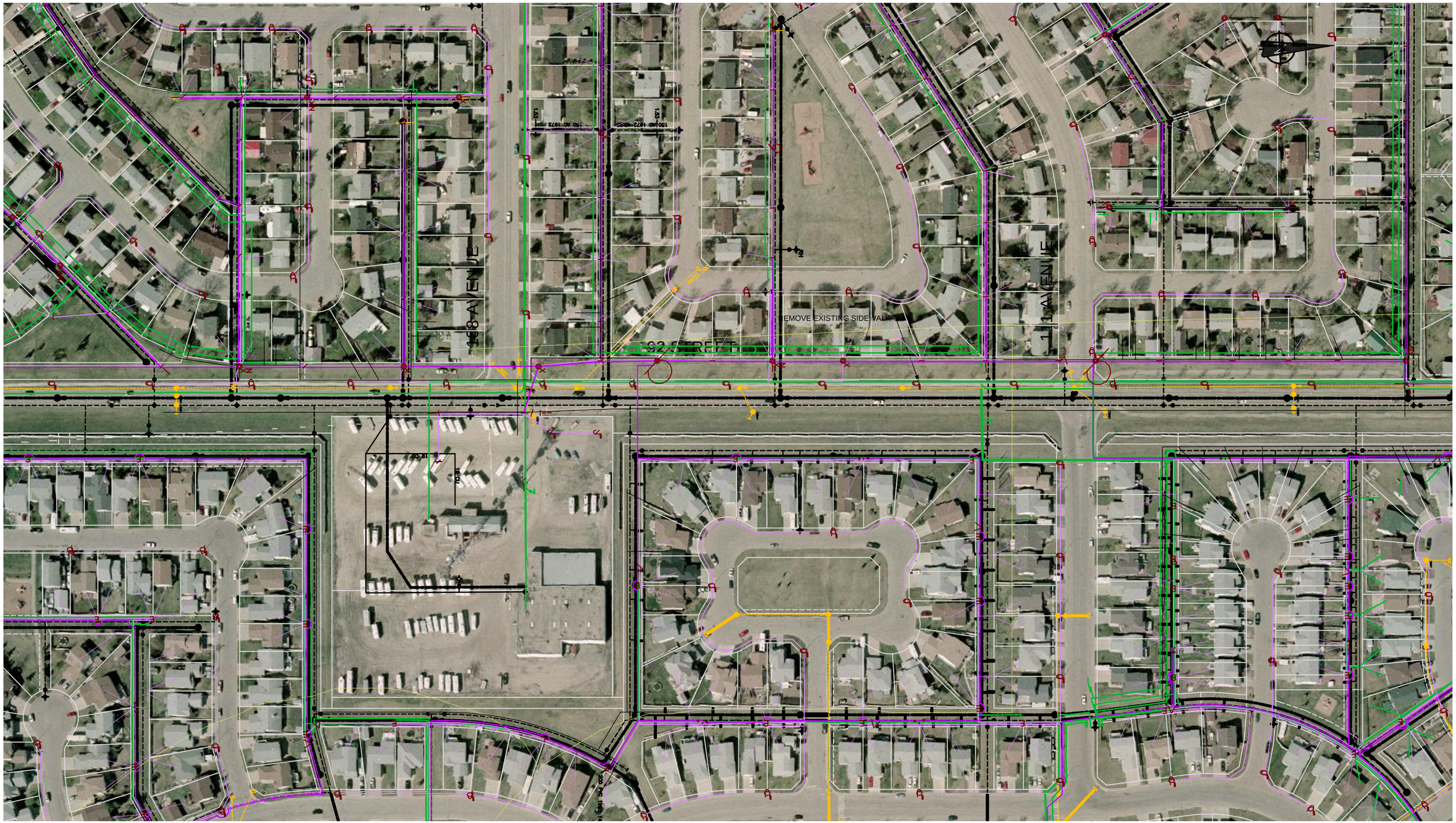
UTILITIES
92 Street

Drawing No. 4.7

Sheet No.

Revision No.

Ralph Schinnenke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg



LEGEND

POWER
GAS
TELEPHONE
SANITARY
STORM
WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

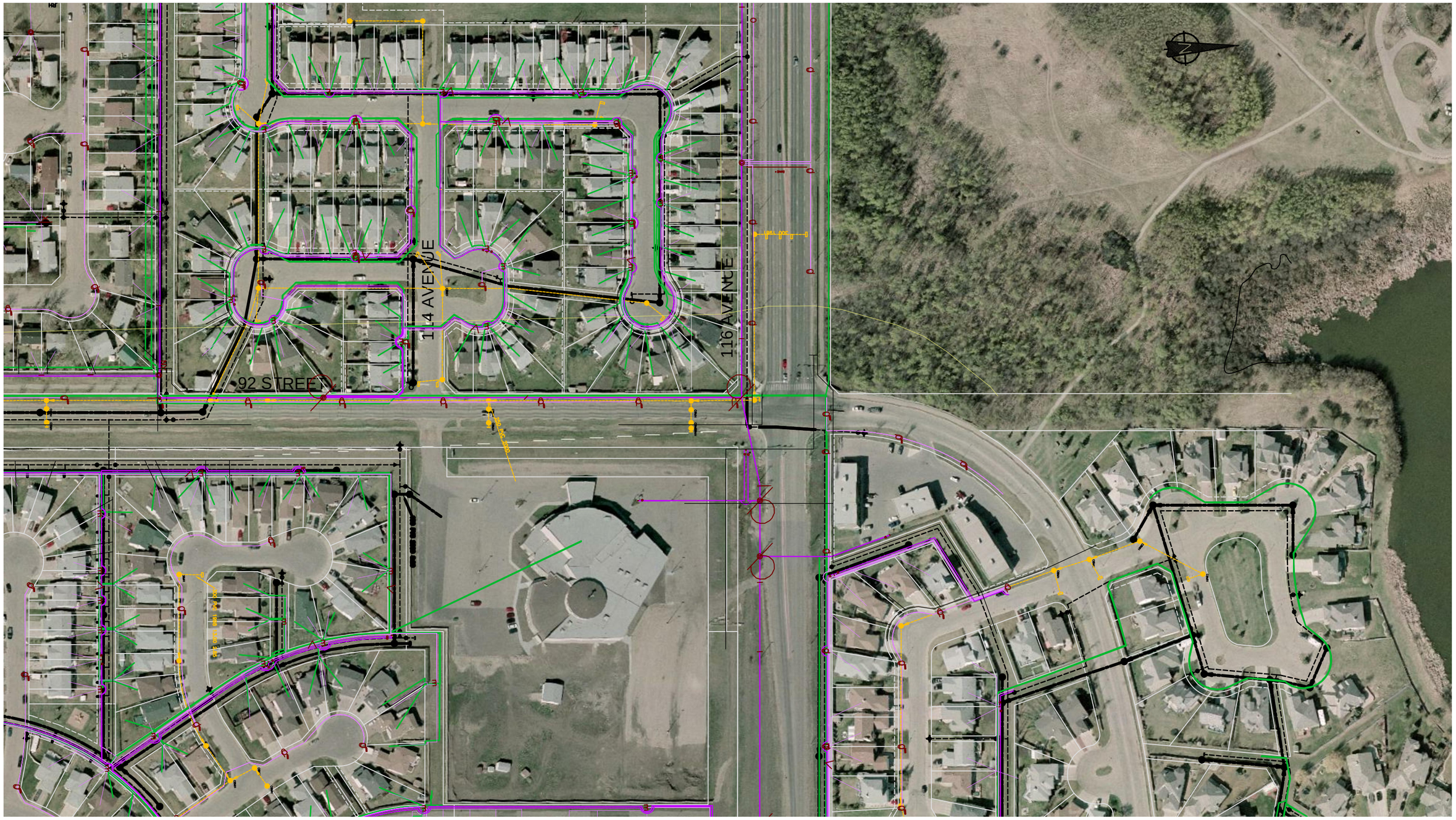
UTILITIES
92 Street

Drawing No. 4.8

Sheet No.

Revision No.

Ralph Schimanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg



LEGEND

- POWER
- GAS
- TELEPHONE
- SANITARY
- STORM
- WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

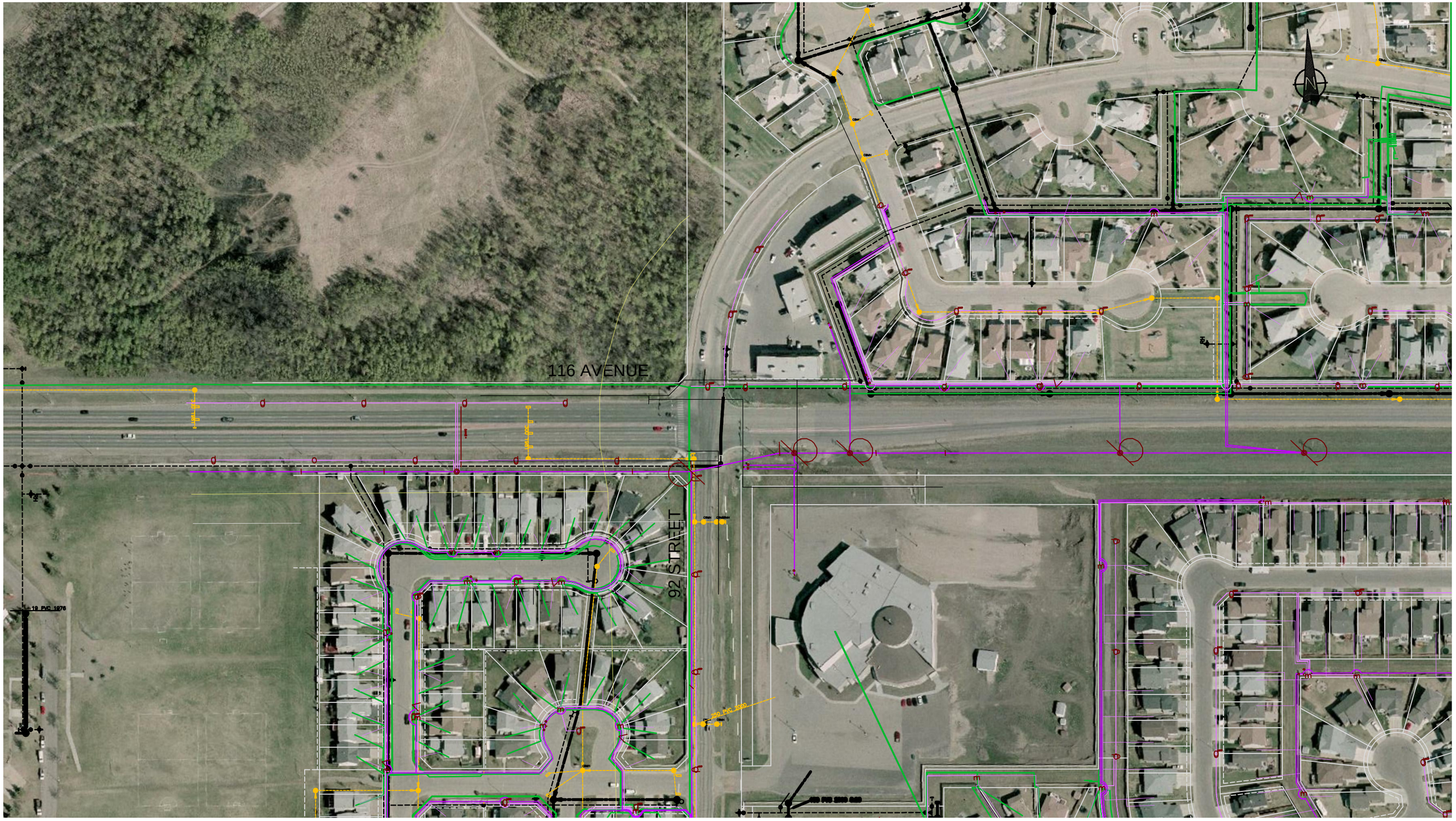
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

UTILITIES
92 Street

Drawing No. 4.9

Sheet No. / Revision No.

Ralph Schimanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg



LEGEND

- POWER
- GAS
- TELEPHONE
- SANITARY
- STORM
- WATER

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:

Designed: | Discipline Review: | Date:

UTILITIES
116 Avenue

Drawing No. 4.10

Sheet No. / Revision No.

Ralph Schimanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_UTIL.dwg

- Minimal risk of property damage – flooding of adjacent properties or vehicles
- Efficient, positive surface drainage to the minor system for events up to 1:5 year; and;

➢ Assurance that the downstream receiving system has capacity to receive runoff quantities expected from the proposed development, and if not, measures to control discharges from the site to acceptable levels.

4.2.2 Water Quality Treatment and Spill Containment

Water quality treatment considerations involve treatment measures to ensure that the site runoff can achieve the following goals/requirements of new developments and redevelopments set out by Alberta Environment & Water (AEW) to ensure protection of natural ecosystems from the impacts of urbanization:

➢ 85% removal of particles 75 microns and larger on an annual basis.

Spill containment considerations involve the provision of measures towards increasing opportunities to contain spills such that they can be recovered before impacting downstream natural ecosystems.

4.2.3 Existing Drainage

This portion of the City generally slopes to the southeast. Consequently, the 92 Street project corridor generally slopes south and the 100 Avenue project corridor generally slopes east. The north portion of the 92 Street corridor from 116 Avenue to about 92 Avenue is an urban section complete with a minor storm drainage system. The southern portion, from about 92 Avenue to 68 Avenue is a rural road section including a ditch drainage system. Much of the adjacent lands that slope towards the project corridors are developed or are developing, and have contained their runoff such that runoff from adjacent lands generally does not contribute to the project corridors.

There are two man-made ditch/channel systems collecting runoff from this northeast portion of the City. One ditch, named Woody Channel, runs southeast, crossing 92 Street at approximately the extension of 84 Avenue. This ditch continues south and discharges into Woody Channel, which subsequently drains into Bear River.

This man-made ditch system has been constructed with enough capacity to convey runoff from major events. They are also vegetated with check dams, and as a result, can be considered a stormwater management Best Management Practice (BMP) for the provision of water quality treatment through the processes of settlement, filtration and plant uptake. As a result, this ditch system is considered integral components of the municipal drainage systems in the City, with Bear River considered a natural ecosystem to be protected. Further information on Woody Channel can be found in the following report:

➢ Woody Channel Study – Resources Road to 68 Avenue, Beairsto, Lehners, Ketchum Engineering, November, 2006

The majority of the 92 Street project corridor drains into Woody Channel near the future extension of 84 Avenue. Running south, the approximate ground elevation drops from 682.5 m at 116 Avenue to 661.0 m at 100 Avenue to 654.0 m at Woody Channel, for a distance of about 3.2 km (overall grade = 0.9%). Running north, the approximate ground elevation drops from 659.0 m about 1.2 km north of 68 Avenue to 654.0 m at Woody Channel, for a distance of about 0.5 km (overall grade = 1.0%). The southernmost portion of 92 Street (about 1.2 km) drains south to 68 Avenue, then east in the ditch

system along 68 Avenue to Woody Channel at 84 Street. The grade drops from 659.0 m to 654.0 m at 68 Avenue (overall grade = 0.4%).

Running east along 68 Avenue, the approximate ground elevation drops form 654.0 m at 92 Street to 653.0 m at 84 Street, for a distance of about 1.2 km (overall grade = 0.1%). However, it can be noted that a stormwater management (SWM) wet lake has recently been constructed in the Signature Falls neighbourhood immediately north of 68 Avenue west of 86 Street. North ditch flows along 68 Avenue east from 92 Street appear to drain into this SWM facility, about 0.7 km east of 92 Street, which drains through a storm sewer system east to Woody Channel, likely at a controlled rate.

4.2.3 Proposed Drainage

4.2.3.1 Minor (Storm Sewer) Drainage System

Storm sewer systems are to be installed within the project corridors for the provision of storm water conveyance and drainage. The storm sewers and contributing catch basin systems are to be designed to convey all site runoff from the proposed roadway redevelopment and corridor area. Catch basins are to be located within the curb/gutter systems along the proposed roadway, spaced as per City requirements, and located at low spots within the road system to ensure positive drainage. Pipes are to be designed with slopes, diameters and material types that provide adequate cleansing velocities and flow conveyance capacities. The overall grades of the existing corridors, identified above, suggest that a pipe system can be designed at grades that will allow cleansing velocities and conveyance capacities to be achieved. As a general requirement, the piped system will only be designed to handle a 1:5 year event. Anything over that will be handled by surface drainage.

The storm sewer system along the northern 3.7 km portion of 92 Street is to discharge east into Woody Channel. The storm sewer system along the southern 1.2 km portion of 92 Street is to drain south to 68 Avenue. A new storm sewer system will be required on 68 Avenue to convey these flows east to an adequate outlet.

4.2.3.2 Major (Overland) Drainage System

Runoff flows in excess of the design capacity of the catch basin and storm sewer system (> 1:5 year) will remain on the surface. These flows, up to the 1:100 year design event, are to be routed overland parallel to the proposed storm sewer systems and discharge to the same outlets. The roadways are to be graded to achieve an effective surface drainage system, considering the following:

- Maintaining a minimum roadway slope of 0.5% to achieve efficient, positive drainage to the storm sewer system;
- Achieving a maximum surface ponding depth of 0.3 m during the 1:100 year design event; and
- Maintaining an overall minimum slope of a cascading roadway system towards the outlets of 0.3%.

4.2.3.3 Ditch Outlet Systems

The capacities of these two ditch systems to accept the additional flows expected from this redevelopment appear to be adequate, but should be confirmed at the design stage. Should any capacity constraints in either of the two ditch system be determined at design stage to be inadequate to accept the increased flows, at a minimum, the following options should be investigated as a means of mitigating the peak flow discharges to within ditch capacities:

- Route roadway corridor runoff through linear bioswale system located adjacent to the roadways within the road right-of-ways, where flows have an opportunity to

infiltrate through bio engineered soils, thus receiving water quality treatment and reducing peak flow discharges – underdrain systems within the bioswales would ensure positive drainage into the storm sewer system; and

- Inline pipe storage within the storm sewer pipe system within downstream portions of the proposed storm sewer network, with controlled release rates and/or control structures.

4.2.3.4 Drainage Outlet, 68 Avenue

As described above, a new storm sewer system will be required along 68 Avenue to convey runoff from about 1.2 km of new storm sewer running south on 92 Street (south of Woody Channel) to an adequate outlet or Woody Channel. Surface drainage from this 1.2 km of 92 Street will also need to be accommodated for in the 68 Avenue storm sewer system. Consideration should be given at design stage to discharge both the 68 Avenue storm system and surface drainage systems east into the new Signature Falls SWM wet pond facility at 86 Street, for a distance of about 0.7 km. Should it be determined at design stage that the Signature Falls SWM facility cannot accommodate these additional flows, at a minimum, the following options should be considered:

- The 68 Avenue major (surface) and/or minor (storm sewer) systems may need to extend east to Woody Channel at 84 Street, a distance of about 1.2 km from 92 Street; or
- Consideration should be given to directing these flows south into the future Summerside development at about 87 Street – stormwater management planning coordination with that development would be required.

4.2.3.5 Water Quality Treatment and Spill Containment

For this project it is proposed that the provincial water quality treatment goals and adequate spill containment features be provided in the existing downstream municipal ditch systems, including Woody Channel, without any additional on-site measures beyond the solids containment features provided by typical catch basin installations.

4.3 Environmental Overview

Environmental considerations along the 92 Street include tree stands, natural wetlands and storm water management.

4.3.1 Tree stands

Notable tree stands are located along the proposed new southern alignment of 92 Street. Any tree clearing should occur outside the April 15 to July 31 window, unless the area is checked for bird nests by a qualified professional.

4.3.2 Natural Wetlands

Naturally occurring wetlands are present along the project corridors. One is located at the very southern limits, between Resources Road and the rail line. Based on the proposed alignment, the southern wetland will not be impacted by the road alignment.

However, any wetland impact requires Water Act Approval from Alberta Environment and Water (AEW) and a Wetland Assessment and Compensation Report. Wetland assessment should be done during the summer months to accurately assess the wetland vegetation, condition and wildlife use. Compensation can take the form of wetland creation – through construction of naturalized storm water management facilities – or through a Wetland Restoration Agency, such as Duck Unlimited Canada. Compensation

is typically at a 3:1 ratio, meaning if 1 ha of wetland is impacted by the project, then 3 ha must be provided as compensation.

4.3.3 Storm Water Management

Any changes to existing storm water management facilities (SWMF), such as adding additional drainage area, requires a notice to AEW that the existing SWMF can handle the additional input. The notice must include an assessment by a Professional Engineer that the SWMF meets the applicable guidelines.

4.4 Noise Attenuation

It is recommended that the roadways be monitored before and after construction to determine if noise attenuation is required based on the City's relevant noise attenuation policy. Noise attenuation in the form of a berm and solid fence is required for all new residential development.

4.5 Opinion of Probable Costs

Cost estimates were based on costs estimates outlined in the City's Transportation System Levy Bylaw, C-1197. The cost estimates are approximate and shown in the table below. Contingency and engineering are included in the costs.

Table 4.1: Opinion of Probable Costs

92 Street					
68 Avenue Geometric Improvements	1		$155,000	each	$155,000
76 Avenue Traffic Signal	1		$345,000	each	$345,000
92 Avenue Traffic Signal	1		$345,000		$345,000
Twinning, 68 Avenue to 96 Avenue	2821	m	$2,452	per m	$6,917,092
100 Avenue Geometric Improvements	1		$155,000	each	$155,000
Twinning, 104 Avenue to 116 Avenue	1270	m	$1,460	per m	$1,854,200
108 Avenue Traffic Signal	1		$345,000	each	$345,000
111 Avenue Traffic Signal	1		$345,000	each	$345,000
Total					**$10,461,292**

5.0 Recommended Plan/Profiles

5.1 92 Street, 116 Avenue to 68 Avenue

Shown on exhibit 5.1 to 5.10 are the recommended plan and profiles for 92 Street. The plans show ultimate alignment which will be built out as per recommended staging plans.

5.1.1 Pedestrian Connectivity

As per design requirements pedestrian connectivity is required along 92 Street. To satisfy this requirement a 3.0 m trail and a 1.5 m sidewalk is maintained throughout the recommended plans. The trail is on one side of the road and a sidewalk on the other.

5.1.1.1 Pedestrian Trail and Walk

The pedestrian trail starts on the east side of 92 Street, beginning at 68 Avenue and continues on the east side of 92 Street up to 96 Avenue, where due to limited right of way crosses 92 Street at the existing traffic signal. From 96 Avenue to the trail continues on the west side of 92 Street up to 116 Avenue. In summary the trail crosses 92 St once at 96 Avenue. This is illustrated in the table below.

Table 5.1: Pedestrian Trail Continuity

Section	Side of Road	Continuity
68 Avenue to 96 Avenue	East Side	2903 m
96 Avenue to 116 Avenue	West Side	2014 m

It should be noted that through the section of 92 Street from 100 Avenue to 104 Avenue the existing 1.5 m sidewalk is recommended to be widened to 3.0 m to accommodate the trail.

A pedestrian sidewalk is recommended on the side of the road opposite the trail.

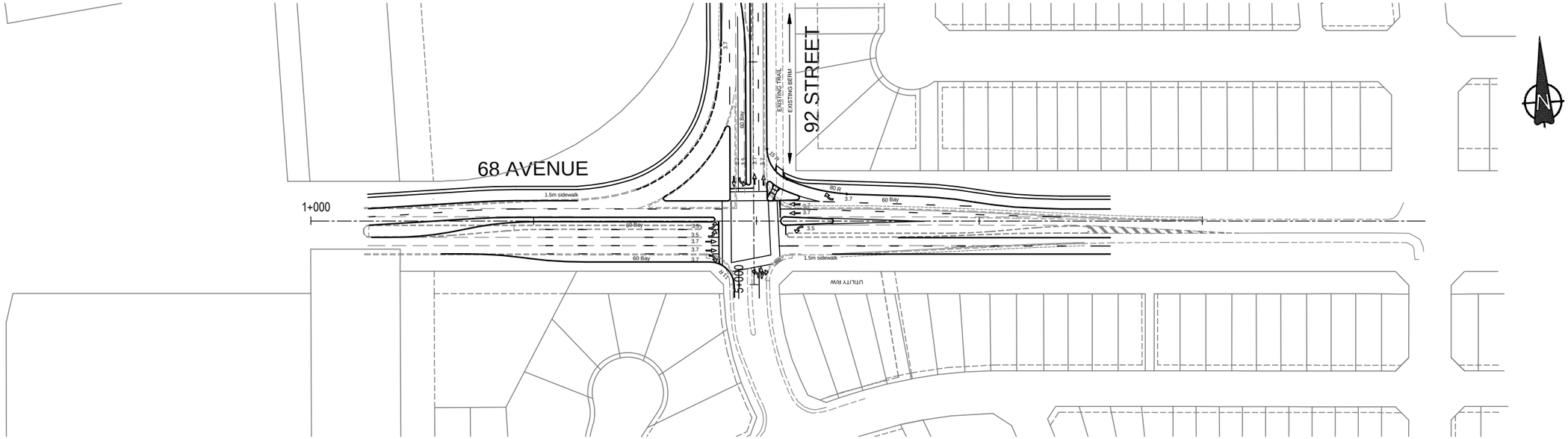
5.1.2 Access Management

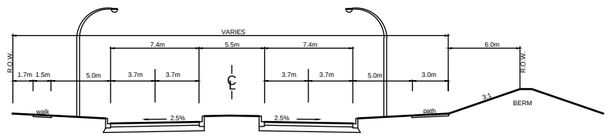
Throughout 92 Street access is limited to intersections with the exception to the driveways which provide access to the industrial businesses between 84 and 89 Avenue. It is recommended that these driveways be realigned as shown on the recommended plans. It is also recommended that at detailed design the City discuss access changes with the affected property owners.

A summary of accesses is shown in the table below:

Table 5.2: 92 Street Intersection Spacing, 92 Street, 68 Avenue to 116 Avenue

Intersection	Spacing to Nearest Intersection			
	Intersection	South	Intersection	North
72 Avenue	68 Avenue	348 m	76 Avenue	445 m
76 Avenue	72 Avenue	445 m	84 Avenue	510 m
84 Avenue	76 Avenue	510 m	89 Avenue	257 m
89 Avenue	84 Avenue	257 m	92 Avenue	262 m
92 Avenue	84 Avenue	262 m	96 Avenue	406 m
96 Avenue	92 Avenue	406 m	100 Avenue	315 m
100 Avenue	96 Avenue	315 m	101 Avenue	60 m
101 Avenue	100 Avenue	60 m	104 Avenue	230 m





PROPOSED CROSS SECTION 92nd STREET

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

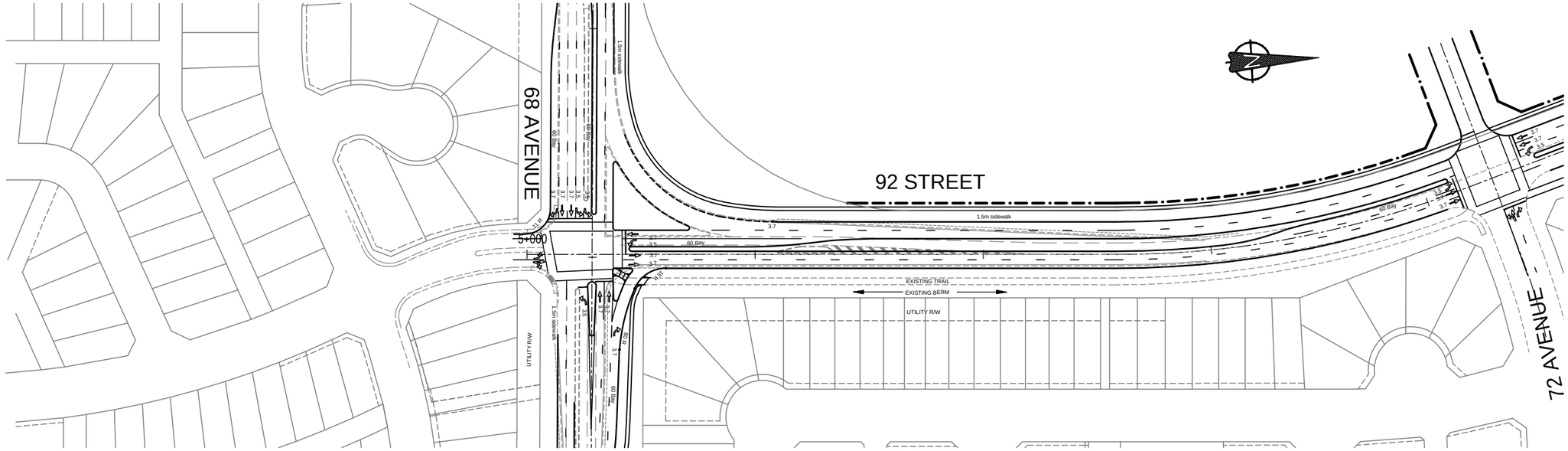
92 Street Functional Plan

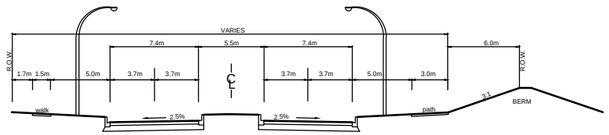
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

PLAN & PROFILE
68 Avenue
STA. 1+000 to 1+500

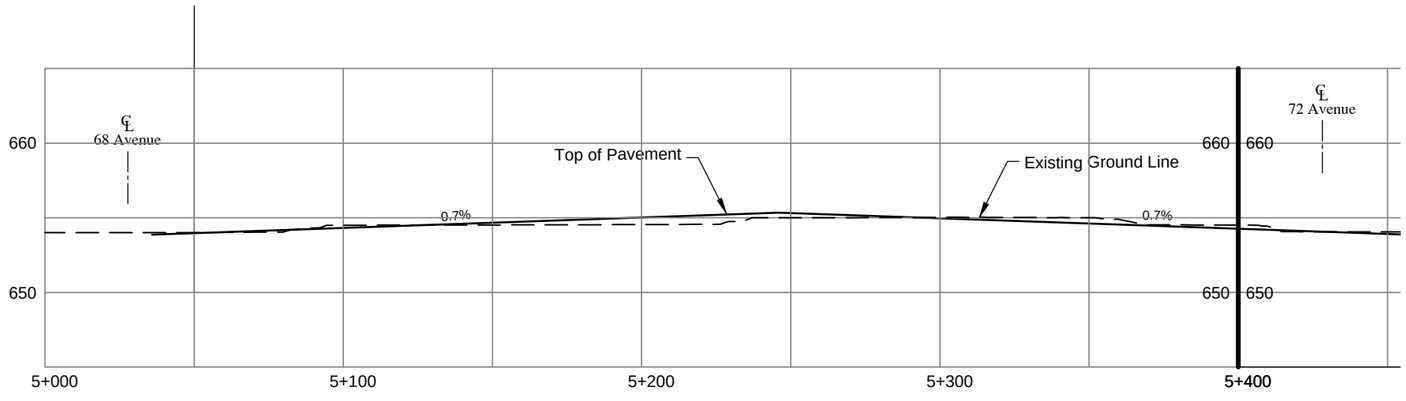
Drawing No. 5.1
Sheet No.
Revision No.

Ralph Schirmanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

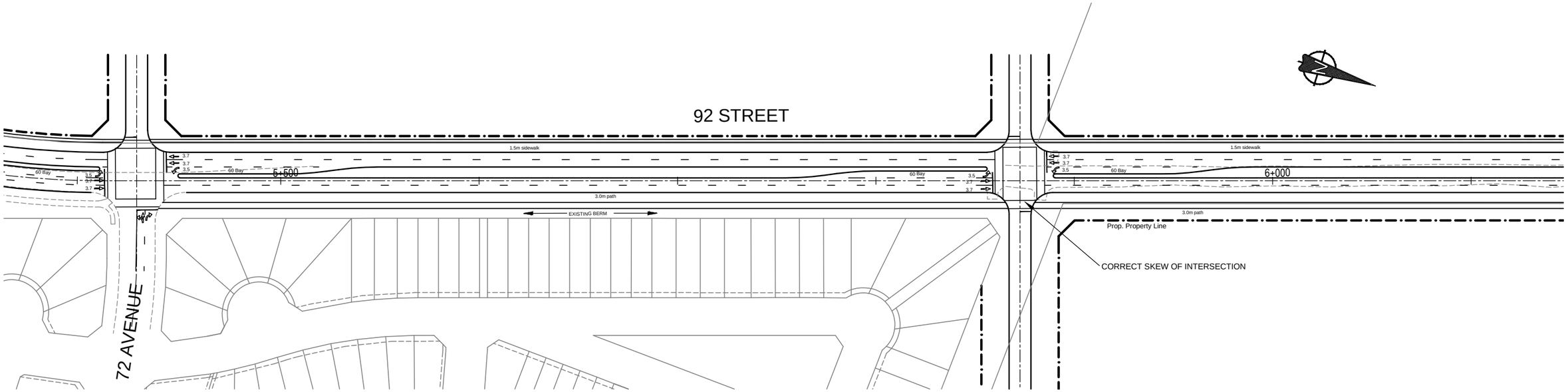
92 Street Functional Plan

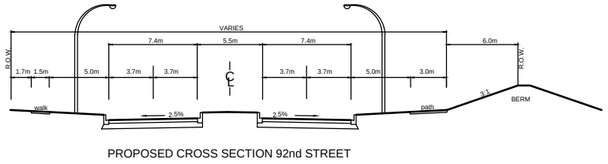
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

PLAN & PROFILE
92 Street
STA. 5+000 to 5+400

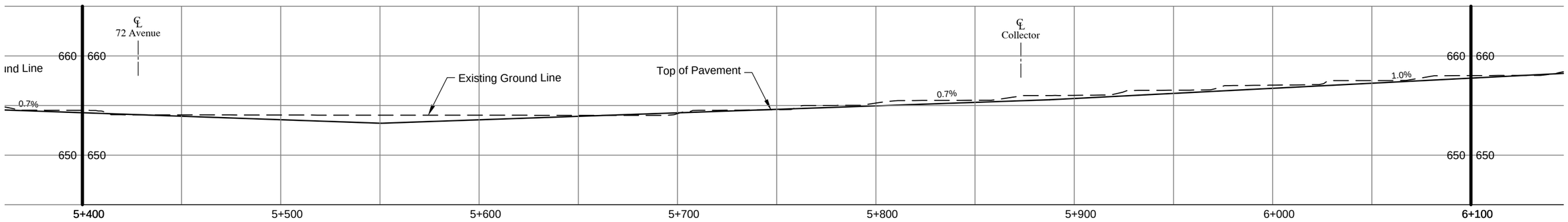
Drawing No. 5.2

Sheet No. / Revision No.





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

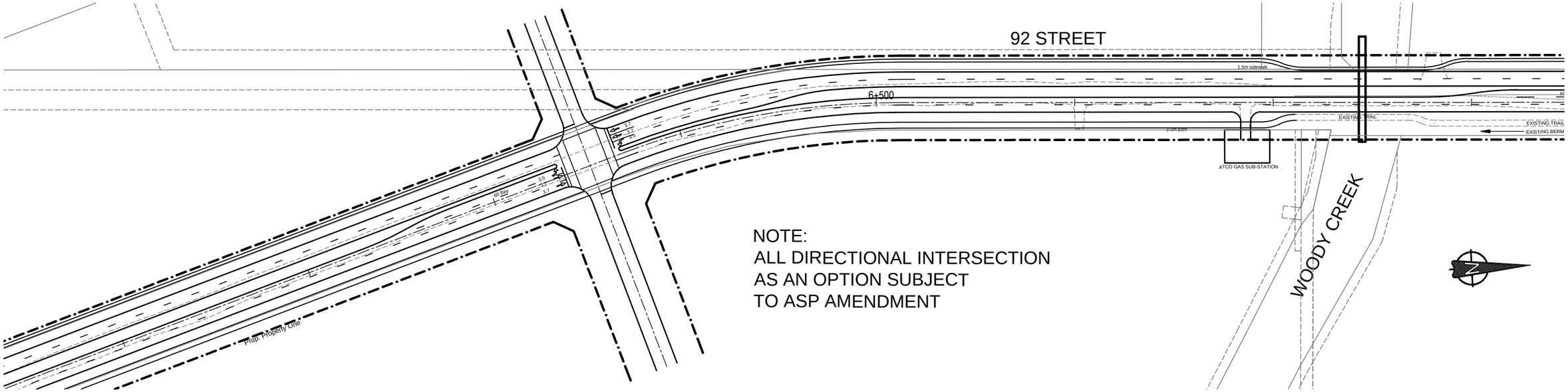
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

PLAN & PROFILE
92 Street
STA. 5+400 to 6+100

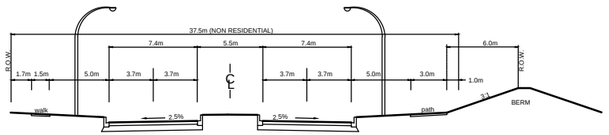
Drawing No. 5.3

Sheet No. / Revision No.

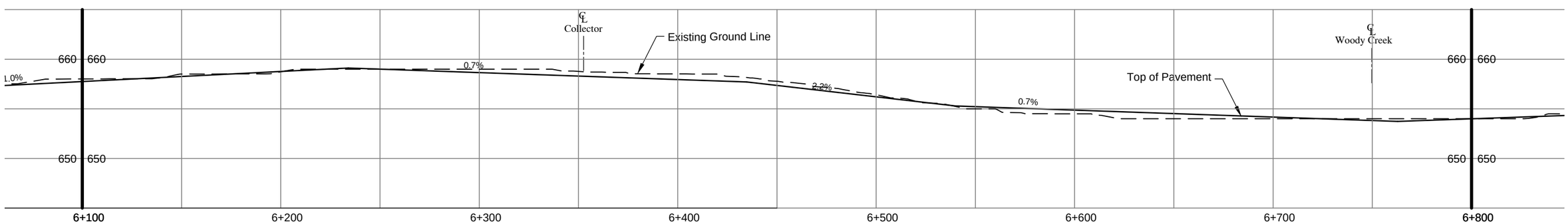
Ralph Schimenke / Jun. 11, 12 / J:\112800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg



NOTE:
ALL DIRECTIONAL INTERSECTION
AS AN OPTION SUBJECT
TO ASP AMENDMENT



PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

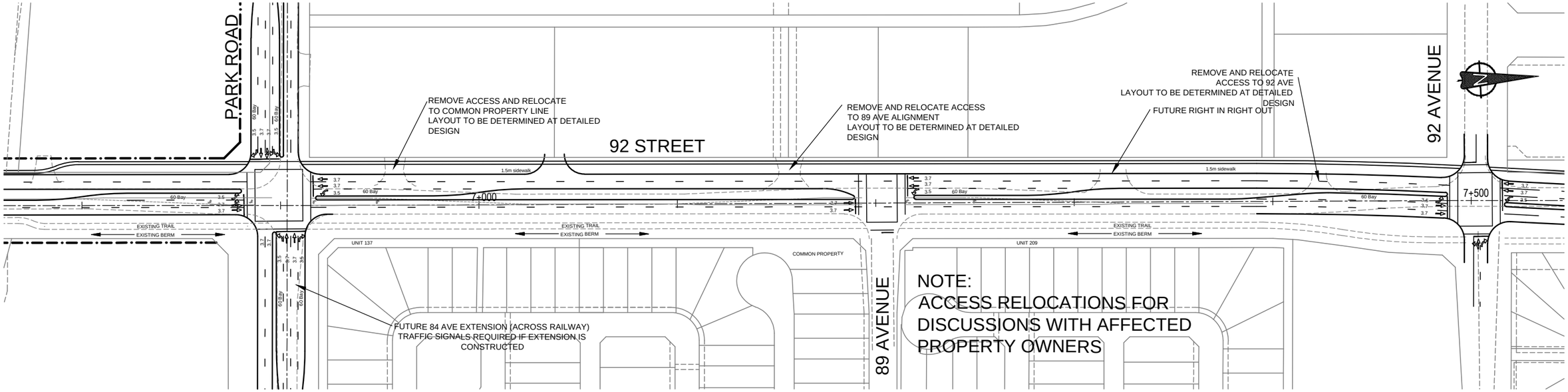
92 Street Functional Plan

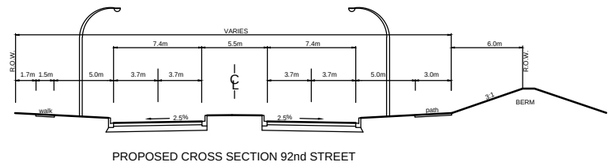
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

PLAN & PROFILE
92 Street
STA. 6+100 to 6+800

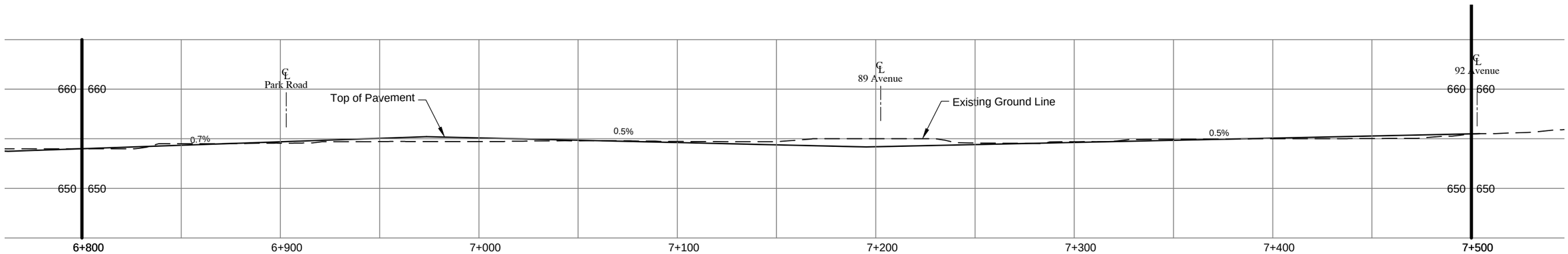
Drawing No. 5.4
Sheet No.
Revision No.

Ralph Schimanke / Jun 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn:	Design Checked:	Date:
Designed:	Discipline Review:	Date:

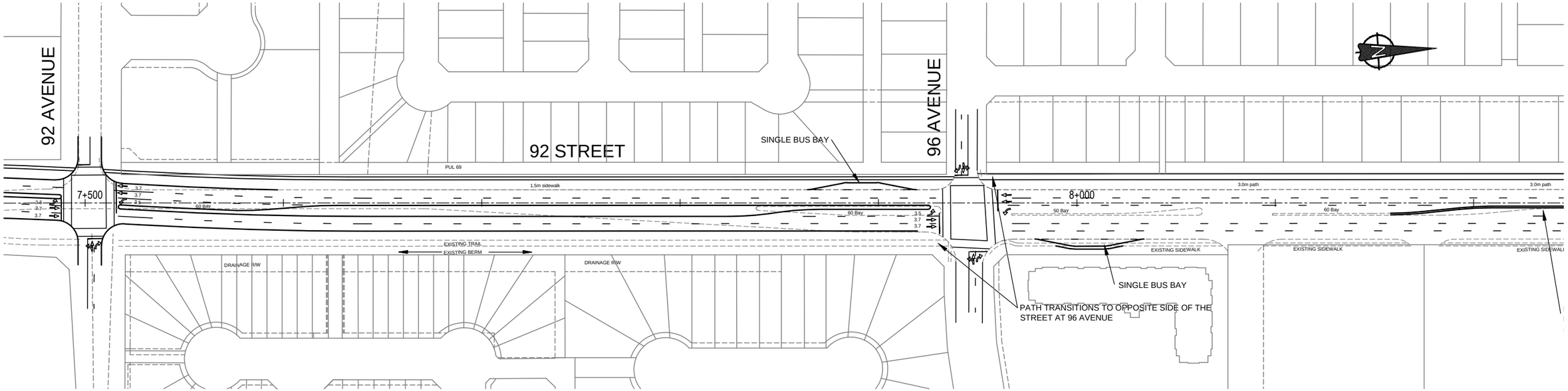
PLAN & PROFILE
92 Street
STA. 6+800 to 7+500

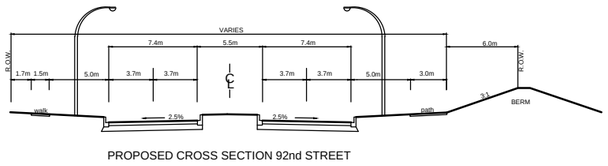
Drawing No. 5.5

Sheet No.

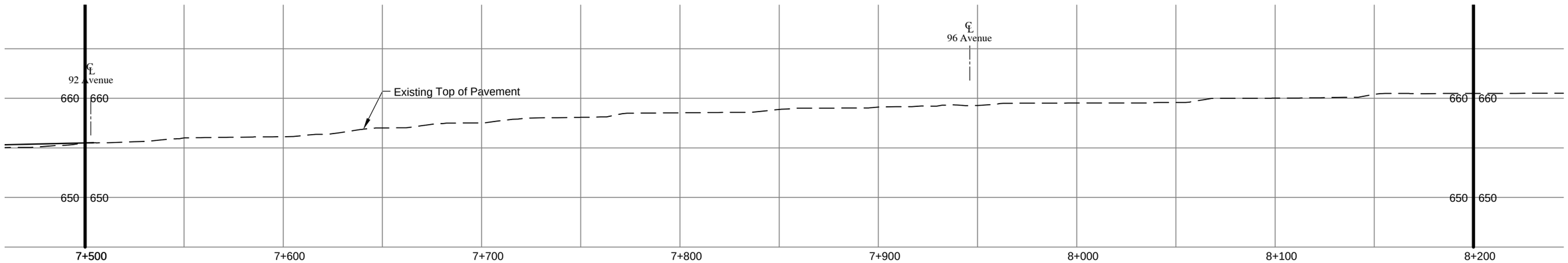
Revision No.

Ralph Schmanke / Jun. 11, 12 / J:\1128001\2833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

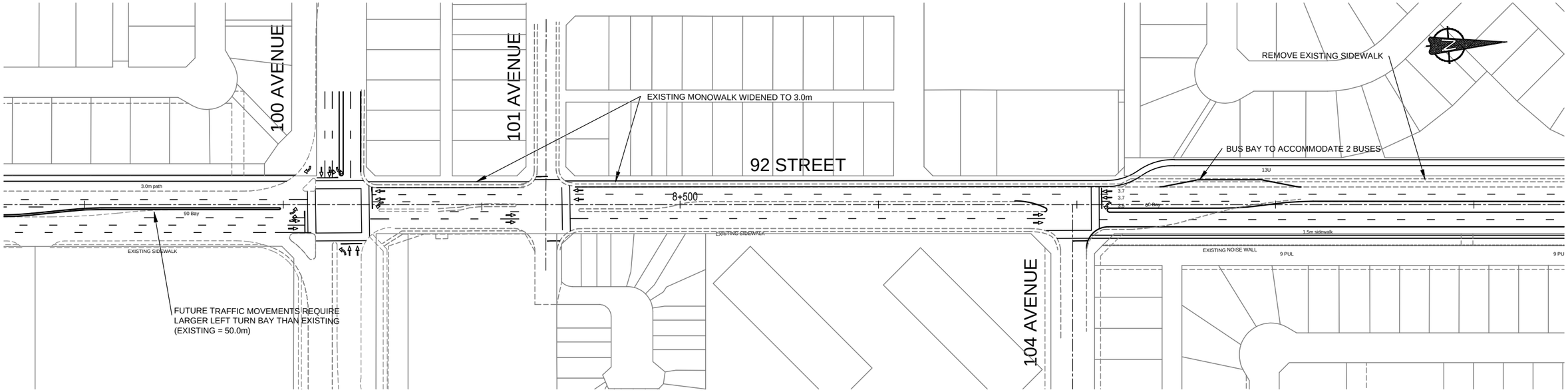
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

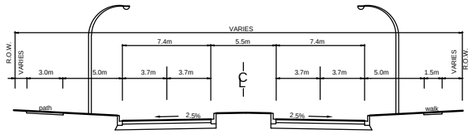
PLAN & PROFILE
92 Street
STA. 7+500 to 8+200

Drawing No. 5.6

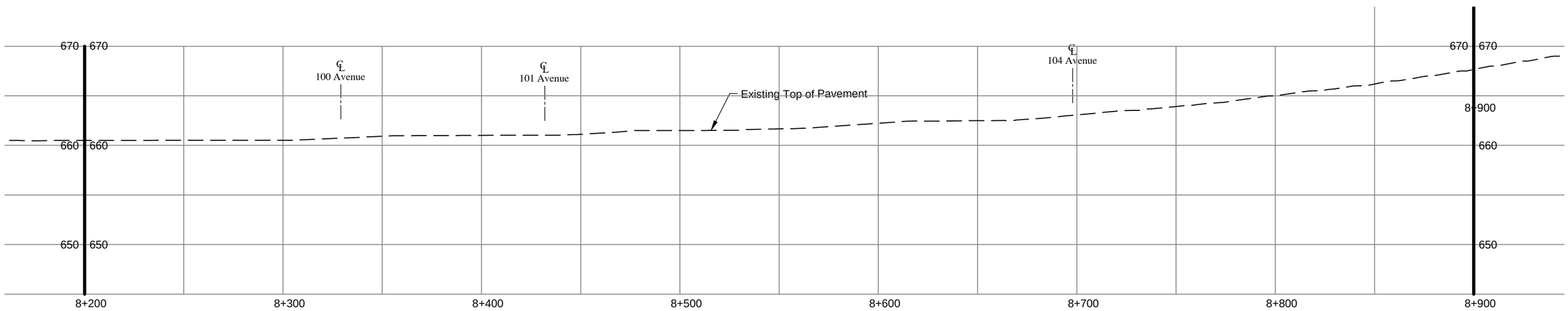
Sheet No. / Revision No.

Ralph Schimenke / Jun. 11, 12 / J:\1128001\2833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

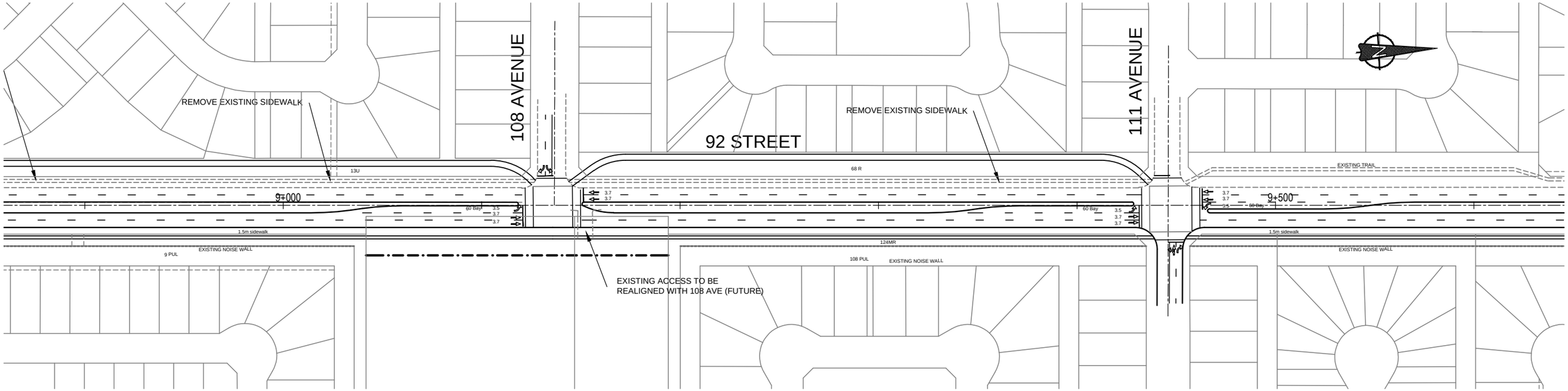
PLAN & PROFILE
92 Street
STA. 8+200 to 8+900

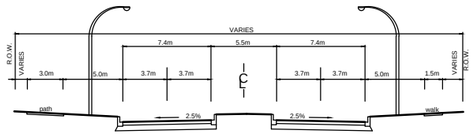
Drawing No. 5.7

Sheet No.

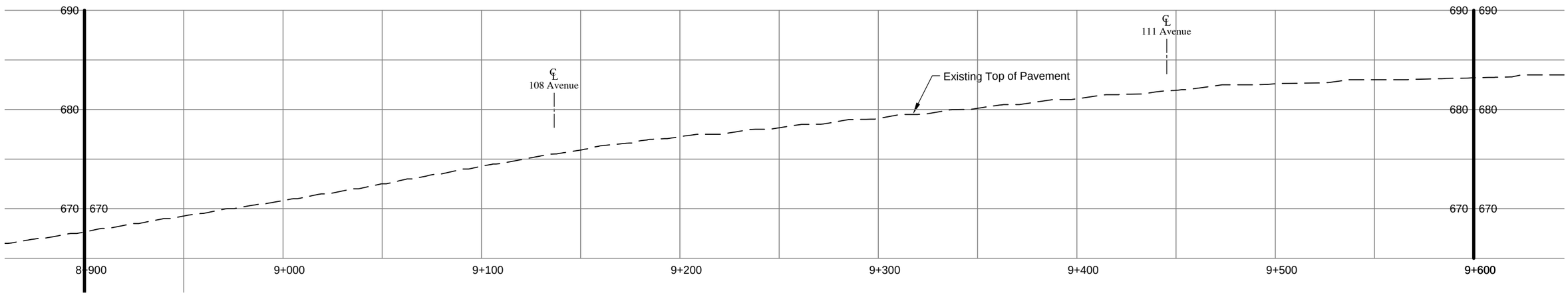
Revision No.

Ralph Schimanke / Jun. 14, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

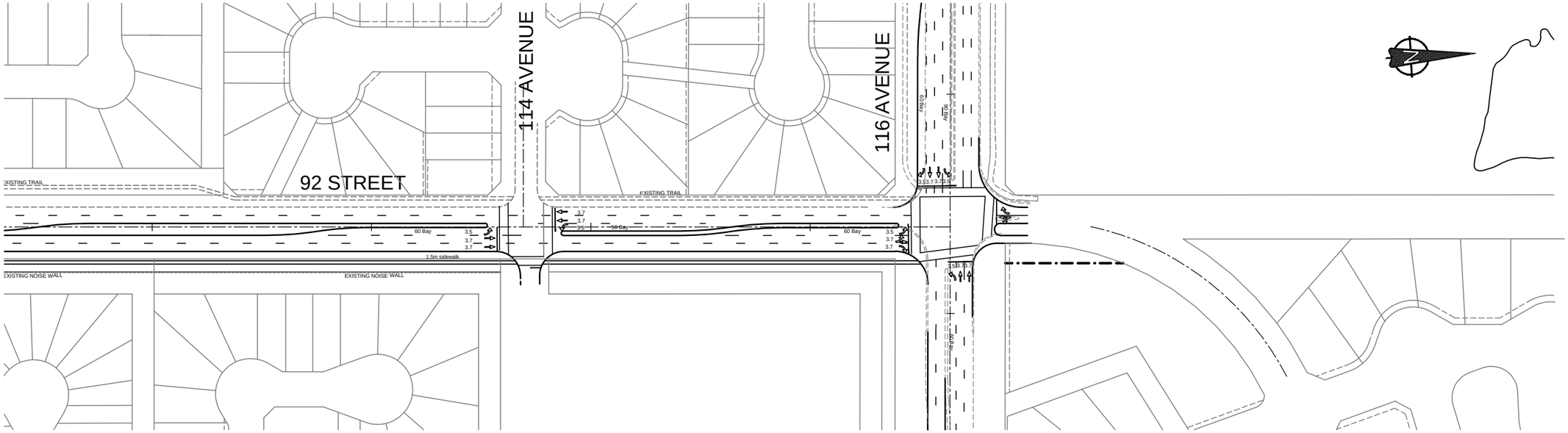
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

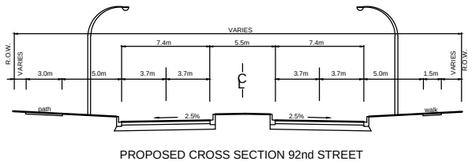
PLAN & PROFILE
92 Street
STA. 8+900 to 9+600

Drawing No. 5.8

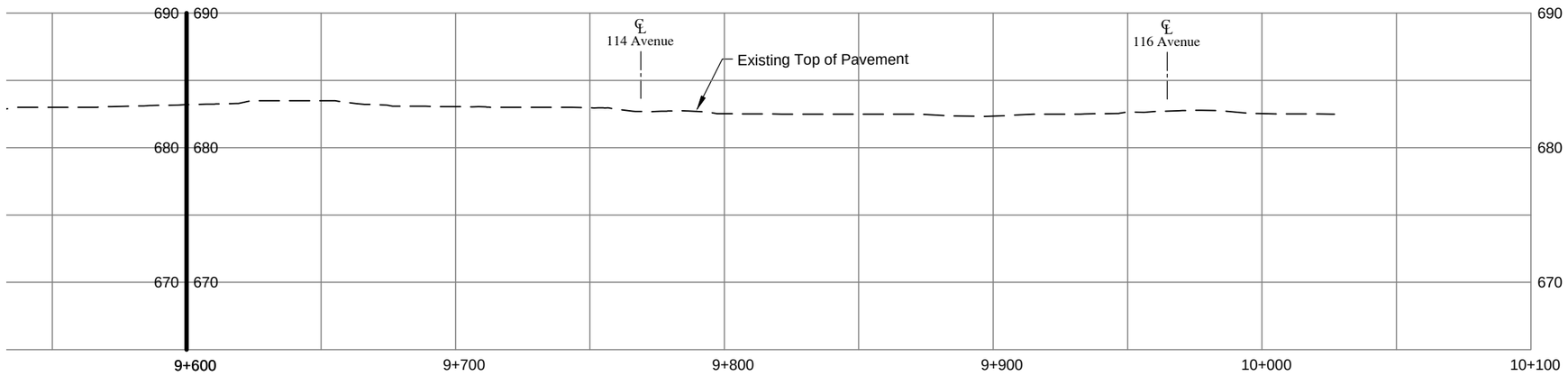
Sheet No. / Revision No.

Ralph Schmanke / Jun. 11, 12 / J:\1128001\2833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

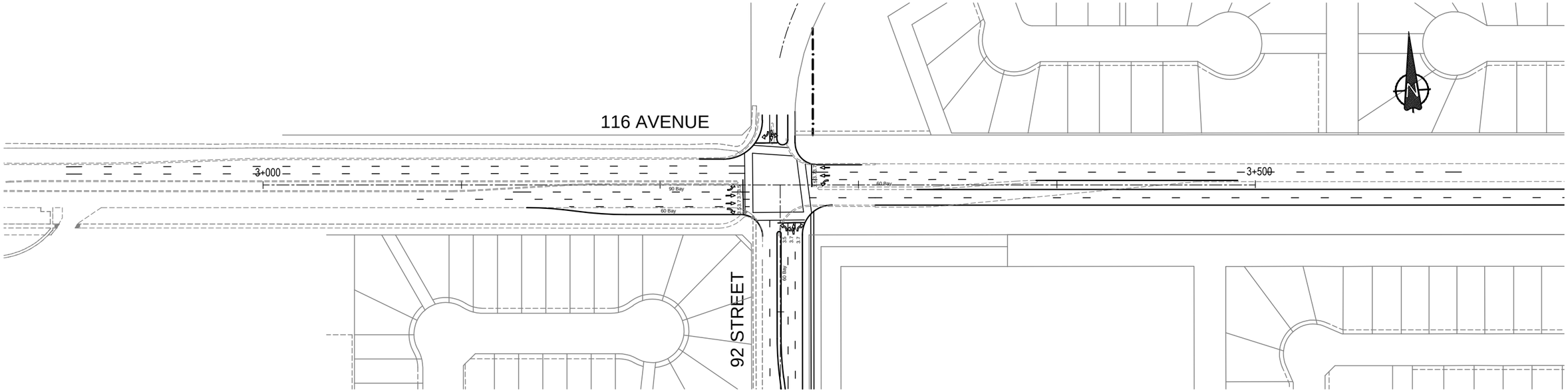
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

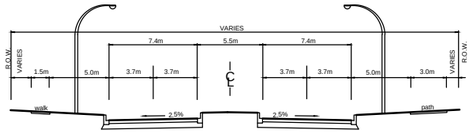
PLAN & PROFILE
92 Street
STA. 9+600 to 10+100

Drawing No. 5.9

Sheet No. / Revision No.

Ralph Schimenke / Jun. 11, 12 / J:\112800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn:
Designed:
Design Checked:
Discipline Review:
Date:
Date:

PLAN & PROFILE
116 Avenue
STA. 3+000 to 3+500

Drawing No.
5.10
Sheet No.
Revision No.

Ralph Schimanke / Jun. 11, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg

Intersection	Spacing to Nearest Intersection			
	Intersection	South	Intersection	North
104 Avenue	100 Avenue	230 m	108 Avenue	406 m
108 Avenue	104 Avenue	406 m	111 Avenue	280 m
111 Avenue	108 Avenue	280 m	114 Avenue	294 m
114 Avenue	111 Avenue	294 m	116 Avenue	160 m

As shown in Table 5.2, intersection spacing along 92 Street is between 60 – 510 m. The shortest distance is between 100 Avenue and 101 Avenue, which is 60 m. All other intersections are spaced at least 160 m apart. It should be noted that the measurements are approximate, measured from curb return to curb return.

5.1.2.1 101 Avenue/92 Street Intersection

As discussed this intersection is approximately 60 m north of the existing signalized intersection of 100 Avenue and 92 Street. For this a technical analysis of the spacing was completed, which concluded the following:

- The results of a traffic analysis based on traffic volumes counted in 2011 indicate that SB traffic at 100 Avenue does not queue up to 101 Avenue
- Applying a 30% growth to the 2011 volumes is a reasonable estimation of volumes at approximately 8 year timeline. (65000 – 78000 Population Horizon). The results of the traffic analysis at this timeline indicate the SB traffic at 100 Avenue will begin to build up and block 101 Avenue.
- Pedestrian activity is relatively low – approximately 10 per hour. With the signalized crossing at 100 Avenue and 104 Avenue a pedestrian signal (flashing or half signal) is not warranted.

Based on the above findings the City may experience some safety and congestion issues at the 101 Avenue intersection in the 65,000 – 78,000 population horizon and should consider closing this intersection at this time. This would reconfigure the geometry, creating a right in/out on each side of 92 Street.

5.1.3 Woody Channel Crossing

Appendix E shows a record drawing of 92 Street where it crosses Wood Channel. Based on this drawing, sufficient width has been provided to accommodate future road widening.

5.1.4 101 Avenue to 104 Avenue

This area was recently changed from permitted parking (24/7) to a peak hour parking ban, including the hours of 7 to 9 AM and 4 – 6 PM. The peak hour parking ban was installed as part of the traffic signal improvements at 104 Avenue in 2011. The peak hour parking ban provides addition southbound through lanes during the AM and PM peak hours. Since the establishment of this peak hour parking ban certain issues have been raised by adjacent property owners. These issues were raised through discussions the open houses and include:

- Drivers do not understand that the parking ban is during the peak hours only. Drivers have been assuming that the area is prohibited parking. This has created driver confusion as they will try to continue in the parking lane during off peak hours.
- An incident has occurred where a property owners vehicle was struck.
- Difficulty in backing out of driveways due to the volumes of traffic.

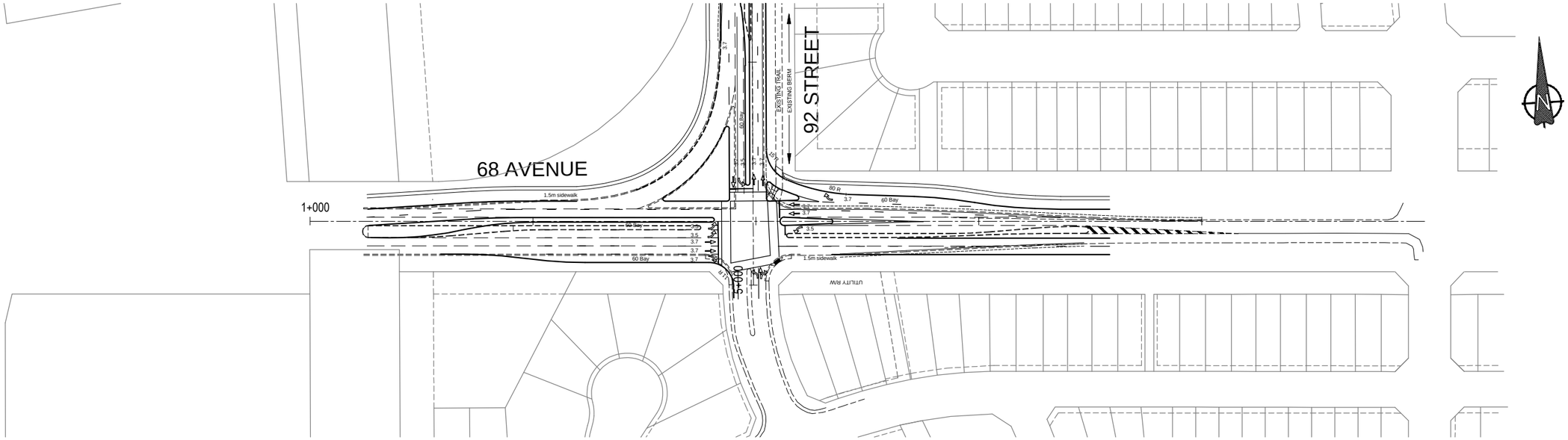
Based on the above concerns it is recommended that the section of peak hour parking ban be changed to parking prohibited (24/7). This is expected to satisfy driver expectations and reduce concerns with property owners of parking cars in this area during off peak periods.

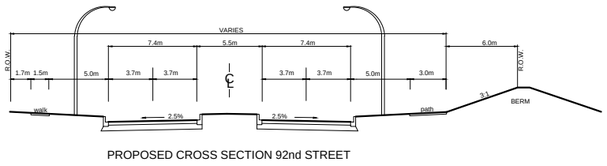
5.1.5 92 Street/76 Avenue Intersection

As shown on Exhibit 5.3, the intersection is aligned at a 90 degree angle which is not consistent with the current planning documents for the area. This is noted as the planning documents need to be amended for this change to be final.

5.1.6 Right-of Way-Requirements

The right-of-way requirements are shown in Exhibits 5.11 to 5.20. These show the amount of land needed for widening.





PROPOSED CROSS SECTION 92nd STREET

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:

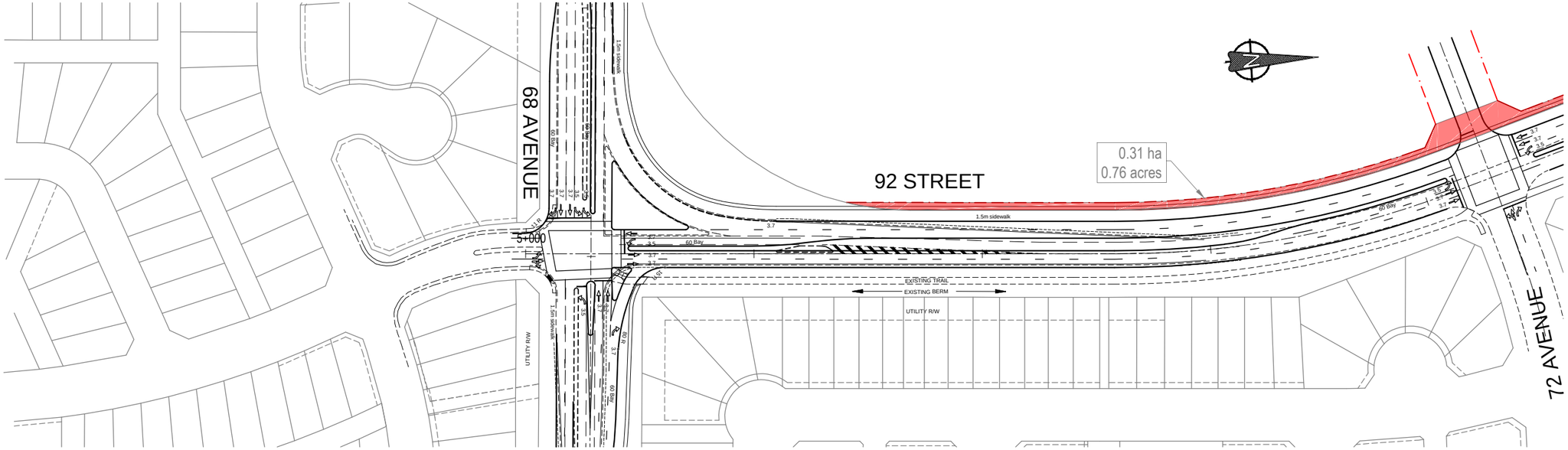
Designed: | Discipline Review: | Date:

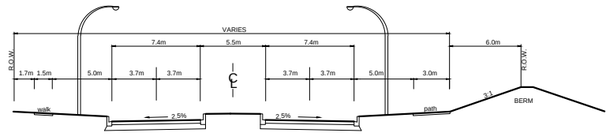
RIGHT-OF-WAY REQUIREMENTS
68 Avenue
STA. 1+000 to 1+500

Drawing No. 5.11

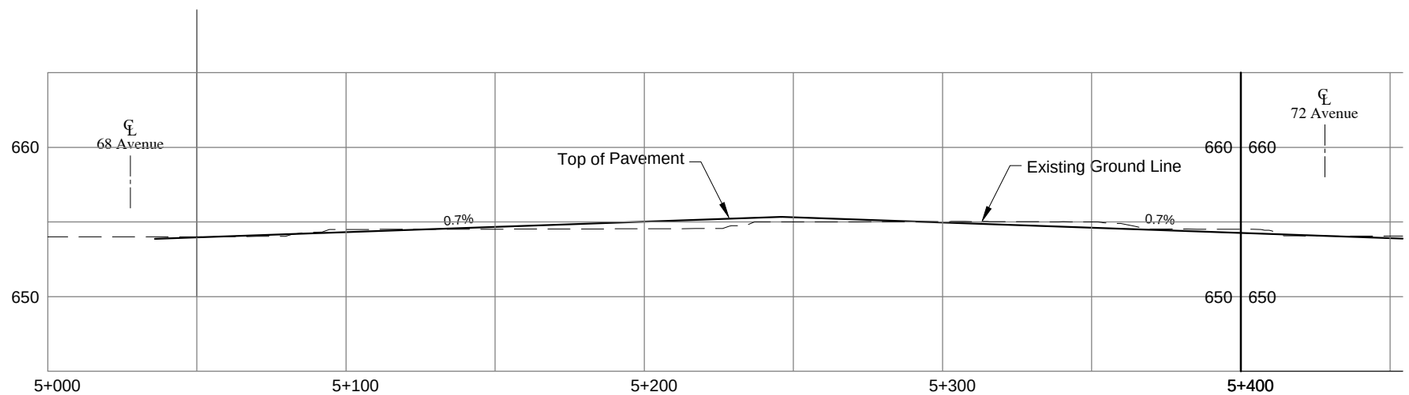
Sheet No. / Revision No.

Ralph Schmanke / Oct. 17, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

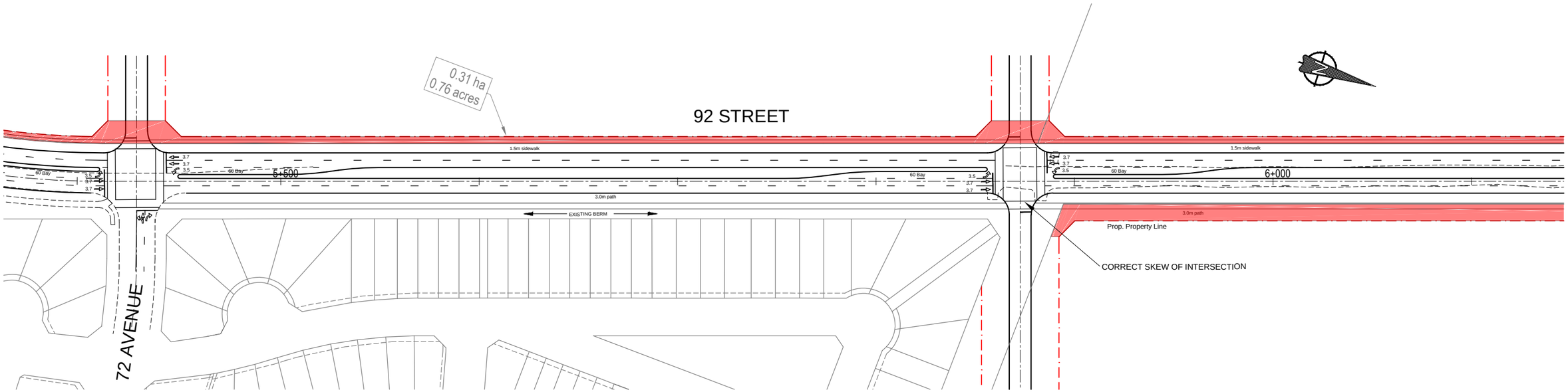
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

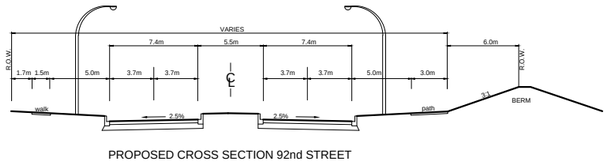
RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 5+000 to 5+400

Drawing No. 5.12

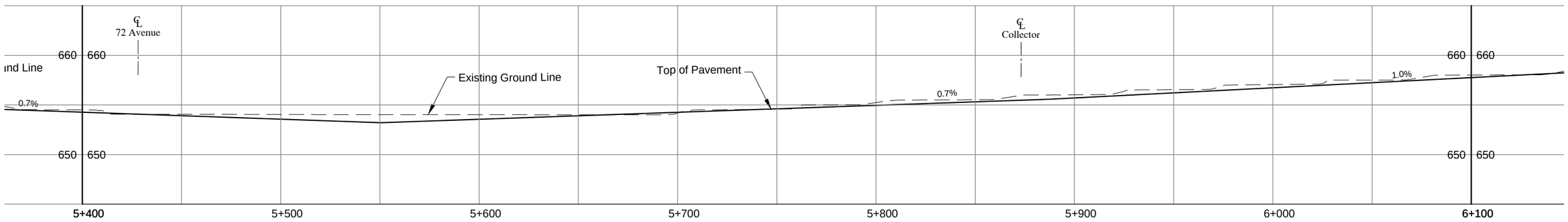
Sheet No. / Revision No.

Ralph Schimanke / Oct. 17, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

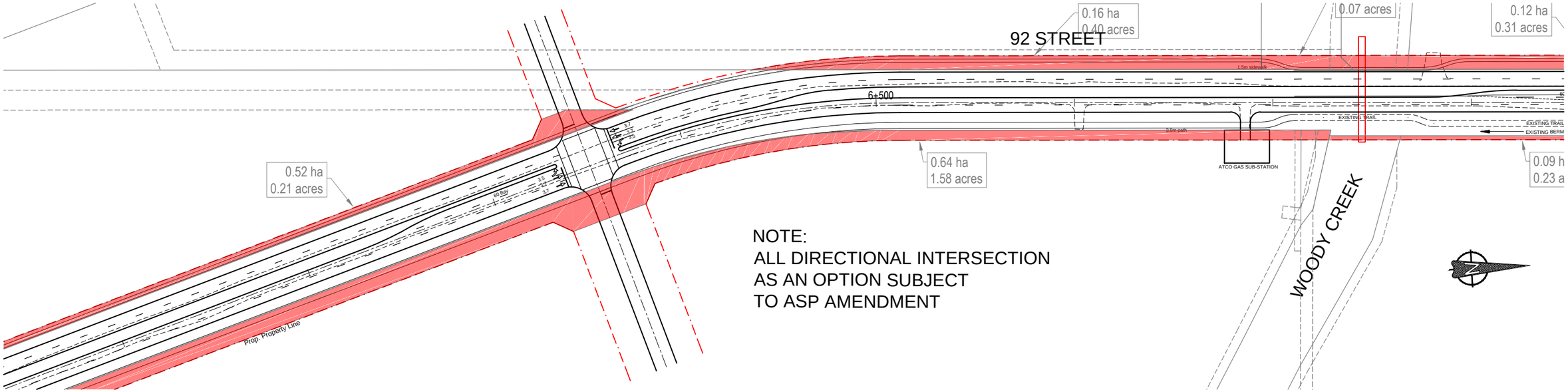
92 Street Functional Plan

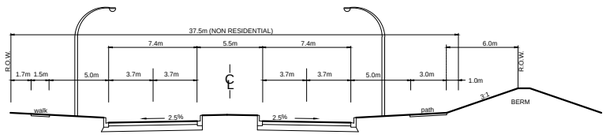
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 5+400 to 6+100

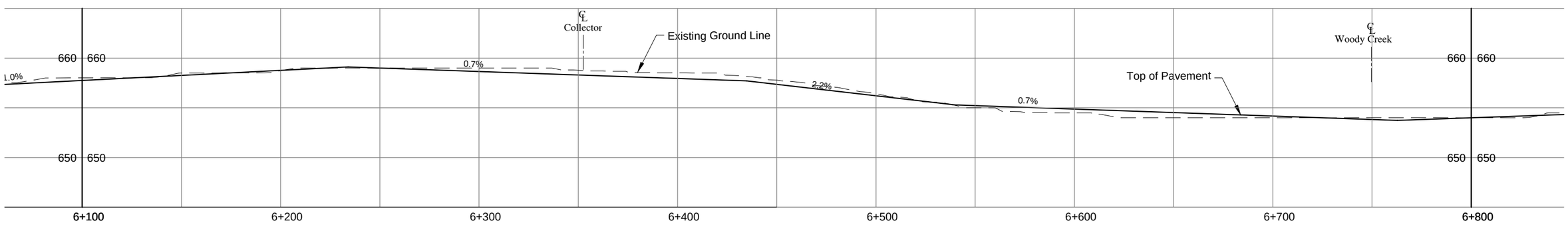
Drawing No. 5.13

Sheet No. / Revision No.





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

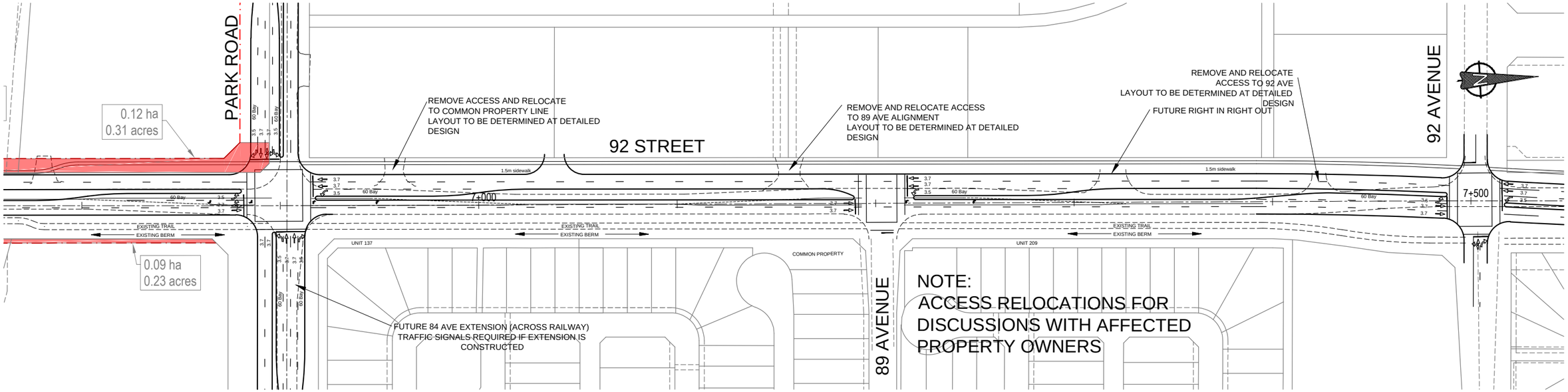
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

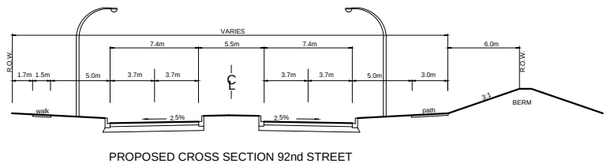
RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 6+100 to 6+800

Drawing No. 5.14

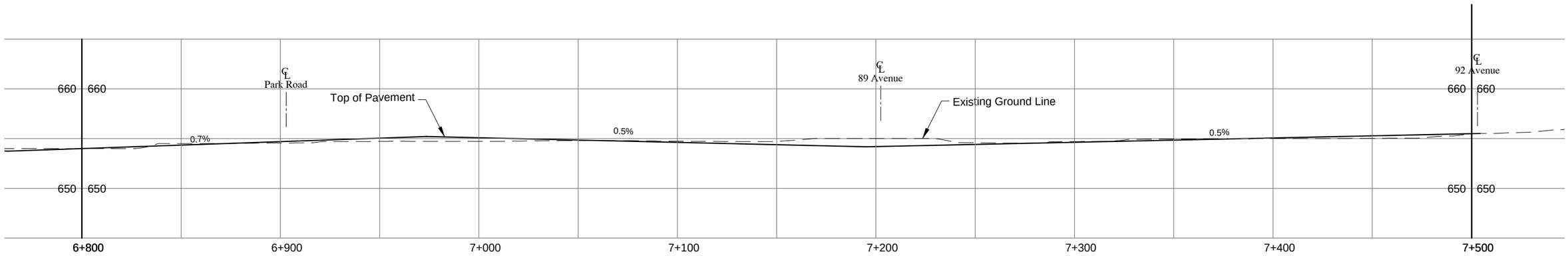
Sheet No. / Revision No.

Ralph Schmanke / Oct. 17, 12 / J:\12800\12833_GP_92St_FPI02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

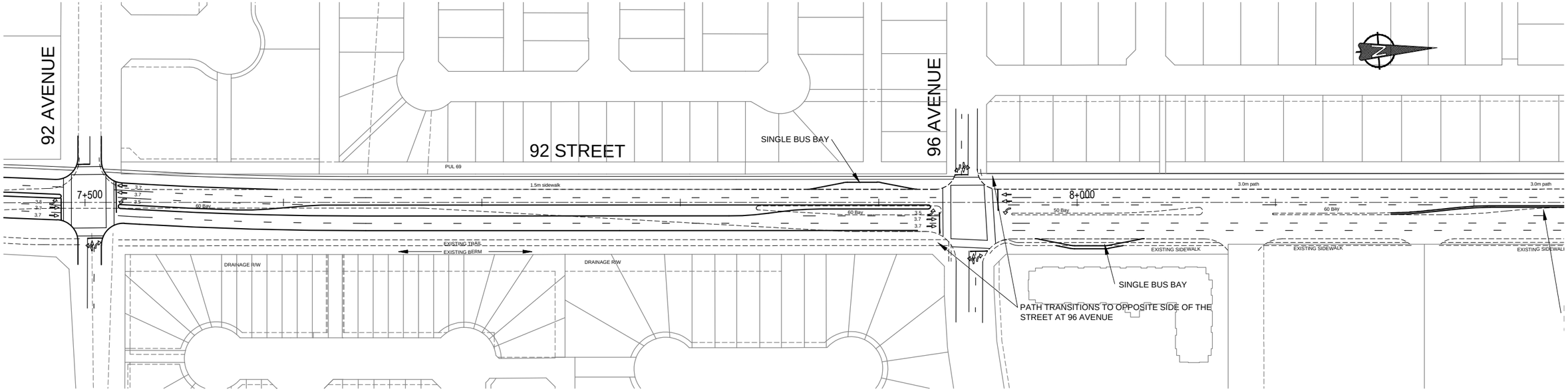
RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 6+800 to 7+500

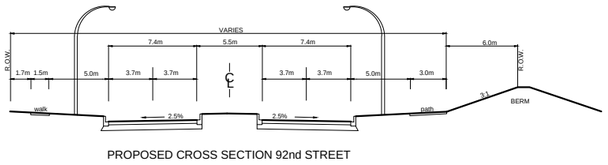
Drawing No. 5.15

Sheet No.

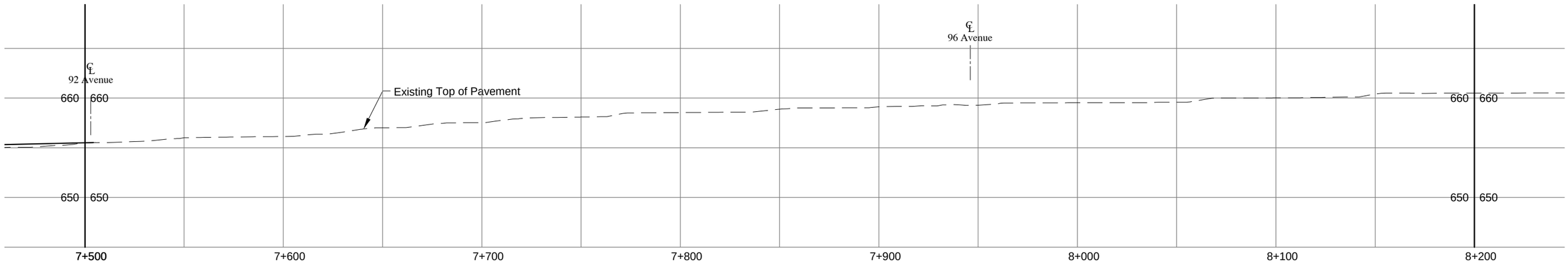
Revision No.

Ralph Schmanke / Oct. 17, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

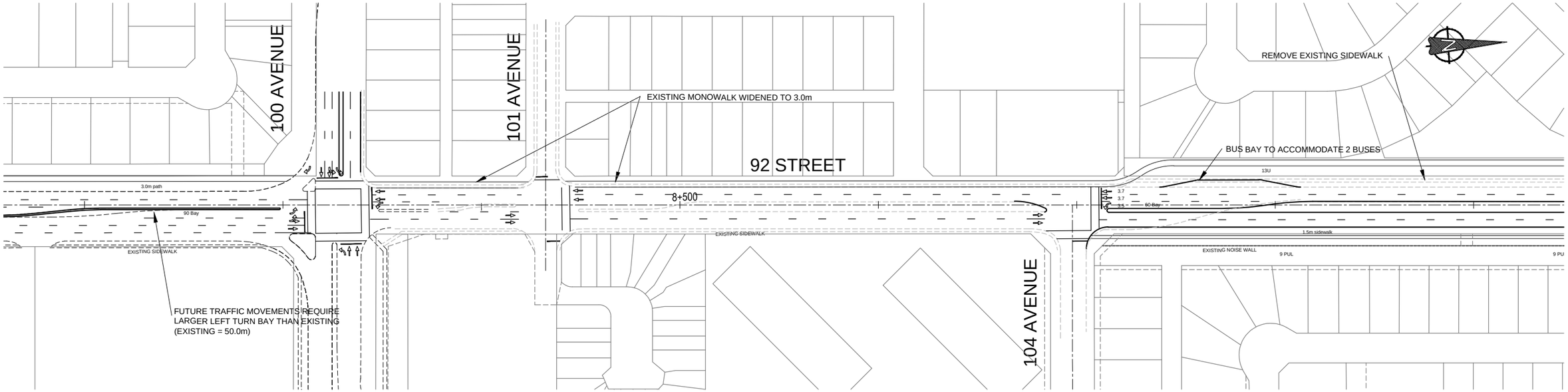
RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 7+500 to 8+200

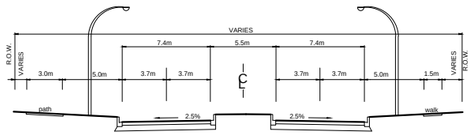
Drawing No. 5.16

Sheet No.

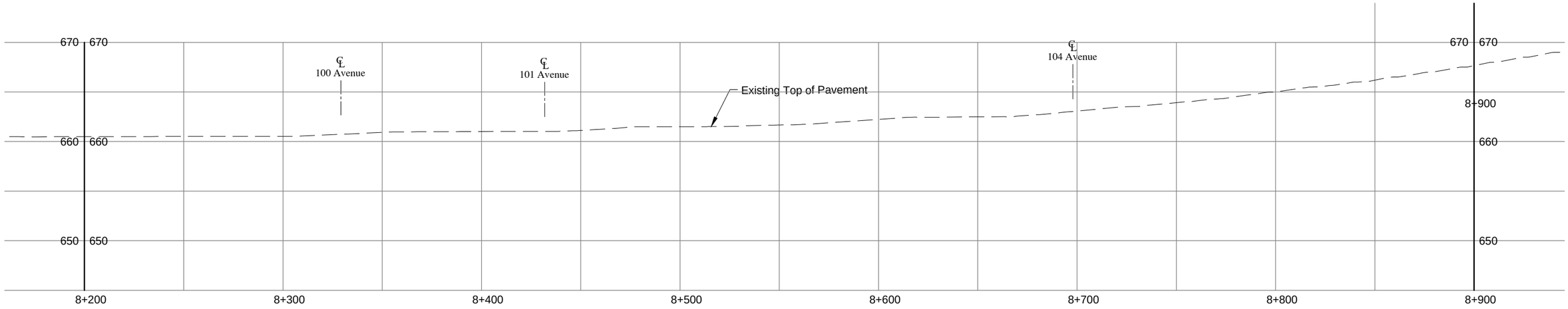
Revision No.

Ralph Schmanke / Oct. 17, 12 / J:\112800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

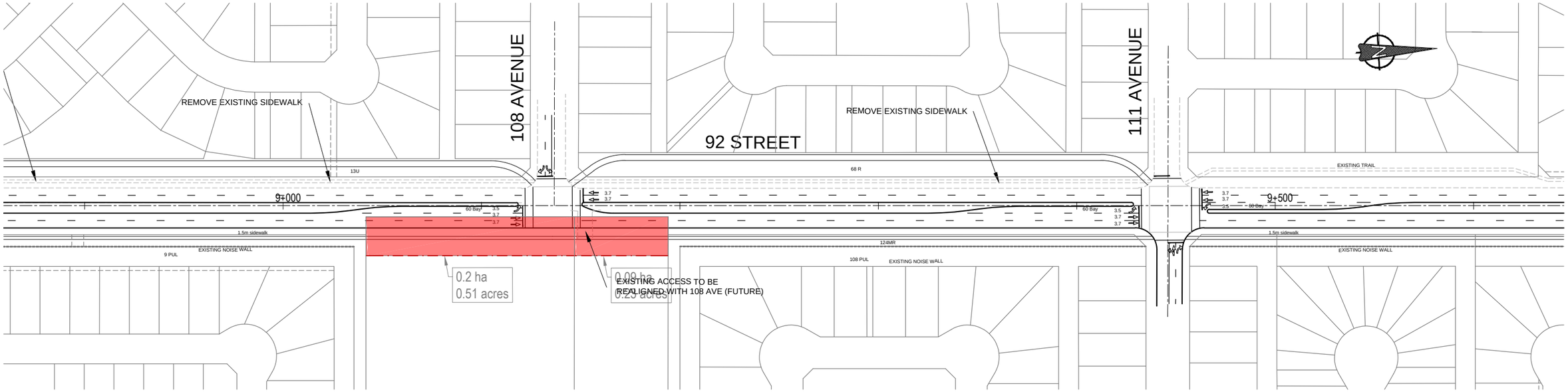
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

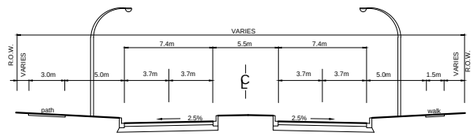
RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 8+200 to 8+900

Drawing No. 5.17

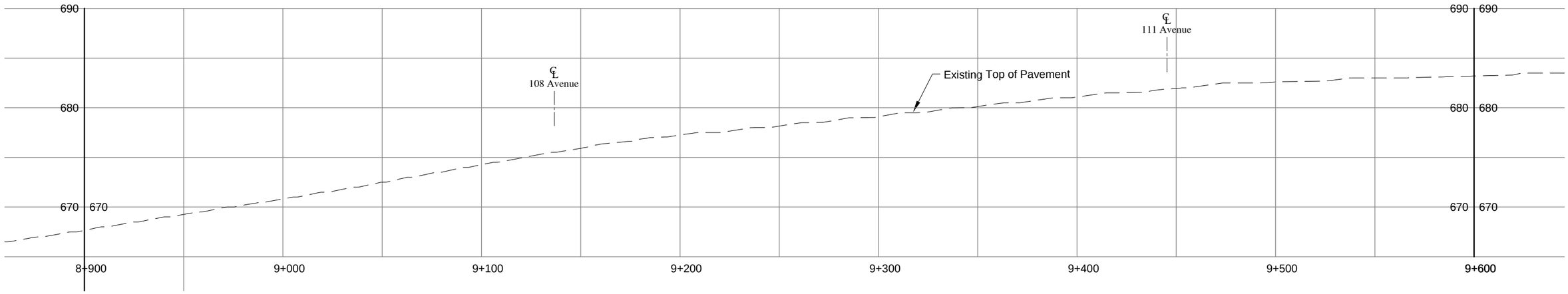
Sheet No. / Revision No.

Ralph Schmanke / Oct. 17, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

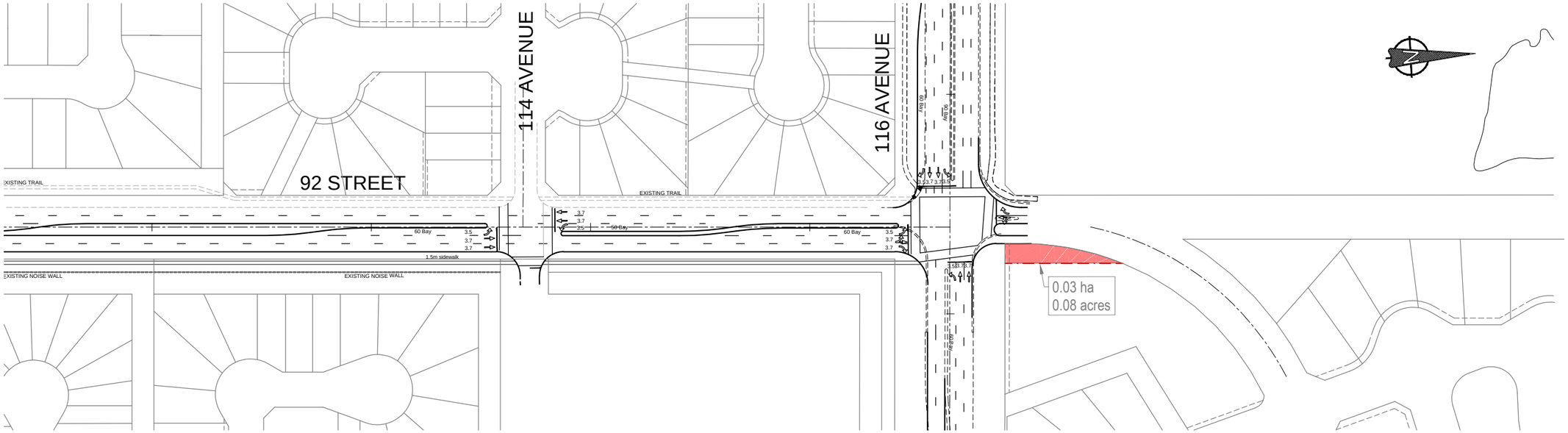
Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

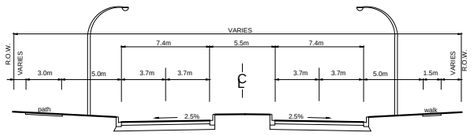
RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 8+900 to 9+600

Drawing No. 5.18

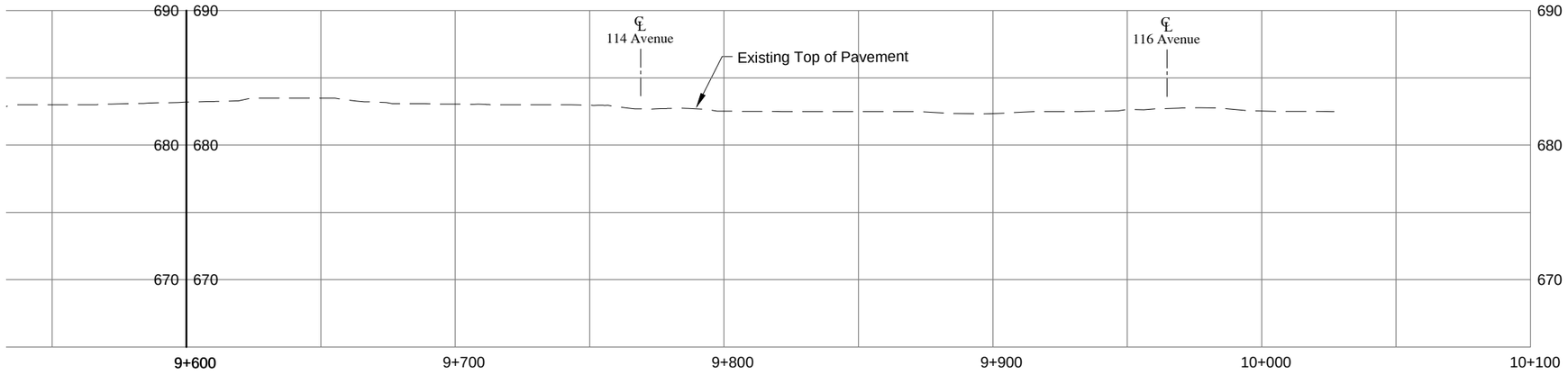
Sheet No. / Revision No.

Ralph Schimanke / Oct. 17, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET



No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:

Designed: | Discipline Review: | Date:

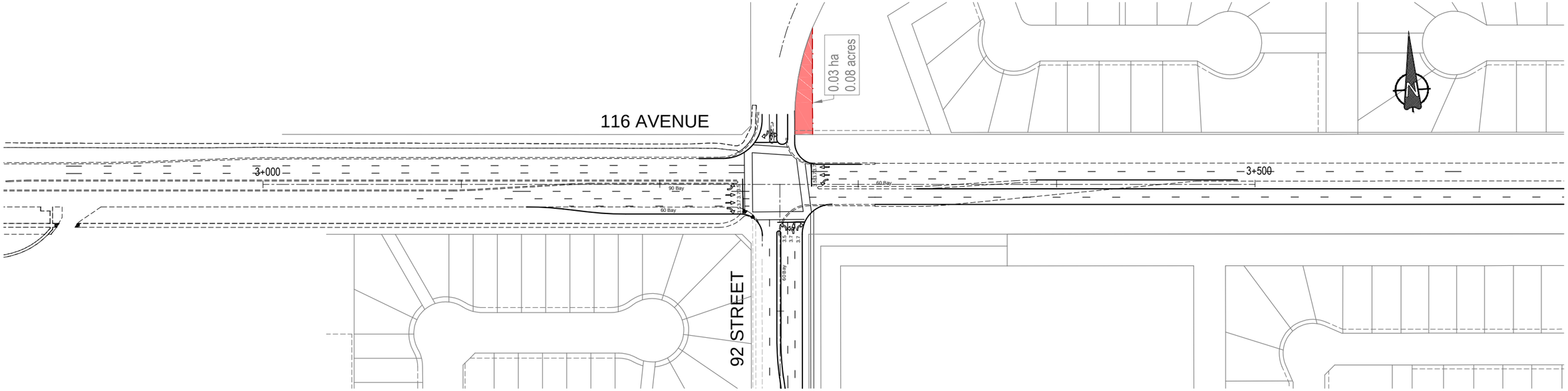
RIGHT-OF-WAY REQUIREMENTS
92 Street
STA. 9+600 to 10+100

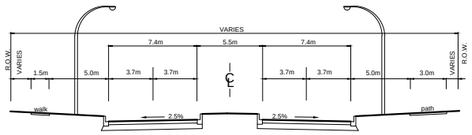
Drawing No. 5.19

Sheet No.

Revision No.

Ralph Schmanke / Oct. 17, 12 / J:\112800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg





PROPOSED CROSS SECTION 92nd STREET

No.	DESCRIPTION	BY	DATE
6			
5			
4			
3			
2			
1			

REVISIONS

P.Eng.

Permit

Scale
HORZ 1:1000 0 10 20 30 40m
VERT. 1:200 0 2 4 6 8m

ISL Engineering and Land Services

City of Grande Prairie

92 Street Functional Plan

Drawn: | Design Checked: | Date:
Designed: | Discipline Review: | Date:

RIGHT-OF-WAY REQUIREMENTS
116 Avenue
STA. 3+000 to 3+500

Drawing No. 5.20

Sheet No.

Revision No.

Ralph Schimanke / Oct. 17, 12 / J:\12800\12833_GP_92St_FP\02_drafting\02a_project\12833_PP_new.dwg

6.0 Public Input Summary

The public input program for this project consisted of two input opportunities, one on February 15, 2012, for reaction to the preliminary ultimate stage plans, and a second on May 08, 2012 to attain input to the finalized staging and ultimate plans. A stakeholder meeting prior to the public open house on each date was held. All sessions were held at the Muskoseepi Park Pavilion. A more detailed report on the public input program, including letters received is provided in Appendix F. The 100 Avenue Functional Study was held in conjunction and some questions may relate to the 100 Avenue project.

6.1 Initial Open House

The meeting was held from 3:00 p.m. to 6:30 p.m. on February 15, 2012, hosted by members of the consultant team and City of Grande Prairie staff. An overview of the ultimate stage plans was presented by the consultant team. Along with the overview of the ultimate stage plans were two options for the 100 Avenue section from 96 Street to 93 Street. Attendees had the opportunity to compare these two options on the comment form.

Twenty two landowners signed the registration sheet for the meeting and the total attendance was approximately 25. Four comment forms were completed and returned at the open house. One attendee submitted comments via email in the two weeks following the open house.

There were a number of concerns regarding the safety at the existing section of roadway on 92 Street, 102 Avenue to 104 Avenue. This section was changed by the City in 2011 from parking permitted to peak hour no parking to accommodate the construction of traffic signals. The City agreed to look into this issues as it is an operational concern. Overall, the 92 Street plans were accepted.

6.2 Second Open House

The second open house was held from 4:00 to 6:30 p.m. on May 8, 2012. Representatives from ISL Engineering and Land Services and the City of Grande Prairie staffed the event. An overview of the ultimate stage plans, including proposed construction staging at this open house.

15 people signed in for the open house and total attendance was about 40. Seven comment forms were completed and returned at the open house. Nine comment forms were submitted via fax and two letters were received via email in the two weeks following the open house.

Overall there were many residents from the Ivy Lake Villas who attended this open house. These residents were concerned with the closure of 101 Avenue at 92 Street as this would limit their access. 11 people opposed the 92 Street plan for this reason. Many of these residents felt that they were not well informed of the proposed changes.

Beyond this intersection ISL received a letter from the Grande Prairie Chamber of Commerce regarding the proposed installation of a median from 89 Avenue to 92 Avenue. The letter can be found in the Appendix F. The primary reason for the letter was to oppose the installation of this median. The letter recommended that a center left turn lane be installed in order to maintain the accesses to the businesses.

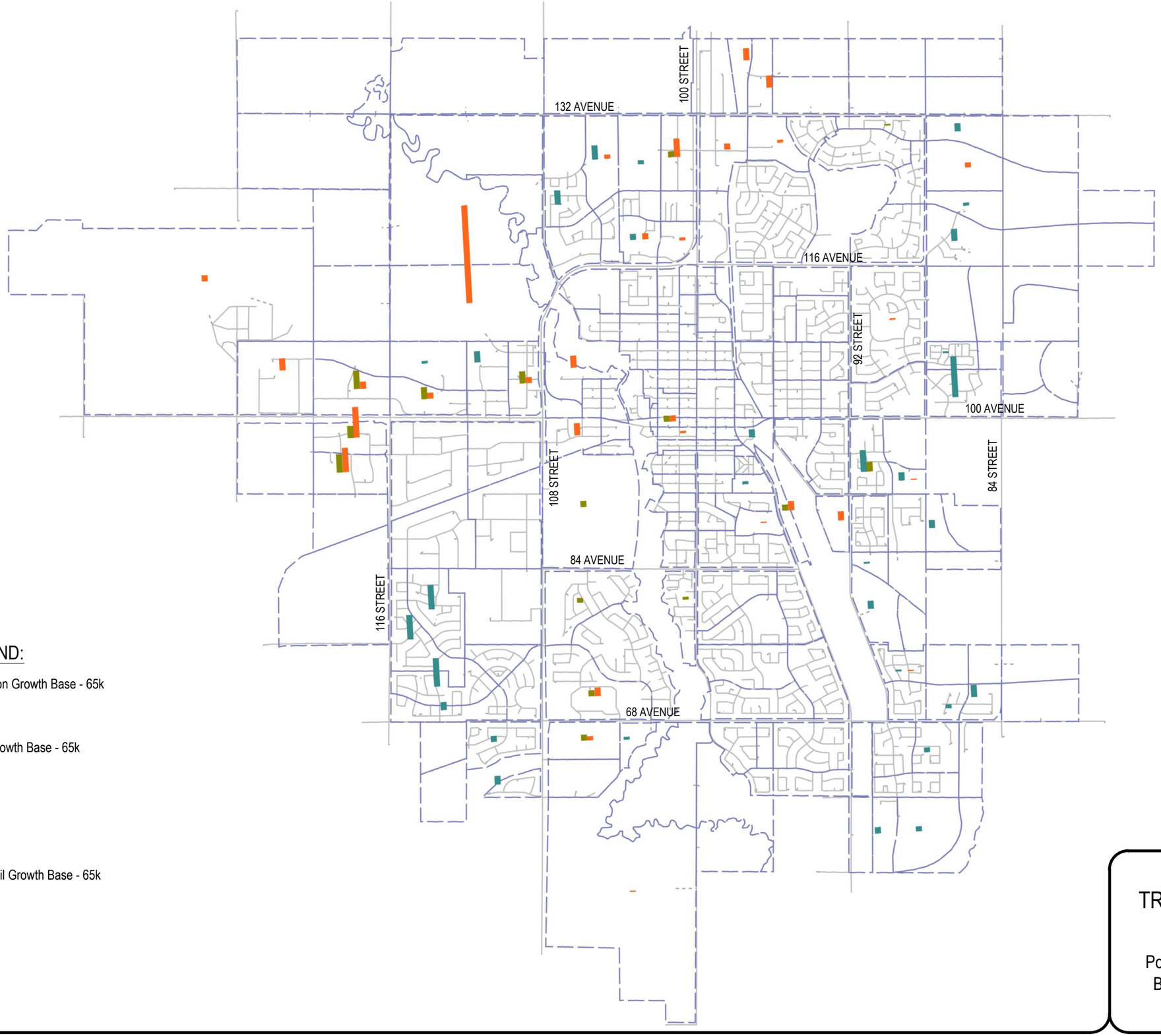
Other concerns included:

- Construct 84 Street as this will provide a better route to drive to and from work and would reduce the amount of traffic on 92 Street.
- Extend 84 Avenue across the rail yard.
- Why was 88 Street closed. This put a lot of traffic on to Crystal Lake Drive.
- How will emergency services be affected by the 101 Avenue intersection closure.
- Synchronization of the signals between 104 Avenue and 100 Avenue is required.
- The sidewalk on the west side of 92 Street is not needed as it will encourage cars and motorcycles to drive on it.

Appendix A

TMP Growth Maps

Exhibit 3.3



LEGEND:

Population Growth Base - 65k
1000
500
0

Retail Growth Base - 65k
1000
500
250
0

Non-retail Growth Base - 65k
1000
500
250
0

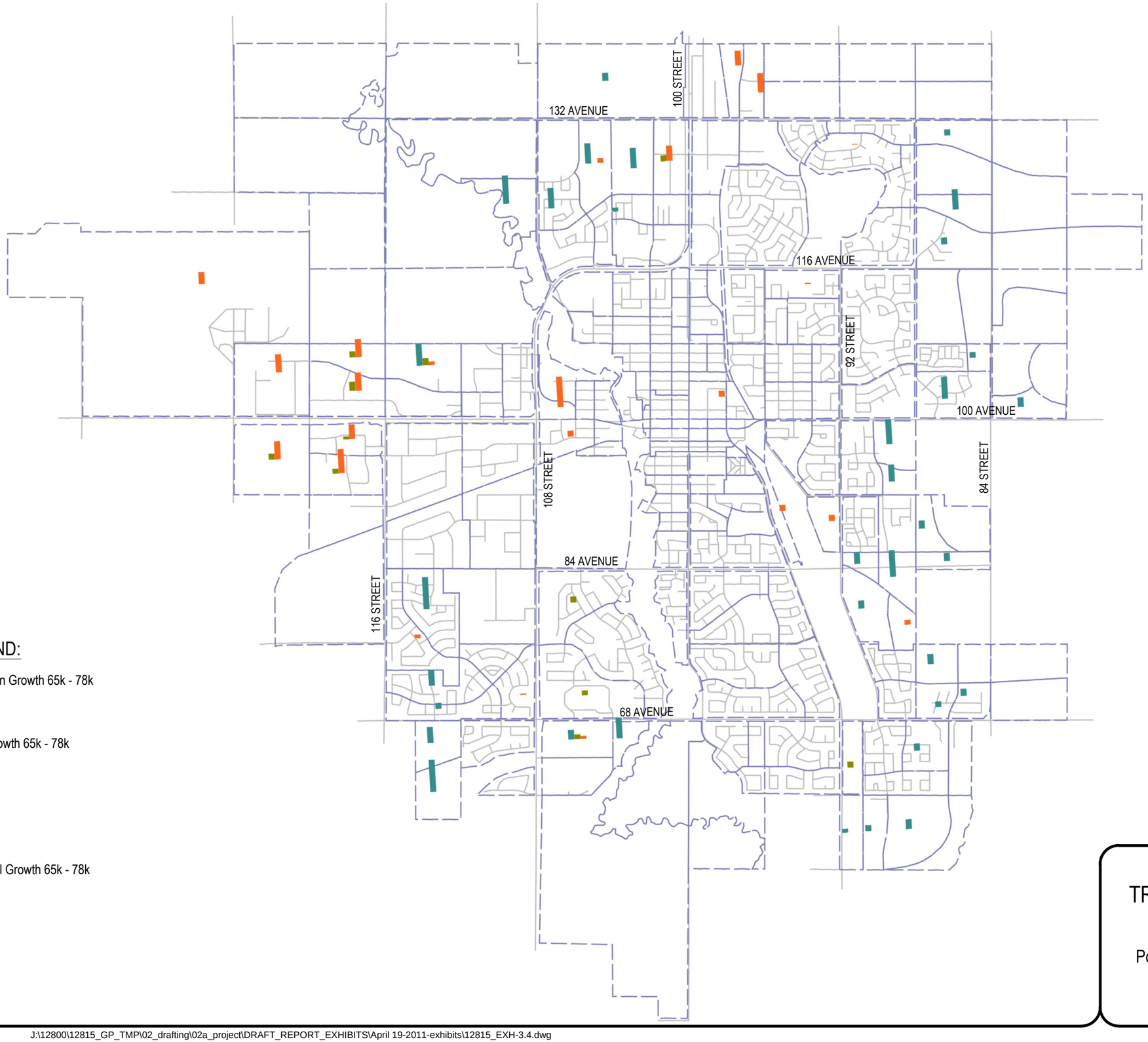
ISL Engineering and Land Services

CITY of GRANDE PRAIRIE TRANSPORTATION MASTER PLAN

Population and Employment Growth Locations
Base Year (2010) to 65k Population Horizon

Theresec April 20, 2011 J:\12800\12815_GP_TMP\02_drafting\02a_project\DRAFT_REPORT_EXHIBITS\April 19-2011-exhibits\12815_EXH-3.3.dwg

Exhibit 3.4



LEGEND:

Population Growth 65k - 78k

1000
500
0

Retail Growth 65k - 78k

1000
500
250
0

Non-retail Growth 65k - 78k

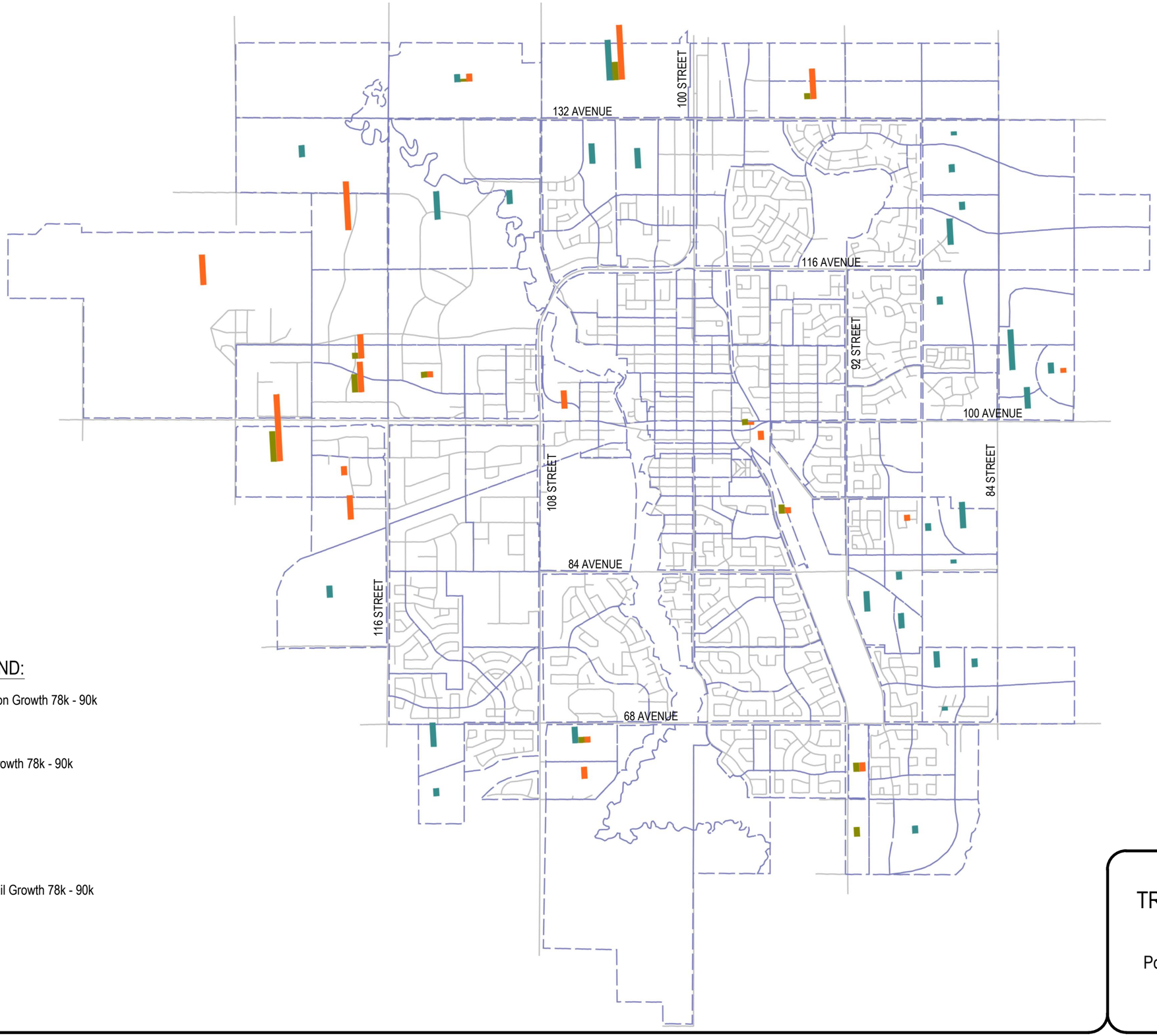
1000
500
250
0

ISL Engineering and Land Services

CITY of GRANDE PRAIRIE TRANSPORTATION MASTER PLAN

Population and Employment Growth Locations
65k to 78k Population Horizons

Exhibit 3.5



LEGEND:

Population Growth 78k - 90k
1000
500
0

Retail Growth 78k - 90k
1000
500
250
0

Non-retail Growth 78k - 90k
1000
500
250
0

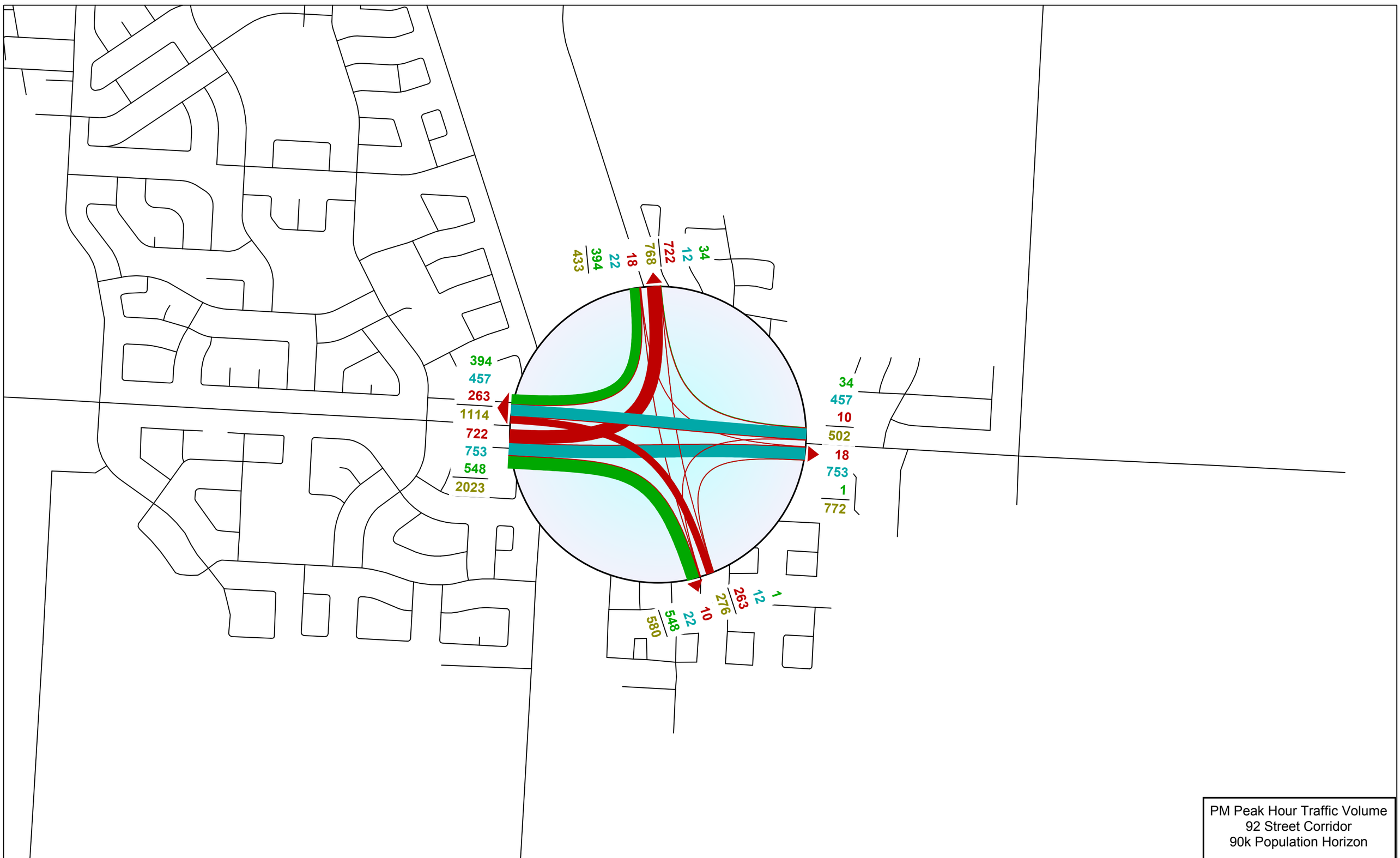
ISL Engineering and Land Services

CITY of GRANDE PRAIRIE TRANSPORTATION MASTER PLAN

Population and Employment Growth Locations
78k to 90k Population Horizons

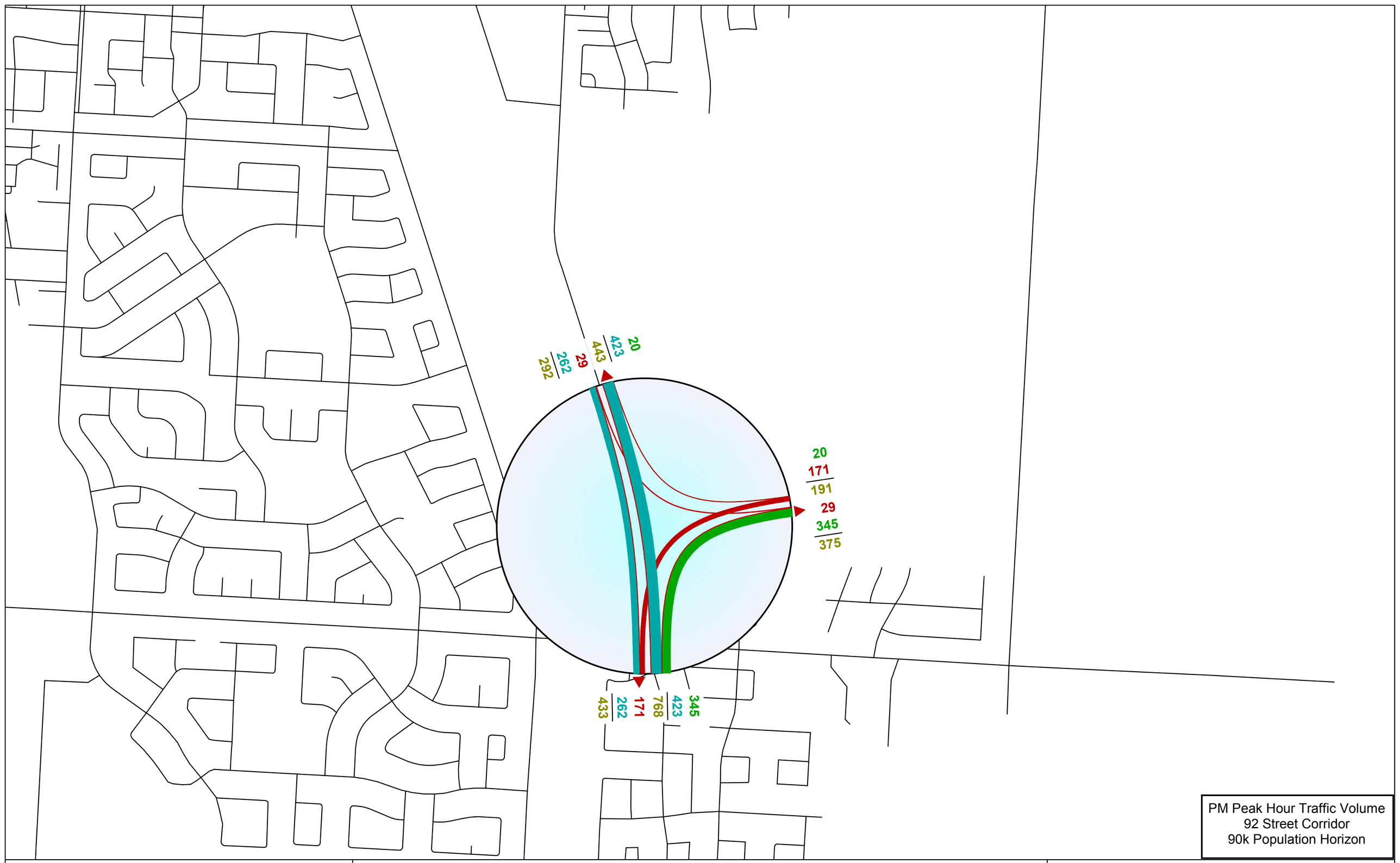
Appendix B

TMP Traffic Volumes



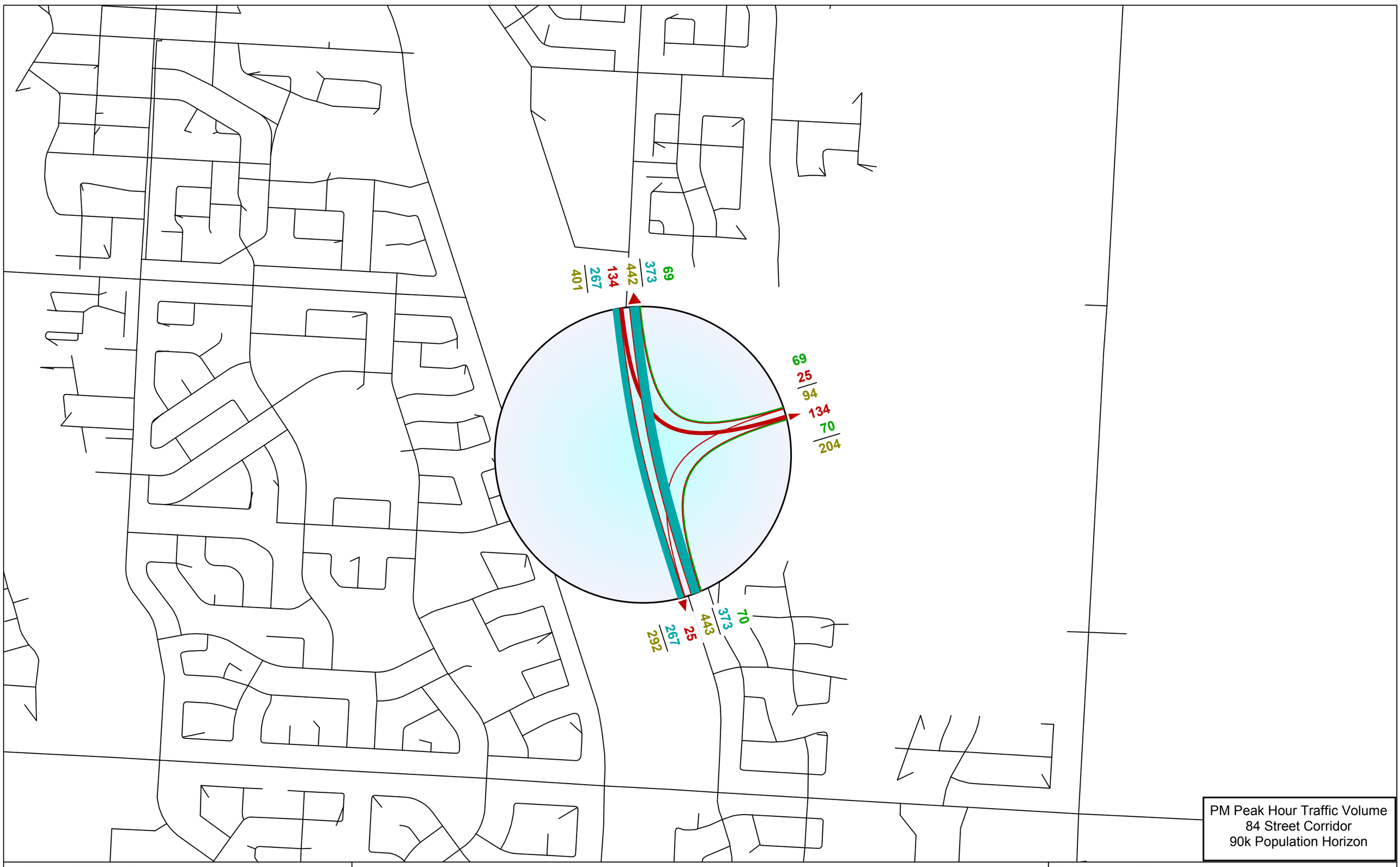
PM Peak Hour Traffic Volume
92 Street Corridor
90k Population Horizon

VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:10970



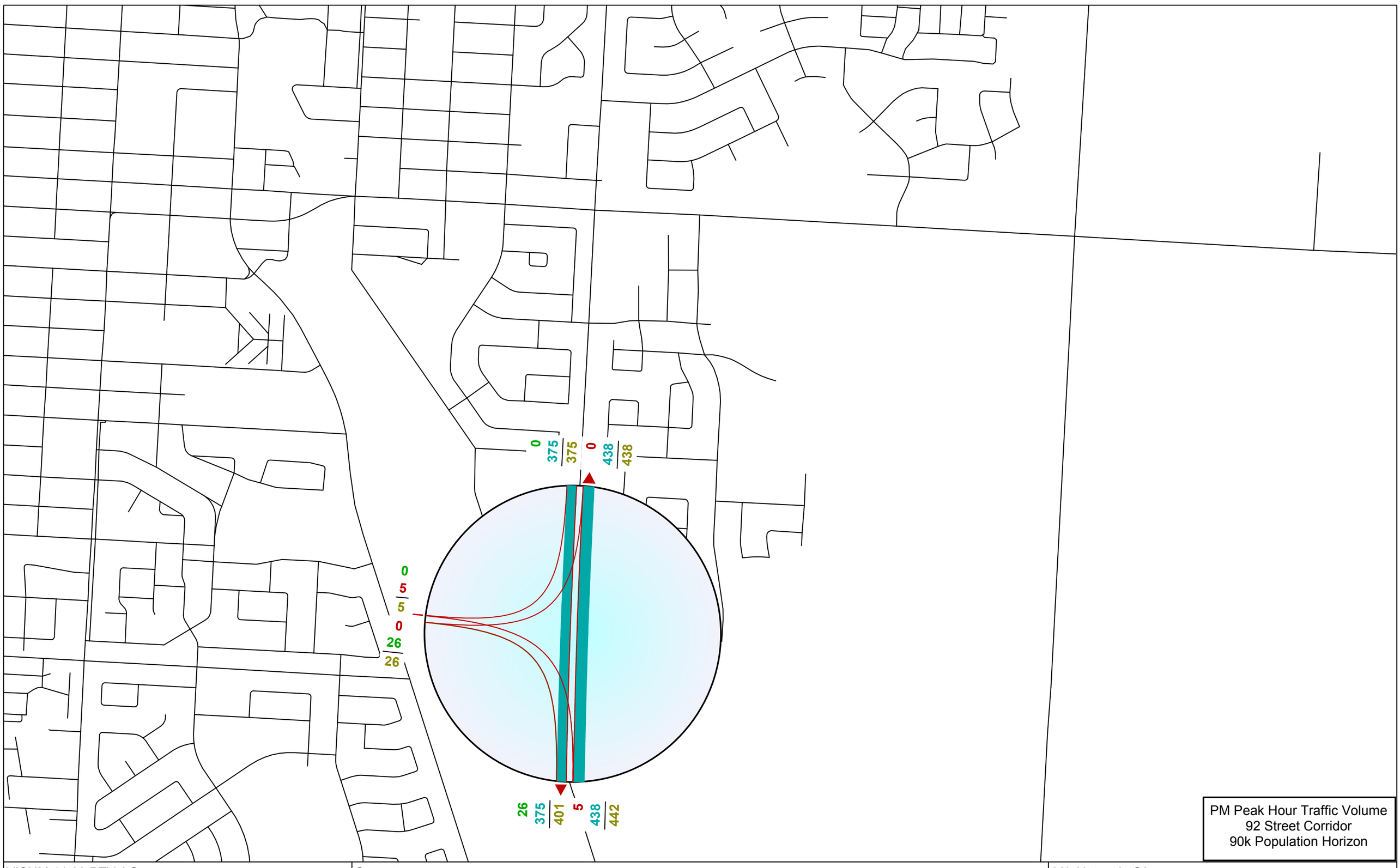
PM Peak Hour Traffic Volume
92 Street Corridor
90k Population Horizon

VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:10970



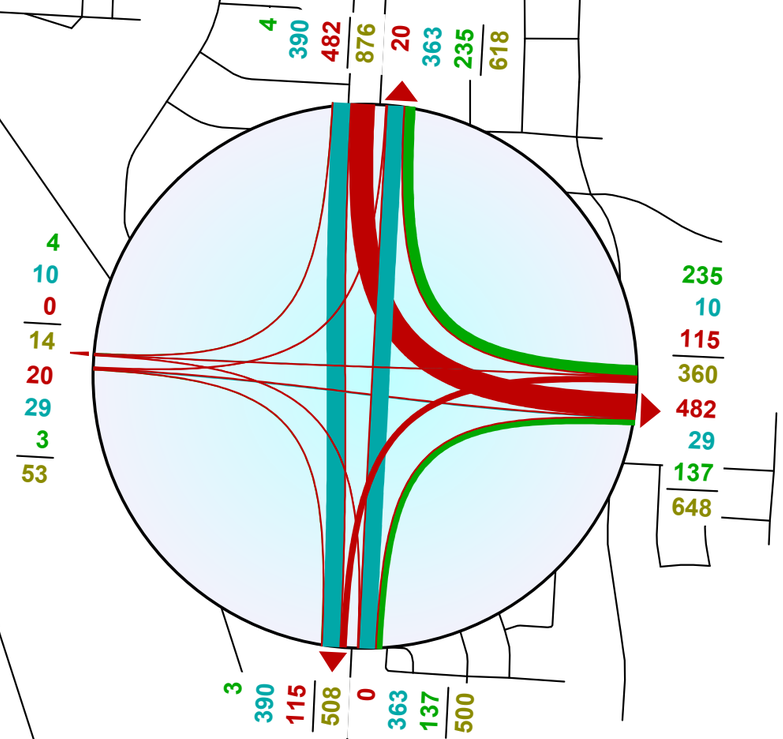
PM Peak Hour Traffic Volume
84 Street Corridor
90k Population Horizon

VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:10970



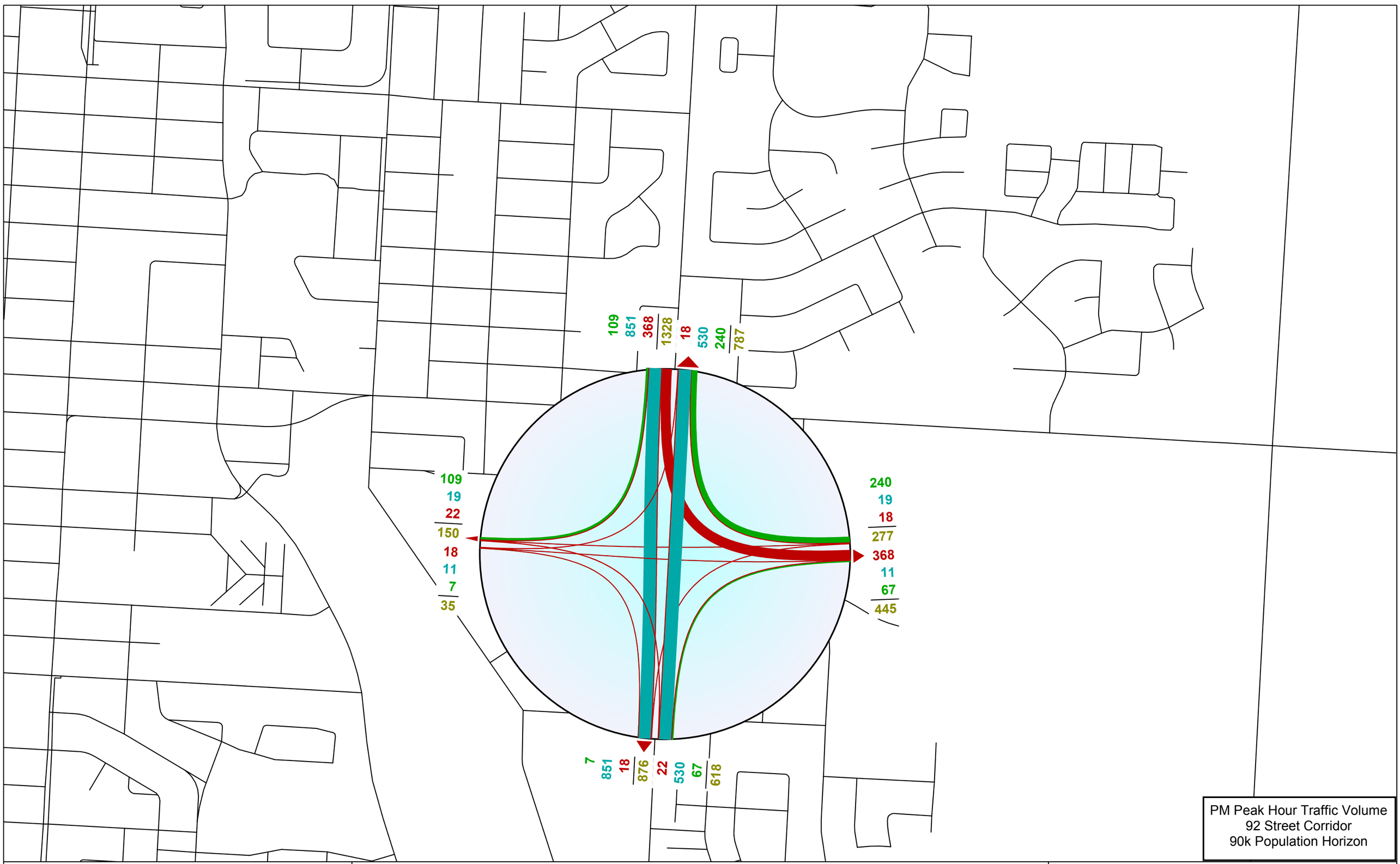
PM Peak Hour Traffic Volume
92 Street Corridor
90k Population Horizon

VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:10970



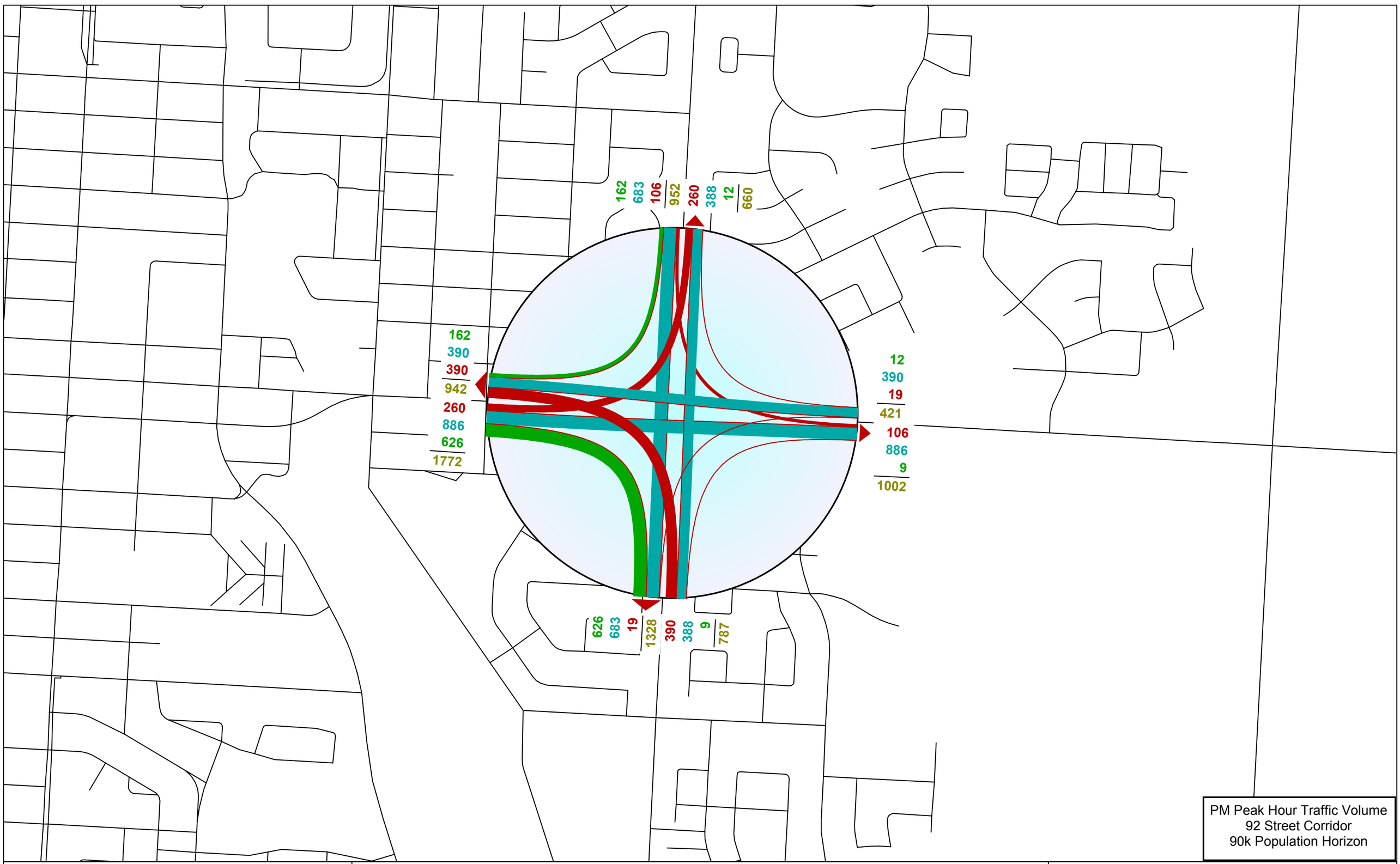
PM Peak Hour Traffic Volume
92 Street Corridor
90k Population Horizon

VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:10970

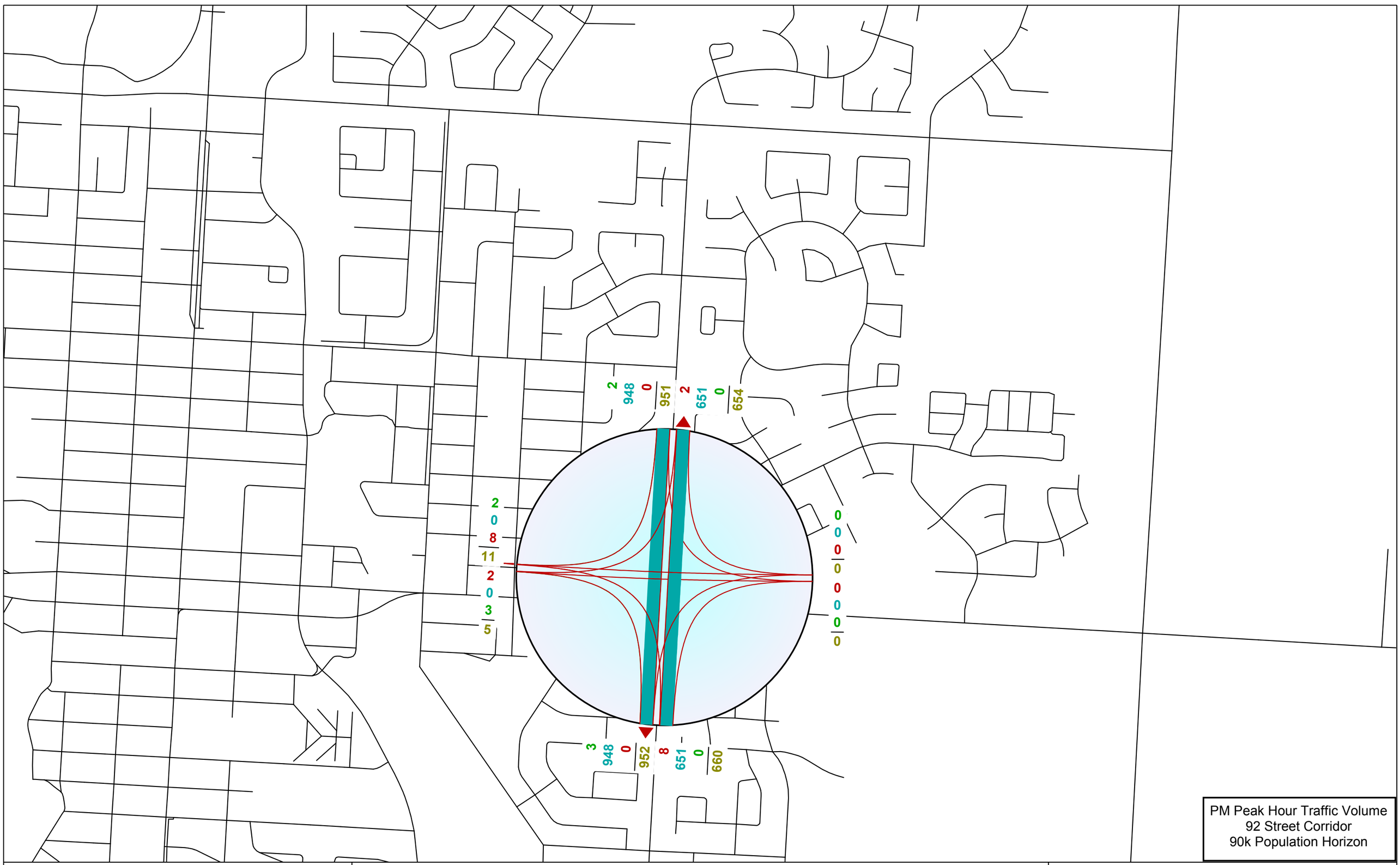


PM Peak Hour Traffic Volume
92 Street Corridor
90k Population Horizon

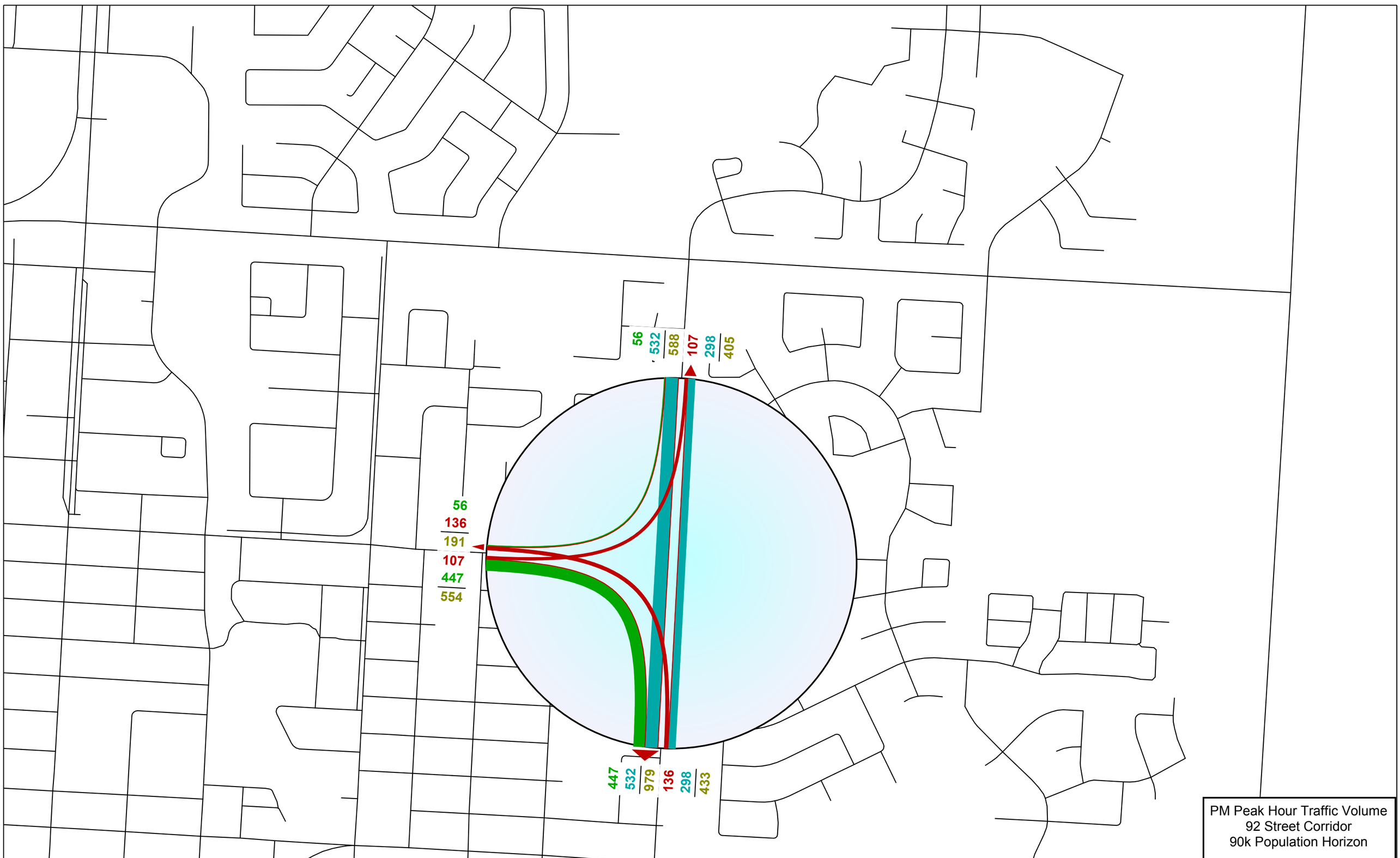
VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:8776



VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:8776

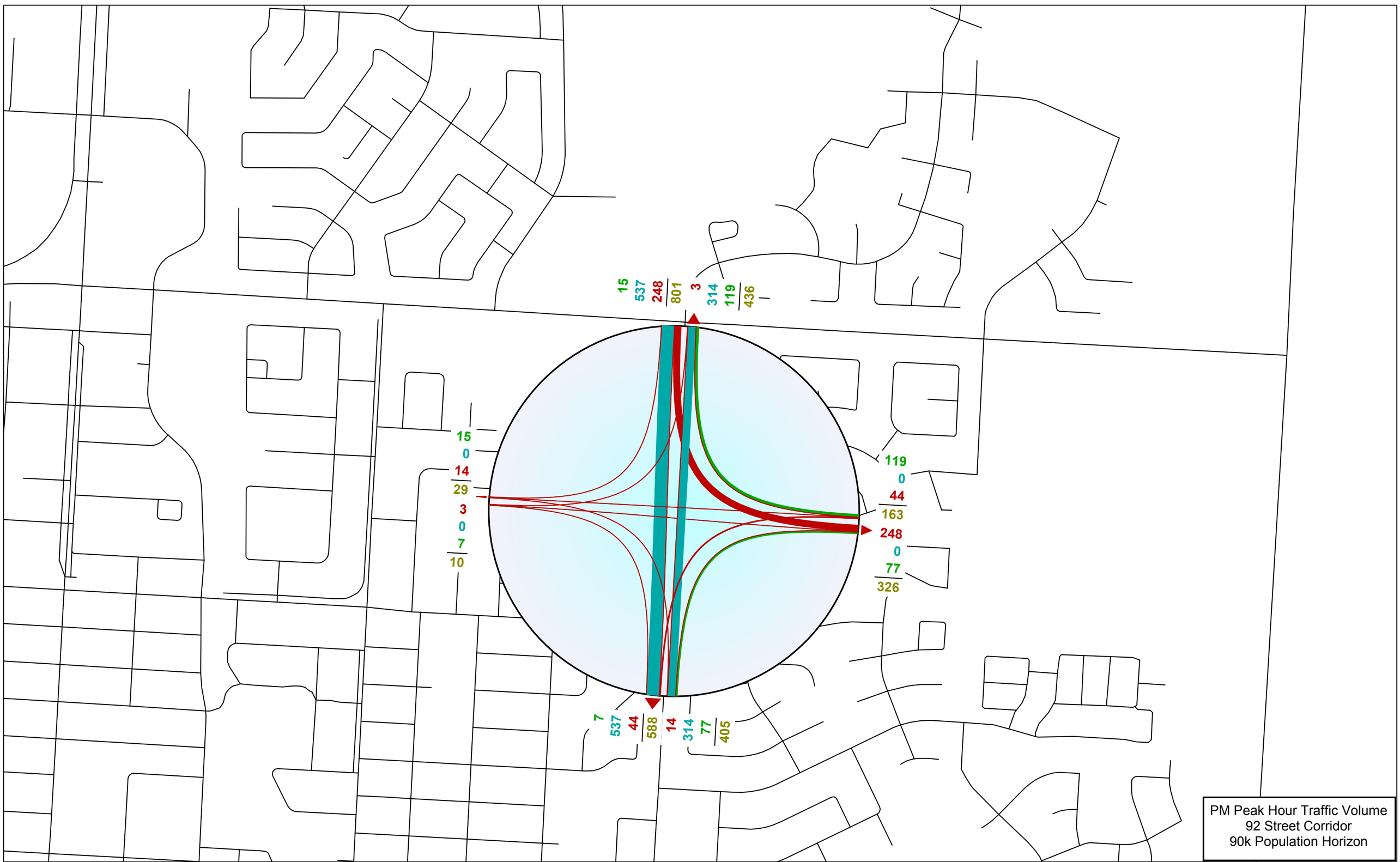


VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:10970

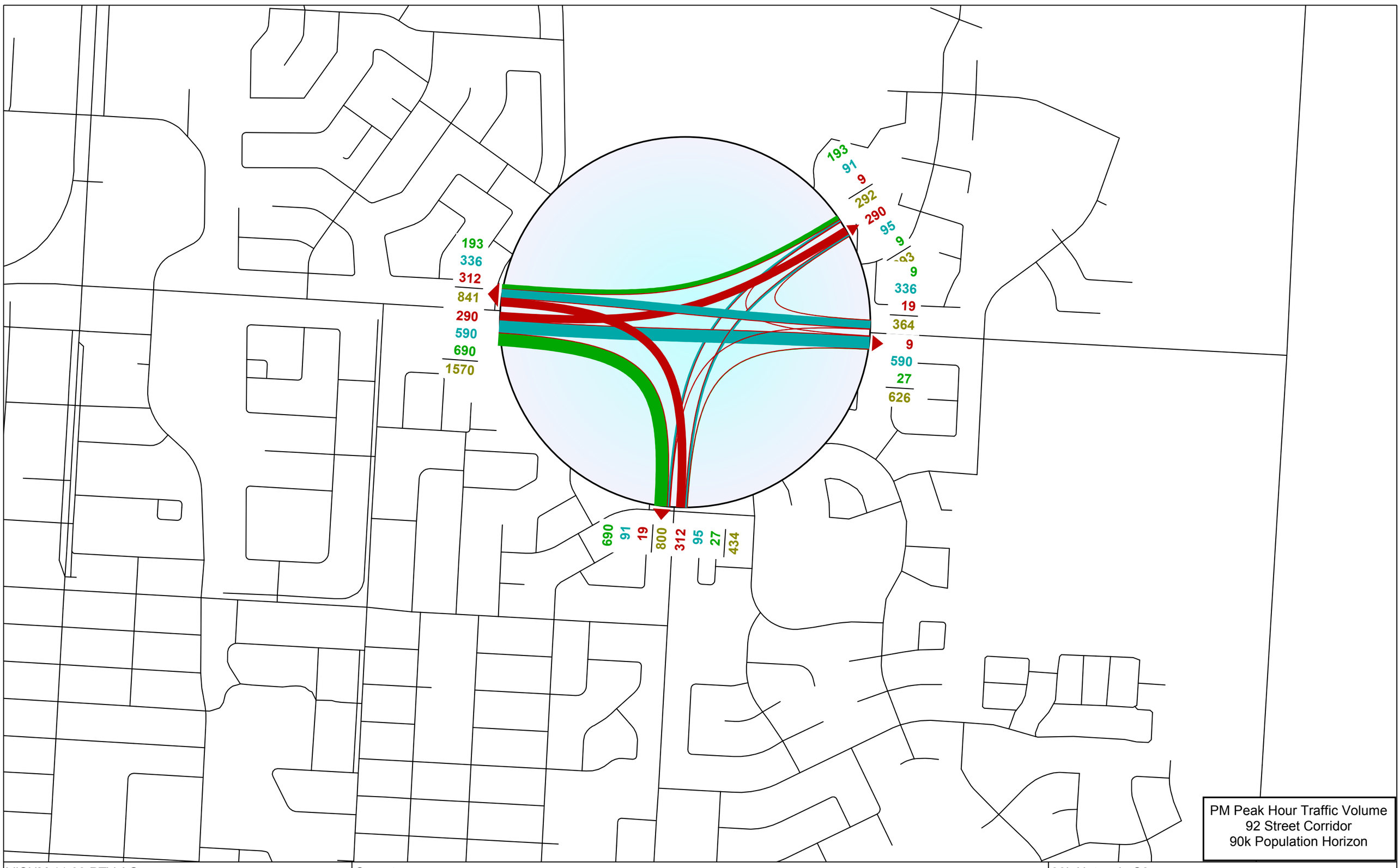


PM Peak Hour Traffic Volume
92 Street Corridor
90k Population Horizon

VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:8776



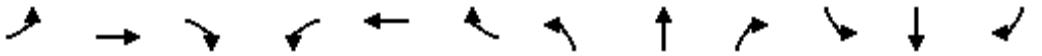
VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:8776



VISUM 11.03 PTV AG	Operator:	90k Network_S8.ver
Created on: 24.12.2010		1:8776

Appendix C

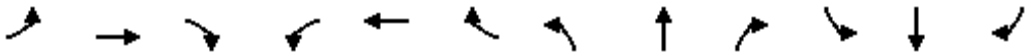
Synchro Reports



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	590	688	19	336	9	313	95	27	9	91	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3525		1681	1723	1583		1854	1583
Flt Permitted	0.39	1.00	1.00	0.41	1.00		0.56	0.75	1.00		0.97	1.00
Satd. Flow (perm)	718	3539	1583	761	3525		984	1318	1583		1804	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	641	748	21	365	10	340	103	29	10	99	210
RTOR Reduction (vph)	0	0	411	0	3	0	0	0	17	0	0	151
Lane Group Flow (vph)	315	641	337	21	372	0	218	225	12	0	109	60
Turn Type	pm+pt		Perm	Perm			pm+pt		Perm	Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	27.0	27.0	27.0	16.0	16.0		25.0	25.0	25.0		17.0	17.0
Effective Green, g (s)	27.0	27.0	27.0	16.0	16.0		25.0	25.0	25.0		17.0	17.0
Actuated g/C Ratio	0.45	0.45	0.45	0.27	0.27		0.42	0.42	0.42		0.28	0.28
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	446	1593	712	203	940		456	576	660		511	449
v/s Ratio Prot	c0.08	0.18			0.11		c0.03	0.03				
v/s Ratio Perm	c0.24		0.21	0.03			c0.17	0.14	0.01		0.06	0.04
v/c Ratio	0.71	0.40	0.47	0.10	0.40		0.48	0.39	0.02		0.21	0.13
Uniform Delay, d1	11.5	11.1	11.5	16.6	18.0		12.6	12.2	10.3		16.4	16.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	9.1	0.8	2.2	1.0	1.2		3.6	2.0	0.1		1.0	0.6
Delay (s)	20.6	11.8	13.8	17.6	19.3		16.2	14.2	10.3		17.4	16.6
Level of Service	C	B	B	B	B		B	B	B		B	B
Approach Delay (s)		14.3			19.2			14.9			16.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

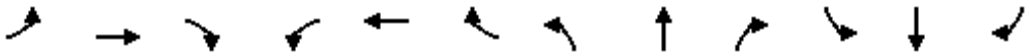
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	1	1	1	2	433	2	1	796	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	1	1	1	1	2	471	2	1	865	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											196	
pX, platoon unblocked												
vC, conflicting volume	1109	1345	433	912	1345	236	866			473		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1109	1345	433	912	1345	236	866			473		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	100	99	100	100			100		
cM capacity (veh/h)	163	150	571	226	150	765	773			1085		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	3	3	2	314	159	1	577	289
Volume Left	1	1	2	0	0	1	0	0
Volume Right	1	1	0	0	2	0	0	1
cSH	206	242	773	1700	1700	1085	1700	1700
Volume to Capacity	0.02	0.01	0.00	0.18	0.09	0.00	0.34	0.17
Queue Length 95th (m)	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	22.8	20.1	9.7	0.0	0.0	8.3	0.0	0.0
Lane LOS	C	C	A			A		
Approach Delay (s)	22.8	20.1	0.0			0.0		
Approach LOS	C	C						

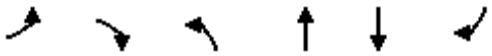
Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	32.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	3	7	44	5	119	14	315	77	248	535	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	3	8	48	5	129	15	342	84	270	582	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						4						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1333	1585	299	1254	1552	213	598			426		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1333	1585	299	1254	1552	213	598			426		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	96	99	52	94	84	98			76		
cM capacity (veh/h)	72	80	697	99	84	792	975			1130		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	14	183	15	228	198	270	388	210
Volume Left	3	48	15	0	0	270	0	0
Volume Right	8	129	0	0	84	0	0	16
cSH	146	336	975	1700	1700	1130	1700	1700
Volume to Capacity	0.10	0.54	0.02	0.13	0.12	0.24	0.23	0.12
Queue Length 95th (m)	2.5	24.7	0.4	0.0	0.0	7.5	0.0	0.0
Control Delay (s)	32.2	30.4	8.8	0.0	0.0	9.2	0.0	0.0
Lane LOS	D	D	A			A		
Approach Delay (s)	32.2	30.4	0.3			2.9		
Approach LOS	D	D						

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	43.2%	ICU Level of Service	A	
Analysis Period (min)	15			



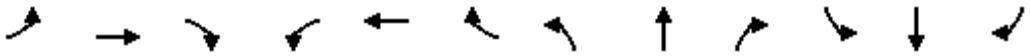
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	107	447	136	299	530	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	116	486	148	325	576	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		8				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1065	318	637			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1065	318	637			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	37	28	84			
cM capacity (veh/h)	184	677	943			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	602	148	162	162	384	253
Volume Left	116	148	0	0	0	0
Volume Right	486	0	0	0	0	61
cSH	839	943	1700	1700	1700	1700
Volume to Capacity	0.72	0.16	0.10	0.10	0.23	0.15
Queue Length 95th (m)	50.3	4.4	0.0	0.0	0.0	0.0
Control Delay (s)	28.6	9.5	0.0	0.0	0.0	0.0
Lane LOS	D	A				
Approach Delay (s)	28.6	3.0			0.0	
Approach LOS	D					

Intersection Summary			
Average Delay	10.9		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	212	92	338	325	212	752
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1726		3279		1770	3539
Flt Permitted	0.97		1.00		0.36	1.00
Satd. Flow (perm)	1726		3279		661	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	230	100	367	353	230	817
RTOR Reduction (vph)	19	0	113	0	0	0
Lane Group Flow (vph)	311	0	607	0	230	817
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	20.9		61.1		61.1	61.1
Effective Green, g (s)	20.9		61.1		61.1	61.1
Actuated g/C Ratio	0.23		0.68		0.68	0.68
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	401		2226		449	2403
v/s Ratio Prot	c0.18		0.19			0.23
v/s Ratio Perm					c0.35	
v/c Ratio	0.78		0.27		0.51	0.34
Uniform Delay, d1	32.3		5.7		7.1	6.0
Progression Factor	1.00		1.46		1.00	1.00
Incremental Delay, d2	9.1		0.2		4.1	0.4
Delay (s)	41.4		8.5		11.2	6.4
Level of Service	D		A		B	A
Approach Delay (s)	41.4		8.5			7.5
Approach LOS	D		A			A

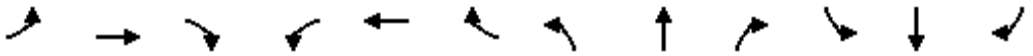
Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	2	3	5	5	5	8	651	5	5	948	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2	3	5	5	5	9	708	5	5	1030	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								103			267	
pX, platoon unblocked	0.95	0.95	0.93	0.95	0.95	0.95	0.93			0.95		
vC, conflicting volume	1422	1773	516	1258	1771	357	1033			713		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1124	1493	326	952	1491	229	882			603		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	97	95	99	99			99		
cM capacity (veh/h)	144	114	622	197	114	738	708			926		

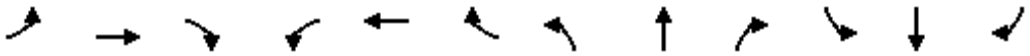
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	8	16	9	472	241	5	687	346
Volume Left	2	5	9	0	0	5	0	0
Volume Right	3	5	0	0	5	0	0	2
cSH	193	198	708	1700	1700	926	1700	1700
Volume to Capacity	0.04	0.08	0.01	0.28	0.14	0.01	0.40	0.20
Queue Length 95th (m)	1.0	2.1	0.3	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	24.4	24.8	10.1	0.0	0.0	8.9	0.0	0.0
Lane LOS	C	C	B			A		
Approach Delay (s)	24.4	24.8	0.1			0.0		
Approach LOS	C	C						

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	36.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	11	7	18	19	240	22	530	67	368	851	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected		0.97	1.00		0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1806	1583		1818	1583	1770	3480		1770	3479	
Flt Permitted		0.81	1.00		0.85	1.00	0.26	1.00		0.41	1.00	
Satd. Flow (perm)		1504	1583		1577	1583	489	3480		755	3479	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	12	8	20	21	261	24	576	73	400	925	118
RTOR Reduction (vph)	0	0	7	0	0	236	0	8	0	0	8	0
Lane Group Flow (vph)	0	32	1	0	41	25	24	641	0	400	1035	0
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		8.5	8.5		8.5	8.5	73.5	73.5		73.5	73.5	
Effective Green, g (s)		8.5	8.5		8.5	8.5	73.5	73.5		73.5	73.5	
Actuated g/C Ratio		0.09	0.09		0.09	0.09	0.82	0.82		0.82	0.82	
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		142	150		149	150	399	2842		617	2841	
v/s Ratio Prot								0.18			0.30	
v/s Ratio Perm		0.02	0.00		c0.03	0.02	0.05			c0.53		
v/c Ratio		0.23	0.01		0.28	0.16	0.06	0.23		0.65	0.36	
Uniform Delay, d1		37.7	36.9		37.9	37.5	1.6	1.9		3.2	2.2	
Progression Factor		1.00	1.00		1.00	1.00	0.37	0.75		0.66	0.31	
Incremental Delay, d2		0.8	0.0		1.0	0.5	0.3	0.2		3.4	0.2	
Delay (s)		38.5	36.9		38.9	38.0	0.9	1.6		5.6	0.9	
Level of Service		D	D		D	D	A	A		A	A	
Approach Delay (s)		38.2			38.1			1.5			2.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



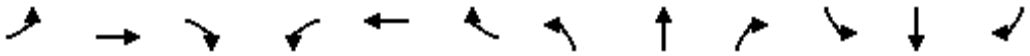
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	29	272	115	38	235	182	364	137	482	390	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.96		1.00	1.00	
Flt Protected		0.98	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1826	1583		1795	1583	1770	3394		1770	3534	
Flt Permitted		0.85	1.00		0.74	1.00	0.50	1.00		0.38	1.00	
Satd. Flow (perm)		1588	1583		1386	1583	936	3394		701	3534	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	32	296	125	41	255	198	396	149	524	424	4
RTOR Reduction (vph)	0	0	247	0	0	213	0	34	0	0	1	0
Lane Group Flow (vph)	0	54	49	0	166	42	198	511	0	524	427	0
Turn Type	Perm		Perm	Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		14.9	14.9		14.9	14.9	46.8	46.8		67.1	67.1	
Effective Green, g (s)		14.9	14.9		14.9	14.9	46.8	46.8		67.1	67.1	
Actuated g/C Ratio		0.17	0.17		0.17	0.17	0.52	0.52		0.75	0.75	
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		263	262		229	262	487	1765		716	2635	
v/s Ratio Prot								0.15		c0.13	0.12	
v/s Ratio Perm		0.03	0.03		c0.12	0.03	0.21			c0.41		
v/c Ratio		0.21	0.19		0.72	0.16	0.41	0.29		0.73	0.16	
Uniform Delay, d1		32.4	32.3		35.6	32.2	13.1	12.2		5.1	3.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.06	0.77	
Incremental Delay, d2		0.4	0.3		10.8	0.3	2.5	0.4		3.7	0.1	
Delay (s)		32.8	32.7		46.4	32.5	15.7	12.6		9.1	2.7	
Level of Service		C	C		D	C	B	B		A	A	
Approach Delay (s)		32.7			38.0			13.4			6.2	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	63	620	1	133	644
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	68	674	1	145	700
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						298
pX, platoon unblocked						
vC, conflicting volume	1314	338			675	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1314	338			675	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	90			84	
cM capacity (veh/h)	126	658			912	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	70	449	226	145	350	350
Volume Left	1	0	0	145	0	0
Volume Right	68	0	1	0	0	0
cSH	618	1700	1700	912	1700	1700
Volume to Capacity	0.11	0.26	0.13	0.16	0.21	0.21
Queue Length 95th (m)	3.0	0.0	0.0	4.5	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	9.7	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	11.6	0.0		1.7		
Approach LOS	B					

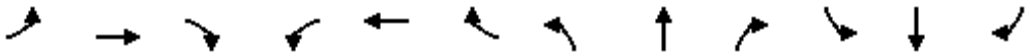
Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	26	5	5	5	5	611	5	5	635	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	28	5	5	5	5	664	5	5	690	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1055	1384	348	1065	1384	335	696			670		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1055	1384	348	1065	1384	335	696			670		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	96	97	96	99	99			99		
cM capacity (veh/h)	172	141	648	163	141	661	896			916		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	39	16	5	443	227	5	460	236
Volume Left	5	5	5	0	0	5	0	0
Volume Right	28	5	0	0	5	0	0	5
cSH	343	203	896	1700	1700	916	1700	1700
Volume to Capacity	0.11	0.08	0.01	0.26	0.13	0.01	0.27	0.14
Queue Length 95th (m)	3.1	2.1	0.1	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	16.8	24.3	9.0	0.0	0.0	9.0	0.0	0.0
Lane LOS	C	C	A			A		
Approach Delay (s)	16.8	24.3	0.1			0.1		
Approach LOS	C	C						

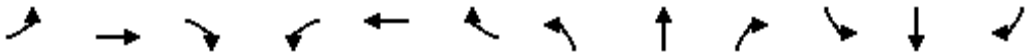
Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	27.7%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	5	25	5	69	5	547	70	134	527	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	27	5	75	5	595	76	146	573	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1253	1548	289	1229	1513	335	578			671		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1253	1548	289	1229	1513	335	578			671		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	94	99	76	95	89	99			84		
cM capacity (veh/h)	96	95	707	111	99	660	991			916		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	5	11	27	80	5	396	274	146	382	196
Volume Left	5	0	27	0	5	0	0	146	0	0
Volume Right	0	5	0	75	0	0	76	0	0	5
cSH	96	167	111	478	991	1700	1700	916	1700	1700
Volume to Capacity	0.06	0.07	0.24	0.17	0.01	0.23	0.16	0.16	0.22	0.12
Queue Length 95th (m)	1.4	1.7	7.2	4.8	0.1	0.0	0.0	4.5	0.0	0.0
Control Delay (s)	44.9	28.1	47.5	14.0	8.7	0.0	0.0	9.7	0.0	0.0
Lane LOS	E	D	E	B	A			A		
Approach Delay (s)	33.7		22.5		0.1			1.9		
Approach LOS	D		C							

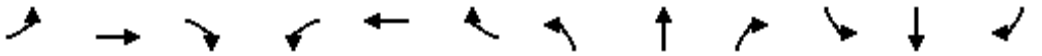
Intersection Summary					
Average Delay	2.9				
Intersection Capacity Utilization	42.8%	ICU Level of Service		A	
Analysis Period (min)	15				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	1	1	2	1	619	2	1	554	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	1	1	1	2	1	673	2	1	602	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	947	1283	302	981	1283	338	604			675		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	947	1283	302	981	1283	338	604			675		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	99	99	100	100			100		
cM capacity (veh/h)	214	164	694	202	164	658	969			912		

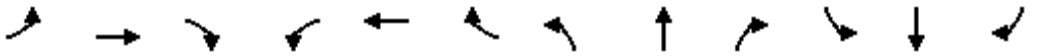
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	3	4	1	449	226	1	401	203
Volume Left	1	1	1	0	0	1	0	0
Volume Right	1	2	0	0	2	0	0	2
cSH	245	284	969	1700	1700	912	1700	1700
Volume to Capacity	0.01	0.02	0.00	0.26	0.13	0.00	0.24	0.12
Queue Length 95th (m)	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	19.9	17.9	8.7	0.0	0.0	9.0	0.0	0.0
Lane LOS	C	C	A			A		
Approach Delay (s)	19.9	17.9	0.0			0.0		
Approach LOS	C	C						

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	27.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	5	171	5	20	5	597	345	29	522	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.95			1.00	0.85	1.00	0.95		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1750			1776	1583	1770	3345		1770	3535	
Flt Permitted		0.90			0.72	1.00	0.44	1.00		0.24	1.00	
Satd. Flow (perm)		1599			1343	1583	814	3345		439	3535	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	5	5	186	5	22	5	649	375	32	567	5
RTOR Reduction (vph)	0	4	0	0	0	17	0	151	0	0	1	0
Lane Group Flow (vph)	0	11	0	0	191	5	5	873	0	32	571	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		9.6			9.6	9.6	22.4	22.4		22.4	22.4	
Effective Green, g (s)		9.6			9.6	9.6	22.4	22.4		22.4	22.4	
Actuated g/C Ratio		0.24			0.24	0.24	0.56	0.56		0.56	0.56	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		384			322	380	456	1873		246	1980	
v/s Ratio Prot								c0.26			0.16	
v/s Ratio Perm		0.01			c0.14	0.00	0.01			0.07		
v/c Ratio		0.03			0.59	0.01	0.01	0.47		0.13	0.29	
Uniform Delay, d1		11.6			13.5	11.6	3.9	5.2		4.2	4.6	
Progression Factor		1.00			1.00	1.00	1.54	3.17		1.00	1.00	
Incremental Delay, d2		0.0			2.9	0.0	0.0	0.6		1.1	0.4	
Delay (s)		11.7			16.4	11.6	6.0	17.2		5.3	5.0	
Level of Service		B			B	B	A	B		A	A	
Approach Delay (s)		11.7			15.9			17.2			5.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	890	753	548	10	457	38	263	19	1	28	35	635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1850		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.34	1.00	1.00	0.73	1.00		0.74	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	639	3539	1583	1364	1850		1384	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	967	818	596	11	497	41	286	21	1	30	38	690
RTOR Reduction (vph)	0	0	212	0	0	33	0	1	0	0	0	513
Lane Group Flow (vph)	967	818	384	11	497	8	286	21	0	30	38	177
Turn Type	Prot		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases			4	8		8	2			6		6
Actuated Green, G (s)	31.5	51.5	51.5	16.0	16.0	16.0	20.5	20.5		20.5	20.5	20.5
Effective Green, g (s)	31.5	51.5	51.5	16.0	16.0	16.0	20.5	20.5		20.5	20.5	20.5
Actuated g/C Ratio	0.39	0.64	0.64	0.20	0.20	0.20	0.26	0.26		0.26	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1352	2278	1019	128	708	317	350	474		355	477	406
v/s Ratio Prot	c0.28	0.23			c0.14			0.01			0.02	
v/s Ratio Perm			0.24	0.02		0.01	c0.21			0.02		0.11
v/c Ratio	0.72	0.36	0.38	0.09	0.70	0.03	0.82	0.04		0.08	0.08	0.44
Uniform Delay, d1	20.5	6.6	6.7	26.0	29.8	25.7	28.0	22.4		22.6	22.6	24.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.12	1.12	3.20
Incremental Delay, d2	3.3	0.4	1.1	0.3	3.2	0.0	13.7	0.0		0.1	0.1	0.7
Delay (s)	23.7	7.0	7.8	26.3	32.9	25.8	41.7	22.4		25.5	25.4	80.5
Level of Service	C	A	A	C	C	C	D	C		C	C	F
Approach Delay (s)		14.0			32.3			40.3			75.6	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

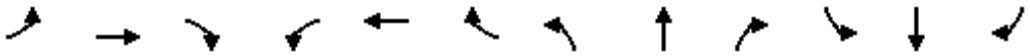
Appendix D

Synchro Reports Staging Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	886	626	19	390	12	390	388	9	106	683	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3438	
Flt Permitted	0.34	1.00	1.00	0.28	1.00	1.00	0.17	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	635	3539	1583	525	3539	1583	323	3539	1583	981	3438	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	254	867	612	19	382	12	382	380	9	104	668	158
RTOR Reduction (vph)	0	0	270	0	0	9	0	0	4	0	32	0
Lane Group Flow (vph)	254	867	342	19	382	3	382	380	5	104	794	0
Turn Type	pm+pt		Perm	Perm		Perm	pm+pt		Perm	Perm		
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	22.2	22.2	22.2	14.2	14.2	14.2	34.8	34.8	34.8	19.1	19.1	
Effective Green, g (s)	22.2	22.2	22.2	14.2	14.2	14.2	34.8	34.8	34.8	19.1	19.1	
Actuated g/C Ratio	0.34	0.34	0.34	0.22	0.22	0.22	0.54	0.54	0.54	0.29	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	287	1209	541	115	773	346	433	1895	848	288	1010	
v/s Ratio Prot	c0.05	0.24			0.11		c0.16	0.11			0.23	
v/s Ratio Perm	c0.25		0.22	0.04		0.00	c0.31		0.00	0.11		
v/c Ratio	0.89	0.72	0.63	0.17	0.49	0.01	0.88	0.20	0.01	0.36	0.79	
Uniform Delay, d1	19.9	18.7	18.0	20.6	22.3	19.9	13.9	7.9	7.0	18.1	21.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.0	2.1	2.4	0.7	0.5	0.0	18.6	0.2	0.0	0.8	4.1	
Delay (s)	45.9	20.7	20.4	21.3	22.8	19.9	32.6	8.1	7.0	18.9	25.2	
Level of Service	D	C	C	C	C	B	C	A	A	B	C	
Approach Delay (s)		24.3			22.6			20.2			24.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

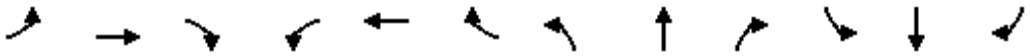
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	29	272	115	38	235	182	364	137	482	390	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	16	148	62	21	128	99	198	74	262	212	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)			2			2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1207	1207	213	1251	1171	235	214			272		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1207	1207	213	1251	1171	235	214			272		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	88	82	30	85	84	93			80		
cM capacity (veh/h)	96	135	827	90	142	804	1356			1291		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	174	211	99	272	262	214
Volume Left	11	62	99	0	262	0
Volume Right	148	128	0	74	0	2
cSH	782	236	1356	1700	1291	1700
Volume to Capacity	0.22	0.90	0.07	0.16	0.20	0.13
Queue Length 95th (m)	6.8	59.8	1.9	0.0	6.1	0.0
Control Delay (s)	15.4	78.6	7.9	0.0	8.5	0.0
Lane LOS	C	F	A		A	
Approach Delay (s)	15.4	78.6	2.1		4.7	
Approach LOS	C	F				

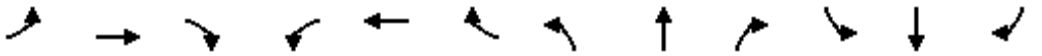
Intersection Summary				
Average Delay	18.1			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	5	171	5	20	5	597	345	29	522	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	4	4	121	4	14	4	422	244	20	369	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	971	1084	371	968	964	544	372			666		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	971	1084	371	968	964	544	372			666		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	46	99	97	100			98		
cM capacity (veh/h)	219	211	675	225	249	539	1186			924		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	138	669	393
Volume Left	4	121	4	20
Volume Right	4	14	244	4
cSH	279	251	1186	924
Volume to Capacity	0.04	0.55	0.00	0.02
Queue Length 95th (m)	0.9	24.3	0.1	0.5
Control Delay (s)	18.4	36.2	0.1	0.7
Lane LOS	C	E	A	A
Approach Delay (s)	18.4	36.2	0.1	0.7
Approach LOS	C	E		

Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	890	753	548	10	457	38	263	19	1	28	35	635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1845		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.42	1.00	1.00	0.74	1.00		0.75	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	781	3539	1583	1375	1845		1392	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Adj. Flow (vph)	726	614	447	8	373	31	214	15	1	23	29	518
RTOR Reduction (vph)	0	0	129	0	0	25	0	1	0	0	0	421
Lane Group Flow (vph)	726	614	318	8	373	6	214	15	0	23	29	97
Turn Type	Prot		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases			4	8		8	2			6		6
Actuated Green, G (s)	37.0	57.0	57.0	16.0	16.0	16.0	15.0	15.0		15.0	15.0	15.0
Effective Green, g (s)	37.0	57.0	57.0	16.0	16.0	16.0	15.0	15.0		15.0	15.0	15.0
Actuated g/C Ratio	0.46	0.71	0.71	0.20	0.20	0.20	0.19	0.19		0.19	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	819	2522	1128	156	708	317	258	346		261	349	297
v/s Ratio Prot	c0.41	0.17			c0.11			0.01			0.02	
v/s Ratio Perm			0.20	0.01		0.00	c0.16			0.02		0.06
v/c Ratio	0.89	0.24	0.28	0.05	0.53	0.02	0.83	0.04		0.09	0.08	0.33
Uniform Delay, d1	19.6	4.0	4.1	25.9	28.6	25.7	31.3	26.6		26.8	26.8	28.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.6	0.2	0.6	0.1	0.7	0.0	19.3	0.1		0.1	0.1	0.6
Delay (s)	33.1	4.2	4.8	26.0	29.3	25.7	50.6	26.7		27.0	26.9	28.8
Level of Service	C	A	A	C	C	C	D	C		C	C	C
Approach Delay (s)		16.1			29.0			48.9			28.6	
Approach LOS		B			C			D			C	

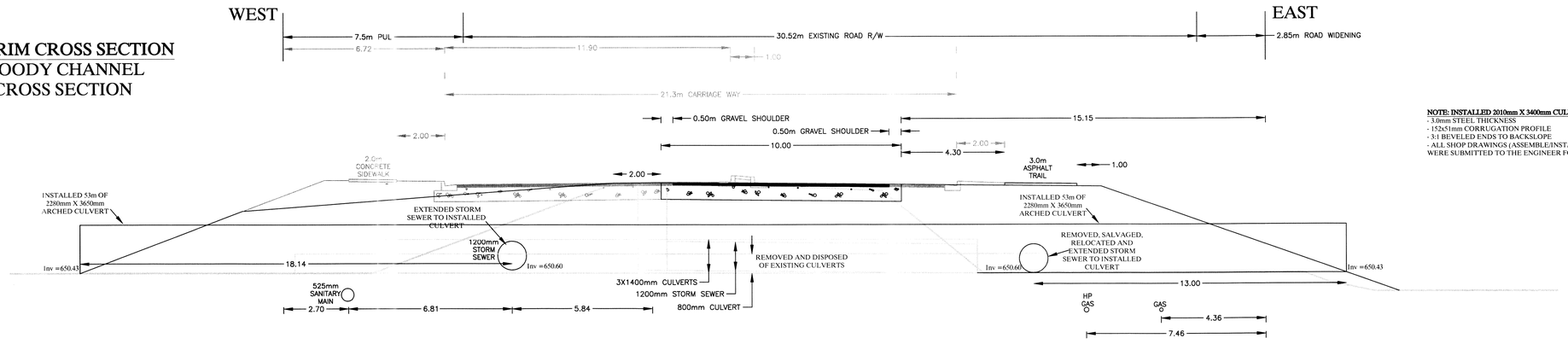
Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix E

Woody Channel Crossing (Record Drawing)

INTERIM CROSS SECTION
WOODY CHANNEL
CROSS SECTION



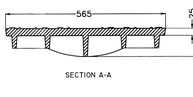
NOTE: INSTALLED 2010mm X 3400mm CULVERT DETAILS:
- 3.0mm STEEL THICKNESS
- 152x51mm CORRUGATION PROFILE
- 3:1 BEVELED ENDS TO BACKSLOPE
- ALL SHOP DRAWINGS (ASSEMBLE/INSTALLATION) WERE SUBMITTED TO THE ENGINEER FOR APPROVAL

REVISIONS
1. ON RECORD – NOV. 2010

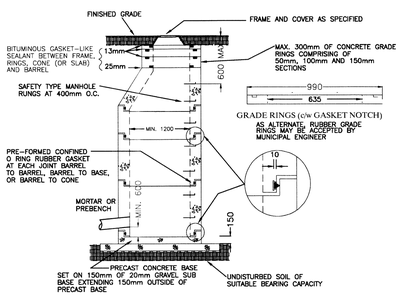
PERMIT NUMBER: P243
PROFESSIONAL ENGINEER

BEAIRSTO LEHNERS KETCHUM
ENGINEERING LIMITED
101, 10940 – 92nd AVENUE
GRANDE PRAIRIE,
ALBERTA T8V 6B5
PHONE 532-4919, FAX 532-4739

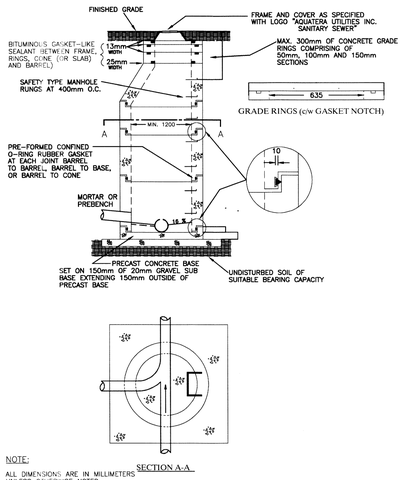
PLAN



SECTION A-A

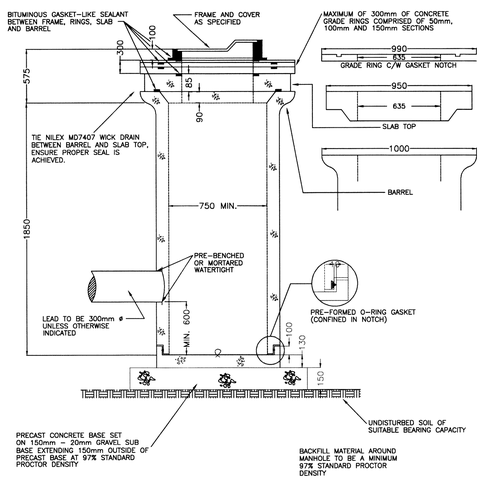


PRECAST CONCRETE CATCHBASIN MANHOLE



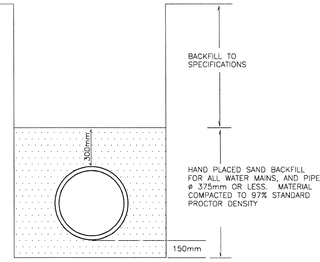
NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

PRECAST CONCRETE MANHOLE

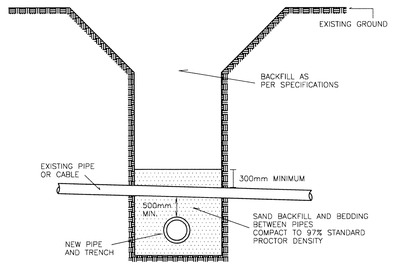


NOTE: ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
DEPTHS EXCEEDING 2425mm FROM LIP OF GUTTER TO BOTTOM OF SUMP WILL REQUIRE CATCH BASIN MANHOLE CONSTRUCTION.

PRECAST CONCRETE CATCHBASIN REGULAR DETAIL



BEDDING DETAIL CLASS B-1



TYPICAL PIPE CROSSING

DRAWN BY:	DENNIS HUSSEY, P.ENG.
CHECKED BY:	DENNIS A. HUSSEY P.ENG.
ENGINEER:	DENNIS A. HUSSEY P.ENG.
FIELD BOOK:	
DATA FILE:	k:09025/Design/Design Dwg
DATE:	AUGUST 2008
SCALES	
HOR. 1:500	VERT. 1:50

CITY OF GRANDE PRAIRIE

92nd STREET UPGRADES
88th AVENUE TO
WOODY CHANNEL

DETAILS
WOODY CHANNEL CROSS SECTION AND STORM SEWER DETAILS.

D-02

Appendix F

Open House Reports

100 Avenue & 92 Street
Functional Planning Studies
February 15, 2012 Public Open House
Summary

The open house for the 100 Avenue and 92 Street Functional Planning Studies was held on February 15, 2012 from 4 to 6:30 p.m. Representatives from ISL Engineering and Land Services and the City of Grande Prairie staffed the event.

22 people signed in for the open house and total attendance was 25. Four comment forms were completed and returned at the open house. One attendee submitted comments via email in the two weeks following the open house.

Results Summary

1. Please use the space below to provide any comments you have on the plan for 92 Street.

- 76 Avenue intersection should be shifted North.
- Right in right out between 68 Ave and 72 Ave is missing.

2. Please rate the 100 Avenue alternatives under consideration, west of 92 Street.

	Excellent	Good	Fair	Poor	Unknown
Option A			**1**		
Option B	**1**	**2**			

Please use the space below to provide any comments you have about the alignment options.

- Least amount of cost (I understand)
- Makes far more sense to get rid of the parking lanes and will save the City money not having to re-do the cross-section of the road in 'A'.

3. Please use the space below to provide any comment you have on the 100 Ave plan east of 92 Street.

- Really like to idea of the four lanes for this area. Right now the two lanes are narrow; there is no street lighting or sidewalks next to the roadway. Driving this street at night with pedestrians walking along the road is very dangerous.

4. Do you have any additional comments about the plans or the study that you would like to share? Please specify below.

- No comments received

5. ABOUT YOU

- Resident – 3
- Developer - 1
- I only live in Grande Prairie – 2
- I live and work in Grande Prairie - 3

6. After reviewing the information presented, please use a checkmark to indicate your level of satisfaction regarding the following:

a) The clarity of information provided about the alignment alternatives.
- Very satisfied – 2 responses
- Generally satisfied – 1 responses
- Dissatisfied – 0 responses

b) The adequacy of information provided about the alignment alternatives.
- Very satisfied – 3 responses
- Generally satisfied – 0 responses
- Dissatisfied – 0 responses

c) The project team's response to my questions.
- Very satisfied – 3 responses
- Generally satisfied – 0 responses
- Dissatisfied – 0 responses

Other comments received via email:
- Safety
    - Before lane changes the company truck had 2 side mirrors smashed off within 2 weeks.
    - Dangerous to signal and pull over to get into driveway as majority of traffic waits to change lanes until they are right behind you. When this occurs a line up forms that is blind to the vehicle stopped with signals on.
    - Almost as dangerous to get out of driveway for those who back out.
    - Any visitors are forced to park on the road. Where do they go if they stay for more than few hours that run into restricted times like during holidays.
    - Children walk on lawns instead of sidewalk due to its close proximity to the fast moving traffic on their way to and from school.
    - 2 vehicles were written off in December by hit-and-run even though they were parked during permitted hours at 9 p.m. Posted signs prohibit parking from 07:00 – 09:00 and 16:00 – 18:00.
- Functionality
    - Some neighbours are forced to park on their front lawn due to posted time restrictions and fear of having their vehicles involved in a collision. They have a motorhome already parked in the back of the house so there is no room for any more vehicles.
    - Other neighbours have taken out the back fence and park in the yard so they have a safe place to park even though they have a driveway in the front.
    - Majority of residents have driveways already in place at the front of their homes.
    - Can the concrete median be removed to make the second southbound land and restore the service lane?
    - Can the lane designation be returned to previous state?

There is only one lane entering the southbound roadway from the north and the east directions at the intersection of 104 Ave and 92 Street. I have already had to replace one vehicle due to the current lane designations and have no desire to do so again within the next four months that it will take the City Council to make their decision on the course of action needed. The thing about current parking time restrictions is that we, as working people ourselves, are leaving and coming home during those hours. It is very common to have traffic skidding to a stop, laying on the horn, and/or making obscene

gestures behind us when we are trying to get into our driveway in the morning and afternoon peak times.

100 Avenue & 92 Street
Functional Planning Studies
May 8, 2012 Public Open House
Summary

The open house for the 100 Avenue and 92 Street Functional Planning Studies was held on May 8, 2012 from 4 to 6:30 p.m. Representatives from ISL Engineering and Land Services and the City of Grande Prairie staffed the event.

15 people signed in for the open house and total attendance was about 40. Seven comment forms were completed and returned at the open house. Nine comment forms were submitted via fax and two letters were received via email in the two weeks following the open house.

Results Summary

1. Do you support the plan for 92 Street? (Please check one)

- ☐ Yes
- ☐ Yes, with modifications (please specify below). – 2 Response
- ☐ No (please specify below). -11 Responses

Comments:

- We have a hard time getting out of our driveway now.
- Do not need the walk on the west side on 92 st. widened. It will only encourage cars and motorcycles to drive on it. Leave it as it is for pedestrians.
- We just bought a unit at Ivy Lake Villas and did not know anything about this. We deserve proper access to both left and right coming out of the complex. We are taxpayers and should have been told about this meeting.
- Traffic will not flow well. I teach at hillside and traffic is already busy enough this will cause more traffic in school area. Safety issues for condo owners on 92 St. How would emergency get in quickly? Will businesses at subway…greatly be affected?
- I think there is a better solution to make that turn a safer one for both pedestrians and drivers such as pedestrian lights and 4 way stops etc.
- By closing off the access to my condo complex traffic will build up in residential area. Emergency vehicles will have a difficult time getting in. Only access out would be going through the strip mall.
- 4 lane fine –blocking the left hand turn out of Ivy Lake Plaza and Ivy Lake Villas absolutely no! Instead of blocking it, put in a pedestrian light. Do you know how absolutely messed up this is going to be for us all? There are 25 families in here.
- Absolutely not. I live in Ivy Lake Villas and that would be the biggest inconvenience to my life. I work at Mother Teresa School and need to turn left every morning for work.
- I live in area off 92 Ave and would have to turn the wrong way every morning to take my son to day care. We have only one entrance to our town houses and we would have to drive blocks out of way every time we left home or came home if this plan was to go through.
- The proposed plan will significantly decrease my ability to access my own home and cause potential safety risk should evacuation of our properties be necessary. This will substantially reduce my homes value.
- Blocking access (left turn) to Ivy Lake Villas will make this complex very difficult to find and the most inconvenient to get to in all GP. Bad idea!

- The proposed meridian at 92 St and 101 Ave intersection be modified for the intersection to remain all directional. To allow east bound traffic stopping at the plaza an access to continue east via 100 Ave. To allow the required emergency vehicles, delivery trucks, the neighbouring residents and other traffic from the north, north east and north west access to and from the plaza and adjacent Ivy Lake residential condo development.
- This plan would effect two rentals of ours, Access to and from these homes will restrict our tenants and us, This plan does not work for the neighbourhood and will be very inconvenient for traffic.

2. Do you support the plan for 100 Avenue? (Please check one)

- Yes -1 Response
- Yes, with modifications (please specify below). – 1 Response
- No (please specify below). – 9 Responses

Comments:

- This is residential. Where in GP is there 4 lanes in residential. City going to buy all the houses. Our house would not be worth anything with no parking. We are our rights to live in a safe place. We do pay taxes as everyone. We want the same treatment.
- Due to age of lots and placement of houses taking the parking lane would cause inadequate parking for residence. This idea was proposed and voted against a few years ago and being revisited with still no solutions for residents.
- I need the parking space in front of my house. The speed on any lane against the curb needs to be restricted. Maybe speed bumps on it. Can the parking restriction be only in the morning on the westbound lane.
- I have a disability as it is and if I should have work being done on my home and have to move my car, I can't park it two or three blocks away then walk. I also say what about our company my mom is a older lady that has to use a cane as it is. She will not be able to walk any distance. We have a hard time getting out of our driveway as it is. Widening 100 Ave will only make it harder. Where would we put out garbage? There are too many people hit at the crosswalk by Eastside kitchen as it is and to many accidents also! I say make it ony way all the way, is better than 4 lane.
- For the plan to be acceptable the alley behind (south) of 100 Ave should be paved.
- We were not advised.
- How would home owners get into homes quickly? Again emergency access.
- I think you should ask the people that live there.
- Decreases access to the businesses at that location
- This is a busy road and lots of children cross this road coming from school. I am concerned about safety and access for homes on 100th.

3. Do you have any additional comments about the plans or the study that you would like to share Please specify below.

Comments:

- I live on 94 st and 100 Ave. Please conside the people who have to live with the traffic. 4 lanes will cause drivers to speed more. Walking on these sidewalks with traffic next to you –get splashed- the seniors walking will be unsafe. The crosswalk at 94 going to school will be unsafe. Where will our garbage cans go with 4 lanes.

- Please get 84 street built and paved so commuters have a better route to drive to and from work and avoid driving through residential areas where safety is an issue. This would reduce traffic on 92 street and 100 avenue and would reduce the need for expansion at the intersection. Make the above road and measure the results before making large changes at the major intersections. This will give people an alternative route when major road construction happens at these intersections. Also, add a rail crossing somewhere between 68th and 100 -84 Ave would be very beneficial!
- The letters (two identical) received in the mail stated this was the last and final. Yet, we never received a previous letter about any other meeting. There needs to be some sort of solution for residents as many are the original homes and residents of this city.
- We need lights at 111 Ave. now. There are only 2 exits from Crystal heights West. Very much traffic in peak hours, including school delivery and school pick up hours. No chance of a left turn or through traffic. Why was 88 Ave on the South end closed? (A surveyed road) and put into residential. Ruined a north-south traffic route. Senseless.
- How are ambulances and fire going to get to us on time? We live along this route. Surely you would know how much this would affect the 25 families living here not to mention the loss of business for the stored next door!
- Sync your lights at safety city with 100 ave lights so traffic flows especially during rush hours. Right now there is no flow esp at 5:30.
- I am a tax payer in this community and was not informed of this plan. Why wasn't I? This affects me and my home directly…I was happy to have one of the committee members of my condo association to make me aware of this or I would have been oblivious to this idea.
- Why were the residents of Ivy Lake Villas not notified? We are 26 tax paying units. Lights need to be synchronized. Was not informed of the City's plans?
- I am very upset. I have lived and paid taxes at Ivy Lake Villas for 14 years –yet not invited to the 2 meetings already held? You can take my tax dollars just fine –but the simple courtesy of an invite ignored? Why do you expect the stores at Ivy Lake Plaza to supply our only left hand turn?
- As a resident in Ivy Lake Villas I was not approached by any city workers about this plan. I am extremely upset about this.
- If this road way is blocked off, fire trucks, RCMP, Ambulance would have to drive a few blocks to make a loop to come back to Ivy Villas at 9140-101 Ave. This would be more than an inconvenience it would be a nightmare for everyone. It would be uncalled for to add 10-15 minutes to everyone's drive because the road way was blocked off. It would be a shame for someone to die or house burn down because the help had to turn blocks out of their way to loop back to the right place all because the entrance was blocked.
- As a taxpayer who is directly affected by this decision I should have been made aware of the meeting's that discusses this proposal but was not in any way notified.
- Was not informed of the meeting until after it too place.
- I am not in favor of closing the access in to 101 Ave –Ivy Lake Villa's. This is going to impede traffic flow out of the complex. I have no desire to drive through the parking lot of the shopping area to be able to go downtown. This is going to adversely affect our property.
- These plans are not accommodating to these neighbourhoods.

4. ABOUT YOU

- Resident – 16
- I represent a Resident - 1
- I only live in Grande Prairie – 3
- I live and work in Grande Prairie – 13
- I only work in Grande Prairie - 1

5. Please respond to the items below with a checkmark to indicate your level of satisfaction regarding the information and feedback opportunities as part of this project:

a) The clarity of information provided about the alignment alternatives.
- Very satisfied –0 responses
- Generally satisfied –4 responses
- Dissatisfied – 6 responses

b) The adequacy of information provided about the alignment alternatives.
- Very satisfied – 0 responses
- Generally satisfied – 4 responses
- Dissatisfied – 7 responses

c) The project team's response to my questions.
- Very satisfied – 0 responses
- Generally satisfied – 3 responses
- Dissatisfied – 7 responses

Other comments received via email:
- Safety
- Functionality

I am an owner and resident of one of the condos in the Ivy Lake Villa complex at 9140-101 ave; I would like to express my serious reservations about the proposed changes to traffic flow in and around the intersection of 101 ave and 92 street.
It is my understanding that the proposed changes to increase the effectiveness of the intersection of 100 ave and 92 street would include the elimination of any left turn options at 101 ave and 92 street; I am opposed to this change for the following reasons:

1) Emergency vehicles response time, particularly ambulance service from the existing station at Wapiti road and 108 street would be slowed as these vehicles would now be forced to travel south to 100 ave and then east to 92 ave followed by north on 92 street to reach my home.
2) Traffic congestion in the short distance between 100 ave and 101 ave with vehicles attempting to make safe lane changes after turning left off of 100 ave and turning right on 101 ave to enter either the Ivy Lake Villas or the shopping centre would be considerable. The possibility of collisions in that area would be increased.
3) Increased traffic flow through the uncontrolled shopping centre for vehicles attempting to travel either south or west would pose a threat to the safety of pedestrians in the shopping centre parking lot.
4) Restricting access to my home would have a negative effect on my property value.

I do understand that some sacrifices do have to be made to allow for our growing community, however the changes proposed put too much of the burden on a very small group of individuals, namely the owners and residents of the Ivy Lake Villas.
I welcome the opportunity to discuss this matter with any one of you at any time;

Re : 100 Avenue & 92 Street Functional Planning Studies

Ivy Lake Villas is a 25 unit condominium complex which is situated along 92 street at 101 Avenue. The main egress from our complex is on 92 Street, from which we can go North or South. As this section of 92 street is already 4 lanes, we do not understand the need to block off the left turn for us.

If it is blocked off the only way out of our complex would be a north turn on 92 street.

In order for us to go south, we would have to go all the way through the Ivy Lake Plaza shopping center, the turn west onto 100 street and then turn south on 92 street at the lights. In order for us to go east, we would have to again go through the shopping center, turn west onto 100 street, then south on 92 street at the lights, turn into the Creekside shopping center, go all the way through the shopping center and exit onto 100 avenue from the Shopper's egress.

Coming home will be a completely other issue. The only way for us to get to our homes is if we ensure that we are travelling east or west on 100 avenue and turn north on 92 street.

We do not believe that there is another residential area in Grande Prairie to which travel is going to be more chaotic.

However, the convenience of getting in and out of our complex is not our most serious concern. Valuable time will be wasted by ambulance and fire trucks trying to get into our complex and loss of life could very well occur.

We have 25 unit owners as well as Unit 26 (being the common area) for which taxes are paid to the City of Grande Prairie.

None of us received any notice of the meetings held in February and on May 8. We learned of these meetings from the owner of Ivy Lake Plaza shopping center on May 9 and are all quite distressed with our own concerns. Although, we can certainly see why the merchants in this plaza are upset, as their business sales will plummet.

Were the rest of the property owners on both sides of 92 street informed ? Is your survey going to reach everyone affected ?

Would you please guarantee to us that we will be notified on any further meetings on this matter ?

THE OWNERS CONDOMINIUM PLAN 9523475
O/A IVY LAKE VILLAS
113, 9140 – 101 Avenue, Grande Prairie, AB, T8X 1K6

May 14, 2012

Becky Machnee
ISL Engineering and Land Services
7909 – 51 Avenue
Edmonton, AB T6E 5L9

Dear Ms. Machnee,

Re : 100 Avenue & 92 Street Functional Planning Studies

Ivy Lake Villas is a 25 unit condominium complex which is situated along 92 street at 101 Avenue. The main egress from our complex is on 92 Street, from which we can go North or South. As this section of 92 street is already 4 lanes, we do not understand the need to block off the left turn for us.

If it is blocked off the only way out of our complex would be a north turn on 92 street.

In order for us to go south, we would have to go all the way through the Ivy Lake Plaza shopping center, the turn west onto 100 street and then turn south on 92 street at the lights. In order for us to go east, we would have to again go through the shopping center, turn west onto 100 street, then south on 92 street at the lights, turn into the Creekside shopping center, go all the way through the shopping center and exit onto 100 avenue from the Shopper's egress.

Coming home will be a completely other issue. The only way for us to get to our homes is if we ensure that we are travelling east or west on 100 avenue and turn north on 92 street.

We do not believe that there is another residential area in Grande Prairie to which travel is going to be more chaotic.

However, the convenience of getting in and out of our complex is not our most serious concern. Valuable time will be wasted by ambulance and fire trucks trying to get into our complex and loss of life could very well occur.

We have 25 unit owners as well as Unit 26 (being the common area) for which taxes are paid to the City of Grande Prairie.

None of us received any notice of the meetings held in February and on May 8. We learned of these meetings from the owner of Ivy Lake Plaza shopping center on May 9 and are all quite distressed with our own concerns. Although, we can certainly see why the merchants in this plaza are upset, as their business sales will plummet.

Were the rest of the property owners on both sides of 92 street informed ? Is your survey going to reach everyone affected ?

Would you please guarantee to us that we will be notified on any further meetings on this matter ?

Yours truly,

L. M. LeBlanc
Secretary / Treasurer
Ivy Lake Villas

780-539-6177 day
780-518-5046 cell
780-513-8331 home

May 9-12

The Owners' Condominium Plan 0020400 / Ivy Lake Plaza
Grande Prairie Alberta

Mr. Norman Kyle R.E.T., P.L. (Eng.)
Senior Transportation Analyst, Engineering Services
City Of Grande Prairie

RE: 100 Avenue & 92 Street
Functional Planning Studies

Dear Mr. Kyle;

Thank you for taking time out of your busy schedule to meet with us this afternoon on such short notice. It was a pleasure to meet you and discuss the above subject.

We are writing this letter to voice our concerns regarding the proposed plan to construct a concrete meridian on 92 street between 100 and 104 avenues. This proposed meridian will affect all of the 21 business outlets located in Ivy Lake Plaza in an extremely negative way, cutting off a main North to South artery from our place of business. It will create great financial hardships to each business outlet in the Plaza; due to the loss of major traffic. All Southbound traffic on 92nd street, coming from the North, will lose complete ability to access the plaza. All Eastbound customers wishing to leave the plaza will no longer have a reasonable route to return East as the direct result of the meridian obstructing the left turn onto 92nd street.

The impact of the meridian to the local residents and the plaza would be substantial; greatly reducing the functionality of the plaza for its services to all East, North, North-East and North-West residential areas. The plaza was zoned to service these neighboring residential areas. Undoubtedly the largest percentage of the plaza's business, from residential areas and traffic, comes from two places; being East using 100th avenue and North, North-East and North-West using 92nd street, therefore requiring the intersection at 92nd street and 101st avenue as a corridor for these areas to access and exit the plaza's services.

The condo owners located behind the Plaza will also find it difficult to only turn right at the junction due to the meridian, those going north will be fine but those wishing to go south or west will have to go north to 108 avenue before they can turn west. We see them taking a shorter route through the Plaza parking lot than turning onto 100 avenue and going west or turning south at the first set of traffic lights. This increase in traffic through the Plaza parking lot will create a SAFETY problem for those patrons walking from their car to the business of their choice.

In conclusion we do not support the plan for 92nd street as currently proposed. The businesses of Ivy Lake Plaza will only be able to service the surrounding residential areas and remain financially viable if the proposed plan for 92 street does not include implementing a meridian closing the intersection of 92nd street and 101st avenue. We ask for your consideration regarding this matter.

The Owners' Condominium Plan 0020400 / Ivy Lake Plaza

Gary Menzies Jack Mah Jake Mah Les Dzwonkiewicz

Chamber of Commerce
GRANDE PRAIRIE & DISTRICT

#217, Centre 2000
11330-106 St.
Grande Prairie, AB

P 780.532.5340
F 780.532.2926
E Info@gpchamber.com

City of Grande Prairie
100 Avenue & 92 Street Functional Plan
Open house feedback

May 14th 2012

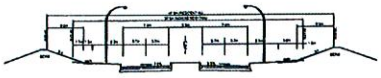
100 Avenue Functional Plan

After reviewing the drawings supplied to the Chamber by the City Engineering department. We would like to request one addition. We feel a left turn entrance off of 100 Avenue into the Cobblestone Shopping Centre should be added to the plan. This would provide better access to the Shopping Centre and reduce left turn traffic at corner of 92 street and 100 avenue.

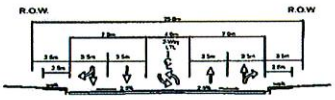
92 Street Functional Plan

After reviewing the drawings supplied to the Chamber by the City Engineering department. We would like to see the following change to the plan;

- Removal of assess to the industrial lots on the west of 92 Street. The Chamber would like to recommend that this proposed Road cross section between 92 Avenue & Park Road (84 Avenue) be changed to a Preferred road cross section that has a center left turn lane for the section between 92 and 84 avenue. See below. This change would provide better access to the industrial lots that normally require larger vehicle assess.



Proposed



Preferred

Thank you for the opportunity to present feed back from our members. We appreciate the future planning of our infrastructure needs and the opportunities that can be created by this forward thinking.
If you have any questions regarding our submission please feel free to contact me at the above contact info.

Dan Pearcy, CEO
Grande Prairie & District Chamber of Commerce

Connecting Business. **Creating Opportunity.**